UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District Office
Andrews Resource Area
Finding of No Significant Impact
South Steens Allotment Management Plan /
Environmental Assessment
OR-06-027-060

INTRODUCTION

Andrews Resource Area, Burns District, has prepared an Environmental Assessment (EA) and Allotment Management Plan (AMP) to analyze recommended management actions developed through an Interdisciplinary Team (IDT) to aid in accomplishing resource objectives, Standards for Rangeland Health and Guidelines for Livestock Management (S&Gs), and land use plan objectives for South Steens Allotment set forth in the 2005 Steens Mountain Cooperative Management and Protection Area Resource Management Plan/Record of Decision (RMP/ROD).

South Steens Allotment #6002 is located approximately 65 miles south of Burns, Oregon; east of Highway 205 and west of Donner und Blitzen Wild River. The allotment is approximately 3 air miles south of the town of Frenchglen and 19 air miles north of the town of Fields. There are 89,525 acres of Bureau of Land Management (BLM) managed lands plus 5,073 acres of private land within the allotment, for a total of 94,598 acres. The allotment consists of four pastures: Home Creek, Tombstone, Hollywood Field, and Steens. Approximately 90,080 acres are within the boundary of the Steens Mountain Cooperative Management and Protection Area (CMPA) that was designated in the Steens Mountain Cooperative Management and Protection Act of 2000 (Steens Act). There are currently 9,577 Animal Unit Months (AUMs) of active grazing preference for livestock within South Steens Allotment. Livestock grazing use is currently authorized from April 1 to October 31.

South Steens Allotment is a Management Category "I" (Improve) allotment (H-1734-2 – Rangeland Monitoring Handbook). The "Improve" category identifies allotments with management or resource issues or concerns. These allotments receive priority for funding, project implementation and monitoring. South Steens Allotment was designated an I Category allotment due to resource concerns such as riparian, water quality, Greater Sage-Grouse, bighorn sheep, noxious weeds, Wilderness Study Area (WSA), Wild and Scenic Rivers, wilderness, recreation, and juniper encroachment [Appendix J-10, CMPA Resource Management Plan (RMP)].

In 2008, South Steens Allotment was assessed for conformance to S&Gs by an IDT. Within the allotment, 3.8 miles of perennial and intermittent streams were determined to be capable of supporting riparian vegetation. A Proper Functioning Condition (PFC) assessment found that 1.3 miles of streams are in PFC and 2.5 miles are functioning at risk with an upward trend and almost at PFC. This resulted in Standard 2 - Watershed Function, Riparian/Wetland Areas and Standard 4 - Water Quality being achieved in the Tombstone and Home Creek pastures (these Standards were determined not to be present in the Hollywood Pasture). However, Standards 2 and 4 were not achieved in the Steens Pasture due to wild horses, livestock, and juniper encroachment in riparian and spring areas, and not in PFC. Of

the three casual factors, only livestock can be addressed using currently authorized management (no additional National Environmental Policy Act (NEPA) analysis required); however, even if livestock were fully removed from these areas, wild horses would still be prominent at these sites, causing damage from hoof shear and overutilization of riparian species. Therefore, BLM does not believe that just changing management of livestock, or livestock removal, would result in significant progress towards the achievement of these Standards within the Steens Pasture. Standards 1 – Watershed Function, Uplands, Standard 3 – Ecological Processes, and Standard 5 - Native, Threatened and Endangered (T&E), and Locally Important Species were fully achieved throughout the allotment; however, it was determined these Standards are at risk of not being achieved in the future due to juniper expansion. See Table 1 in the attached EA for further detail on Standards for Rangeland Health Determinations. Grazing management practices were found to conform to Guidelines.

SUMMARY OF THE PROPOSED ACTION

The following would be the result of the Proposed Action.

1. Permit Renewal

   A 10-year term livestock grazing permit would be issued, to continue 9,577 active use AUMs of livestock grazing on public land. The season of use would be shortened slightly, from April 1 through October 31 to April 15 through October 31. The percentage public land (PL%) based on forage, would remain at 94 percent for the allotment; however, the PL% for each pasture would be added as a Term and Condition of the permit, and the pasture PL% is what would be used for billing purposes in each pasture. This AMP/EA and associated Decision would be added as a Term and Condition of the permit, as would requiring that the permittee open gates between South Steens Allotment and the portion of the Herd Management Area (HMA) within Steens Mountain Wilderness following livestock removal each year and closed gates prior to livestock grazing to aid in the free movements of wild horses. Actual use billing would be authorized.

2. Livestock Grazing Management

   Livestock use dates for each pasture would be determined on an annual basis based on the vegetative stages of key forage species and the prescribed grazing treatment (see Appendix A for Grazing Treatment Descriptions). Livestock numbers may also vary annually as outlined under Adaptive Management (EA Chapter II, A. Actions Common to All Alternatives); however, total permitted AUMs would not exceed 9,577. Any modifications to the proposed grazing system would conform to the utilization target of 50 percent for native, key forage species, and care would be taken to ensure all pastures received periodic growing season rest.

   Hollywood Pasture would primarily be used as a gather pasture to get cattle to and from Tombstone Pasture. Utilization in Hollywood Pasture in the spring would be limited to 30 percent (livestock and wild horse utilization combined) in order to provide enough forage for livestock during fall gathering and fall and winter wild horse use. Hollywood Pasture would receive on full year of rest (from livestock) every four years. Tombstone Pasture would rotate between an early/graze and a defer treatment, every other year. Steens Pasture would also rotate between an early/graze and defer treatment; however, it would be on an opposite rotation from

Tombstone Pasture. Home Creek Pasture would only be given an early treatment, with one year of complete rest every fourth year. Table 2 in the EA outlines the Proposed Grazing System.

3. Proposed Range Improvements

Rangeland improvement activities would include spring development and protection, a riparian exclosure, well, pipeline, and trough installation, and maintenance and abandonment of existing reservoirs. All range improvements would follow *General Project Design Elements* (EA Chapter II.A.6.) and *Project Design Elements Specifically for Proposed Range Improvements* (EA Chapter II.A.7), unless otherwise provided for. Refer to Map 7 in the EA for Alternative B: Proposed Range Improvement locations.

The Proposed Action includes the following Proposed Range Improvements:

- Maintenance of 13 currently existing reservoirs (9 within WSAs);
- Abandonment of 9 currently existing reservoirs (all within WSAs);
- Construction of 9 new reservoirs (all within WSAs);
- Protection of 2 springs, using fencing, and one route crossing (within WSAs);
- Development of 2 springs, including protection and 250 feet of route realignment (within WSAs);
- Construction of 1 riparin exclosure (within a WSA);
- Construction of 3 new wells (all outside WSAs);
- Construction of 2 new pipelines totaling 0.6 miles (all outside WSAs); and
- Placement of 5 new troughs, associated with spring developments, wells, and pipelines (2 within WSAs)

Table 3 in the EA lists what improvements are proposed and which, if any, WSA they would be located within.

All projects implemented within WSAs would be constructed to reduce impacts to wilderness values on a site-specific, case-by-case basis, and measures would be taken to ensure a more natural appearance including but not limited to the design features as described in the EA. All projects within WSAs would meet either the non-impairment requirement or an exception.

4. Adaptive Management and Flexibility

Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain and, in this context, adaptive management affords an opportunity for improved understanding. Knowing uncertainties exist in managing for sustainable ecosystems, some changes in management may be authorized, which include, but are not limited to, adjusting the rotation, timing, season of use of grazing (within the permitted season of use), and livestock numbers (both above and below the number included on the grazing permit):

- Based on the previous year's monitoring and current year's climatic conditions.

- Based on the previous year's monitoring of bitterbrush utilization and Cole Browse Transects to ensure at least 85 percent of existing deer winter range within this allotment remains intact.
- Due to drought causing a lack of available water in areas originally scheduled to be used.
- To balance utilization levels.
- To protect the riparian and water resources.

Flexibility in grazing management would be authorized, and changes in rotations would only be allowed as long as they continue to meet resource objectives. Flexibility would allow for a two week period of flexibility around the permitted season of use.

5. Monitoring

Monitoring, by BLM staff in coordination with the permittee, of the success in meeting allotment specific resource objectives would take place within South Steens Allotment. Monitoring will occur no matter what the outcome of the EA and related Decision is. New monitoring would be established for proposed range developments that are selected in the decision.

6. Goals and Objectives for South Steens Allotment

Four new goals with associated objectives would be established for the South Steens Allotment. These goals would provide a baseline for comparison during the next allotment evaluation or allotment management plan process.

7. Easement Establishment

The BLM would work with the private landowner, within South Steens Allotment, to obtain a legal right by an easement, memorandum of understanding or cooperative management agreement to any Federal developments on private land, to ensure the ability to locate, construct, use, control, maintain, improve, relocate, and repair the existing developments located on private property. These Federal developments would include both those already existing on the ground, as well as any developments constructed on private land that may be a result of this EA.

FINDING OF NO SIGNIFICANT IMPACT

Consideration of the Council on Environmental Quality (CEQ) criteria for significance (40 CFR 1508.27), both with regard to context and intensity of impacts, is described below:

Context

The Proposed Action would occur in South Steens Allotment and would have local impacts on affected interests, lands, and resources similar to and within the scope of those described and considered in the Andrews Management Unit (AMU)/CMPA Proposed Resource Management Plan (PRMP)/Final Environmental Impact Statement (FEIS). There would be no substantial broad societal or regional impacts not previously considered in the PRMP/FEIS. The actions described represent anticipated

program adjustments complying with the CMPA RMP/ROD and the Steens Act, and implementing range management programs within the scope and context of those documents.

Intensity

The CEQ's ten considerations for evaluating intensity (severity of effect):

1. *Impacts that may be both beneficial and adverse.* The EA considered potential beneficial and adverse effects. Project Design Features were incorporated to reduce impacts. None of the effects are beyond the range of effects analyzed in the AMU/CMPA PRMP/FEIS, to which the EA is tiered.

   Cultural Heritage: Under the Proposed Action Alternative, cultural resources would not be affected by grazing effects, except in existing and new congregation areas that might arise near proposed range developments. New range improvements all create new livestock congregation areas and could damage cultural resources within these areas. These range developments would be inventoried prior to construction and the best method to eliminate effects to nearby cultural resources would be utilized. Maintaining existing reservoirs would lead to continued disturbance in the existing congregation areas but would not affect nearby cultural sites since equipment would stay in the original development footprint.

   Grazing Management/Rangelands: Under the proposed action the permittee would be able to utilize all 9,577 AUMs authorized on the Term Grazing Permit, without risking damage to resources. Grazing management would allow the Standards currently being achieved to continue to be achieved and to continue to conform to Guidelines. The exclosure of four springs, as part of spring protection and spring development, would protect the spring sources and associated riparian areas. This would allow the allotment to move towards meeting Standards 2 and 4. Range improvement projects would occur to aid grazing management. Proposed range improvements would allow livestock grazing to once again occur in areas near the river, which were historically available but have not been accessible since the Donner und Blitzen WSR corridor was fenced, excluding livestock.

   The maintenance of 13 existing reservoirs would ensure that the water sources that are currently available would be able to continue functioning and likely become reliable water sources. Nine reservoirs that are unreliable or have variable reliability would be abandoned and replaced with new, strategically located reservoirs. Three new wells would provide truly reliable water for livestock and wild horses since wells would not rely on precipitation. Livestock would have improved distribution and utilization patterns due to the increased number of water sources available, resulting in ecological benefits across the allotment.

   Lands and Realty: South Steens Allotment currently has several improvements in which BLM has no legal access (easement, memorandum of understanding, and/or cooperative agreement). The BLM has entered into negotiations with the private landowner to obtain legal access by easement to locate, construct, use, control, maintain, improve, relocate, and repair the existing improvements on private property as well as those that may occur on private property, as a result of this EA. Related Actions will be evaluated in a separate document.

Migratory Birds: At most (under Alternative C), approximately 5% of the available habitat within the allotment would have some level of reduced vegetation that might affect migratory birds. However, areas adjacent to the allotment also support habitat, so at most only 2% of available habitat in the vicinity would be affected. Due to the varying presence and habitat needs of migratory birds, other effects would be nebulous and will not be further analyzed in this EA.

Noxious Weeds: The Proposed Action has multiple new ground-disturbing activities, which have potential to create opportunities for noxious weed establishment and spread. Therefore, risk of new weed introductions would be proportional to the numbers of ground-disturbing activities. Following project design elements listed in Chapter II of the EA would reduce opportunities for introduction of new weeds. Additional water sources would help reduce concentrations of animals around currently reliable water sources, reducing impacts to plant communities in those areas. Livestock would congregate around new developments, but by having an increased number of developments disturbance caused by livestock would be spread out over a larger area and would not be as severe as is currently occurring around existing reliable water sites. Productive, healthy plant communities should reduce opportunities for noxious weed introduction and spread. The majority of range improvements would occur within ¼ mile of an existing road (open or closed) that would be used for monitoring.

Recreation/Visual Resources: The Proposed Action has most developments being located away from known areas of prolonged visitor use (i.e., campsites) and effects on the quality of the recreational experience would be minimal. If any encounters with visitors occur during installation of the proposed developments, there would be some temporary and short-term (days) disturbance to recreational activities in the immediate area. Some visitors may be displaced from campsites either by noise or visual disturbance associated with developments or increased presence of cattle (though some may appreciate the presence of cattle). However, it is expected livestock would be better distributed, in smaller groups, across the allotment, rather than concentrated in larger numbers around a few water sources. Overall, evidence of livestock may be reduced at each water source. Very little change to the land/water component of the landscape character would occur given none of the developments require major excavation that would noticeably modify landscape features. The maintenance or abandonment of existing reservoirs would not have additional effects on visual resources as they are already occurring. Overall, the land/water component of the landscape character would be preserved. Given the limited area affected by developments as a whole, the vegetation component of the landscape character would be preserved. To the extent possible, structures would be treated to reduce the reflectivity of the developments, and would be constructed and/or painted to blend in with the surrounding area.

Riparian Zones, Wetlands, and Water Quality: Under the Proposed Action, maintenance of unreliable reservoirs would tend to pull livestock and wild horses away from Home Creek by providing alternative reliable water sources. This redistribution of grazing animals may accelerate the current upward trend in riparian functioning condition. Development and protection of springs and riparian areas would eliminate wild horse and livestock access to riparian soils saturated year-round, forcing them to congregate on firmer upland soils. Without annual disturbance from hoof chiseling by wild horses and livestock, the extent and function of riparian soils would expand within topographic limits at the sites, and support riparian vegetation

over a larger area (estimated at 12 to 15 acres for the entire allotment). These springs and riparian related developments would result in the pasture moving towards meeting Standards 2 and 4 in that pasture and allow the rest of the pastures to continue achieving these Standards.

Social and Economic Values: The Proposed Action would allow the permittee to graze all 9,577 allotted AUMs, even during drought years, and increase the revenue generated to the Federal government. . Implementing the project could provide economic opportunities for local contractors and suppliers. Range improvement projects may be funded under a cost share between the Burns District BLM and the permittee. To develop all rangeland improvements under this alternative the cost is estimated to be over $260,588. Providing for sustainable grazing management that improves habitat conditions for wildlife would in turn increase economic opportunities and foster more desirable social opportunities such as hunting and wildlife viewing. Some visitor's perception of solitude and experience may also be affected by presence of livestock; however, it is expected livestock would be better distributed, in smaller numbers, over the entire area. By maintaining a viable ranching operation and improving rangeland conditions in South Steens Allotment, the traditions associated with the ranching communities of Harney County would be maintained and possibly improved.

Soils and Biological Soil Crusts: Direct long-term (one or more decades) and short-term (less than one decade) impacts to soils and BSCs from all ground-disturbing activities associated with implementing this alternative, would affect <1% of the allotment. The cumulative effect of the alternative, when all proposed projects have been completed, would be to distribute annual disturbance to BSCs and soils from livestock and wild horse grazing across the allotment by increasing the amount of area that is available to animals for grazing due to the increase in use area.

Special Status Species - Wildlife: The Proposed Action would spread water around the allotment Approximately 28 acres of vegetation would be removed around new water sources. Areas within 0.25-mile of water sources (about 1,750 acres) would show reduced grasses and forbs so sage-grouse would have to search other areas for sufficient food. Spring sources and riparian areas fenced to exclude livestock and wild horses and are returned to a more natural state would benefit sage-grouse for watering and riparian/wetland vegetation for foraging, which sage-grouse depend on during the late summer months especially for brood rearing purposes. New and maintained existing reservoirs would also provide watering sources for sage-grouse as long as water remains throughout the year. Although late-season grazing effects would be spread out, this could affect residual grass cover for nesting sage-grouse the following spring. With more late-season water sources available, the possibility of mosquitoes carrying WNV being found throughout the allotment and affecting sage-grouse populations is increased although the probability, based on professional judgment, is slight. Overall, effects of different developments should not affect habitat. About 1,750 acres (about 0.36%) of sage-grouse habitat in the Cumulative Effects Analysis Area would have some reduced vegetation that would be expected to affect use such as nesting or feeding. Since these projects are spread throughout the allotment and would occur over a number of years, there should be no effects on population numbers. Bats would be provided with more opportunities from late-season watering sources and would have more areas to forage for insects near these water sources. Late-season water availability would

depend on the reliability of new reservoirs to capture and retain water season-long, as well as the distribution of new troughs, and the period the troughs are being filled.

Upland Vegetation: Direct long-term (one or more decades) and short-term (less than one decade) impacts to vegetation from ground-disturbing activities, associated with implementing this alternative, would affect <1% of the allotment. These effects would be slightly offset by the abandonment of reservoirs, which would result in an increase in vegetation at those sites in the long-term. Providing additional water sources is anticipated to maintain utilization, from all grazers, at or below target levels of 50%, across the allotment. This improved distribution, combined with the proposed grazing rotation which provides growing season rest to key forage plant species, is anticipated to cause a stable to upward trend in rangeland condition on upland plant communities across the allotment. Over the next decade, as livestock access portions of the allotment where bunchgrasses have become decadent due to lack of removal of old vegetation, trampling and light to moderate grazing could begin to improve vigor of plants.

Wild Horses: Under this alternative, new developments are spread throughout the allotment which would allow for improved wild horse distribution and utilization across the allotment. The troughs associated with wells and pipelines would guarantee year-round water would be available, even in drought years. However, in drought years these locations would receive heavy utilization as other water sources dry up, resulting in uneven distribution and utilization patterns during those years. Wild horse movements and available live water would continue to be restricted by the management fence for protection of Donner und Blitzen River.

Wild and Scenic Rivers and Wilderness: Under the Proposed Action the permittee would be able to fully use the total permitted AUMs. Since no range improvements are being proposed in the wilderness or WSR corridor and current grazing would continue within the Home Creek portion of the wilderness, there would be no anticipated effects to the Steens Mountain Wilderness. There would be a benefit to the Donner und Blitzen River WSR because there would be less to no pressure by livestock to get water from the river due to the increased number of off-stream watering sources.

Wilderness Study Areas: For the Proposed Action, the total area influenced by existing and proposed developments in Blitzen River WSA would be approximately 10.25% (3,269 acres), the total area influenced by existing and proposed developments in Home Creek WSA would be approximately 162 acres (13.92%), and in South Fork Donner und Blitzen WSA would be 2,002 acres (10.59%). In comparison, Blitzen River and South Fork Donner und Blitzen WSAs would still have less area influenced by unnatural features than two nearby WSAs, both of which had approximately 12 percent of total area influenced by unnatural features at the time they were established (Volume I of the Oregon BLM Wilderness Study Report, 1991). While the total area influenced by developments appear to be staying at the same level within the Home Creek WSA as it would be prior to the proposed developments, the total affected area would actually decrease due to reservoir abandonment and wilderness values would be enhanced. The same thing would happen within South Fork Donner und Blitzen WSA; however, in this WSA, the abandonment of reservoirs would offset the construction of new reservoirs. There would be ecological benefits associated with better distribution of water resulting in better distribution of livestock and wild horses throughout the allotment. Health and vigor of key forage species and other upland grasses

would be maintained or in some areas improved due to decreased levels of heavy grazing around the previously limited reliable water sources and moderate grazing of areas that have not been grazed regularly. The spring developments/exclosures would protect riparian areas, which would improve the habitat for riparian-associated wildlife and avian species. By protecting riparian areas, these areas would increase in naturalness.

Wildlife and Locally Important Species: Under the Proposed Action, small, less mobile mammals would be affected most through loss of habitat near new water troughs and reservoirs. Vegetation would be removed during construction of reservoirs (approximately two acres) and use by livestock and wild horses would reduce grass and forb cover near the reservoirs, but would not remove much more shrubby vegetation than removed during construction. Approximately 28 acres of vegetation would be removed around new water sources. Areas within 0.25 mile of water sources (about 1,750 acres) would show some reduced grasses and forbs so wildlife would have to search other areas for sufficient food. However, this effect would not be measureable since grasses and forbs would still remain in the area. Spring sources and riparian areas fenced and returned to a more natural state would benefit wildlife for watering purposes as well as increase available forage for them. New and maintained existing reservoirs would also provide watering sources for wildlife as long as water remains throughout the year. Overall, effects of different development on different wildlife species would be minimal and should not affect habitat for different species.

2. *Degree to which the Proposed Action affects public health and safety.* No aspect of the Proposed Action would have an effect on overall public health and safety.

3. *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.* Unique characteristics present within South Steens Allotment include: Cultural Resources, Wild Horses, Special Status Species, Wild and Scenic Rivers and Wilderness, and Wilderness Study Areas. See above section for related impacts.

4. *The degree to which effects on the quality of the human environment are likely to be highly controversial.* Controversy in this context means disagreement about the nature of the effects, not expressions of opposition to the Proposed Action or preference among the alternatives. No unique or appreciable scientific controversy has been identified regarding the effects of the Proposed Action.

5. *Degree to which possible effects on the human environment are highly uncertain or involve unique or unknown risks.* The analysis has not shown there would be any unique or unknown risks to the human environment nor were any identified in the AMU/CMPA PRMP/FEIS to which this proposal is tiered.

6. *Degree to which the action may establish a precedent for future actions with significant impacts or represents a decision in principle about a future consideration.* This project neither establishes a precedent nor represents a decision in principle about future actions. The Steens Act provided a unique opportunity to conserve, protect, and manage the long-term ecological integrity of the CMPA. In addition, range improvements, implementation of AMPs and issuance

of 10-year grazing permits are ongoing and expected actions as outlined in the CMPA RMP/ROD and as analyzed in other EAs. No long-term commitment of resources causing significant impacts was noted in the EA or RMP.

7. W*hether the action is related to other actions with individually insignificant but cumulatively significant impacts.* The environmental analysis did not reveal any cumulative effects beyond those already analyzed in the AMU/CMPA PRMP/FEIS, North Steens 230-kV Transmisstion Line Project EIS, or the North Steens Ecosystem Restoration Project EIS, which encompasses the South Steens Allotment. The EA described the current state of the environment (Affected Environment by Resource, Chapter III), which included the effects of past actions. Continued livestock grazing, weed treatments, road maintenance, recreation activities, North Steens 230-kV Transmission Line Project, and the North Steens Ecosystem Restoration Project, are all Reasonably Foreseeable Future Actions (RFFA). The Comprehensive Recreation Plan for the CMPA and the South Steens Wild Horse Gather EA are in the National Environmental Policy Act (NEPA) process and subject to change based on public comments in future NEPA analysis and subsequent administrative remedies. Therefore, effects of these RFFA are not addressed in this analysis. The cumulative effects of these actions were thoroughly addressed throughout Chapter III by resource, as applicable.

8. *Degree to which the action may adversely affect districts, sites, highways, structures or objects listed in or eligible for listing in the National Register of Historic Places.* There are no features within the project area listed or eligible for listing in the National Register of Historic Places. However, as part of the Project Design Elements identified in the attached EA, new range improvements would be inventoried for cultural resources prior to improvement construction. Sites eligible for listing to the National Register of Historic Places, within the area of effect of range improvements, would be avoided to mitigate potential effects. If avoidance is not a viable mitigation option, other measures such as surface collecting and mapping, testing and full-scale excavation could be used.

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat.* There are no known threatened or endangered species or their habitat affected by the Proposed Action. However, Special Status Species (SSS) occurring within this Project Area include greater sage-grouse, two species of bats (fringed myotis and Townsend's big-eared bat), diverse-leaved pondweed, and redband trout. Diverse-leaved pondweed, which is currently known to exist in Tombstone Reservoir, would not be affected since no actions are currently proposed for that reservoir. Effects to redband trout would be the result of effects to water quality. No measurable effects to redband trout are anticipated. Effects to sage-grouse and bats are summarized above.

10. *Whether an action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.* The Proposed Action does not threaten to violate any law. The Proposed Action is in compliance with the CMPA RMP, which provides direction for the protection of the environment on public lands. The Steens Act also directs BLM to:

- Maintain the cultural, economic, ecological, and social health of the CMPA;
- Promote viable and sustainable grazing on private and public lands within the CMPA;

and

- Conserve, protect, and manage the long-term ecological integrity of the CMPA.

On the basis of the information contained in the AMP/EA and all other information available to me, it is my determination that:

1. The implementation of the Proposed Action will not have significant environmental impacts beyond those already addressed in the AMU/CMPA PRMP/FEIS (August 2004) or the North Steens Ecosystem Restoration Project (September 2007);

2. The Proposed Action is in conformance with the CMPA RMP/ROD;

3. There would be no adverse societal or regional impacts and no adverse impacts to affected interests; and

4. The environmental effects, together with the proposed Project Design Elements, against the tests of significance found at 40 CFR 1508.27 do not constitute a major Federal action having a significant effect on the human environment.

Therefore, an EIS is not necessary and will not be prepared.

_____ _____

Rhonda Karges Date
Andrews/Steens Resource Area Field Manager

SOUTH STEENS ALLOTMENT MANAGEMENT PLAN/ ENVIRONMENTAL ASSESSMENT

OR-06-027-060

Bureau of Land Management
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July 10, 2013

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SOUTH STEENS
ALLOTMENT MANAGEMENT PLAN /
ENVIRONMENTAL ASSESSMENT
OR-06-027-060

CHAPTER I. INTRODUCTION: PURPOSE OF AND NEED FOR ACTION

A. Summary

This Allotment Management Plan (AMP)/Environmental Assessment (EA) analyzes possible management actions developed through Interdisciplinary Team (IDT) recommendations, Steens Mountain Advisory Council (SMAC) recommendations, public comments, and in coordination with the livestock permittee, to aid in accomplishing allotment resource objectives and conform to (or continuing to conform to) all Oregon and Washington Standards for Rangeland Health (further referred to as Standards) and Guidelines for Livestock Grazing Management (further referred to as Guidelines; Standards and Guidelines together are referred to as S&Gs). Possible management actions include grazing management, permit renewal, and proposed range improvements including water developments. The goal of these management actions is to balance all resources and meet multiple use requirements, while conforming to required laws and policies.

B. Background

South Steens Allotment (#6002) is located approximately 65 miles south of Burns, Oregon; east of Highway 205 and west of Donner und Blitzen Wild and Scenic River ((WSR); Map 1 – Vicinity). The allotment is approximately three air miles south of the town of Frenchglen and 19 air miles north of the town of Fields. There is 89,525 acres of Bureau of Land Management (BLM) managed lands plus 5,073 acres of private land within the allotment, for a total of 94,598 acres. South Steens Allotment is divided into four pastures: Home Creek, Tombstone, Hollywood Field, and Steens. Approximately 90,080 acres of public land occurring within the allotment are within the Steens Mountain Cooperative Management and Protection Area (CMPA) and 16,609 acres are within Steens Mountain Wilderness. South Steens Allotment contains parts of three Wilderness Study Areas (WSAs): South Fork Donner und Blitzen WSA (27,904 acres) and Home Creek WSA (1,178 acres) are both entirely contained within the South Steens Allotment, and Blitzen River WSA, of which 23,415 acres of 31,857 acres are located within the South Steens Allotment. All three WSAs became remnants of WSAs following the Steens Mountain Cooperative Management and Protection Act of 2000 (Steens Act) in which portions of all three WSAs were designated Wilderness. See Map 2 – Land Status for a visual representation of land status and ownership within the allotment. The South Steens Allotment is fully encompassed within the South Steens Wild Horse Herd Management Area (HMA); this HMA also expands into another allotment and the Steens Mountain Wilderness and No Livestock Grazing Area. Within the South Steens HMA, the appropriate management level (AML) is between 159 and 304 animals. In 2012, a census occurred within the HMA, and a direct count aerial inventory found 383 wild horses. Since this number is over the AML, the process for conducting a wild horse gather has been initiated. This allotment also contains 74,755 acres of Preliminary Priority Habitat (PPH) for sage-grouse and 16,409 acres of

Preliminary General Habitat (PGH) for sage-grouse[1], which are a BLM Special Status Species (SSS). The U.S. Fish and Wildlife Service (FWS) has concluded that the Greater Sage-Grouse warrants protection under the Endangered Species Act, but protection is currently precluded due to the need to take action on other species facing more immediate and severe extinction threats.

One grazing authorization (permit), #3602570[2], exists for this allotment. Under this permit, the current season of use is from April 1 through October 31, for 9,577 Animal Unit Months (AUMs) of active grazing preference for livestock. For this allotment, percentage public land (PL %), based on forage production, is 94% on the current permit[3].

The South Steens Allotment was designated an "Improve" (I) Management Category allotment (H-1734-2 – Rangeland Monitoring Handbook) in 1984 and reconfirmed in the 2005 Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area Record of Decisions and Resource Management Plans (RMP; Appendix J-10). An "Improve" categorization identifies the allotment as having management or resource issues or concerns and resource conflicts. "I" category allotments typically receive priority for funding, project implementation, and monitoring. South Steens Allotment was designated an "I" category allotment due to resource concerns related to riparian condition, water quality, Greater Sage-Grouse, bighorn sheep, noxious weeds, recreation, juniper encroachment, WSAs, WSRs, and the Steens Mountain Wilderness [2005 Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area Record of Decisions and Resource Management Plans (RMP), Appendix J-10].

In the Omnibus Oregon Wild and Scenic Rivers Act of 1988, 72 miles of the Donner und Blitzen River was designated as a wild river and became part of the WSR system. The 1980 BLM Oregon and Washington *Final Intensive Inventory Decisions* determined that there were two units (three subunits) within the South Steens Allotment that had wilderness characteristics. At this time, subunit 2-86E (Blitzen River) was 58,560 acres, subunit 2-85G (South Fork Donner und Blitzen River) was 35,870 acres, and subunit 2-85H (Home Creek) was 26,590 acres[4]. The final decision for these three subunits was that they all be designated as WSAs. The Oregon Wilderness Study Report of 1991 determined that 4,575 acres of public land within the Home Creek WSA were not suitable for wilderness due to the area's irregular configuration creating a potentially unmanageable area. The Blitzen River WSA contained 55,880 acres of public land of which 34,210 acres were recommended not suitable for wilderness due to the irregular configuration creating a potentially unmanageable area, as well as the fact that common land uses for the western portion of the WSA were livestock grazing, development of range improvement projects, and possible mineral exploration and development. South Fork of the

[1] Preliminary Priority Habitat (PPH) are areas that have been identified as having the highest conservation value to maintaining sage-grouse populations, this corresponds to Core Habitat Areas as designated by ODFW. Preliminary General Habitat (PGH) are areas of occupied seasonal or year-round sage-grouse habitat outside of PPH. These areas include ODFW Low Density Habitat as well as additional areas of currently occupied sage-grouse habitat.

[2] This grazing authorization also covers other allotments. The proposed management and alternatives described within this document do not affect the management of those other allotments.

[3] The percentage of public land is determined by the proportion of livestock forage available on public lands within the allotment compared to the total amount available from both public lands and those owned or controlled by the permittee (43 CFR 4130.3-2g)

[4] These acreages include BLM-managed land, as well as private, state, and refuge land.

Donner und Blitzen River WSA contained 37,555 acres of public land and all of the acres were recommended as suitable for wilderness. The 1991 Wilderness Study Report recommended that livestock grazing continue at their current levels within all the WSAs.

In May 1993, the BLM prepared the Donner und Blitzen National WSR Management Plan EA (EA-OR-020-2-72), allowing livestock grazing within the Donner und Blitzen WSR corridor. The Decision was challenged in Federal District Court (ONDA v. Green). In 1995, prior to receiving a Final Judgment on the challenge, the South Steens AMP/EA was written. The 1995 AMP allowed for livestock grazing and watering along the Donner und Blitzen WSR. In 1997, the Court in ONDA v. Green issued a Final Judgment that barred the BLM from 1) authorizing grazing in the river corridor; 2) building parking lots and improving roads in the corridor; and 3) constructing any water diversions in the river corridor until a new river plan and Environmental Impact Statement (EIS) were prepared.[5] The fourth component of the judgment required BLM to construct the "Blitzen protection fence" (previously analyzed in the 1995 South Steens AMP/EA), and within 3 years to remove an equal amount of obsolete fence from WSAs. The Blitzen protection fence was built in 1998, excluding livestock use on the southeastern edge of Steens Pasture within South Steens Allotment. The remainder of Donner und Blitzen WSR corridor was not fenced, as the BLM believed topography would prohibit livestock from watering on the river.

On October 20, 2000 Congress enacted the Steens Act, creating the 425,550-acre CMPA, adding over 28 miles of additional wild river designations within the Steens Mountain area, and a 97,229-acre No Livestock Grazing Area; the current acreage is 99,859 acres due to land exchanges that occurred within the boundary of the No Livestock Grazing Area. Under the Steens Act, portions of the existing WSAs were converted to wilderness, leaving remnant WSAs adjacent to, but outside of the designated wilderness. The Steens Act states, upon cancellation of grazing permits "…future grazing use in that designated area [No Livestock Grazing Area] is prohibited. The Secretary shall be responsible for installing and maintaining any fencing required for resource protection within the designated no livestock grazing area" (Section 113). The western boundary of the No Livestock Grazing Area is formed by the Donner und Blitzen WSR corridor and is adjacent to the South Steens Allotment. The western boundary of the WSR corridor and the No Livestock Grazing Area are also the western boundary of Steens Mountain Wilderness.[6] One exception to the No Livestock Grazing Area is the water gap in the Tabor Cabin area, within the Donner und Blitzen WSR corridor and Steens Mountain Wilderness (Steens Act). This water gap was previously on private property, which was exchanged through Title VI of the Steens Act. One element of the land exchange was that Roaring Springs Ranch, Inc., reserved a "nonexclusive easement" to use and maintain "…for livestock, wild horse and wildlife watering purposes" the aforementioned water gap. This easement is recognized as a legal use of this portion of the No Livestock Grazing Area for said purposes.

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[5] In October 2000, prior to completion of an EIS and river plan, the Steens Act permanently established the No Livestock Grazing Area along the river area. The Steens Mountain Wilderness and WSR Plan was completed in July 2005, and include recognition of the No Livestock Grazing Area.

[6] The Steens Mountain Wilderness is divided into two separate sections. The largest piece includes the No Livestock Grazing Area and the WSR corridor, and is located on top of the Steens Mountain, with the majority being located east of the Donner und Blitzen River. The smaller portion is located on the western side of the CMPA, and is centered on Home Creek. The two portions are separated by the South Fork Donner Und Blitzen and the Home Creek WSAs.

The Steens Act also established the SMAC "...to advise the Secretary in managing the Cooperative Management and Protection Area and in promoting the cooperative management under subtitle C" (Section 131). The BLM is required to "consult with the advisory committee as part of the preparation and implementation of the management plan" and the SMAC will in turn submit recommendations on management plans within the CMPA.

Following the Steens Act and subsequent land exchanges, the Active/Permitted Use AUMs for numerous allotments, including the South Steens Allotment, were adjusted. Changes to the mandatory terms and conditions on the associated permits were authorized by Public Law 106-399 of 2000 (Steens Mountain Cooperative Management and Protection Act). South Steens Allotment went from 19,133 AUMs of Active/Permitted Use to 9,577 AUMs. The new Active/Permitted Use AUMs were determined using production characteristics of the remaining portion of South Steens Allotment. This was agreed upon by Roaring Springs Ranch, Inc. in the Livestock Grazing Agreement included with the Roaring Springs Ranch, Inc. land exchange signed February 15, 2002.

In 2001 BLM completed the *Projects for Implementation of the Steens Mountain Cooperative Management and Protection Act of 2000* EA OR-027-01-27 (referred to as the Implementation EA), which analyzed environmental effects of installing range improvements required to implement the Steens Act, including projects to exclude livestock from the No Livestock Grazing Area. The purpose was to "implement the 'no livestock grazing area,' install and maintain fencing required for resource protection within this area, provide replacement forage within and outside the CMPA, and construct fencing and water systems to allow for viable livestock operations and sustainable livestock grazing which promotes the long-term ecological integrity within the CMPA and meets the Standards for Rangeland Health and the Guidelines for Livestock Management." The need for the Implementation EA action was "to conform with the directives of the Act, thereby ensuring the long-term ecological integrity of the CMPA." The Decision Record for the Implementation EA included construction of fences to exclude livestock from the No Livestock Grazing Area, among other improvements. Some sections of fencing along the river were not selected because the BLM believed topography along portions of Donner und Blitzen River was steep enough that livestock would not be able to enter the river corridor and water at the river. The Implementation EA stated that "[a]lthough no other projects are being considered at this time, the addition of other gap fences where livestock are continually accessing the no livestock grazing area is possible."

Following the Implementation EA, the No Livestock Grazing Area boundary was monitored for cattle intrusions. Monitoring from 2003 to 2005 found cattle had been crossing South Fork Donner und Blitzen River from South Steens Allotment, and entering the No Livestock Grazing Area. Cattle were using existing trails and drainages on the west side of the river to enter the area, and would then continue into Big Indian, Little Indian, and Mud creeks as well as Riddle Brothers Ranch Meadows. In 2006, to stop cattle from entering the No Livestock Grazing Area, BLM amended the Decision Record for the Implementation EA to include the construction of a 2.5-mile fence, which had been previously analyzed but not selected in the original decision. The fence was to be located in T. 34 S., R. 32¾ E., Sections 7, 17, 18, and 20. The fence was to be constructed as close as topography would allow to the actual boundary between South Steens Allotment and Steens Mountain Wilderness. Roaring Springs Ranch, Inc., appealed the decision

and requested a stay of the decision to the Department of the Interior's Office of Hearings and Appeals (OHA) on the basis that eliminating “livestock access to the river will render the adjacent portion of Steen’s Pasture useless except during the sensitive Spring growing season.” In a declaration, the Roaring Springs Ranch manager stated, “Roaring Springs does not necessarily object to this fencing” and their “primary concern is to ensure a reliable replacement water source for Steen’s [sic] Pasture.” The BLM and Roaring Springs Ranch, Inc., entered into a joint motion to stay the decision and proceedings for one year in order to come to a resolution.

In 2006, the BLM and Roaring Springs Ranch, Inc., entered into a Cooperative Range Improvement Agreement. The agreement allowed Roaring Springs Ranch to clean out waterholes in South Steens Allotment, allow wild horses to utilize a new waterhole constructed on private land, and construct a pipeline from a private well to a private waterhole within the Hollywood Pasture, if necessary. Roaring Springs Ranch also agreed to work with the BLM to develop waterholes and reservoirs within the South Steens Allotment to provide late season water, and to help protect the Three Springs complex area once other water was available. The BLM agreed to provide bentonite for Weaver Place and Solomon Canyon waterholes; rebuild Weaver Place Reservoir, and cleanout Weaver Place Dugout Waterholes to promote late season water. In addition, BLM agreed to write an Environmental Assessment to analyze the development of waterholes and reservoirs within the South Fork Donner und Blitzen and Blitzen River WSAs to provide water for livestock, wildlife, and wild horses. Subsequent to the Cooperative Range Improvement Agreement, Roaring Springs Ranch, Inc., withdrew their appeal and OHA dismissed the matter. The BLM constructed the 2.5mile fence in fall 2007. One component of this AMP/EA will be the analysis of the development of waterholes and reservoirs as described in the Cooperative Range Improvement Agreement.

Under the 1995 South Steens AMP/EA, the grazing system was a four-year rotational system, using adaptive management to ensure changes can be made quickly in response to monitoring data. Flexibility in stocking levels, pasture rotations, and timing of grazing was allowed in order to attain utilization targets and achieve management objectives. During the first two years of the grazing rotation, cattle would start grazing the southern end of the allotment, summer at the upper elevations, and leave the allotment via the northern pastures. The following two years cattle would start on the north end and graze to the south end. This grazing management would have relied heavily on wranglers to make sure livestock left the riparian areas and grazed the uplands, as well as to limit utilization in the pastures. However, herding focused on riparian areas around the river and streams, with little focus on the smaller springs and meadows, and it is not known how often herding actually occurred or how effective herding was at protecting these small riparian resources. In addition, herding applied only to livestock, wild horses are unable to be herded. The prescribed grazing rotation was kept general, in order to allow for adaptive management changes in response to climate conditions and monitoring data. The general rotation prescribed in the 1995 South Steens AMP has not been followed in the last ten years due to the creation of the No Livestock Grazing Area and land exchanges from the Steens Act of 2000. This resulted in a decrease in size and number of pastures for South Steens Allotment. Adaptive management, which allows for coordinated flexibility in grazing management, was written into the 1995 AMP, which has allowed grazing management to be modified while still allowing the permittee to meet the terms and conditions of the permit. While the prescribed grazing management has not been directly followed, grazing management has been using

adaptive management, and provided growing season[7] rest from livestock in at least one out of every four years. Current grazing management practices are conforming to Guidelines.

In 2008, South Steens Allotment was assessed for conformance to S&Gs by an IDT (see Chapter IV for current IDT members). Within the allotment, 3.8 miles of perennial and intermittent streams were determined to be capable of supporting riparian vegetation. A Proper Functioning Condition (PFC) assessment found that 1.3 miles of streams are in PFC and 2.5 miles are functioning at risk with an upward trend and almost at PFC. This resulted in Standard 2 - Watershed Function, Riparian/Wetland Areas and Standard 4 - Water Quality being achieved in the Tombstone and Home Creek pastures (these Standards were determined not to be present in the Hollywood Pasture). However, Standards 2 and 4 were not achieved in the Steens Pasture due to wild horses, livestock, and juniper encroachment in riparian and spring areas, and not in PFC. Of the three casual factors, only livestock can be addressed using currently authorized management (no additional NEPA analysis required); however, even if livestock were fully removed from these areas, wild horses would still be prominent at these sites, causing damage from hoof shear and overutilization of riparian species.[8] Therefore, BLM does not believe that just changing management of livestock, or livestock removal, would result in significant progress towards the achievement of these Standards within the Steens Pasture. Standards 1 – Watershed Function, Uplands, Standard 3 – Ecological Processes, and Standard 5 - Native, Threatened and Endangered (T&E), and Locally Important Species were fully achieved throughout the allotment; however, it was determined these Standards are at risk of not being achieved in the future due to juniper expansion. See Table 1 for further detail on the determination of Standards.

Table 1: 2008 Standards and Guidelines Assessment[9]

Standard	Achieved	Not Achieved	Casual Factors	Comments
1. Watershed Function - Uplands	All Pastures	---	---	Western juniper has contributed to a moderate departure from expected conditions for hydrologic function and biotic integrity in areas of juniper encroachment throughout the allotment. However, overall soil and site stability, hydrologic function, and biotic integrity are still essentially intact. Areas that have previously burned, reducing the amount of juniper on the site, have vigorous and abundant bunchgrass species. Continued juniper encroachment would increase the risk of this Standard not being achieved in the future. Cheatgrass in the Hollywood Pasture was found to be resulting in a slight departure from what is expected for biotic integrity.

[7] The growing season typically occurs between May 1 to July 1-15, depending on annual conditions.
[8] A South Steens HMA Gather EA has been initiated and scoping completed for this process.
[9] These S&Gs have not been updated since 2008 since the BLM does not believe that any major changes have occurred within the allotment that would result in these determinations being changed. Livestock grazing and wild horse management has not changed. Western juniper, though treated in some areas, is still a threat and continue to contribute to a departure from expected conditions. Some improvement may have occurred in wildlife habitat where treatment has occurred, but the extent of this is not enough to change the 2008 determination.

2. Watershed Function - Riparian/ Wetland Areas	Hollywood, Home Creek, and Tombstone Pastures	Steens Pasture	Wild horses, livestock, and juniper expansion	Within the Tombstone Pasture, 1.33 miles of streams were found to be at PFC in a 1998 assessment and 2.5 miles of Streams in Home Creek Pasture were found to be Functioning at Risk with an Upward Trend. These streams have deep-rooted, obligate wetland plants that promote bank stability and proper functioning. Within Home Creek Pasture, subsequent analysis suggests that Home Creek is now expected to be in PFC, but no formal PFC assessment has since been completed. The above-mentioned pastures have achieved this Standard. In the Steens Pasture, use of springs by livestock and wild horses has prevented development of riparian communities and altered flows supporting downstream meadows. Phases II and III[10] expansion juniper have also altered hydrologic cycles, resulting in a reduced period during which subsurface flows contribute to the meadows. The riparian areas within the Steens Pasture are not currently at PFC, and are not achieving this Standard. This Standard was determined not present in the Hollywood Pasture.
3. Ecological Processes	All Pastures	---	---	Plant composition and productivity are at or near expected levels for much of the allotment. Deep-rooted shrubs and grasses are prevalent, driving nutrient cycling, and maintaining the hydrologic cycle; litter is accumulating in place. Noxious weeds and invasive plants, such as cheatgrass, are not present to the extent that they would significantly alter ecological processes. Nutrient and hydrologic cycles are currently functioning properly. However, western juniper, where present and expanding, has contributed to a moderate departure from expected conditions for plant composition and community structure. The continued expansion of western juniper puts the allotment at risk for not meeting this Standard in the future.
4. Water Quality	Hollywood, Home Creek, and Tombstone Pastures	Steens Pasture	Wild horses and livestock	Pastures achieving this Standard have tributaries that are at or near PFC and the nearby uplands are not contributing sediment to water. In these pastures, western juniper has encroached into these areas and resulted in decreased base flow and may result in increased sedimentation in the future. Home Creek was determined to have achieved this Standard due to its having an upward trend, moving toward PFC, a greenline occupied by vigorous, deep-rooted, obligate wetland species, and little sedimentation is occurring. However, Home Creek is on the Oregon Department of Environmental Quality's (ODEQ) list of streams exceeding the seven-day average maximum temperature for year-round use by redband trout. Expansion juniper is the major factor in not meeting the temperature requirement. Continued juniper expansion may result in this Standard not being met in the future due to altered hydrologic processes and increased sedimentation. In the Steens Pasture, springs receive heavy use from livestock, when present, and year-round from wild horses, due to the fact they are reliable water sources within the pasture. Year-round presence of animals moving in and around the spring area increases sedimentation in the water, resulting in poor-quality drinking water for horses, livestock, and wildlife. This Standard was determined not present in the Hollywood Pasture.

[10] Phase I of woodland succession is described as having trees present but shrubs and herbs are the dominant vegetation that influence ecological processes (hydrologic, nutrient, and energy cycles) on the site; Phase II woodlands have trees that are codominant with shrubs and herbs and all forms equally influence ecological processes on the site; woodland succession Phase III has trees that are the dominant vegetation and are the primary species influencing ecological processes on the site (Miller et al. 2005).

5. Native, Threatened and Endangered (T&E), and Locally Important Species	All Pastures	---	---	Habitat for Greater Sage-Grouse is in generally good condition. The exception is areas that have Stage II/III juniper establishment in big sagebrush, low sagebrush, and ephemeral wet meadows and riparian areas within the Steens Pasture. Juniper encroachment into sage-grouse habitat is putting this Standard at risk for not being achieved in the future. Juniper encroachment is also beginning to degrade mule deer, pronghorn antelope, and elk habitat; however, current habitat is still adequate for these species. *Potemegton diversifolius*, a SSS plant is present in Tombstone Reservoir, and is expected to remain there barring prolonged drought conditions.

On January 7, 2009 the South Steens Water Development EA (which was written to analyze additional water developments as well as provide a comprehensive allotment management plan), the signed Finding of No Significant Impact (FONSI), and Signed Proposed Decision were made available to the public for the 15-day protest period. This was followed by a 30-day appeal period on the Final Decision. Prior to the end of the appeal period on February 20, 2009 Joan Suther, Andrews/Steens Resource Area Field Manager, rescinded the FONSI and Final Decision Record. Following the rescinding, it was determined that modifications and improvements to the EA were necessary to allow for a complete analysis of alternatives and fully meet all NEPA requirements. This South Steens AMP/EA was written based on the original South Steens Water Development EA, with additional input from the SMAC and other interested publics, including previous comments and protests. This EA includes modified alternatives fully meeting all resource concerns, additional alternatives to ensure complete NEPA analysis occurs, and provides a comprehensive management plan for the allotment.

C. Purpose of and Need for Action

The purpose of the Action is to:

1. Manage livestock and reduce wild horse impacts to riparian areas within South Steens Allotment to make significant progress[11] toward achieving the Riparian and Water Quality Standards not currently achieved within Steens Pasture.

2. Continue to achieve Rangeland Health Standards currently being achieved, and continue to conform to Guidelines in accordance with all applicable laws, regulations, and policies.

3. Provide additional sources of reliable late-season water for wild horses and livestock within the South Steens Allotment to replace water historically used from Donner und Blitzen River, provide for better wild horse and livestock distribution, and decrease risk to wild horses in drought years, while preventing the impairment of wilderness suitability in the WSAs. Consideration of additional water sources would meet the BLM's obligation to write an EA to analyze the development of waterholes and reservoirs within

[11] Significant Progress: Used in reference to achieving a standard as outlined in the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the BLM in the States of Oregon and Washington (1997). The use of the word "significant" in this document does not meet the Council on Environmental Quality's (CEQ) definition of the word.

the South Steens Allotment to provide water for livestock, wildlife, and wild horses, as agreed upon in the 2006 Cooperative Range Improvement Agreement.

4. Develop a comprehensive AMP for the South Steens Allotment.

5. Consider an external request to renew a 10-year grazing permit, which expires on February 28, 2014. The AMP/EA focuses only on the grazing permit renewal for the South Steens Allotment. Other allotments that are on the current grazing permit will be renewed separately following appropriate analysis.

The need for the Action is:

1. Currently, Standard s 1 - Watershed Function, Uplands, 3 - Ecological Processes, and 5 - Native, Threatened and Endangered, and Locally Important Species are fully achieved throughout the allotment and Standards 2 - Watershed Function - Riparian/Wetland Areas, and 4 - Water Quality are achieved in Tombstone and Home Creek pastures, and determined not to be present in the Hollywood Pasture. However, achievement of all Standards, in all pastures, is at risk of not being met in the future due to resource damage caused by juniper expansion across the allotment.

   Within Steens Pasture, Watershed Function – Riparian/Wetland Areas and Water Quality Standards (2 and 4) are not being achieved due to the heavy use of springs and mesic/wet meadows by wild horses and livestock, which have prevented development of riparian communities and altered flows supporting meadows. The year-round presence of animals moving in and around the spring areas increase sedimentation in the water, which results in poor-quality drinking water for wild horses, livestock, and wildlife. During field visits, the poor quality drinking water has been observed visually in the form of areas of stagnate muddy water, often with animal waste present within the water. This has resulted in these areas not being in PFC throughout the pasture. Phases II and III expansion juniper has also altered hydrologic cycles by consuming water that would otherwise flow in springs and meadows. This AMP/EA only addresses treatment of junipers within these spring areas, which are not currently achieving standards. Treatment of expansion juniper across the allotment has been previously addressed in the 2007 North Steens Ecosystem and Restoration Project EIS and ROD.

   Two pastures within South Steens Allotment, Tombstone and Steens, are adjacent to the No Livestock Grazing Area and the Donner und Blitzen WSR corridor. However, prior to Judge Haggerty's Final Order in ONDA v. Green, the Steens Act, and implementation of livestock exclusion fencing, South Steens Allotment included portions of Donner und Blitzen River. Wild horses and livestock within South Steens Allotment were able to use Donner und Blitzen River as a year-round water source, which was especially important for grazing on the eastern side of the pastures, during drought years, and in the late summer and fall when other waterholes within the allotment become dry. Due to the ability to utilize the river for water, few developments to provide reliable, year-round water for wild horses and livestock had been constructed on the eastern side of the allotment. Numerous water developments have been constructed on the western side of

the allotment to allow utilization of areas farther from the river where there are fewer natural water sources. Wild horses and livestock tend to congregate in areas near water; as distance from water increases, utilization decreases. The full consequences of the Steens Act, and subsequent fencing limiting wild horse and livestock grazing movements, were not fully realized until implementation was complete and several years of drought occurred. The loss of Donner und Blitzen River as a water source has modified wild horse and livestock distribution and utilization patterns. Losing the river as a water source resulted in wild horses and livestock that watered at the river, in addition to existing water developments (mostly on the western side of the allotment) and spring sources, to water exclusively at existing water developments and springs. Areas within grazing range of the river currently have few opportunities for wild horse and livestock watering; therefore, little grazing has occurred in these areas following the 2007 completion of the river corridor fence that was authorized in the amended Implementation EA Decision. The Implementation EA was an attempt to evaluate the consequences of the Steens Act, which included dividing the South Steens Allotment and removing the ability of livestock to water along the river, with the exception of the Tabor Cabin water gap. The Implementation EA originally included the development of two new waterholes (Weaver Place waterhole[12] and Black Canyon waterhole), both of which were completed, as well as the development of Burnt Car Spring, which was analyzed but not completed. At the time, it was felt that these water developments would offset the effects of removing the river as a watering source from the allotment. Now, several years after the Implementation EA, BLM has monitoring data (trend, utilization, observations, etc…) for South Steens Allotment (as adjusted by the Steens Act) and has found development of two water sources has not been adequate to allow wild horse and livestock grazing to continue in a manner similar to where it occurred prior to implementation of the Steens Act. Map 3 – Current Range Improvements provides a visual display of current water sources within the allotment, Map 4 – Reliable Water Sources identifies which water sources regularly provide water late in the year for wild horses and livestock, and Maps 5 and 6 show estimated use areas, based on a 2-mile grazing radius[13], using all reliable water sources and only reliable public water sources, respectively.

Following the fencing of Donner und Blitzen WSR corridor in 2001, Roaring Springs Ranch, Inc., has voluntarily utilized, on average, 5,102 AUMs per year (2003-2010[14]) of the 9,577 AUMs of Permitted Active Use, due to lack of water and concern that if they utilized 100% of their permitted use, livestock would heavily concentrate around the limited areas of existing water, resulting in ecological damage in the vicinity of these areas.

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[12] Not to be confused with Weaver Spring (S2), which is located in the same vicinity as the waterhole, but was not developed or protected following the Implementation EA.

[13] The 2-mile grazing radius came from research by George et al. 2007, Ganskopp 2011, Holechek et al. 2001, which suggest that in general livestock will not graze further than two miles from water.

[14] The actual use data from 2011 and 2012 was not included in this average since Tombstone Pasture was rested per the BLM (for reasons other than widespread ecological concerns within the pasture), and using that data would inappropriately reduce the average use across the allotment.

Better, more even distribution of wild horses and livestock throughout South Steens Allotment is needed to conserve, protect and manage the long-term ecological integrity, as stated in the Steens Act [Section 102 (a)], while promoting viable and sustainable grazing [Steens Act, Section 1 (b) (11)], protecting and managing healthy wild horse populations [The Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195)], and other Wilderness supplemental values. Design features to prevent impairment of wilderness suitability and to enhance wilderness values would be utilized to assure conformance with Section 204(b) of the Steens Act and Section 603(c) of the Federal Land Policy and Management Act of 1976 (FLPMA), and are identified in Chapter II of this document.

2. The BLM has a responsibility to respond to an external request for renewal of the grazing permit associated with South Steens Allotment. If BLM decides to issue the grazing permit within South Steens Allotment, that decision must be consistent with grazing regulations at 43 CFR 4100, the Taylor Grazing Act (43 U.S.C 315, 1934), FLPMA, the Steens Act, and the Steens Mountain Cooperative Management and Protection Area RMP, 2005. In coordination with the permit renewal, the BLM is developing a new AMP that would fit the current conditions of the allotment, as determined through monitoring, and include grazing management as it would relate to the terms and conditions on the renewed permit. The AMP will contain the management components as established within the Decision Record that will be associated with this document.

D. Resource Objectives

The following objectives are from the Steens Mountain Cooperative Management and Protection Act of 2000.

- To maintain and enhance cooperative and innovative management projects, programs and agreements between tribal, public, and private interests in the Cooperative Management and Protection Area.
- To promote grazing, recreation, historic, and other uses that are sustainable.
- To conserve, protect and to ensure traditional access to cultural, gathering, religious, and archaeological sites by the Burn Paiute Tribe on Federal lands and to promote cooperation with private landowners.
- To ensure the conservation, protection, and improved management of the ecological, social, and economic environment of the Cooperative Management and Protection Area, including geological, biological, wildlife, riparian, and scenic resources.
- To promote and foster cooperation, communication, and understanding and to reduce conflict between Steens Mountain users and interests.

The following objective is from BLM Manual 6330 Management of Wilderness Study Areas from 2012.

- Consistent with relevant law, manage and protect WSAs to preserve wilderness characteristics so as not to impair the suitability of such areas for designation by Congress as wilderness.

The following management objectives are from the August 2005 CMPA Resource Management Plan (RMP)/Record of Decision (ROD).

- Manage impaired waters on public lands listed under Section 303(d) of CWA [Clean Water Act] to restore beneficial uses and to improve water quality so that listing is no longer warranted (Water Resources, RMP-18)[15].
- Achieve or maintain a rating of PFC for perennial and intermittent flowing and standing water bodies relative to site capability, site potential, and BLM management jurisdictions. Maintain, restore, or improve riparian/wetland vegetation communities relative to ecological status, site potential and capability, or site-specific management objectives. Manage riparian/wetland areas to maintain, restore, or improve soil moisture content and retention of alluvial ground water to augment base flow conditions during warm summer months (Vegetation, RMP-24).
- Maintain or restore native vegetation communities through sound landscape management practices. Increase species and structural diversity at the plant community and landscape levels in big sagebrush communities. Provide multiple successional stages within the landscape (Vegetation, RMP-30).
- Manage big sagebrush, quaking aspen, and western juniper plant communities to meet habitat requirements for wildlife. Manage big sagebrush communities to meet the life history requirements of sagebrush dependent species (Vegetation, RMP-31).
- Maintain, restore or improve habitat [for fish and wildlife]. Manage forage production to support wildlife population levels identified by ODFW [Oregon Department of Fish and Wildlife] (Fish and Wildlife, RMP-33).
- Manage Special Status plant species and their habitats so management actions do not contribute to their decline or listing as T&E. Conserve Special Status animal species and the ecosystems on which they depend. Manage big sagebrush communities to meet the life history requirements of sagebrush-dependent Special Status Species (Special Status Species, RMP-35).
- Protect, maintain, improve, or restore Visual Resource values by managing all public lands in accordance with VRM [Visual Resource Management] system (Visual Resources, RMP-45).
- Work cooperatively with private and community groups and local government, Burns Paiute tribal, or other tribal governments to provide for customary uses consistent with other resource objectives and to sustain or improve local economies. Maintain, and promote the cultural, economic, ecological, and social health of the Steens Mountain Area (Social and Economic Values, RMP-46).
- Maintain a thriving natural ecological balance within HMAs. Maintain/improve year-round water sources to sustain wild horse herds (Wild Horses and Burros, RMP-50).
- Provide for a sustained level of livestock grazing in the CMPA, while meeting resource objectives and requirements for the S&Gs. Implement administrative solutions and rangeland projects to provide proper management for livestock grazing while meeting resource objectives and requirements for S&Gs (Grazing Management, RMP-53).

[15] As mentioned in the S&Gs, within the South Steens Allotment, Home Creek is currently considered impaired due to not meeting the temperature requirements.

- Manage public visitation in the wilderness to provide outstanding opportunities for solitude, primitive and unconfined recreation, naturalness, and other features including ecological, geological, scientific, educational, scenic and historic (Wilderness, RMP-73).
- Manage livestock grazing in wilderness under the stipulations of the Congressional Grazing Guidelines (HR 101-405 Appendix A) (Wilderness, RMP 75).
- Manage existing WSAs so as not to impair their suitability for preservation as wilderness (Wilderness Study Areas and Parcels with Wilderness Characteristics, RMP-80).

The following management objectives are from the August 2005 Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area Resource Management Plan (RMP)/Record of Decision (ROD) Appendix J – Allotment Management Summaries, J-10.

- Improve the ecological condition of upland vegetation communities.
- Maintain the ecological condition of upland vegetation communities.
- Maintain/improve the condition of riparian vegetation communities.

The following management objectives are from the August 2005 Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area RMP/ROD Appendix P - Steens Mountain Wilderness and Wild and Scenic Rivers Plan.

- To maintain or improve ground water recharge and holding capacity of riparian/wetland areas to maintain or increase base flow conditions of water sources (streams and springs) (Water Resources, P-30).
- To manage soils to maintain, restore, or improve soil erosion classes, watershed health, and areas of fragile soils (Soils and Biological Soil Crusts, P-31).
- Maintain or restore ecological status of native plant communities. Increase species and structural diversity at the plant community and landscape levels in the big sagebrush communities. Provide multiple successional stages within the landscape (Vegetation, P-35).
- To maintain, restore, or improve riparian/wetland vegetation communities toward an advanced ecological status condition at the reach or scale relative to wilderness management and other resource specific management objectives (Vegetation, P-36).
- To maintain, restore, or improve Special Status Species habitats. To conserve Special Status animal species and the ecosystems on which they depend (Fish, P-41).
- To continue cooperation and coordination with other State and Federal agencies on the management of wildlife, wildlife habitat, and protection of the character of the wilderness and WSRs. To manage forage protection to support wildlife population levels identified by ODFW, while minimizing effects to wilderness resources (Wildlife, P-42).
- To protect, maintain, enhance, or restore visual resource values by managing all BLM administered lands in the Steens Mountain Wilderness and WSR corridors in accordance with VRM Class I objectives (Visual Resources, P-47).
- To maintain a thriving natural ecological balance within the HMA. To maintain/improve year-round water sources to sustain the wild horse herd (Wild Horses, P-49).
- Provide for a sustained level of livestock grazing where allowed in Steens Mountain Wilderness, while providing for Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (S&Gs) as

described in the CMPA RMP. Implement administrative solutions and rangeland projects to provide proper management for livestock grazing while meeting resource objectives and requirements for S&Gs (Grazing, P-53).

The following management objectives are from the 1995 South Steens Wild Horse Herd Management Area Plan Update that was included in the 1995 South Steens AMP in Appendix E.

- Manage wild horse populations at an appropriate management level of between 159 and 304 animals to maintain a thriving natural ecological balance within the HMA. Provide adequate quality forage for 3,648 AUMs of wild horse use). Wild horses will be managed in a manner that maintains satisfactory riparian condition and improves riparian conditions where less than satisfactory condition exists (1995 South Steens Wild Horse HMA Plan Update, *In:* 1995 South Steens AMP, Appendix E, Pg. 74).

E. Decisions to be Made

The BLM will decide whether to accept, reject, or accept with modifications the permittee's request to renew a 10-year grazing permit with specific terms and conditions, and adopt and implement the proposed new allotment management plan (AMP). In addition, the authorized officer will determine whether to construct range improvements within the allotment.

F. Conformance with Land Use Plans

The Proposed Action and alternatives are in conformance with the CMPA RMP and ROD, dated August 2005, even though they are not specifically provided for, because they are clearly consistent with the RMP decisions outlined above under Section D: Resource Objectives.

G. Consistency with Other Authorities

The Proposed Action has been designed to conform to the following documents, which direct and provide the framework for management of BLM lands within Burns District:

- Taylor Grazing Act (43 U.S.C. 315), 1934
- National Environmental Policy Act (42 U.S.C. 4320-4347), 1970
- Wild Free-Roaming Horses and Burros Act (16 U.S.C. 1331-1340), 1971
- Federal Land Policy and Management Act (43 U.S.C. 1701), 1976
- Public Rangelands Improvement Act (43 U.S.C. 1901), 1978
- BLM Manual 6330 Management of Wilderness Study Areas (2012)
- August 12, 1997 Standards for Rangeland Health and Guidelines for Livestock Management for Public Lands Administered by the BLM in the States of Oregon and Washington
- 1998 Burns District Noxious Weed Management Program EA (OR-020-98-05)
- Greater Sage-Grouse and Sagebrush-steppe Ecosystems Management Guidelines (BLM-2000)
- Steens Mountain Cooperative Management and Protection Act (16 U.S.C. 460nnn), 2000
- BLM National Sage-grouse Habitat Conservation Strategy (2004)
- Steens Mountain Wilderness and WSRs Plan (August 2005)

- Steens Mountain Travel Management Plan (EA OR-05-027-021), 2007
- Protection, Management, and Control of Wild Free roaming Horses and Burros (43 CFR 4700), 2009
- Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (Hagen 2011)
- WO IM 2012-043 Greater Sage-Grouse Interim Management Policies and Procedures
- Maintenance of Range, Wildlife, and Wild Horse Improvements in Wilderness Study Areas in the Burns District (EA OR-020-05-080), 2005
- State, local, and Tribal laws, regulations, and land use plans

H. Management Policy for Lands under Wilderness Review

Under Title II, Section 204(b) of the Steens Act and Section 603(c) of FLPMA, the Secretary shall manage lands, according to his authority and other applicable laws, in a manner so as not to impair the suitability of such areas for preservation of wilderness, prevent unnecessary or undue degradation of the lands and their resources, or to afford environmental protection. While at the same time under the Section 102 of the Steens Act, BLM must emphasize conserving, protecting and managing the long-term ecological integrity of Steens Mountain and to promote grazing, recreation, historic, and other uses that are sustainable. The BLM must also comply with the Wild Horse and Burro Act.

Compliance with Section 603(c) of FLPMA is based on guidance provided in BLM's Manual 6330 – Management of BLM Wilderness Study Areas. The BLM's management policy is to continue resource uses on lands designated as WSAs in a manner that maintains the area's suitability for preservation as Wilderness as long as the use meets the non-impairment standard or exception (Manual 6330, Chapter 16.B).

There are seven classes of allowable exceptions to the non-impairment standard defined in section 1.6.C.1 in the BLM Manual 6330. One of the exceptions to the non-impairment standard is "[a]ctions that clearly benefit a WSA by protecting or enhancing these characteristics are allowable even if they are impairing, though they must still be carried out in the manner that is least disturbing to the site" (Manual 6330 Chapter 1.6.C.2.f.).

The manual provides for maintenance of existing developments "[L]ivestock management developments existing or under construction on October 21, 1976 (or the designation date for Section 202 WSAs not reported to Congress), may continue to be used and maintained in the same manner and to the same degree as such use was being conducted on that date." (BLM Manual 6330, Chapter 1.6.D.3.a.i).

The manual allows for new livestock developments "[N]ew livestock developments may only be approved if they meet the non-impairment standard or one of the exceptions, such as protecting or enhancing wilderness characteristics (BLM Manual 6330, Chapter 1.6.D.3.a.ii).

The manual lays outs how changes in grazing practices are also allowed "[A]s a grandfathered use, grazing management practices (e.g. level of use, season of use etc.) authorized during the 1976 grazing fee year (or prior to the designation date for Section 202 WSAs not reported to

Congress), including levels of use, may not be changed solely because the use may impair a WSAs suitability for preservation as wilderness (BLM Manual 6330, Chapter 1.6.D.3.c).

The manual also addresses wild horse management and states that "Wild horse and burro herds are managed to remain in balance with the productive capacity of the habitat; this includes managing herds so as not to impair wilderness characteristics. Wild horse and burro populations must be managed at appropriate management levels so as to not exceed the productive capacity of the habitat (as determined by available science and monitoring activities), to ensure a thriving natural ecological balance, and to prevent impairment of wilderness characteristics, watershed function, and ecological processes. The BLM should limit population growth or remove excess animals as necessary to prevent the impairment of the WSA" (BLM Manual 6330 Chapter 1.6.D.9).

This EA analyzes and discloses the impacts (both adverse and beneficial) of the proposed AMP, renewing a 10-year grazing permit, and proposed range improvements. At the end of the process, the Finding of No Significant Impact and Decision Record will need to make a finding of consistency with BLM Manual 6330, based on the analysis of impacts in this EA.

I. Consistency with Sage-grouse Guidance

Oregon Department of Fish and Wildlife (ODFW) published the first version of the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (Strategy) in 2005 (Hagen 2005), in cooperation with several state and federal agencies and private landowners. The Strategy provided recommendations and guidance to land managers in the long-term conservation of Greater Sage-Grouse and sagebrush (*Artemisia* spp.) communities. BLM's Oregon State Office agreed to implement the Strategy wherever possible. The updated version of the Strategy (Hagen 2011), which introduced the core area approach for identifying important areas for Greater Sage-Grouse, was finalized in 2011. This version contained core area determination methodology, interpretation, and management recommendations. The BLM used the core area information to determine Preliminary Primary Habitat (PPH; which includes core habitat as determined by ODFW) and Preliminary General Habitat (PGH; which includes low density habitat as determined by ODFW, as well as the currently occupied habitat determined by the BLM).

Hagen (2011) considered and incorporated information from the Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and It's Habitat (Greater Sage-Grouse Monograph; Knick and Connelly 2011) as well as information from the USFWS 12-Month Finding for Petitions to List Greater Sage-Grouse, as it relates to sage-grouse populations and habitat, into the current version of the Strategy. The USFWS recognizes the Greater Sage-Grouse Monograph as the primary source of science, range wide, for the 12-Month Finding for Petitions to List Greater Sage-Grouse. The BLM is in the process of amending the existing Steens Mountain CMPA ROD to incorporate newer information contained in the National Technical Team Report (2011) and the Strategy (2011), as part of BLM's National RMP amendment effort to conserve sage-grouse and its habitat on BLM-managed lands, range wide.

The BLM implements the Strategy (2011) in accordance with Special Status Species management policy in the revised BLM Manual 6840 (BLM 2008) and with Instruction Memorandum WO-2012-043 Greater Sage-Grouse Interim Management Policies and Procedures issued December 27, 2011.

Analysis of the different alternatives for consistency with the Strategy (2011) and the BLM 6840 Manual are discussed in Chapter III, A. 8. in the Special Status Species – Wildlife section.

J. Scoping

On December 22, 2006, the BLM initiated a public comment period to receive input on EA development and to identify issues to be addressed. Forty-nine comment letters were received.

Issues identified through scoping include:

- WSA suitability and non-impairment
- Changes in grazing management
- Monitoring
- Riparian and upland vegetative impacts
- Motorized use and miles of roads associated with development
- Wild horse gathers
- Reliable, year-round water for wild horses
- Water distribution, quality and quantity
- Sage-grouse and habitat
- Special Status Species and habitat
- Mule deer and habitat
- Wildlife and habitat
- Integrity of WSR and No Livestock Grazing Area
- Historical water usage
- Fencing
- Balancing grazing, access, preservation and other uses
- Invasive species and noxious weeds
- Socioeconomics
- Recreation
- Consistency with FLMPA, Steens Act, WSA Policy, RMP, WSR Act
- Soils and Biological Soil Crusts (BSCs)
- Visual resources

In addition, this project was originally discussed at SMAC public meetings and a tour was provided in August 2007. The SMAC provided official recommendations on September 23, 2008, with the understanding that new developments would not increase the number of permitted AUMs or the Appropriate Management Level (AML) for wild horses, and the intent that the level of current AUMs can be managed in a more ecologically balanced manner. The official SMAC recommendations were taken into consideration prior to the release of this document. On July 24, 2008, a subcommittee of the SMAC provided additional scoping comments (not an official recommendation) regarding this EA after a second tour of the allotment on July 17 and 18, 2008. These comments were taken into consideration and addressed where applicable.

On January 7, 2009 the South Steens AMP/EA (called the South Steens Water Development EA at the time), signed FONSI, and Signed Proposed Decision were made available to the public for the 15-day protest period followed by a 30-day appeal period on the Final Decision. Prior to the end of the appeal period on February 20, 2009 Joan Suther, Andrews/Steens Resource Area Field Manager, rescinded the FONSI and Final Decision Record. Following the rescinding, modifications and improvements have been made to the South Steens AMP/EA with additional input from the SMAC and other interested publics. SMAC consultation included presentations/updates at multiple meetings during 2011, as well as another SMAC field trip (September 2011). At the September 2011 SMAC meeting, the SMAC provided the BLM with recommendations on how to develop the proposed action. Following the comment period, the SMAC plans to consider submitted comments and develop a recommendation for the proposed decision. This revised South Steens AMP/EA is a revised version of the EA released in 2009. Some changes include additional relevant background information, revision of alternatives, addition of new alternatives, improved analysis, and increased use of scientific references. Changes were made to ensure that the BLM is meeting the requirements of the most recent laws, policies, and regulations, as well as providing adequate analysis under NEPA to allow a fully informed decision to be made. This revised EA with unsigned FONSI will be made available for public comments prior to the issuance of a proposed decision.

K. Issues Considered but not Analyzed Further

1. Wilderness Characteristics

Wilderness characteristics outside of designated wilderness and existing WSAs will not be analyzed in this EA for the following reasons:

In 2003, BLM reviewed current conditions and citizen information submitted for the lands that currently do not have a WSA or wilderness designation within the South Steens Allotment, including the BLM lands contained in three citizens' wilderness proposals, and updated the wilderness inventory. Pursuant to 40 C.F.R. § 1502.21, the BLM hereby incorporates its wilderness inventory update by reference. The wilderness inventory update considered the standard wilderness criteria of size, naturalness, and outstanding opportunities for solitude or primitive and unconfined recreation, as described in Section 2(c) of the Wilderness Act. The BLM used multiple resources to complete the wilderness inventory update, including an in-house IDT with field knowledge of the areas, aerial photographs, and BLM databases containing records of Rights-of-Way, mineral leases, mining claims, road improvements, and vegetation treatments to make their findings. BLM staff made site visits to the field in areas where more information was needed to validate inventory findings. No changes to conditions within South Steens Allotment were identified that would modify the findings of the 1980 intensive inventory that had evaluated the presence of wilderness characteristics on BLM-administered lands. The CMPA RMP confirmed no new areas within South Steens Allotment were found to have wilderness characteristics, but if parcels with wilderness characteristics were present, they would not be provided any additional special management status as the protection afforded by the CMPA was considered sufficient protection to properly protect and manage any wilderness characteristics that may be present (2005 CMPA RMP, RMP-81).

In addition, the 9th Circuit Court of Appeals in December 2010 upheld BLM's findings that these parcels do not possess wilderness values.

Those portions of the citizen proposed areas that were determined by BLM to lack wilderness characteristics were eliminated by BLM primarily due to the lack or outstanding opportunities for solitude or primitive and unconfined recreation. Within four of the citizen proposals, the BLM wilderness inventory update did not find wilderness characteristics to be present. Below is a summary of the BLM's Findings for areas within the South Steens Allotment:

- Blitzen River South – Only subunit B was evaluated. Subunit A does not meet the acreage threshold. Subunit B is generally natural, but lacks outstanding opportunities for primitive and unconfined recreation or solitude.

- Roaring Springs – The inventory team could not reach consensus as to the naturalness of the unit. However, it does not possess outstanding opportunities for solitude or primitive and unconfined recreation.

- West Blitzen River – The entire unit was evaluated as an addition to the Blitzen River WSA. The inventory team could not reach consensus as to the naturalness of subunit, but it does not possess outstanding opportunities for solitude or primitive and unconfined recreation. Therefore, the unit does not qualify as wilderness and would not enhance the wilderness values present in the Blitzen River WSA.

Therefore, wilderness characteristics have been determined not to be present, no new information has come in and these determinations are still current. The 2003 inventory is still considered current. Wilderness characteristics will not be analyzed in this EA.

2. Greenhouse Gas Emissions and Climate Change

Greenhouse Gas Emissions and Climate Change will not be analyzed in this EA for the following reason:

Livestock grazing results in methane emissions as a result of ruminant digestion. Methane emission rates from cattle vary widely and depend on many variables (Johnson and Johnson 1995; DeRamus et al. 2003). Estimates for grazing cattle typically range from 80 to 101 kilograms of methane per year, per animal (Environmental Protection Agency (EPA), 2009) or 6.7-9.2 kilograms of methane per month. This analysis will assume a methane emission rate of 8 kilograms of methane per AUM. Assuming that methane has a global warming potential 21 times carbon dioxide (EPA 2009, p. ES-3), each AUM results in 0.168 metric tons of carbon dioxide equivalent. Continuing to permit grazing use at the authorized level of 9,577 AUMs per year within the South Steens Allotment would result in methane emissions of 1,608.9 metric tons of carbon dioxide equivalent per year. Current U.S. emissions of methane from livestock total approximately 139 million metric tons of carbon dioxide equivalent per year (EPA 2009,

p. 6-2), and current U.S. emissions of all greenhouse gases total approximately 7 billion metric tons of carbon dioxide equivalent (EPA 2009, p. 2-4). Current global emissions of all greenhouse gases total 25 billion metric tons of carbon dioxide equivalent (Denman et al. 2007, p. 513). Emissions from grazing in the South Steens Allotment would represent 0.001 percent of the annual U.S. methane emissions from livestock, 0.00002 percent of the annual U.S. emissions of all greenhouse gases, and 0.000006 percent of the global emissions of all greenhouse gases. Since there are no alternatives that would authorize more than 9,577 AUMs, the emissions from any alternative would be at or below the above numbers. Greenhouse gas emissions from the Proposed Action and alternatives would be so small as to be negligible. This emission would be so small that its incremental contribution to global and national emissions would not be measurable at the level of precision of global and national emissions. This emission would be so small that it would not merit reporting under the EPA rule on mandatory reporting of greenhouse gases, which presents a reporting threshold of 25,000 metric tons of carbon dioxide equivalent for several industrial and agricultural sectors (40 CFR 98.2).

Livestock grazing can affect rangeland carbon levels, through changes in plant community and changes in ecosystem processes, but the effects have been variable and inconsistent among the ecosystems studied (Schuman et al. 2009). Some studies have found that grazing can result in increased carbon storage compared to no grazing, because of increased plant turnover and changes in plant species composition (Follett et al. 2001). Many changes in rangeland carbon from different grazing practices do not result in substantial changes in total ecosystem carbon, but are redistributions of carbon, for example, from aboveground vegetation to root biomass (Derner and Schuman 2007). Overall, changes in rangeland carbon storage, as a result of changes in grazing practices, are expected to be small and difficult to predict, especially where a rangeland health assessment has determined that the Standards for Rangeland Health and Guidelines for Livestock Grazing Management are being met. Therefore, this analysis will assume that changes in grazing practices on this allotment would not result in any change in total carbon storage.

Changes in greenhouse gas levels affect global climate. Forster et al. 2007 (pp. 129-234), reviewed scientific information on greenhouse gas emissions and climate change, and concluded that human-caused increases in greenhouse gas emissions are extremely likely to have exerted a substantial warming effect on global climate. The U.S. Geological Survey (USGS), in a May 14, 2008 memorandum to the U.S. Fish and Wildlife Service (USFWS), summarized the latest science on greenhouse gas emissions and concluded that it is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration and designate it as the cause of specific climate impacts at a specific location.

CHAPTER II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives A through F have been fully analyzed in Chapter III of this AMP/EA. Following the public review period for this document, a Proposed Decision will be made by the Field Manager, who may choose to proceed with any one of the alternatives analyzed or a combination of portions of multiple alternatives.

A. Actions Common to All Alternatives Except the No Action Alternative

Actions described below would be part of the new AMP, and are not dependent on the specific alternative selected.

1. Goals and Objectives for the South Steens Allotment. Use associated ecological site descriptions (ESDs) for comparison, where appropriate.

a. *Goal:* Maintain or improve riparian functioning condition of perennial and intermittent streams, and restore and maintain natural, free-flowing characteristics of springs and associated wet meadows.

- *Objective:* Maintain PFC of 1.4 miles of two unnamed perennial tributaries to Donner und Blitzen River in Tombstone Pasture assessed for PFC in 1999. *Measure:* PFC.
- *Objective*: Maintain an upward trend in riparian vegetation on 2.4 miles of Home Creek in Home Creek Pasture so that wetland plant species continue to replace upland species within the Greenline. *Measure:* Greenline, PFC.
- *Objective*: Improve vigor of woody riparian species (as appropriate) on 2.4 miles of Home Creek, in Home Creek Pasture, so all age classes are present for the five willow species established in the Greenline, and potential shade can be achieved within the next decade in order to maintain or reduce stream temperature[16] for redband trout habitat, and address DEQ 303d list concerns. *Measure:* Greenline, Temperature, Photo Points.
- *Objective*: Restore riparian areas around springs and associated riparian areas within the Steens Pasture, to reach potential extent within one decade, and achieve presence of at least 75% wetland species in the Greenline within two decades (presence of woody riparian species is not expected or required at these sites). *Measure:* Greenline, Photo Points.

b. *Goal:* Manage uplands in a mosaic of native plant communities and seral stages.

- *Objective:* Maintain or increase the relative frequency of key species, such as Idaho fescue, bluebunch wheatgrass, mountain big sagebrush, and forbs species that provide food for Greater Sage-Grouse, in the Tombstone, Steens, and Home Creek pastures over the next 10 years. Current relative frequency is plot specific and historic trend data should be used for comparison. *Measure:* Pace 180°, Photo Points.
- *Objective:* Maintain the relative frequency of key species, such as Indian rice grass, needle-and-thread grass, Thurber's needlegrass, bluebunch wheatgrass, Wyoming sagebrush and forbs species, which provide food for Greater Sage-Grouse, in the Hollywood Pasture over the next 10 years.

[16] The current ODEQ Temperature Standard for redband trout is 20° C (68° F).

Measure: Pace 180°, Photo Points.

- *Objective:* Maintain frequency and distribution of bitterbrush in Steens and Tombstone pastures over the next 10 years. *Measure:* Pace 180°, Cole Browse, Photo Points.

c. *Goal:* Manage forage and water resources to provide and maintain a thriving natural ecological balance within the South Steens Allotment portion of the South Steens HMA.

- *Objective:* Manage wild horse populations at an AML of between 159 and 304 animals to provide and maintain a thriving natural ecological balance with all resource uses. *Measure:* Wild Horse Census, Utilization, Pace 180°.
- *Objective*: Improve wild horse distribution across the HMA, reducing areas of heavy utilization around current reliable water sources. *Measure*: Wild Horse Census, Utilization, wild horse observations.

d. *Goal:* Maintain wilderness characteristics within Steens Mountain Wilderness (Home Creek portion) and Home Creek, Blitzen River, and South Fork Donner und Blitzen River WSAs.

- *Objective:* Maintain wilderness in a manner consistent with the Steens Mountain Wilderness and WSRs Management Plan (August 2005), Steens Act, Wilderness Act, and FLPMA. *Measure:* Wilderness Monitoring.
- *Objective:* Maintain Home Creek, Blitzen River, and South Fork Donner und Blitzen River WSAs within South Steens Allotment in a manner consistent with the Steens Act and FLPMA. *Measure:* WSA Monitoring.

2. Easement Establishment

The BLM would work with the private landowner, within South Steens Allotment, to obtain a legal right by an easement, memorandum of understanding or cooperative management agreement to any Federal developments on private land, to ensure the ability to locate, construct, use, control, maintain, improve, relocate, and repair the existing developments located on private property. These Federal developments would include both those already existing on the ground, as well as any developments constructed on private land that may be a result of this EA.

3. Assumptions Common to all Alternatives

The current livestock grazing permit (#3602570) has five allotments on it, including South Steens Allotment. Any discussion on renewing the permit only applies to South Steens Allotment. Following a Final Decision that renews the permit, as it relates to South Steens Allotment, South Steens Allotment would be removed from the current grazing permit authorization #3602570, and would be placed on a seperate authorization and assigned a new authorization number. Any other allotments on the current

authorization that have NEPA and a Final Decision completed prior to South Steens authorization becoming active may also be placed upon this authorization. This would be done in order to keep the number of authorizations assigned to the permittee at a minimum while ensuring that each authorization shows the appropriate status for all allotments on them. The remaining allotments will remain on the existing permit, and renewal of that permit will follow current policy[17].

Actual use billing would be authorized as part of this AMP because of the variability in forage production from year to year and the unreliability of water sources. Annual grazing would be authorized with a Letter of Authorization prior to turnout. Accurate records must be kept and an Actual Use Grazing Report is to be submitted within 15 days after the authorized use is completed within the allotment. Advance billing would be allowed at the discretion of the BLM; if the terms and conditions are not met, actual use billing would no longer be allowed, and advanced billing would occur. The permit would be issued with changes to the terms and conditions, encompassing all changes within this AMP.

The Implementation EA analyzed, and selected in the Decision Record, installation of two gap exclusion fences in the Burnt Car Road area to prevent livestock from entering the river corridor. These gap fences have yet to be constructed due to budget constraints; however, for purposes of this EA, the gap fences will be considered in all alternatives as existing.

The North Steens Ecosystem Restoration Project (North Steens Project) is a landscape-level project, the goal of which is to reduce juniper-related fuel loading and improve the ecological health of the area by encouraging a healthy functioning ecosystem through appropriate land treatments. Treatment techniques include a combination of prescribed fire, juniper treatments, fencing, seeding and planting, in order to reduce fuel loads, restore vegetative communities, improve habitat, and increase forage for wildlife. Project activities primarily occur above 4,500 feet and below 7,200 feet, concentrating on the "juniper belt." The North Steens Project Area includes the entire South Steens Allotment. Juniper treatments authorized in the North Steens Ecosystem Restoration Project ROD (2007) will continue to be implemented regardless of the Decision made from this analysis.

All range improvements would follow the Project Design Elements (PDEs) outlined below unless specifically provided for in the alternative descriptions. The locations of all proposed range improvements are estimated locations. Exact, on-the-ground locations of any proposed range improvements would be determined by those responsible for constructing the proposed developments, just prior to actual construction. The exact location of any proposed range improvements not currently shown within WSAs, or Wilderness, would remain outside WSAs and Wilderness areas. All range improvements would occur within one-quarter mile of the current proposed location.

[17] Active renewal of the permit would require complete NEPA analysis; if this occurs for other allotments on the current permit, those allotments may also be placed under the new authorization number since they would both be active permits and have the same expiration dates.

4. Adaptive Management and Flexibility[18]

Adaptive management is a system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting desired outcomes; and, if not, facilitating management changes that would best ensure outcomes are met. Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain and, in this context, adaptive management affords an opportunity for improved understanding. Knowing uncertainties exist in managing for sustainable ecosystems, some changes in management may be authorized, which include, but are not limited to, adjusting the rotation, timing, season of use of grazing, and livestock numbers:

- Based on the previous year's monitoring and current year's climatic conditions.
- Based on the previous year's monitoring of bitterbrush utilization, Cole Browse Transects, and/or other appropriate monitoring methods to ensure that at least 85 percent of existing deer winter range within this allotment remains intact.
- Due to drought, causing a lack of available water in areas originally scheduled to be used.
- To balance utilization levels.
- To protect the riparian and water resources.

Flexibility in grazing management would be authorized, and changes in rotations would only be allowed as long as they continue to meet resource objectives. Flexibility is dependent upon the demonstrated stewardship and cooperation of the permittee and occurs within the confines of the permit dates. Rangeland monitoring is a key component of adaptive management. As monitoring indicates changes in grazing management are needed to meet resource objectives, changes are implemented annually working with the permittee. A two-week period of flexibility would be allowed, both prior to and following the permitted season of use, in order to adjust grazing in response to annual climate and vegetative conditions, using adaptive management. Additional flexibility would occur within the terms and conditions of the grazing authorization.

Knowing uncertainties exist in managing for sustainable ecosystems, developments would be constructed in a phased-in approach, using adaptive management practices, and taking budget constraints into consideration, along with currently unforeseen ecological concerns

Criteria for determining success of new or maintained developments include:

- The ability to supply water from July through October (dry season).
- The ability to accommodate 20 to 100 head of livestock and/or wild horses during the dry season.

[18] Flexibility would not apply to Alternative G: Complete Removal of Livestock Grazing, since without livestock, this flexibility would not be needed. Adaptive management would continue to be used as it relates to other resources.

5. Monitoring

Monitoring, by BLM staff in coordination with the permittee, of the success in meeting allotment specific resource objectives and goals will take place within South Steens Allotment. Monitoring will occur no matter what the outcome of this document and related decision is. All monitoring will follow the direction provided in the CMPA and Andrews Management Unit (AMU) Monitoring Plan dated May 4, 2011 (or subsequent plan) and the 2005 CMPA RMP.

Grazing management will be monitored annually and may include utilization studies for each pasture grazed by livestock, along with use supervision reports and actual use reports, which will be collected by BLM staff. The modified Key Forage Plant Method will be used to measure utilization in each pasture. The target utilization levels for key forage plant species are no more than 50% utilization[19] on native upland perennial species (2005 CMPA RMP, p. 53). Utilization monitoring is performed yearly (as priorities, time, and budget constraints allow) after every pasture move, along a route transect performed by vehicle and/or horseback. Upland trend will be monitored approximately every five years (as priorities, time, and budget constraints allow) using Pace 180° methodology (Johnson and Sharp 2012; Rangeland Monitoring: Trend Studies Technical Reference TR 4400-4, 1984) and permanent photo points to measure the relative frequency of occurrence of key forbs, shrubs, and perennial grass species, in order to assess trend in rangeland condition. Soil Surface Factor methodology will be used to measure soil stability and Observed Apparent Trend will be assessed at each upland trend plot. Currently, there are eighteen upland trend monitoring plots within the allotment.

The Cole Browse Method will monitor antelope bitterbrush (*Purshia tridentata*), an important browse species for mule deer, on fall and winter range, as often as possible. This method documents livestock use of bitterbrush to determine what level of utilization occurs during different grazing treatments. Early use, during spring through seed head formation, on grasses usually does not affect growth rates of bitterbrush. Use of bitterbrush by livestock increases as seed heads ripen and as grasses and forbs enter dormancy. Moderate to heavy late season use of bitterbrush by livestock affects availability of browse for wintering mule deer and continued moderate to heavy use, year after year, affects reproductive capabilities of these plants. There are two existing Cole Browse transects established, one in Home Creek Pasture and one in Steens Pasture, but none have been established in the Tombstone or Hollywood pastures. Some additional transects will need to be established in each pasture to determine utilization rates and document reproductive status based on grazing schedule.

Wilderness areas will be monitored at least twice a year and WSAs will be monitored at a minimum of once per month, when accessible to the public, as directed in the 2005 CMPA RMP (RMP-81). Wild horses will be monitored annually. Monitoring may be

[19] Burns District BLM typically measures utilization percentage using an ocular method, not a weight method.

done using wild horse actual use data, observations, and/or utilization data, with censuses occurring approximately every 2 to 4 years.

Riparian monitoring will be completed approximately every 5 years using the Greenline and/or PFC methods. Cultural resources, Special Status Species, soils, recreation activities, and numerous other resources will be monitored periodically, as needed, throughout the allotment. An evaluation of management objectives and actions will be completed approximately 5 years after implementation of this AMP, and potential improvement construction through an allotment evaluation process.

New Monitoring includes:

- Establish new upland monitoring plots as needed to ensure plots are providing an accurate picture of what is happening across the pastures.
- Establish two to three Cole Browse transects based on the presence of suitable bitterbrush stands.
- Establish at least one new photo point at each spring/riparian area. If the decision to construct exclosures is made, one photo would be taken immediately after construction and retaken annually for the first five years after exclosure construction, and then on a 5 to 10 year interval.

6. General Project Design Elements

Project Design Elements (PDEs) were developed to aid in meeting project goals and objectives. These features are nonexclusive and are subject to modification based on site-specific terrain characteristics (topography and vegetation).

a. Proposed rangeland improvement sites would be surveyed for cultural values prior to implementation. Where cultural sites are found, their condition and National Register eligibility would be evaluated. If sites are determined to be National Register eligible, and under threat of damage, mitigation measures to protect cultural materials would be determined. Mitigation plans would be developed in consultation with the State Historic Preservation Office (SHPO), if necessary. Mitigation measures can include protective fencing, surface collection and mapping of artifacts, subsurface testing, and complete data recovery (full-scale excavation).

b. Proposed rangeland improvement sites would be surveyed for Special Status plant species prior to implementation. Special Status plant sites would be avoided.

c. New livestock facilities (livestock troughs, fences, corrals, handling facilities) would be constructed at least 1 km (0.6 mi.) from leks, in order to avoid concentration of livestock near leks, and reduce collision hazards to flying birds and avian predator perches.

d. All proposed wire fences, constructed within 1.25 mile of a lek or known seasonal use area (i.e. spring exclosures), would include anti-strike markers on the wires to reduce potential mortality from sage-grouse striking the fence.

e. No project construction or maintenance would occur April 1 through June 15 during sage-grouse nesting.

f. Proposed range improvement sites would be surveyed for noxious weed populations prior to implementation. Weed populations identified in or adjacent to the proposed projects would be treated using the most appropriate methods, in accordance with the 1998 Burns District Noxious Weed Management Program EA/Decision Record (DR) OR-020-98-05 or subsequent decision.

g. The risk of noxious weed introduction would be minimized by ensuring all equipment (including all machinery, 4-wheelers, and pickup trucks) is cleaned prior to entry to the sites, minimizing disturbance activities, and completing follow-up monitoring, to ensure no new noxious weed establishment occurs. Should noxious weeds be found, appropriate control treatments would be performed in conformance with the 1998 Burns District Noxious Weed Program Management EA/DR OR-020-98-05 or subsequent decision.

h. The grazing permittee would be responsible for all fence maintenance. Proper fence maintenance would be a stipulation for turnout each year.

7. Project Design Elements Specifically for Proposed Range Improvements

Additional PDEs were developed to aid in meeting specific project goals and objectives. These features are nonexclusive and are subject to modification based on site-specific terrain characteristics (topography and vegetation). Changes, additions or deletions would be made through coordination with appropriate BLM specialists, grazing permittee, and SMAC, and approved by the Field Manager. All projects implemented within WSAs would be constructed to reduce impacts to wilderness values on a site-specific basis, and measures would be taken to ensure a more natural appearance, including, but not limited to the features described below. If new methods of increasing the natural appearance of any of the below developments are found prior to construction, these new methods may be used as long as the level of disturbance from utilizing these methods is not greater than the methods described below. The design elements would apply to all proposed range improvements of the specified type (i.e. fence, well, pipeline, etc...), unless specifically provided for under the description of proposed range improvements for each alternative. The Industrial Fire Precaution Levels (IFPLs) will be followed during construction, where appropriate. Maintenance on all range improvements would be done, as needed, to ensure the continued functioning of the improvement; maintenance activities would be the minimum necessary to ensure continued functionality of the improvement and would not exceed the original disturbance footprint of the improvement. Some proposed range improvements are located on private land; however, this document is in no way binding to the landowner

and development of these improvements would still be decided by the landowner. Upon affirmative final decision to implement proposed range improvements, cooperative agreements (Form SF-4120-6) between the South Steens Allotment permittee and Burns District BLM would be completed to address each partner's responsibilities for labor, construction, maintenance, and/or supplies. There is currently a verbal agreement that the permittee would cost share selected range improvement projects.

a. Fencing: Fences around wells with solar panels would be as small as possible, while still protecting the well and power source, and would be constructed to BLM specifications for a 3-strand, barbed-wire fence to meet cattle, elk deer, and antelope requirements. Post spacing would be 22-feet (except in small exclosures were spacing may be less) and the maximum fence height would be 38 inches. The strands would be spaced beginning 16 inches from the ground, 10 inches between the bottom and middle strand, and 12 inches between the middle and top strands. The bottom strand would be smooth wire; the other strands would be barbed wire. Fences around springs and riparian areas may be a wood fence or four-strand barbed wire fence. These fences would include gates, as appropriate, to allow access for administration and recreational use. The wood fence would be approximately 48 inches tall and may be made of juniper that is removed from within the exclosure and surrounding area, when possible, or brought in posts, as needed. The wood fence would be designed to allow wildlife to access the riparian area. The wire fence height would be approximately 42 inches. The bottom wire would be smooth, and placed approximately 16 inches from the ground, while the third and bottom wires would be placed approximately 6 inches apart, the second and third wire would be approximately 8 inches apart, with the top and second wire placed approximately 12 inches apart. Metal stays would be used in each section of fence, to keep wires spaced appropriately. Posts would be standard metal posts, solid green in color. Green steel braces and stretch panels would be used where needed, instead of wood braces and rock cribs. Juniper trees may be used to support the fence where possible. Where required, anti-strike markers would be placed on fence wires to reduce bird (specifically Greater Sage-Grouse) collision, wood rail fences would not have reflectors. Only spot removal of rocks or vegetation would occur, when necessary, during construction. Pickups and four-wheel All-Terrain Vehicles (ATVs) would generally be used in construction, travel would be done in a manner that reduces establishment of tracks and any tracks adjacent to a road or way would be hand raked the distance necessary to deter the establishment of unauthorized routes.

   Wire placed within the WSAs would be green coated, where possible. In WSAs and Wilderness, pack animals would be used off existing roads, ways, or closed ways, to haul in materials and to access the site for construction.

b. Fence Removal: Fence removal would be completed by hand using pack animals. All posts and wire would be removed from the site. Removal of existing fences would occur within one year of constructing replacement fences.

c. Reservoir Construction: Reservoirs would be designed based on site-specific factors. Reservoir dams would be 10 to 20 feet high, a minimum of 12 feet wide on top of the dam, and less than 150 feet in length. Slope on the upstream side would be a 2 to 1 ratio (2:1). Slope on the downstream side would be no greater than 3:1; however, the downstream portion of the dam would be designed to blend in with the surrounding topography better, resulting in a shallower incline. Fill materials needed, to blend the upstream side of the dam with surrounding topography, would be hauled in, following all appropriate laws, policies, and regulations. The dam would be seeded with perennial grasses and, in areas where rocks are a prominent part of the landscape, would be strategically placed to promote naturalness. Spillways would be no less than 25 feet wide and 100 to 150 feet in length (may be longer as needed due to shallower dam slopes), with a smooth bottom and a mild grade to prevent cutting due to erosion. Rip rap (6 inch-10 inch rocks) may also be used to further prevent erosion. During construction, trees and shrubs would be removed from the dam site and flooded basin. Where possible trees and shrubs would be left in place to provide screening. The size of the disturbed area would depend on the size of the reservoir, but would be no more than two acres, with the permanent footprint of the reservoir being no more than one acre following revegetation. Any bentonite or borrow material[20] needed (such as clay soils) would be hauled in and placed in layers at the reservoir site. All disturbed areas would be reseeded after construction. A native/nonnative mix would be used in areas outside WSAs. Access to the sites would be by existing roads where available. If no access road is available, cross-country travel would occur; no new roads would be constructed to access these developments.

Within WSAs, only native seeds would be used. Within WSAs, shrub plantings and rock placement may occur, to reduce visual effects, on a site-specific basis, in areas where they are a prominent part of the landscape. No shrubs would be planted on dams to protect the structural integrity of the dam. Within WSAs, any cross-country travel with equipment would be done in a manner that reduces establishment of tracks and any tracks adjacent to a road or way would be hand raked, and seeded as necessary, for whatever distance needed to deter the establishment of unauthorized routes.

d. Reservoir Maintenance: Reservoirs would have sediment cleaned out of the basin and spill way (if needed) using a dozer or other large equipment, to increase reservoir depth to the original depth. If the reservoir is not holding water, bentonite would be applied. Dams and spillways would be repaired by a dozer, or other appropriate equipment, and may include the movement of rocks and sediment. Dams would be repaired by sealing and packing material on top of the dam with heavy equipment. New material may be obtained onsite, where possible outside WSAs or hauled in. When material is obtained onsite, the borrow area would be within the original area of disturbance, and would be rehabilitated to promote naturalness. Trees and shrubs within the reservoir, spillway, or on the

[20] The BLM would follow current laws, regulations, and policies when hauling in borrow materials.

dam may be removed, as needed, to improve structure soundness and functioning of the reservoir.

Within WSAs, any additional material needed would be brought in following appropriate laws, policies, and regulations. Any cross-country travel with equipment would be done in a manner that reduces the establishment of tracks, and any tracks adjacent to a road or way would be hand raked, and seeded if necessary, the distance needed to deter establishment of unauthorized routes.

e. Reservoir Abandonment: Any reservoir identified to be abandoned would not be cleaned nor have dams or spillways repaired. These reservoirs would not have any bentonite (or other clay soils) applied to increase water holding ability. No removal of trees or shrubs would be allowed. As these reservoirs fail, they would not be repaired. Seeding of grass and shrub species would occur within reservoirs that no longer function. The BLM would not physically remove these reservoirs. Natural reclamation would be allowed to occur.

Only native seed species would be utilized within WSAs.

f. Wells: Access for well-drilling equipment would use existing roads and ways. Any needed materials (rocks or soil) would be hauled in with a dump truck. Roads and ways needed for access may receive spot maintenance in accordance with the Transportation Plan (TP) and Travel Management Plan (TMP), which would generally consist of removing rocks and tree limbs or trees in order to provide for safe passage by vehicles. The well site would consist of an original disturbance area of approximately 100 by 100 feet, within approximately 30 feet of a route. The entire disturbed area would be seeded with a native/non-native seed mix outside WSAs and with a native seed mix within WSAs, to increase the rate of recovery. Following seeding/rehabilitation of the disturbed site, the permanent footprint would be no more than 20 by 20 feet. In general, an 8 to 12-inch diameter hole would be drilled at each well site to accommodate 6-inch casing (pipe). Casing would be used for the entire depth of the hole unless solid rock is encountered. Pump size would be dependent upon depth of well and location of storage tank (if needed). The pump in the well would be powered using solar power, a fuel generator, or both. The well and power source would be fenced, using the above-mentioned fencing standards. The fence would be the minimum needed to protect the well and energy source. Vegetative and topographic screening would be utilized as much as possible to minimize visual disturbance.

Panels for solar energy would be installed using a tractor with an auger. Poles would be 8 inches in diameter and concreted in the ground; solar panels would be mounted upon the poles. Pole height would be as low as possible, while still allowing panels to clear vegetation. The well and solar panels would be fenced to protect them from wild horses, livestock, and large wildlife species. The fence would follow the design features previously outlined, and would be no more than

0.1 mile in length. The smallest total area would be used. Panels vary in size from 16 to 40 inches in length by 40 to 70 inches in width. Reduced glare solar panels, with camouflage netting applied to the back of the solar panels, would be used when available. Solar panels would only be utilized if they would meet the power requirements of the pump, dependent on well depth and water production. This determination would be made by an engineer or other expert in the area.

Fuel-powered generators would be 5,000 kilowatts, or smaller, with the exact size determined by well characteristics and availability. Generators would either be located within a small trailer, that is painted green in color to blend in with the surroundings, or placed in a small, three-sided pit (no more than 10 feet x 10 feet x 36 inches). Placing the generator in a pit would reduce the visual disturbance of the generator. With either option, the generator would be covered or enclosed to protect the generator and reduce noise pollution. Generators would be expected to run 4 to 16 hours a day depending on water consumption, and may be audible up to one-quarter mile under some conditions. Technology is now available to use satellites to start, stop and notify users when problems arise with the generators; timers are also available to control times when generators operate. This technology may be used if appropriate and feasible. To limit the amount of time the generator operates, level switches could be installed in the storage tank (if present), these would only turn the generator on when the storage tank went below one-half full and would turn off when full. When wells are not in use, generators would be removed.

Windmills can also be used to power a well. They are approximately 20 feet high, placed on 8 by 8 foot concrete bases, and installed directly over the well head using a boom truck. Equipment required would also include a backhoe and a concrete truck. However, based on the estimated depth of the proposed wells, it is not likely that windmills would be a viable option since windmills are not known to be effective in deep wells.

Within WSAs, only native seed species would be utilized.

g. Storage Tanks: Storage tanks would be at most 8 feet high by 28 feet in length and hold up to 10,000 gallons of water. Smaller tanks that would hold 5,000 gallons (approximately 8 feet in height by 14 feet in length) would be utilized where they would fit the needs of the site. Tank size would be based on water production of the well (a lower producing well would require a larger storage tank). Storage tanks may be associated with wells, when necessary depending on the well and site characteristics and water system design. Storage tanks would be buried near the associated well, at a location that is higher than the associated pipeline and troughs, to allow it to gravity feed where possible. Buried tanks would disturb approximately a 12-foot wide by 36-foot long area (less for smaller tanks). A manhole, 36 inches-48 inches in diameter, covered, that would rise approximately 6 inches above ground level would be installed to provide access to the storage tank. Areas disturbed would be contoured to blend in with the

surrounding undisturbed area to the extent possible. The disturbed area would be seeded with a native/nonnative mix outside WSAs; only native seeds would be used within WSAs. Equipment for installation would include an excavator, backhoe, or other heavy equipment, and a lowboy truck and trailer to haul in the tank. Access would require use of a maintained road. Maintenance would occur as described under the Wells PDE.

Within WSAs, only native seed species would be utilized.

h. Pipelines: Pipeline trenches would be constructed using a steel-tracked crawler, with ripper and plastic pipe laying apparatus, within approximately 30 feet of a route. A trench would be dug with a simple ripping tooth, as deep as possible, but no deeper than 36 inches, and approximately 3 inches wide. A 2-inch black plastic (polyethylene) pipe would then be placed in the trench. All disturbed areas would be reseeded after construction, using a native/nonnative mix in areas outside WSAs; within WSAs, only native seeds would be used. The area would be further naturalized by returning rocks (mossy side up) disturbed by pipeline installation to their approximate original location, in order to reduce the appearance of rock berms and to break up the linear shape of the pipeline. In some areas, it may not be possible to trench in the pipeline due to a rock layer. In these areas, a portion of the black plastic pipe may lie directly on the ground or just beneath the ground's surface. Efforts would be made to cover the pipe, as much as possible, without creating a dirt berm. Valve covers and vents would not be more than 6 inches above ground and would consist of a vertical piece of culvert with a lid, both of which would be painted to blend in to the surrounding vegetation.

Within WSAs, only native seed species would be utilized.

i. Troughs: Outside WSAs, up to 10,000 gallon bottomless troughs would be installed[21]. These troughs are circular, up to 30 feet in diameter, with a 4 to 6-inch concrete bottom, and a 2 to 4-foot concrete apron to aid in erosion control. The sides of the trough would be 2 feet high and constructed of galvanized metal. A backhoe would be used to scrape dirt, to form the area for a tough, within approximately 30 feet of a route. A concrete truck would haul concrete to the site to construct the apron and concrete bottom. The area disturbed during installation of the trough would be approximately 100 by 100 feet. The metal would be painted to blend in with the surrounding environment using the BLM Standard Environmental Color of Shadow Gray or another color determined by onsite vegetative characteristics.

Within WSAs 1,200 gallon, galvanized metal troughs, measuring 4 feet by 12 feet by 21 inches, would be utilized. If the site is expected to service large numbers of

[21] Smaller troughs including smaller bottomless troughs or galvanized troughs, may be used outside of WSAs if there is no need for a larger trough. However, the disturbance for these smaller troughs would always be less than for the bottomless trough described here.

wild horses and/or livestock, multiple troughs may be installed, or the width of the troughs may be increased. Trough sites would be leveled using a backhoe. Disturbance associated with the installation of standard galvanized troughs would be approximately 50 by 50 feet. Rock hauled by a dump truck is then put around the trough using a backhoe to reduce soil compaction by livestock and assist in blending the site with the surrounding area. These troughs would be partially buried (where possible) in order to place the top of the trough below the dominant shrub vegetation. Rocks may be placed or concreted around the trough, and the trough may be chemically treated and/or painted to reduce glare. The specific treatments would be determined on a site-by-site basis and would be determined by members of the IDT.

Wildlife escape ramps would be installed in each trough. Escape ramps would be fabricated of metal or may be a pile of rocks in one part of the trough. All troughs would have trough floats installed to prevent water from overflowing, as well as an overflow pipe to protect the site in the event the float valve is damaged, preventing water from being turned off, and resulting in water continuously flowing into the trough. Troughs would be located far enough away from a well or spring source/exclosure to minimize damage to the water source site; however, they would be within 250' of the water source. Troughs located on pipelines would be located within 50' of the main pipeline.

j. Spring Protection/Exclosures: Springs identified to be protected, or enclosed, and meadow exclosures would be fenced using the standards mentioned above under fencing. The fence would be located 10-20 feet from the edge of meadow or riparian vegetation in order to reduce grazing pressure on the fence from wild horses and livestock. Fences would be marked with anti-strike markers to reduce the possibility of wildlife collisions with the fence, where appropriate. Generally, each exclosure would be approximately 2 to 6 acres, though the exact size would vary depending on the spring and the surrounding riparian area. Juniper trees within the exclosures may be cut (old growth junipers would remain standing) to further protect the spring source and promote the riparian area. Trees not used for the fence, may be left, or would be hand piled (outside the exclosure and riparian area) and burned.

k. Spring Development: Spring development would consist of surrounding the spring with fencing (see Spring Protection/Exclosures above), installing a spring box to gather water, and a short pipeline to carry water to a 4 by 12-foot metal trough. Spring boxes, generally consisting of a 1½-foot diameter galvanized steel culvert and drain rock, would be installed using a rubber-tired backhoe. Any part of the headbox that is visible would be painted to blend in with the surrounding environment; however, the majority, if not all of the spring box, would be buried. Pipeline installation and trough placement would be as described above, with the trough located outside the fenced exclosure. Length of pipeline would be determined by exclosure size and trough placement. Depending on the water flow at the spring, more than one trough may be installed. All troughs would be

constructed with a valve that would allow control of water flow into the trough. Troughs would be constructed with a float valve to prevent overflow; however, an overflow pipe would be installed to prevent loss of water in the event the float valve fails and water continue to flow into the trough, the overflow pipe would carry water back into the spring exclosure. The flow valve and overflow would result in only the water needed to fill the trough(s) being permanently removed from the spring source. Juniper trees within the exclosures may be cut (old growth junipers would remain standing) to further protect the spring source and promote the riparian area. Trees not used for the fence, may be left, or would be hand piled and burned outside the exclosure and riparian area.

l. Seeding/Rehabilitation: Outside WSAs, a mix of native and nonnative species would be seeded in order to provide the best chance of success; non-native species, such as crested wheatgrass, are often more competitive with annual grasses such as cheatgrass. Seeding of disturbed areas would occur using an ATV with a seeder attachment for large areas, or by hand using a seed thrower in smaller areas.

Within WSAs, only native species would be seeded and seeding would be completed by hand.

B. Alternative A: No Action

The No Action Alternative would renew the existing livestock grazing permit for South Steens Allotment for 10 years, continuing the current grazing management, for the permitted season of use of April 1 through October 31. Active grazing preference would remain at 9,577 AUMs[22] on public land. Even though the permittee has elected to use fewer AUMs over the past 12 years (with BLM approval), it has generally been due to limited water availability and in wet years, full use is possible. This analysis shows the on-the-ground effects of utilizing the full permitted AUMs. The permit would be issued with the same terms and conditions as the expiring permit[23]. Management would continue as identified in the 1995 AMP to the extent possible. The permittee is expected to continue to use less than full grazing preference in order to reduce the risk of not meeting S&Gs in the future due to poor distribution as a result of limited reliable water sources. The permittee would continue to be able to apply for full permitted active use, which would only be limited in years when utilization reached 50% in accessible areas, often prior to receiving full AUM use from South Steens Allotment, or if resource damage was documented as a result of using the full permitted active use. No range improvements would be constructed under this alternative. Existing improvements, including those within WSAs, would continue to be maintained following existing policy.

[22] Authorized/Permitted AUMs would be as close to this number as possible using the adjusted season of use, without exceeding this number. The current method for calculating AUMs does not always allow for an exact number of AUMs to be placed on a permit.
[23] The current grazing permit expires 2-28-2014.

C. Alternative B: Proposed Action – Management Changes and Range Improvements

The Proposed Action was developed by the BLM IDT in order to address identified resource concerns/issues and Standards determination that two of five Standards were not fully achieved in the allotment with wild horses, livestock, and juniper encroachment being causal factors. The Proposed Action conforms to all Guidelines by providing periodic growing season rest to all areas of the allotment. In addition, AMP components discussed under the section *Actions Common to All Alternatives Except the No Action Alternative*, management discussed below would also be incorporated as part of the new AMP.

1. Permit Renewal

The Proposed Action includes renewal of the existing livestock grazing permit for South Steens Allotment for the current permittee. A new 10-year term livestock grazing permit would be issued, to continue 9,577 active use AUMs of livestock grazing on public land. No changes to permitted AUM numbers would occur. The season of use would be shortened slightly, from April 1 through October 31 to April 15 through October 31. The percentage public land (PL%) based on forage, would remain at 94% for the allotment; however, the PL% for each pasture would be added as a Term and Condition of the permit, and the pasture PL% is what would be used for billing purposes in each pasture. The PL% for each pasture is currently calculated at: Hollywood Pasture - 93%, Tombstone and Steens pastures - 99% and Home Creek Pasture - 76%. Percentage public land would be adjusted, as necessary, following any land sales or purchases, exclusion of private property (fences), allotment/pasture boundary adjustment or correction, etc..., or new production information occurring within South Steens Allotment and the permittee would be billed using the most accurate PL% calculations.

New Terms and Conditions on the permit would include adjusting the season of use, adjusting the PL% by pasture for billing purposes, authorizing actual use billing, and this AMP/EA and associated decision(s). In addition, a Term and Condition requiring that the permittee open gates, not only within the allotment interior, but also between South Steens Allotment and the portion of the HMA within Steens Mountain Wilderness, following livestock removal each year and closed prior to livestock grazing would be added to aid the free movement of wild horses throughout the HMA.

2. Livestock Grazing Management

Livestock grazing management is designed to provide periodic growing season rest for plant species. Use periods in each pasture may vary annually in order to provide for recommended rest periods as described in the Proposed Grazing System in Table 2. Approximate use dates are not provided in the proposed grazing system due to the location of the allotment on the western edge of Steens Mountain, where climatic conditions can vary greatly from year to year. This variation result in key forage species entering vegetative states on different dates, which is why livestock grazing management is based on grazing treatments and not specific dates (see Appendix A for Grazing Treatment Descriptions). Livestock use dates for each pasture would be determined on

an annual basis based on the vegetative stages of key forage species and the prescribed grazing treatment. Permitted season of use would be April 15 through October 31, which would be adequate to carry out the proposed grazing management. Livestock numbers may also vary annually as outlined under Adaptive Management (Chapter II, A. Actions Common to All Alternatives); however, total permitted AUMs would not exceed 9,577. Prior to authorizing grazing each year, monitoring data and current climatic conditions, such as drought, would be taken into consideration. This may result in changes to stocking levels, pasture rotations and timing of grazing in order to best meet objectives. Any modifications to the proposed grazing system would conform to the utilization target of 50% for native, key forage species, and care would be taken to ensure all pastures received periodic growing season rest. Adjustments to the permitted season of use, not to exceed 14 days, may be allowed to provide flexibility in meeting resource objectives, dependent on annual climate and growing conditions.

Hollywood Pasture receives high levels of wild horse use in the winter and spring. Therefore, Hollywood Pasture would primarily be used as a turnout and gather pasture to get cattle to and from Tombstone Pasture, resulting in early and defer grazing treatments. Utilization in the spring would be limited to 30% (livestock and wild horse utilization combined) in order to provide enough forage for livestock during fall gathering and fall and winter wild horse use. Overall utilization in the fall would be limited to 50% (livestock and wild horse utilization combined). Defer (fall) use would only be authorized if maximum utilization levels would not be exceeded during the livestock use period, based on utilization determinations made prior to defer use occurring. In one year out of four, Hollywood Pasture would receive complete livestock rest, with livestock being allowed to trail through the pasture when being moved between the Tombstone Pasture and private property.

Tombstone Pasture would rotate between an early/graze and a defer treatment, every other year. Steens Pasture would also rotate between an early/graze and defer treatment; however, it would be on an opposite rotation from Tombstone Pasture. Home Creek Pasture would only be given an early treatment, with one year of complete rest every fourth year.

Under this rotation, all pastures would receive growing season rest from livestock, at least every other year, with both Hollywood and Home Creek Pastures receiving growing season rest from livestock every year. Providing periodic growing season rest for all pastures would result in continued conformance to Guidelines.

Table 2: Proposed Grazing System

Pasture	Cows	Year 1	Year 2	Year 3	Year 4	AUMs
Hollywood	500	Early/Defer	Rest	Early/Defer	Early/Defer	510
Tombstone	1,200	Early/Graze	Defer	Early/Graze	Defer	3,900
Steens	1,200	Defer	Early/Graze	Defer	Early/Graze	3,307
Home Creek	1,000	Early	Early	Early	Rest	1,860

3. Proposed Range Improvements

Proposed rangeland improvement activities include spring development and protection, a riparian exclosure, well, pipeline, and trough installation, new reservoir construction, and maintenance and abandonment of existing reservoirs. All range improvements would follow *General Project Design Elements* (Chapter II.A.6.) and *Project Design Elements Specifically for Proposed Range Improvements* found under Chapter II.A.7., unless provided for below. All proposed range improvements would be located in the area shown on Map 7 - Alternative B: Proposed Range Improvements; however, some minor changes in location may be made during construction as described under the *Actions Common to all Alternatives* section above. No range improvements proposed outside a WSA would be allowed to be moved to within a WSA. See Map 3 for the location of existing range improvements and Map 7 locations of proposed range improvements.

Under the Proposed Action, 13 currently existing reservoirs, both within and outside of WSAs, would be maintained and 9 existing reservoirs would be abandoned. Any existing reservoirs that are not identified to undergo maintainence at this time may be maintained in the future, following appropriate NEPA analysis. Nine new reservoirs would be constructed, all located in WSAs. These new proposed reservoirs would provide a water source that would result in areas not currently accessible (i.e. used by) wild horses and/or livestock (due to the lack of water) to become accessible.

This alternative proposes the protection of two springs, one of which is partially on private property[24] and partially within a WSA (S1 Three Springs); the other (S2 Weaver Spring) is fully within a WSA. Spring protection would include fencing of the riparian areas to reduce damage caused by wild horses and livestock. The fence at Three Springs (S1) would exclose approximately 10 acres. Approximately 5 acres of the full exclosure would be on BLM-administered land; the exclosure would require approximately 0.5 mile of fence, approximately half of which would be on BLM-managed land. At Weaver Spring (S2), less than one acre would be exclosed; the total amount of fence required would be less than 0.1 mile. Fences would be located approximately 20 feet outside the riparian areas to reduce livestock and wild horse pressure on them. At Weaver Spring, a road crosses the riparian area created by spring runoff. To protect the riparian area, and prevent multiple sets of ruts from vehicles trying to maneuver through wet areas, a crossing would be created using rock and gravel.

Two other springs would be developed; this would include exclosure fences to protect the riparian area, as well as troughs located outside the exclosures to continue allowing the spring to be a watering source for animals. If it is determined water flow is not adequate to install a trough, no headbox, pipeline, or trough would be installed, and any disturbance would be rehabilitated. Fences would still be constructed to provide for spring protection. The spring exclosure fences would be dependent on the sizes of the riparian areas around the springs. The fences would be located approximately 20 feet outside the riparian areas to reduce livestock and wild horse pressure on them. One of the

[24] By analyzing proposed range improvements that would be located on private property, the BLM would be able to assist the landowner with development, most often in the form a labor or supplies. If the BLM assisted with development, all project design elements would be followed, including cultural clearances. However, the analysis of these range improvements does not guarantee that they would be constructed, nor does it in any way bind the landowner.

springs, S4, is Burnt Car Spring. Burnt Car Spring was initially an action common to all alternatives; the development was authorized under a new Decision Record for the Implementation EA. However, the redevelopment of Burnt Car Spring is being fully analyzed within this document. There is currently a large cistern type storage tank at Burnt Car Spring. This tank presents an entrapment danger for wildlife, wild horses, and livestock where animals may fall into the tank and be unable to get out. Some bones within the tank suggest that this occassionally occurs. This could be potentially dangerous for recreators. In order to increase safety at Burnt Car Spring, a concrete saw would be brought out to the spring site, and a "doorway" cut into the tank to eliminate the risk of entrapment. The other spring, S3, known as Broken Leg Spring, currently has a route passing directly through the spring (located at T. 34 S., R. 32¾ E., Section 19). In order to effectively protect this spring, the existing route would be realigned approximately 150 feet west of the spring for a distance of approximately 250 feet. The new portion of this route would be created primarily by passage of a vehicle; however, to provide safe access, large rocks may need to be moved with equipment followed by filling of holes with soil. This would be the only work allowed to be done with equipment for the route realignment. The old route, approximately 200 feet long, would be barricaded using downed juniper from the immediate area and reseeded using native seed if necessary. If this alternative was selected, this EA would amend the CMPA Travel Management Plan to incorporate this route realignment.

In addition to spring development and protection, one riparian meadow exclosure, approximately 2.3 acres, would be constructed to protect a riparian meadow area within South Fork Donner und Blitzen WSA.

Juniper trees may be cut within the spring and riparian exclosures in order to further protect the spring source and promote the riparian areas; old growth trees would remain standing.

Of the wells, none would be located within WSAs, and all of them would be powered with solar power or generators, depending on the site characteristics of each well site. Two wells would each have a pipeline running off them, which would be approximately 0.5 and 0.1 miles in length, depending on the location. One pipeline would flow into a trough; the other would flow into a maintained reservoir. If solar panels are used, the protection fences around the wells and solar panels would be no longer than 0.1 mile each, and would be the minimum required to protect the development from damage caused by animals.

All troughs are associated with spring developments, wells, and pipelines. Three troughs located outside WSAs would be 30 foot bottomless troughs (or smaller)[25] and the troughs located within WSAs would be galvanized metal troughs.

Of the range improvements proposed under this alternative 14 of 19 would be new improvements within WSAs. Associated with these improvements would be two troughs

[25] For analysis purposes assume 30 foot bottomless troughs would be installed, since they would have the most disturbance compared to smaller troughs.

also located in the WSAs at spring developments. In addition, nine of the proposed improvements would be the maintenance of existing reservoirs within WSAs and there would be nine abandonments of reservoirs within WSAs. Table 3 lists what improvements are proposed and which, if any, WSA they would be located within.

Table 3: Alternative B: Proposed Range Improvements

ID #	Action	Within WSA?
Existing Reservoir (ER) Maintenance		
ER1	Maint.	Not in a WSA
ER2	Maint.	Not in a WSA
ER3	Maint.	Blitzen River WSA
ER7	Maint.	S. Fork Donner und Blitzen WSA
ER9	Maint.	S. Fork Donner und Blitzen WSA
ER10	Maint.	S. Fork Donner und Blitzen WSA
ER11	Maint.	S. Fork Donner und Blitzen WSA
ER12	Maint.	Home Creek WSA
ER14	Maint.	S. Fork Donner und Blitzen WSA
ER15	Maint.	Not in a WSA
ER17	Maint.	S. Fork Donner und Blitzen WSA
ER21	Maint.	Home Creek WSA
ER24	Maint.	Not in a WSA
ER5	Abandon	S. Fork Donner und Blitzen WSA
ER6	Abandon	S. Fork Donner und Blitzen WSA
ER8	Abandon	S. Fork Donner und Blitzen WSA
ER13	Abandon	Home Creek WSA
ER18	Abandon	S. Fork Donner und Blitzen WSA
ER19	Abandon	S. Fork Donner und Blitzen WSA
ER20	Abandon	Home Creek WSA
ER22	Abandon	Home Creek WSA
ER23	Abandon	S. Fork Donner und Blitzen WSA
TOTAL	**13 Maintain; 9 Abandon**	
Proposed Reservoirs (R)		
R4	New	Blitzen River WSA
R5	New	Blitzen River WSA
R6	New	Blitzen River WSA
R7	New	S. Fork Donner und Blitzen WSA
R11	New	S. Fork Donner und Blitzen WSA
R12	New	S. Fork Donner und Blitzen WSA
R13	New	S. Fork Donner und Blitzen WSA
R14	New	S. Fork Donner und Blitzen WSA
R15	New	S. Fork Donner und Blitzen WSA
TOTAL	**9**	
Proposed Spring Development (S)		
S1	Protect	S. Fork Donner und Blitzen WSA/Pvt.
S2	Protect	S. Fork Donner und Blitzen WSA
S3	Develop	S. Fork Donner und Blitzen WSA
S4	Develop	Blitzen River WSA
TOTAL	**2 Protect; 2 Develop**	
Proposed Wells (W)		
W3	New	Not in a WSA
W6	New	Not in a WSA
W13	New	Not is a WSA
TOTAL	**3**	
Proposed Pipelines (P)[26]		
P4	0.5 Miles	Not in a WSA
P8	0.1 Miles	Not in a WSA
TOTAL	**2 Pipelines, 0.6 Miles**	
Proposed Troughs (T)		
T6	New	Not in a WSA
T7	New	Blitzen River WSA
T11	New	Not in a WSA
T18	New	Not in a WSA
T24	New	S. Fork Donner und Blitzen WSA
TOTAL	**5**	
Riparian Meadow Exclosure Construction (E)		
E1	0.3 Miles	S. Fork Donner und Blitzen WSA
TOTAL	**1 Exclosure; 0.3 Miles Fence; 2.2 Acres**	

[26] This section, under all alternatives, only shows pipelines that lead to separate troughs, not the short pieces of pipeline that will be required to install a trough at a well or spring.

D. Alternative C: Maximum Water Distribution

Under Alternative C, Permit Renewal and Livestock Grazing would occur as described in Alternative B: Proposed Action. The difference between Alternative B and this alternative occurs in the number and types of proposed range improvements.

Rangeland improvement activities would include spring development, well, pipeline, and trough installation, maintenance and abandonment of existing reservoirs, and new reservoir construction. All range improvements would follow *General Project Design Elements* (Chapter II.A.6.) and Project Design Elements Specifically for Proposed Range Improvements found

above under Chapter II.A.7., unless provided for below. All range improvements would be located in the area shown on Map 8; however, some minor changes in location may be made during construction as described under the Actions Common to all Alternatives section above. No range improvements proposed outside a WSA would be allowed to be moved to within a WSA. See Map 3 for the location of existing range improvements and refer to Map 8 for Alternative C: Proposed Range Improvement locations.

Under this alternative, 16 currently existing reservoirs, both within and outside of WSAs would be maintained and seven existing reservoirs would be abandoned. Any existing reservoirs not identified to undergo maintenance at this time may be maintained in the future, following appropriate NEPA analysis. Seventeen new reservoirs would be constructed, all located in WSAs and in areas identified as not being accessible to (i.e. used by) wild horses and livestock due to the lack of water.

This alternative proposes the development of all four springs. Broken Leg Spring (S3) and Burnt Car Spring (S4) would be developed as discussed under Alternative B. This would include exclosure fences to protect the riparian area, as well as troughs located outside the exclosures to continue allowing the spring to be a watering source for animals. If it is determined water flow is not adequate to install a trough, no headbox, pipeline, or trough would be installed, and any disturbance would be rehabilitated; the fences would still be built to provide for spring protection. The spring exclosure fences would be dependent on the sizes of the riparian areas around the springs. The fences would be located approximately 20 feet outside the riparian areas to reduce livestock and wild horse pressure on them. In order to increase safety at Burnt Car Spring, a concrete saw would be brought out to the spring site, and a “doorway” cut into the tank to eliminate the risk of entrapment. Development at Broken Leg Spring would include realigning the existing route approximately 150 feet west of the spring for a distance of approximately 250 feet. The new portion of this route would be created primarily by passage of a vehicle; however, to provide safe access, large rocks may need to be moved with equipment followed by filling of holes with soil. This would be the only work allowed to be done with equipment for the route realignment. The old route could be barricaded using downed juniper from the immediate area and reseeded using native seed if necessary. The CMPA Travel Management Plan would be amended to reflect the reroute, following completion of route realignment. Three Springs (S1) and Weaver Spring (S2) would be developed following PDEs in Chapter II.A.7, with the exclosure fences occurring as described under Alternative B. The Weaver Spring road crossing would be created using rock and gravel as described under Alternative B.

Of the proposed wells, four would be located within WSAs and six would be outside WSA; all of them would be powered with solar power or generators, depending on the site characteristics of each well site. There would be ten pipelines running off the wells, for 14.6 miles of pipelines, with some wells supporting multiple pipelines. If solar panels are used, the protection fences around the wells and solar panels would be no longer than 0.1 mile each, and would be the minimum required to protect the development from damage caused by animals rubbing on them.

All troughs are associated with spring developments, wells, and pipelines. Under this alternative, 24 new troughs would be installed. The 10 troughs located outside WSAs would be

up to 30 foot bottomless troughs[27]. The other troughs located within WSAs would be galvanized metal troughs.

See Map 8 for range improvements proposed under Alternative C. In addition to the proposed range improvements previously mentioned as being on private property, this alternative would include one spring, three wells, and four troughs located (at least partially) on private property. Of the range improvements proposed under this alternative 32 of 41 are new improvements within WSAs. Associated with the proposed spring developments, wells, and pipelines are 24 new troughs, 14 of which would be located within the WSAs. In addition, 13 existing reservoirs within WSAs would be maintained and seven reservoirs within WSAs would be abandoned. Table 4 lists proposed improvements, length when applicable, and which, if any, WSA they are located within.

[27] For analysis purposes assume 30 foot bottomless troughs would be installed, since they would have the most disturbance compared to smaller troughs.

Table 4: Alternative C: Proposed Range Improvements

ID #	Action	Within WSA?
Existing Reservoir (ER) Maint. / Abandonment		
ER1	Maint.	Not in a WSA
ER2	Maint.	Not in a WSA
ER3	Maint.	Blitzen River WSA
ER4	Maint.	S. Fork Donner und Blitzen WSA
ER5	Maint.	S. Fork Donner und Blitzen WSA
ER6	Maint	S. Fork Donner und Blitzen WSA
ER7	Maint.	S. Fork Donner und Blitzen WSA
ER8	Maint.	S. Fork Donner und Blitzen WSA
ER9	Maint.	S. Fork Donner und Blitzen WSA
ER10	Maint.	S. Fork Donner und Blitzen WSA
ER11	Maint.	S. Fork Donner und Blitzen WSA
ER12	Maint.	Home Creek WSA
ER13	Maint.	Home Creek WSA
ER14	Maint.	S. Fork Donner und Blitzen WSA
ER15	Maint	Not in a WSA
ER17	Maint.	S. Fork Donner und Blitzen WSA
ER16	Abandon	S. Fork Donner und Blitzen WSA
ER18	Abandon	S. Fork Donner und Blitzen WSA
ER19	Abandon	S. Fork Donner und Blitzen WSA
ER20	Abandon	Home Creek WSA
ER21	Abandon	Home Creek WSA
ER22	Abandon	Home Creek WSA
ER23	Abandon	S. Fork Donner und Blitzen WSA
TOTAL	**16 Maintain, 7 Abandon**	
Proposed Reservoirs (R)		
R1	New	Blitzen River WSA
R2	New	Blitzen River WSA
R3	New	Blitzen River WSA
R4	New	Blitzen River WSA
R5	New	Blitzen River WSA
R6	New	Blitzen River WSA
R7	New	S. Fork Donner und Blitzen WSA
R8	New	S. Fork Donner und Blitzen WSA
R9	New	S. Fork Donner und Blitzen WSA
R10	New	S. Fork Donner und Blitzen WSA
R12	New	S. Fork Donner und Blitzen WSA
R13	New	S. Fork Donner und Blitzen WSA
R14	New	S. Fork Donner und Blitzen WSA
R15	New	S. Fork Donner und Blitzen WSA
R16	New	S. Fork Donner und Blitzen WSA
R17	New	S. Fork Donner und Blitzen WSA
R18	New	S. Fork Donner und Blitzen WSA
TOTAL	**17**	
Proposed Spring Development (S)		
S1	Develop	S. Fork Donner und Blitzen WSA/Pvt.
S2	Develop	S. Fork Donner und Blitzen WSA
S3	Develop	S. Fork Donner und Blitzen WSA
S4	Develop	Blitzen River WSA
TOTAL	**Develop 4**	
Proposed Wells (W)		
W1	New	Blitzen River WSA
W2	New	Not in a WSA - Private
W3	New	Not in a WSA
W4	New	Not in a WSA
W5	New	Not in a WSA - Private
W6	New	Not in a WSA
W7	New	Not in a WSA - Private
W8	New	S. Fork Donner und Blitzen WSA
W9	New	S. Fork Donner und Blitzen WSA
W15	New	S. Fork Donner und Blitzen WSA
TOTAL	**10**	
Proposed Pipelines (P)		
P1	1.2 Miles	Blitzen River WSA
P2	1.2 Miles	Not in a WSA
P3	0.9 Miles	Blitzen River WSA
P4	0.9 Mile 0.5 Mile	Blitzen River WSA Not in a WSA

P5	1.7 Miles	Blitzen River WSA
P6	1.6 Miles	Not in a WSA
P7	2.2 Miles	S. Fork Donner und Blitzen WSA
P9	1.7 Miles	Not in a WSA
P10	2.2 Miles	S. Fork Donner und Blitzen WSA
P16	0.5 Miles	S. Fork Donner und Blitzen WSA
TOTAL	**10 Pipelines; 14.6 Miles**	
Proposed Troughs (T)		
T1	New	Blitzen River WSA
T2	New	Not in a WSA
T3	New	Not in a WSA - Private
T4	New	Blitzen River WSA
T5	New	Blitzen River WSA
T6	New	Not in a WSA
T7	New	Blitzen River WSA
T8	New	Not in a WSA
T9	New	Blitzen River WSA
T10	New	Blitzen River WSA
T12	New	S. Fork Donner und Blitzen WSA
T13	New	S. Fork Donner und Blitzen WSA
T14	New	S. Fork Donner und Blitzen WSA
T15	New	S. Fork Donner und Blitzen WSA
T18	New	Not in a WSA
T19	New	Not in a WSA - Private
T21	New	S. Fork Donner und Blitzen WSA
T22	New	Not in a WSA
T23	New	Not in a WSA - Private
T24	New	S. Fork Donner und Blitzen WSA
T25	New	Blitzen River WSA
T28	New	S. Fork Donner und Blitzen WSA
T29	New	Not in a WSA
T32	New	Not in a WSA - Private
TOTAL	**24**	

In addition, AMP components discussed under the section *Actions Common to All Alternatives except the No Action Alternative* would also be incorporated as part of the new AMP.

E. Alternative D: Along Road Development

Under Alternative D, Permit Renewal and Livestock Grazing Management would occur as described in Alternative B: Proposed Action. Alternative D would focus the development of range improvements along roads and ways, in order to limit surface disturbance and improve access for construction and maintenance. Rangeland improvement activities would include spring development and protection, well, pipeline, and trough installation, maintenance and abandonment of existing reservoirs, new reservoir construction, and fence relocation. All range improvements would follow *General Project Design Elements* (Chapter II.A.6.) and Project Design Elements Specifically for Proposed Range Improvements found above under Chapter II.A.7., unless provided for below. All range improvements would be located in the area shown on Map 9; however, some minor changes in location may be made during construction as described under the Actions Common to all Alternatives section above. No range improvements proposed outside a WSA would be allowed to be moved to within a WSA.

Under this alternative, seven currently existing reservoirs, both within and outside of WSAs, would be maintained and two existing reservoirs would be abandoned (both within WSAs). See Map 3 for the location of existing range improvements. Any existing reservoirs not identified to undergo maintenance at this time may be maintained in the future, following appropriate NEPA analysis. One new reservoir would be constructed, in the Blitzen River WSA.

The two springs, Burnt Car (S4) and Weaver (S2), which are not located along a road or way, would still receive protection in the form of an exclosure fence. Burnt Car Spring would also be modified as described in the proposed action to address the safety issue. Broken Leg Spring (S3) and Three Springs (S1) would be developed. This would include exclosure fences to protect the riparian area, as well as troughs located outside the exclosures to continue allowing the spring to be a watering source for animals. If it is determined water flow is not adequate to install a trough, no headbox, pipeline, or trough would be installed, and any disturbance would be

rehabilitated; the fences would still be built to provide for spring protection. The spring exclosure fences would be dependent on the sizes of the riparian areas around the springs. The fences would be located approximately 20 feet outside the riparian areas to reduce livestock and wild horse pressure on them. Development at Broken Leg Spring (S3) would include realigning the existing route approximately 150 feet west of the spring for a distance of approximately 250 feet. The new portion of this route would be created primarily by passage of a vehicle; however, to provide safe access, large rocks may need to be moved with equipment followed by filling of holes with soil. This would be the only work allowed to be done with equipment for the route realignment. The old route could be barricaded using downed juniper from the immediate area and reseeded using native seed if necessary. The CMPA Travel Management Plan would be amended to reflect the reroute, following completion of route realignment.

Of the proposed wells, four would be located within WSAs and six would be outside WSA; all of them would be powered with solar power or generators, depending on the site characteristics of each well site. There would be thirteen pipelines running off the wells, for 17.5 miles of pipelines; some wells may support multiple pipelines. If solar panels are used, protection fences around wells and solar panels would be no longer than 0.1 mile each, and would be the minimum required to protect the development from damage caused by animals rubbing on them.

All troughs are associated with spring developments, wells, and pipelines. Under this alternative, 20 new troughs would be installed. The 10 troughs proposed outside of WSAs would be up to 30 foot bottomless troughs[28], while the remaining troughs proposed in WSAs would be galvanized metal troughs.

This alternative includes the partial relocation of a pasture boundary fence, which would result in the removal of approximately 2.1 miles of fence, and the construction of approximately 3.0 miles of new fence. The new fence would be located along the east side of Lauserica Road and would allow the Home Creek and Steens pasture boundaries to follow the boundary of the Home Creek portion of Steens Mountain Wilderness and South Fork Donner und Blitzen WSA more closely.

One spring development, three wells, and four troughs (up to 30 foot bottomless troughs) would be located on private land.

Of the range improvements proposed under this alternative, 19 of 29 are new improvements within WSAs. Associated with the proposed spring developments, wells, and pipelines would be 20 troughs, 10 of which would be located within WSAs. In addition, one would be the removal of an existing fence within a WSA. Table 5 lists what improvements are proposed and which, if any, WSA they are located within. See Map 9 for range improvements proposed under Alternative D.

[28] For analysis purposes assume 30 foot bottomless troughs would be installed, since they would have the most disturbance compared to smaller troughs.

Table 5: Alternative D: Proposed Range Improvements

ID #	Action	Within WSA?
Existing Reservoir (ER) Maint. / Abandon		
ER2	Maint.	Not in a WSA
ER4	Maint.	S. Fork Donner und Blitzen WSA
ER5	Maint.	S. Fork Donner und Blitzen WSA
ER10	Maint.	S. Fork Donner und Blitzen WSA
ER11	Maint.	S. Fork Donner und Blitzen WSA
ER13	Maint.	Home Creek WSA
ER15	Maint.	Not in a WSA
ER19	Abandon	S. Fork Donner und Blitzen WSA
ER21	Abandon	Home Creek WSA
TOTAL	**7 Maintain, 2 Abandon**	
Proposed Reservoirs (R)		
R4	New	Blitzen River WSA
TOTAL	**1**	
Proposed Spring Development/Protection (S)		
S1	Develop	S. Fork Donner und Blitzen WSA/Pvt.
S2	Protect	S. Fork Donner und Blitzen WSA
S3	Develop	S. Fork Donner und Blitzen WSA
S4	Protect	Blitzen River WSA
TOTAL	**2 Develop; 2 Protect**	
Proposed Wells (W)		
W1	New	Blitzen River WSA
W2	New	Not in a WSA - Private
W3	New	Not in a WSA
W4	New	Not in a WSA
W5	New	Not in a WSA - Private
W6	New	Not in a WSA
W7	New	Not in a WSA - Private
W8	New	S. Fork Donner und Blitzen WSA
W12	New	S. Fork Donner und Blitzen WSA
W15	New	S. Fork Donner und Blitzen WSA
TOTAL	**10**	
Proposed Pipelines (P)		
P1	1.2 Mile	Blitzen River WSA
P2	1.2 Mile	Not in a WSA
P4	0.9 Mile 0.5 Mile	Blitzen River WSA Not is a WSA
P5	1.7 Mile	Blitzen River WSA
P6	1.6 Mile	Not in a WSA
P7	2.2 Mile	Not in a WSA
P9	1.7 Mile	Not in a WSA
P10	2.2 Mile	S. Fork Donner und Blitzen WSA
P12	0.8 Mile	S. Fork Donner und Blitzen WSA
P14	0.8 Mile	S. Fork Donner und Blitzen WSA
P19	1.1 Mile	S. Fork Donner und Blitzen WSA
P20	1.0 Mile	S. Fork Donner und Blitzen WSA
P22	0.6 Mile	S. Fork Donner und Blitzen WSA
TOTAL	**13 Pipelines; 17.5 Miles**	
Proposed Troughs (T)		
T1	New	Blitzen River WSA
T2	New	Not in a WSA
T3	New	Not in a WSA - Private
T4	New	Blitzen River WSA
T6	New	Not in a WSA
T8	New	Not in a WSA
T9	New	Blitzen River WSA
T10	New	Blitzen River WSA
T13	New	S. Fork Donner und Blitzen WSA
T14	New	S. Fork Donner und Blitzen WSA
T15	New	S. Fork Donner und Blitzen WSA
T16	New	S. Fork Donner und Blitzen WSA
T18	New	Not in a WSA
T19	New	Not in a WSA - Private
T22	New	Not in a WSA
T23	New	Not in a WSA - Private
T24	New	S. Fork Donner und Blitzen WSA
T25	New	Blitzen River WSA
T28	New	S. Fork Donner und Blitzen WSA
T29	New	Not in a WSA
T31	New	S. Fork Donner und Blitzen WSA
T32	New	Not in a WSA - Private
TOTAL	**22**	
Proposed Fence Removal (RF)		
RF1	2.1 Mile	S. Fork Donner und Blitzen WSA
TOTAL	**1 Fence Removal; 2.1 Miles**	
Proposed Fence Construction (F)[29]		
F6	3.0 Mile	S. Fork Donner und Blitzen WSA
TOTAL	**1 Fence; 3 Miles**	

[29] Proposed fence construction totals do not include fences associated with other improvements such as Spring Developments or wells. These are mentioned in the PDEs.

In addition, AMP components discussed under the section *Actions Common to All Alternatives except the No Action Alternative* would also be incorporated as part of the new AMP.

F. Alternative E: Edge Developments

Under Alternative E, Permit Renewal and Livestock Grazing Management would occur as described in Alternative B: Proposed Action. Alternative E proposes to maximize water developments on BLM-managed land located outside of wilderness and WSA. The only developments that would occur within the interior of the WSAs would be the four spring protection developments, three of which would be in South Fork Donner und Blitzen WSA and one would be within Blitzen River WSA. Spring protection would only include the construction of exclosure fences around the springs and associated riparian areas as described in the PDEs. This alternative would not include the route realignment at Broken Leg Spring (S3) or the road crossing at Weaver Spring (S2). It would include the safety work at Burnt Car Spring as described under the Proposed Action.

Rangeland improvement activities would include spring protection, well, pipeline, and trough installation, maintenance and abandonment of existing reservoirs, water gap development, and fence relocation. All range improvements would follow *General Project Design Elements* (Chapter II.A.6.) and Project Design Elements Specifically for Proposed Range Improvements found above under Chapter II.A.7., unless provided for below. All range improvements would be located in the area shown on Map 10; however, some minor changes in location may be made during construction as described under the Actions Common to all Alternatives section above. No range improvements proposed outside a WSA would be allowed to be moved to within a WSA. See Map 3 for the location of existing range improvements and refer to Map 10 for Alternative C: Proposed Range Improvement locations.

Under this alternative, three currently existing reservoirs, outside of WSAs, would be maintained and none would be abandoned. Any existing reservoirs not identified to undergo maintenance at this time may be maintained in the future, following appropriate NEPA analysis.

Spring protection would occur at all four springs, as described in Chapter II.A.7.

Of the proposed wells, one would be located within a WSA and eight would be outside WSAs; all of them would be powered with solar power or generators, depending on the site characteristics of each well site. There would be six pipelines running off the wells, for 7.0 miles of pipelines; some wells may support multiple pipelines. If solar panels are used, the protection fences around the wells and solar panels would be no longer than 0.1 mile each, and would be the minimum required to protect the development from damage caused by animals rubbing on them.

All troughs are associated with spring developments, wells, and pipelines. Under this alternative, 13 new troughs would be installed. As all of these troughs would be located outside of WSAs, they would be up to 30 foot bottomless troughs; however, the troughs may be smaller based on need at each individual site.[30]

[30] For analysis purposes assume 30 foot bottomless troughs would be installed, since they would have the most disturbance compared to smaller troughs.

In addition, this alternative includes the partial realignment of the pasture boundary. The pasture boundary fence would be relocated between Home Creek and Steens pastures to the boundary between the Home Creek portion of Steens Mountain Wilderness and Home Creek WSA, as well as along private property and Home Creek WSA boundary. This would result in the removal of approximately 4.6 miles of fence and the construction of approximately 5.2 miles of new fence.

To provide additional, reliable, late season water for wild horses and livestock, three water gaps would be placed on the eastern edge of the allotment and Steens Mountain Wilderness. These water gaps would consist of an additional 1.4-1.5 miles of fence, and would result in three changes to the allotment boundary where the water gaps would be located. Delivery of materials and construction of these water gaps would be done using pack animals, as would materials needed for maintenance. Monitoring would also be done using primitive, non-motorized methods.

One spring development, five wells, one pipeline, and seven troughs would be located on private land.

Of the range improvements proposed under this alternative 9 of 26 are new improvements within WSAs and wilderness. In addition, one would be the removal of an existing fence within a WSA. Three proposed developments would be new fences associated with water gaps that would be located within Steens Mountain Wilderness; two would also be partially within a WSA. Table 6 lists what improvements are proposed and which, if any, WSA is affected. See Map 10 for location of range improvements proposed under this alternative.

Table 6: Alternative E: Proposed Range Improvements

ID #	Action	Within WSA?
Existing Reservoir (ER) Maintenance		
ER1	Maint.	Not in a WSA
ER2	Maint.	Not in a WSA
ER15	Maint.	Not in a WSA
TOTAL	**3 Maintain**	
Proposed Spring Development/Protection (S)		
S1	Develop	S. Fork Donner und Blitzen WSA/Pvt
S2	Protect	S. Fork Donner und Blitzen WSA
S3	Protect	S. Fork Donner und Blitzen WSA
S4	Protect	Blitzen River WSA
TOTAL	**1 Develop; 3 Protect**	
Proposed Wells (W)		
W2	New	Not in a WSA - Private
W3	New	Not in a WSA
W4	New	Not in a WSA
W5	New	Not in a WSA - Private
W6	New	Not in a WSA
W7	New	Not in a WSA - Private
W10	New	Not in a WSA - Private
W12	New	S. Fork Donner und Blitzen WSA
W14	New	Not in a WSA - Private
TOTAL	**9**	
Proposed Pipelines (P)		
P2	1.2 Mile	Not in a WSA
P4	0.5 Mile	Not in a WSA
P6	1.6 Mile	Not in a WSA
P9	1.7 Mile	Not in a WSA
P21	1.3 Mile	Not in a WSA - Private
P22	0.6 Mile	S. Fork Donner und Blitzen WSA
TOTAL	**6 Pipelines; 6.9 Miles**	
Proposed Troughs (T)		
T2	New	Not in a WSA
T3	New	Not in a WSA - Private
T6	New	Not in a WSA
T8	New	Not in a WSA
T17	New	Not in a WSA - Private
T18	New	Not in a WSA
T19	New	Not in a WSA - Private
T22	New	Not in a WSA
T23	New	Not in a WSA - Private
T27	New	Not in a WSA - Private
T29	New	Not in a WSA
T32	New	Not in a WSA - Private
T34	New	Not in a WSA - Private
TOTAL	**13**	
Proposed Fence Removal (RF)		
RF3	4.6 Mile	S. Fork Donner und Blitzen WSA
TOTAL	**1 Fence Removals; 4.6 Miles**	
Proposed Fence Construction (F)		

F2	0.2 or .3 Mile[31]	Blitzen River WSA / Steens Mountain Wilderness
F3	0.3 Mile	Steens Mountain Wilderness
F5	0.9 Mile	S. Fork Donner und Blitzen WSA/ Steens Mountain Wilderness
F7	1.6 Mile 1.0 Mile 2.6 Mile	S. Fork Donner und Blitzen WSA Home Creek WSA Not in a WSA - Private
TOTAL	**4 Fences; 6.6 -6.7 Miles**	

[31] There are two possible locations for this water-gap fence; the total length of new fence would be dependent on which location was selected.

In addition, AMP components discussed under the section *Actions Common to All Alternatives except the No Action Alternative* would also be incorporated as part of the new AMP.

G. Alternative F: Reduced Grazing with No Development

Under this alternative, no range improvements would be constructed. Current range improvements would continue to be maintained (under other NEPA analysis) in order to ensure functionality for wild horses and livestock. This alternative would result in the renewal of the 10-year grazing permit for South Steens Allotment, for the current permittee, with changes to terms and condition encompassing all changes within this AMP. The 10-year term livestock grazing permit would be issued with 7,875 active use AUMs of livestock grazing on public land (a decrease of 1,702 AUMs, which would become suspended use AUMs). Between 2003 and 2012, 7,875 AUMs were the maximum livestock actual use reported. It is assumed this level of grazing would be possible in years of adequate water, without additional water sources being developed. Distribution would not be changed under this alternative since no new developments would be constructed to provide water. The season of use would be changed from April 1 through October 31 to April 15 through October 31. Livestock grazing management would follow the grazing rotation outlined in Alternative B: Proposed Action, with decreased livestock numbers and AUMs. See Table 7 for the grazing system under this alternative, showing livestock numbers and AUMs adjusted from Table 2. The BLM has authority to decrease grazing under 43 CFR 4110.3-2(b) and 4130.3-3(a).

Table 7: Grazing System for Alternative F

Pasture	Head	Year 1	Year 2	Year 3	Year 4	AUMs
Hollywood	500	Early/Defer	Rest	Early/Defer	Early/Defer	500
Tombstone	1,200	Early/Graze	Defer	Early/Graze	Defer	3,250
Steens	1,200	Defer	Early/Graze	Defer	Early/Graze	2,625
Home Creek	1,000	Early	Early	Early	Rest	1,500

In addition, AMP components discussed under the section *Actions Common to All Alternatives except the No Action Alternative* would also be incorporated as part of the new AMP.

H. Alternative G: Complete Removal of Livestock Grazing

This alternative would result in the 10-year grazing permit not being renewed for this allotment; therefore, completely removing all permitted livestock grazing from the South Steens Allotment. The 9,577 AUMs of Active Grazing Preference would become Suspended Use AUMs. Under this alternative, no new range improvements would be constructed within the South Steens Allotment unless needed for another resource and analyzed as appropriate to meet NEPA requirements. Existing range improvements within this allotment would only be maintained as needed for other resources such as wild horses, following appropriate NEPA analysis. This

alternative would only affect the South Steens Allotment on the current grazing permit. No other allotments on the current grazing permit would be affected by selection of this alternative.

Allotment Management Plan components discussed under the section *Actions Common to All Alternatives except the No Action Alternative* would only apply under this alternative when they are not related to livestock grazing.

I. Comparison of Alternatives

Table 8 provides a comparison of Alternatives.

Table 8: Number/Miles of Development per Alternative

Range Improvement	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G
Active Grazing Preference AUMs	9,577	9,577	9,577	9,577	9,577	7,875	0
Suspended Use AUMs	0	0	0	0	0	1,702	9,577
Reservoir Maintenance (Outside WSAs)	0	4	3	2	3	0	0
Reservoir Maintenance (Within WSAs)	0	9	13	5	0	0	0
Reservoir Abandonment (Within WSAs)	0	9	7	2	0	0	0
New Reservoirs (Within WSAs)	0	9	17	1	0	0	0
Spring Development (Within WSAs)	0	2	4	2	1	0	0
Spring Protection (Within WSAs)	0	2	0	2	3	0	0
Riparian Exclosure (Within WSAs)	0	1; 0.3 Miles	0	0	0	0	0
Wells (Outside WSAs)	0	3	6	6	9	0	0
Wells (Within WSAs)	0	0	4	4	0	0	0
Pipelines (Outside WSAs)	0	2; 0.6 Miles	3.4; 5 Miles	4.4; 7.2 Miles	5; 6.3 Miles	0	0
Pipelines (Within WSAs)	0	0	6.6; 9.6 Miles	8.6; 10.3 Miles	1; 0.6 Miles	0	0
Troughs (Outside WSAs)	0	3	10	10	13	0	0
Troughs (Within WSAs)	0	2	14	12	0	0	0
Fence Removal (Within WSA)	0	0; 0 Miles	0; 0 Miles	1; 2.1 Miles	1; 4.6 Miles	0	0
Fence Construction (Outside WSA)	0	0	0	0	0.5; 2.6 Miles	0	0
Fence Construction (Within WSA/Wilderness)	0	0; 0 Miles	0; 0 Miles	1; 3.0 Miles	3.5; 4.0-4.1 Miles	0	0

J. Alternatives Considered but not Fully Analyzed

Six additional alternatives were considered, but not analyzed in detail because they did not meet the entire Purpose of and Need for Action. These alternatives were a modified season of use, change of class of livestock, complete removal of wild horses, relocating wild horses to Steens Mountain Wilderness, water hauling, and herding.

1. Modified Season of Use

This alternative was eliminated because the Purpose of and Need for Action of includes providing live, reliable, late-season water, which would not be met just by modifying the season of use. In addition, modifying the season of use would not protect riparian areas since wild horses are present year-round, and they are a causal factor along with livestock in not achieving Standards in the Steens Pasture. Additionally, all other Standards are being achieved fully throughout the allotment under the current season of use, and all pastures are conforming to Guidelines. The current and proposed season of use covers early, growing season, and defer grazing treatments, and allows for flexibility and management of livestock. Winter grazing is not feasible within this allotment as snow levels and road conditions would inhibit access to the area; livestock mortality rates would be higher if access is limited preventing regular livestock checks. Supplemental feeding may need to occur depending on snow depth, which is not generally permissible under BLM regulations. The allotment is also home to the South Steens Wild Horse herd, which is within the allotment year round; therefore, care needs to be taken to ensure wild horses are left with sufficient feed at all times, but especially during the winter when snow levels may decrease the ability to graze large portions of the allotment. Winter grazing by livestock would result in both wild horses and livestock utilizing the same areas where vegetation would be accessible. Additionally, early spring grazing would not be possible in most years due to snow, wet, and cold conditions, which would limit management of livestock and forage production within the allotment. By limiting livestock grazing to a spring and early summer season of use, grazing every year could cause long-term trend on plant communities to deteriorate since grazing would occur annually during the growing season. Therefore, pastures would not achieve Standards or conform to Guidelines. (The BLM's standard practice is to build periodic growing season rest for upland pastures into the grazing management plan). Modifying use could also affect the economic viability of the permittee, as well as decrease the permittee’s ability to rest private property adjacent to the allotment during the fall, which the permittee currently manages for sage-grouse habitat. The permittee/private landowner is currently working with the U.S. Fish and Wildlife Service on Candidate Conservation Agreement with Assurances (CCAA).

2. Change of Livestock Class

Converting livestock class from cattle to sheep was determined to be unfeasible due to the proximity of the allotment to bighorn sheep habitat. In addition, it would not be economically feasible or satisfy need for reliable water, which would still be needed for wild horses and sheep. In addition, most pastures are conforming to Guidelines with only

one pasture (Steens) not currently achieving Standards (see Table 1). Changing from cattle to sheep would remove livestock from the riparian areas that are not meeting Standards, due to herding, but Standards would not become met due to the continued presence of wild horses.

Sheep use is controlled by a herder that is with them continually and is responsible for determining where they graze and when they move; therefore, to provide the most effective use of the allotment, it would be expected that interior fences would be removed. This type of use would intensively manage utilization levels and timing of use, and provide more uniform distribution and utilization patterns. Removal of fences would benefit the free-roaming nature of wild horses and may aid in improved wild horse distribution across the HMA.

However, bighorn sheep occasionally inhabit the area, which could result in contact with domestic sheep. Interactions between wild and domestic sheep have proven to be detrimental to bighorn sheep populations. In recent years, biologists and veterinarians have shown that even casual contact may lead to respiratory disease and fatal pneumonia in bighorns (Onderka and Wishart 1988, Schommer and Woolever 2001). In the summary of their disease overview, Schommer and Woolever (2001) quote several scientists concluding contact between bighorn and domestic sheep increases risk of bighorn mortality. A complete range of causal agents that lead to these disease events cannot be conclusively proven at this point. Therefore, segregation of these two species is the best management tool until more scientific research is completed. If sheep were allowed to graze within the South Steens Allotment, the 46-year effort to reestablish native California bighorn sheep on Steens Mountain could be jeopardized.

Additionally, the permittee's facilities are not currently capable of accommodating sheep, as they are currently set up for cattle production. Changing from cattle to sheep production would require a complete change of their facilities including, but not limited to rebuilding chutes, corrals and fences, and building lambing sheds. A change in employees would also be expected to occur with hiring of experienced sheepherders and the dismissal of current cattle wranglers. Predator control would have to be addressed at a higher intensity, and the purchase of sheepdogs would be needed. All of these changes would require a large input of capital from the permittee.

3. Complete Removal of Wild Horses

Complete removal of horses from the South Steens Allotment was eliminated from detailed analysis for the following reasons:

- The Wild Horse and Burro Act requires the BLM to protect and manage wild horses in areas they were found at the time the Act was passed and in a manner designed to achieve and maintain a thriving ecological balance in keeping with the public land, multiple-use concept;
- The CMPA RMP provides for viable wild horse populations in South Steens HMA. Elimination of wild horses and closure of HMAs (even if partial) can only

be conducted during the land use planning process or within an RMP revision or amendment. This document is not a land use plan allocation; therefore, elimination of wild horses is outside the scope of this analysis;

- Wild horses are a supplemental value in all of the WSAs within South Steens Allotment;
- Current funding for wild horse gathers is scarce. Complete removal is difficult and would take multiple gathers, as wild horses are often spread out over large areas; and
- Rangeland conditions are currently achieving Standards in all but one pasture (Steens Pasture, see Table 1) and all pastures are conforming to Guidelines.

4. Permanently Relocating Wild Horse to Steens Mountain Wilderness Portion of the HMA

Permanently relocating all wild horses from the South Steens Allotment portion of the South Steens HMA to the Steens Mountain Wilderness portion of the HMA would not comply with the CMPA RMP; which provides for viable wild horse populations in the entire South Steens HMA, including the South Steens Allotment, as well as a portion of the Steens Mountain Wilderness that is outside the allotment. Permanently relocating wild horses from South Steens Allotment would result in the allotment portion of the HMA becoming an inactive part of the South Steens HMA. This would also result in a decrease in the current AUM allocation for wild horses since none of the AUMs from within the South Steens Allotment would be available. To adjust for the decrease in AUMs, the HMA would have to be expanded somewhere else, or the AML would have to be decreased to the level that could be supported by the Steens Wilderness portion of the HMA and other allotments. Elimination of wild horses and closure of HMA's (even partial closures) can only be conducted during the land use planning process or within an RMP revision or amendment; which is outside the scope of this analysis.

Permanent removal of all wild horses from South Steens Allotment would not be in conformance to the Wild Horse and Burro Act that requires the BLM to protect and manage wild horses in areas they were found at the time the Act was passed in a manner designed to achieve and maintain a thriving ecological balance. This includes the South Steens Allotment portion of the HMA.

Additionally, relocating all wild horses to the Steens Wilderness portion of the HMA would not meet the Purpose of the Action to "provide for better wild horse and livestock distribution". The Steens Mountain Wilderness portion of the HMA does not provide year-round habitat for wild horses due to deep snow during most winter months, which would prevent free-roaming migration to their winter range. During most winters, this would result in dire impacts to herd health.

5. Water Hauling

The hauling of water to existing reservoirs, and installing new troughs for water storage, was not fully analyzed since it would not meet the entire Purpose of and Need for Action. When livestock are not present in a pasture, water would not be hauled; therefore, water

would not be available for horses on a reliable and regular basis. In addition, water hauling would not be economically feasible. The permittee is located approximately 35 miles, and the BLM office is approximately 90 miles, from the allotment. The time and cost associated with hauling water on a daily basis during drought years for the BLM could cost as much as $6,848 just for vehicles per season [(180 miles @ $0.21/mile (General Services Administrative rate to cover fuel, maintenance and insurance) x 30.41666 days/month x 5 months) + ($220/month x 5 months)]. If the rate was the same[32], it would cost the permittee approximately $2,218 per season just for the vehicle use to haul water. Labor, time, water, and the purchase or rental of a water tanker, or other appropriate vehicle, is not included in this total and would increase the cost of hauling water by thousands of dollars per year. Routes throughout the allotment would need to be maintained and/or upgraded in order to get equipment to prime locations to dispense water and improve wild horse and livestock distribution across the allotment. This would be an issue since many of the roads within the allotment are actually "ways" found within WSAs that have strict maintenance limitations. Water hauling would not meet the purpose and need if the water was not able to be spread throughout the allotment to improve livestock distribution. If road conditions were insufficient to provide for water hauling under all conditions, including wet and muddy conditions, water hauling would not meet the purpose and need of providing a reliable water source for livestock.

Assuming cattle within the pasture are lactating (which is generally true since cow-calf pairs are typically turned out into this allotment), they would require 20 gallons of water per day[33] (NRC, 2000) and 608 gallons per month (AUM) (20 gallon x 30.41666 days/month). Assuming all 9,577 AUMs are permitted, approximately 5,826,007 gallons of water would be needed. Using a 3,000 gallon tanker, this would be up to 1,942 water hauling trips[34] to provide water for livestock. This does not include the water need for wild horses. Assuming average weight for wild horses is 1,050 pounds, the Merck Manual (Kahn 2005) suggests horses require a minimum of 4.2 gallons per day, with an average intake of 6.8 gallons, and could be as high as 13.65 gallons. Therefore, to meet the water requirements of the South Steens HMA at least 668 gallons per day would be required (when at the low end of AML). When water requirements are at a maximum and AML is at the high end, up to 4,150 gallons would be needed per day. Hauling water to horses would result in an additional water tanker delivery at least every 4-5 days up to at least one tanker delivery per day. If water was hauled for horses, year around, at least 243,747 gallons of water would need to be hauled in, but the requirement could be as high as 1,514,604 gallons, translating to 82 to 506 tanker loads, respectively.

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[32] The permittee rate to haul water would follow current market prices, not the General Services Administrative (GSA) rate. The calculation was based on the GSA rate since future market prices cannot be known.

[33] Assuming a temperature of 70 degrees Fahrenheit and a 1,100 pound cow. Non-lactating cows require only 9 gallons per day.

[34] This is assuming drought conditions with no available water. Water hauling would be something less than this depending on what water was available at existing developments.

6. Herding

This includes the herding of livestock, removal of fences, and rejection of all proposed range developments. This alternative was eliminated from detailed analysis for the following reasons:

- The riparian areas would receive less use if cattle are successfully kept out of the riparian areas. However, wild horses would still congregate in riparian areas (Ostermann-Kelm et al. 2008, Crane et al. 1997), since they do not respond to herding and typically run when approached by people on horseback or foot (Jewett et al. 1983), making it unlikely herding would allow these areas to make significant progress toward meeting Standards.
- While herding is a simple idea, much is needed to successfully implement cattle herding as a livestock management strategy. In these four large pastures, two to five riders would have to work this area every day. It takes several years for the cattle to get used to changed management. Problems that often occur during this learning period include: 1) small groups of cattle that get separated from the main bunches and end up spending long periods of time near springs or other water sources; 2) placement of cattle in areas where it is very difficult to get them to stay; 3) figuring out the good and poor cattle locations; and 4) finding cattle once they become separated from the herd. This puts stress on the cattle which results in reduced performance and can require additional labor until livestock become familiar with the herding process. Even a few animals within riparian areas for an extended period can damage riparian areas. When herding was prescribed under the 1995 AMP, the focus of the herding was to keep cattle away from riparian areas associated with streams and creeks, with little effort to keep livestock away from riparian areas that occur in the uplands.

Combining strategic supplement placement with herding has shown synergistic benefits (Bailey 2004). Providing offsite attractants such as alternate water, shade, or supplements, along with herding, appeared to be more effective for riparian management than herding alone (Bailey 2004). Monitoring of intensive herding management in Idaho found that the program was successful when the herder showed a consistent daily presence on the allotment (Butler 2000). If the herder missed just one day, the cows became unsettled and often refused to be herded (Butler 2000).

In order for herding to maximize ecological benefit, the herder would need to be able to access all water sources from all locations. Since fences would limit this, fence removal would likely occur. By removing fences, the herder would always be able to access the most appropriate water source without having to move the herd through the limited gates that currently exist within the allotment. If the herder regularly moved an entire herd through a limited number of gates, it would result in an increased number of trails and permanent ecological disturbance than if they were able to travel to water following a slightly different route each time. Cost to completely remove the 23 miles of existing fence would be approximately $184,000 ($8,000/mile x 23 miles). If this alternative

were unsuccessful, it would cost approximately the same amount to reconstruct the fences removed to allow for herding.

CHAPTER III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This environmental consequences section presents the potential changes to the environment resulting from implementation of the alternatives. This chapter describes all expected effects, including direct, indirect, and cumulative effects, on resources from enacting the proposed alternatives.

This document is tiered to the AMU/Steens Mountain CMPA Proposed RMP/FEIS (Andrews/Steens PRMP/FEIS) (August 2004). The environmental consequences and cumulative effects sections in the Andrews/Steens PRMP/FEIS describe potential environmental consequences to the greater environment of the South Steens Allotment and are incorporated into this document by reference in accordance with the CEQ regulations ~~§~~ 43 CFR 1502.2.

Direct and indirect effects, plus past actions, become part of the cumulative effects analysis; therefore, use of these words may not appear. The Reasonably Foreseeable Future Actions (RFFAs) for this site are continued livestock grazing, wild horse use, wild horse gathers, weed treatments, road maintenance, recreation activities, and the North Steens Ecosystem Restoration Project; these are also relevant to cumulative effects and are discussed under each resource, as applicable.

livestock grazing, wild horse use, wild horse gathers, weed treatments, road maintenance, recreation activities, North Steens 230-kV Transmission Line Project, and the North Steens Ecosystem Restoration Project; these are also relevant to cumulative effects and are discussed in Chapter 3 under each resource, as applicable.

The North Steens Ecosystem Restoration Project (North Steens Project) is a landscape-level project, the goal of which is to reduce juniper-related fuel loading, and improve the ecological health of the area, by encouraging a healthy functioning ecosystem through appropriate land treatments. Treatment techniques include a combination of prescribed fire, juniper treatments, fencing, seeding and planting in order to reduce fuel loads, restoring vegetative communities, improving habitat, and increasing forage for wildlife. Project activities primarily occur above 4,500 feet and below 7,200 feet, concentrating on the "juniper belt". The North Steens Project Area includes the entire South Steens Allotment.

The North Steens 230-kV Transmission Line Project Record of Decision (ROD) was signed on December 28, 2011 by Secretary of the Interior Ken Salazar in Washington D.C. The ROD contains a right-of-way (ROW) grant decision under Title V of the Federal Land Policy and Management Act (FLPMA). BLM's decision is to issue new ROW grants to Echanis, LLC (Echanis) for a 230kV overhead electric transmission line, new and existing access roads, overland access routes, and temporary tensioning sites. The FEIS was made available on October 21, 2011. On March 16, 2012, the BLM issued a ROW to Echanis, LLC for the North Steens Transmission Line Project. On April 5, 2012 the Oregon Natural Desert Association appealed the decision in the U.S. District Court of Appeals. Oral Arguments for the case are set for July 22, 2013. No ground disturbing activities have taken place. All of the wind farm developments and portions of the transmission line are on private land, but were analyzed in the Final EIS as connected actions under NEPA. The Echanis Wind Energy Project Site

(located completely on private land) is more than 15.5 miles from the eastern edge of the South Steens Allotment. All other components of this project are also more than 15.5 miles from the allotment.

Currently, a Comprehensive Recreation Plan is being developed by the BLM, which may affect some resources; however, this document is still in process and subject to change based on public comments in future NEPA analysis and subsequent administrative remedies. Therefore, this plan is not being considered a RFFA or included in the analysis of cumulative impacts. Scoping has also begun for the South Steen HMA Gather, but that document is also still in process and subject to change.

The IDT reviewed the elements of the human environment, as required by law, regulation, Executive Order, and policy, to determine if they would be affected by any of the alternatives. An IDT has reviewed and identified issues and resources affected by the alternatives. The results are summarized in the Table 9. Affected elements are in bold.

Table 9: Issues/Resource Table

Issues/Resources	Status	If Not Affected, Why? If Affected, Reference Applicable EA Section
Areas of Critical Environmental Concern (ACECs)	Not Present	There are no ACECs within this allotment.
Air Quality (Clean Air Act)	Not Affected	Department of Environmental Quality (DEQ) is responsible for air quality permit requirements at facilities and for operations in Oregon. DEQ currently requires no air quality permit for existing operations in the project area. The dust produced from livestock movement, range improvement construction, and vehicle use would be intermittent and not measurable.
American Indian Traditional Practices	Not Affected	No known American Indian Traditional Practices areas occur within the allotment.
Cultural Heritage	**Affected**	**See Chapter III, Part A.1**
Environmental Justice (Executive Order 12898)	Not Affected	The Proposed Action and alternatives would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations, as such populations do not exist within the project area.
Farmlands (prime or unique)	Not Present	There are no prime or unique farmlands within the allotment.
Fisheries	Not Affected	Effects to fish species would be the result of effects to water quality (temperature or increased sediment), and water quality is addressed in the Riparian Zones, Wetlands, and Water Quality section of this document (see Chapter III, Part A.5). No measurable effects to fish for any of the alternatives is anticipated.
Flood Plains (Executive Order 13112)	Not Present	There is no occupancy or modification of flood plains and no risk of flood loss.
Grazing Management and Rangelands	**Affected**	**See Chapter III, Part A.2**
Hazardous or Solid Waste	Not Present	No known hazardous or solid wastes are in the allotment.
Lands and Realty	**Affected**	South Steens Allotment currently has several improvements in which BLM has no legal access (easement, memorandum of understanding, and/or cooperative agreement). The BLM has entered into negotiations with the private landowner to obtain legal access by easement to locate, construct, use, control, maintain, improve, relocate, and repair the existing improvements on private property as well as those that may occur on private property, as a result of this EA. Related Actions will be evaluated in a separate document.
Migratory Bird Treaty Act (Executive Order	**Affected**	At most (under Alternative C), approximately 5% of the available habitat within the allotment would have some level of reduced vegetation that might affect migratory

13186)			birds. However, areas adjacent to the allotment also support habitat, so at most only 2% of available habitat in the vicinity would be affected. Due to the varying presence and habitat needs of migratory birds, other effects would be nebulous and will not be further analyzed in this EA.
Noxious Weeds (Executive Order 13112)		**Affected**	**See Chapter III, Part A.3**
Paleontology		Not Affected	No alternative would have an affect beyond what has occurred in the past.
Recreation and Visual Resources		**Affected**	**See Chapter III, Part A.4**
Riparian Zones, Wetlands, and Water Quality (Executive Order 11990)		**Affected**	**See Chapter III, Part A.5**
Social and Economic Values		**Affected**	**See Chapter III, Part A.6**
Soils and Biological Soil Crusts (BSCs)		**Affected**	**See Chapter III, Part A.7**
SSS and Habitat	**Wildlife**	**Affected**	**See Chapter III, Part A.8**
	Plants	Not Affected	If SSS plants are found during the botanical clearance, these sites would be avoided. *Potemegton diversifolius*, which is currently known to exist in Tombstone Reservoir, would not be affected since no actions are currently proposed for that reservoir.
	Fish	Not Affected	Since effects to redband trout would be the result of effects to water quality (temperature or increased sediment), and water quality is addressed in the Riparian Zones, Wetlands, and Water Quality section of this document. No measurable effects to redband trout are anticipated for any of the alternatives.
T/E Species or Habitat	Wildlife	Not Present	There are no known T/E species or habitat found within the allotment.
	Plants	Not Present	There are no known T/E species or habitat found within the allotment.
	Fish	Not Present	There are no known T/E species or Habitat found within the allotment.
Upland Vegetation		**Affected**	**See Chapter III, Part A.9**
Wild Horses		**Affected**	**See Chapter III, Part A.10**
Wild and Scenic Rivers (WSRs) / Wilderness		**Affected**	**See Chapter III, Part A.11**
Wilderness Study Areas (WSAs)		**Affected**	**See Chapter III, Part A.12**
Wilderness Characteristics		Not Present	See Chapter I, Part J.1
Wildlife / Locally Important Species and Habitat		**Affected**	**See Chapter III, Part A.13**

A. Resources

1. Cultural Heritage

Affected Environment: Cultural Heritage

The South Steens Allotment has not received a high-level cultural resources survey. A research survey in the late 1970s and inventories for reservoirs, spring development, fuels

treatments, and rock source development are the primary sources of cultural resource data in the allotment. These surveys found prehistoric archaeological sites associated with a number of topographic and hydrological features such as hilltops, low rims above relic water courses, playa lakes, springs, and modern watercourses. The adjacent Riddle Brothers Ranch National Historic District (Historic District) has been completely inventoried with the discovery of 47 prehistoric sites within the approximately 1,000-acre Historic District. Although the Historic District probably has a high-site density because of access to the perennial Little Blitzen River, many sites in the Historic District are not near the river. Slightly lower-site densities are expected in the upland portions of South Steens Allotment and similar site densities are expected near perennial water sources when compared to the Historic District. Several prehistoric sites in the Historic District are considered very important in the region. They are long-term village sites probably used 9 months a year. At least three similar sites are known to occur within the allotment and one of three prehistoric rock art sites on Steens Mountain occurs in the allotment. One of these sites has both very old (7000+ years) rock art and has some of the oldest buried deposits on the mountain. The probability that more National Register eligible sites occur within the allotment is very high.

South Steens Allotment has been grazed by sheep, cattle, and wild horses for up to 130 years. In former times, prior to the Taylor Grazing Act of 1935, grazing on public lands was essentially uncontrolled. After the Taylor Grazing Act, the allotments were tied to base property, shutting out former grazers without base property, and reducing the number of livestock on public lands. This situation exerted some control over grazing on public lands, which continued to be the responsibility of the Grazing Service. Under the Grazing Service, and then under the BLM beginning in 1946, the number of grazing managers was low, the number of grazers was high, and the pattern of grazing was more intense than it is today. Even as late as the early 1960s, grazing levels were considerably higher than today because the grazing management infrastructure had not been developed to the degree we have today. Cultural resources sites were affected more intensely and to a greater depth in the past than under the more refined, controlled grazing management of today's practices (Thomas 2013, personal communication).

Based on field observations by BLM cultural resources staff over the last 16 years, the estimated average grazing effects on cultural resource sites has occurred in the top 12" of sediment. These effects are plant pedestalling, hoof shear, and surface scuffing. The deepest disturbance is seen in congregation areas where concentrated hoof shear is most common. Generalized grazing, where light hoof shear and scuffing are the most common effects, has produced light (2") to moderate (6") damage. The logical conclusion leading from these observations is most sites have sustained a certain amount of grazing effects over the years. As a result, current grazing practices have little effect on cultural resource sites, except when sites fall within congregation areas.

Environmental Consequences: Cultural Heritage

Effects Common to All Alternatives:

Observations, at livestock congregation areas, and geomorphological factors lead to the conclusion that congregation areas (either current or future) are the only locations of on-going grazing effects to cultural resources sites. The cycle of ground disturbance, absence of vegetative cover, and resultant water and wind erosion lead to continued loss of sediment, which could continue until bedrock is exposed. Cultural materials anywhere within the sediment column would eventually be exposed to surface trampling. When the deepest cultural materials are exposed to surface trampling, site integrity would be reduced to near zero.

Alternatives that include new methods of spreading grazing impacts more evenly over the allotment are not expected to increase the effects on cultural resources, except where new congregation areas would arise. New congregation areas could arise due to spring developments, new water trough placements, changes in the fencing pattern within the allotment and new exclosure fences around riparian areas or formerly unfenced spring developments. It is in these areas around new range developments or changes to old ones that new effects (particularly hoof shear) detrimental to cultural resources could be seen. Cultural resource clearances would occur prior to the development of any range improvement, and any sites found would be avoided as described in the PDE section, to eliminate effects from construction and prevent the site from becoming a congregation area.

Generalized grazing effects by livestock or wild horses, except in congregation areas, would not be measurable under each alternative.

For the purposes of this analysis, the Cumulative Effects Analysis Area (CEAA) for cultural resources is at the allotment scale. All Action Alternatives and other ongoing and reasonably foreseeable future projects would not lead to cumulative effects to cultural resources because proposed projects would be localized or the sites would be completely avoided. Potential direct and cumulative effects to cultural resources would be mitigated through project-specific cultural resource inventory and mitigation measures prior to any project implementation. The extent that sites have been affected by livestock trampling in the past has not been adequately measured and quantified due to a historic lack of information on the sites themselves prior to livestock being permitted to graze the area.

The South Steens Allotment is the focus of fuels reduction/range improvement efforts under the North Steens Project, which is a RFFA. This project proposes to remove, through thinning and burning, thousands of acres of juniper within the allotment. Juniper in known cultural resources sites would not generally be cut. Prescribed fire, other than low-intensity surface fires, would not occur within cultural sites.

Alternative A: No Action

Under the No Action Alternative, cultural resources would not be affected by grazing, except when they are located in existing congregation areas, typically located around

water sources, where hoof shearing already occurs. No new developments would be constructed affecting cultural resources.

Alternative B: Proposed Action

Under the Proposed Action Alternative, cultural resources would not be affected by grazing effects, except in existing and new congregation areas that might arise near proposed range developments.

New range improvements such as reservoir construction, spring developments, placement of livestock water troughs, exclosure fences and other fencing projects all create new livestock congregation areas and could damage cultural resources within these areas. Maintaining existing reservoirs would lead to continued disturbance in the existing congregation areas.

Each site to be protected would be evaluated in consultation with the Oregon SHPO to determine its National Register eligibility. If found eligible, protection measures, such as fencing, would be required.

Alternative C: Maximum Water Distribution

Under Alternative C, cultural resources would not be affected by grazing, except in existing congregation areas and new congregation areas that might arise near proposed range developments.

Alternative C would have the greatest effect on cultural resources of all the alternatives because it proposes the greatest number of new and maintained range improvements.

Alternative D: Along Road Development

Under Alternative D, cultural resources would not be affected by grazing, except in existing congregation areas and new congregation areas that might arise near proposed range developments.

Effects to cultural resource sites under Alternative D would be less than Alternative C, about the same as Alternative B and greater than Alternative E.

Alternative E: Edge Development

Under Alternative E, cultural resources would not be affected by grazing, except in existing congregation areas and new congregation areas that might arise near proposed range developments.

Effects to cultural resource sites under Alternative E would be fewer than all the action alternatives (No Action Alternative and Alternative F are not considered action alternatives) because it has the lowest level of proposed grazing improvements.

Alternative F: Reduced Grazing with No Development

Under Alternative F, cultural resources would not be affected by grazing, except in existing congregation areas.

Alternative F would affect cultural resources less than the No Action Alternative because grazing would permanently be reduced in the allotment, thereby decreasing use levels of existing congregation areas and associated hoof shear at those sites.

Alternative G: Complete Removal of Livestock Grazing

Under this alternative, Cultural Resources would not be affected by livestock grazing since no grazing would be allowed within the allotment. Hoof shearing by livestock would no longer occur in areas where it currently occurs, reducing the risk of damage to cultural resources at those sites. No maintenance would occur on existing range improvements (for the benefit of livestock), eliminating the possibility of damaging cultural resources.

2. Grazing Management and Rangelands

Affected Environment: Grazing Management and Rangelands

Authorized use consists of one cattle grazing permit (#3602570) in this allotment. The permitted active use for this permit is from April 1 through October 31, equaling 9,577 AUMs of active use within the allotment. Cattle numbers can fluctuate annually, as long as the AUMs of total active use on the allotment are not exceeded. In this allotment, there are intermixed private lands within BLM-managed pastures (Table 10). The allotment is completely fenced, or livestock movement out of the allotment is completely limited by topographic features, on the north, south, and west sides. However, the east side, bordering the Donner und Blitzen WSR is only partially fenced, with areas using topography and gap fences to prevent livestock movement[35]. In addition, a portion of the pasture boundary fence between Tombstone and Steens Pastures is not a solid fence, relying in a few areas on topographical barriers. Due to the allotment and pastures not having solid fences, livestock occasionally get into areas they may not be authorized for at that time. This issue is mitigated by the permittee pushing livestock back to the areas they are currently authorized to use as soon as they become aware of the issue. Without a solid fence, this issue can be mitigated, but not completely resolved.

[35] Topography on the east side of the allotment is not a complete barrier as it is on the west side where topography is used as a boundary instead of fences.

Table 10: Percent Public and Private Land per Pasture based on Acres[36]

Pasture	% Public	% Private
Hollywood	92.4	7.6
Home Creek	78.0	22.0
Steens	99.4	0.6
Tombstone	98.9	1.1

In addition to the 9,577 AUMs allocated for livestock, 500 AUMs are allocated for deer, 22 AUMs for antelope, 60 AUMs for elk, and 3,540 AUMs for wild horses (Andrews/Steens RMP, J-10).

In 1995, the South Steens Allotment consisted of 10 pastures, totaling 332,400 acres (private and public). Livestock use was permitted for 21,197 AUMs on public land and followed an adaptive rotational grazing system. In the adaptive rotational grazing system, livestock were turned out at lower elevations and then moved up Steens Mountain where they summered, before returning to the lower elevations and being gathered. Following the Steens Act, this rotation was modified for the four remaining pastures. Under the updated system, in two consecutive years livestock grazing starts at the north end of the allotment in May, after which cattle moved south through Tombstone Pasture, and were removed from Steens Pasture on or before October 1. For the following 2 years, cattle would start on the south end of the allotment, in Home Creek Pasture, then moved north through Steens and Tombstone Pastures, and were removed from Hollywood Pasture in October. This grazing system was designed to provide rest during the growing season for native upland and riparian key forage species for two consecutive growing seasons for each pasture, on a 2-year cycle. However, due to the changes that occurred in this allotment following the Steens Act of 2000, this grazing system has not been consistently implemented.

In 2000, following the Steens Act, AUMs were reduced to 19,133. During the Steens Act 3-year implementation period (2000-2003), AUMs were further reduced to 9,577 AUMs, the current active permitted use. The permittee has not used the allotted 9,577 AUMs since the implementation was completed (see Table 11 for the actual use AUMs following the Steens Act). This partial non-use was voluntary for resource conservation as the permittee and BLM were concerned that using the full permitted use would result in a downward trend in areas within a two mile grazing zone around the limited reliable water sources. In this instance, the voluntary reduction of AUMs is not related to a lack of forage within the allotment, but the inability for animals to access the forage due to a lack of water in the central portion of the allotment that resulted when the Donner und Blitzen River was fenced and became unavailable for livestock and wild horse watering.

[36] This table does not show % Public Land (%PL) as discussed under the Proposed Action description. This table shows percentage of ownership and is based on acreage, while %PL is based on forage production.

Table 11: Actual Use for South Steens Allotment (2000-2012)

Year	Actual Use AUMs
2000	3959
2001	No Data
2002	3805
2003	4513
2004	7875
2005	No Data
2006	2241
2007	5865
2008	7011
2009	2046
2010	6162
2011	2409[37]
2012	5508

Within the South Steens Allotment, there are 22 reliable water sources (reliable meaning water is available late into the grazing season, from approximately July through October, in most years), in addition to Home Creek in the Home Creek Pasture, and the Tabor Cabin water gap in the Steens Pasture. There are 18 waterholes with variable reliability (some years they hold water late into the year and some they do not) and 29 unreliable waterholes (do not hold late season water in most years). In general, the existing waterholes were located on the western half of the allotment due to the Donner und Blitzen River historically being open for livestock and wild horse watering, servicing the eastern portion of the allotment. Therefore, waterholes that are currently present have poor distribution across the allotment, with few reliable water sources in the eastern portions of the allotment. Currently, using a two mile use area around reliable water[38], including Home Creek, only 83.3% (78,818 acres) are available to livestock and wild horses within the allotment. Two of the reliable waterholes and a portion of Home Creek are currently located on private property. The BLM has no existing easement and the landowner[39] could stop providing access to them without warning or compensation, further reducing the reliable water supply within the allotment for both livestock and wild horses. In addition to the constructed water sources, wild horses and livestock are also able to water at four undeveloped spring complexes (one in Tombstone Pasture and three in Steens Pasture), which typically become muddy (water quality becomes poor) as the season progresses due to wild horse and cattle use, and Home Creek (located in Home Creek Pasture). The area where available forage is located can be seen in use areas based on available water, shown in Map 5 – Use Area Based on Reliable Water, and in Map 6 – Use Area Based on Reliable Water Not on Private Property.

[37] Tombstone Pasture was not used in 2011 or 2012, as required by the BLM.
[38] The 2 mile use area is based on research by George et al. 2007, Ganskopp 2011, and Holechek et al. 2001. It is acknowledged that use areas may be smaller due to other factors, such as rockiness and topography (George et al. 2007, Holechek et al. 2001, Stuth 1991, Cook 1966).
[39] The private landowner within this allotment is also the permittee.

Table 12 describes actual utilization levels, by pasture, for South Steens Allotment. CMPA direction for the target utilization maximum of native forage plants is 50% (moderate) at the end of the growing season (RMP Grazing Management, p. 53). The modified Landscape Appearance Utilization / Key Species Monitoring Method employed by the Burns District BLM involves an observer placing areas of rangeland within grazing use categories by comparing observations with written descriptions of each utilization class; it is an ocular method, therefore estimates are not determined by weight and cannot be directly compared to utilization percentages determined by clipping. Utilization classes are largely defined by the percentage of seed stalks of key forage species remaining in shrub interspaces after the grazing treatment; an observation indicative of the frequency of interspace grazing of grasses, similar to that quantified by France et al. (2008). This method can be found in Interagency Technical Reference 1734-3, Utilization Studies and Residual Measurements. The categories are No Use (0-5%), Slight (6-20%), Light (21-40%), Moderate (41-60%), Heavy (61-80%), and Severe (81-100%). At Heavy utilization levels, it is expected that more than 15% of key forage species located under the shrub canopy are grazed (France et al. 2008). Utilization is total utilization and can include wildlife, livestock and wild horse use. In areas where wild horses are known to congregate, utilization levels may be over 50% late in the year due to wild horse use; however, livestock are removed from those areas prior to the area reaching 50% utilization. A weighted average is then used to calculate the overall utilization for the pasture. In concentrated areas around the limited reliable, late-season water sources, monitoring results show higher utilization of upland and riparian species by wild horses and livestock. The Tombstone Pasture has been rested since 2010. Grazing was resumed in this pasture in June of 2013.

Table 12: Actual Percent Utilization of Key Forage Species for South Steens Allotment (2000-2013)[40]

Year	Hollywood Pasture (FEID, ACTH7, ELEL)	Tombstone Pasture (FEID, PSSP6, ACTH7, ELEL)	Steens Pasture (FEID, PSSP6, ACHNA)	Home Creek Pasture (FEID, ACTH7)
2000	65	40	34	21
2001	No Data	No Data	No Data	No Data
2002	No Data	No Data	No Data	No Data
2003	30	28	40	No Data
2004[41]	65	33	No Data	23
2005	15	36	28	No Data
2006	No Data	No Data	16	No Data
2007	46	44	23	52
2008	40	32	28	19
2009	63	55	No Data	No Data
2010	No Data	5	No Data	No Data
2011	No Data	No Data	No Data	No Data
2012	45.6	No Data	No Data	No Data
2013	47.5[42]	No Data	No Data	No Data

The Ecological Site Inventory (ESI) was completed in 1990 for the Burns District. The following acres for each range condition class category, by pasture, are shown in Table 13.

Table 13: Range Condition as Determined in ESI (Acres)

Pasture	Good	Good-Fair	Fair	Poor	N/A
Tombstone #1	7,183	13,994	8,568	0	<1
Steens #2	20,270	11,139	9,745	0	11
Home Creek #3	10,983	1,765	2,004	0	9
Hollywood #4	19	0	3,599	100	136

As defined in the NRCS Range and Pasture Handbook (2003), range condition is defined as "the present status of vegetation of a range site in relation to the natural potential plant community for the site. Range condition is expressed as a percentage of the Potential Native Community (PNC) presently occurring on the range site and grouped into the following range condition classes: Excellent (76-100%), Good (51-75%), Fair (26-50%), and Poor (0-25%)[43]. Overall, the South Steens Allotment has approximately 38,454 acres

[40] This shows total utilization, not just livestock utilization. Therefore, livestock rest is not shown in the table since wild horses are always present.
[41] Wild horses were gathered in fall of 2004 from South Steens HMA, wild horses were determined to be the major cause of exceeding the 50% target utilization in Hollywood Pasture.
[42] This is wild horse utilization from May 15, no livestock use had occurred.
[43] Note: The NRCS no longer uses this term; however it was regularly used in range management at the time the ESI was completed and can still provide valuable information about the range.

(43.0%) in the Good class, 26,898 acres (30.0%) classified as Good-Fair, 23,916 acres (26.7%) in the Fair class, and100 acres (0.1%) in the Poor range class and (0.2% not rated)[44].

The ESI also documented the successional status (seral state) within the allotment as early, mid, late, PNC (or some combination of those) and no data. This information for the South Steen Allotment is shown in Table 14. The successional status was determined using a similarity index that compares the current status of the site to PNC as discussed in the Ecological Site Inventory Handbook 1734-7 (2001). Using the similarity index, there are four successional status ratings. The successional status ratings are Early (0-25% Similarity), Mid (26-50%), Late (51%-76%), and PNC (76-100%).

Table 14: Successional Status as Determined in ESI (Acres)

Pasture	Early	Mid	Mid-Late	Mid-PNC	Late-Mid	Late	PNC	No Data
Tombstone #1	191	7,997	13,207	0	240	7,838	272	<1
Steens #2	84	18,330	3,776	9,923	5,378	3,542	122	11
Home Creek #3	0	6,947	1,141	4,558	0	2,107	0	0
Hollywood #4	100	3,431	0	0	186	0	0	136

This data suggests that less than 0.5% of the allotment is in an early state, 41% is in a Mid, 20%

Table 15: Grazing Management Past and RFFAs[45]

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	37	---	---	Unknown
Wildfires	6041.4	---	6	Unknown	---	Unknown
Fences	---	58.3	---	---	None	---
Pipeline	---	0.5	---	---	None	---
Exclosures	2.6	---	1	None	---	None
Water Developments	---	---	69	---	---	None
Gravel Pit	125.7	---	1	None	---	None
Cutting	5352.6	---	11	6745.4	---	14
Piling	2339.0	---	8	839.4	---	7
RX Burning	9985.0	---	16	6318.9	---	20
Seeding	681	---	2	5	---	1

RFFAs in the CEAA that may contribute to cumulative effects to livestock grazing include livestock grazing under the current permit, ongoing maintenance of existing range improvements, wild horse utilization, periodic wild horse gathers to maintain horse numbers within the AML, wildlife use, hunting and other recreational pursuits, and ongoing noxious weed treatments. A major reasonably foreseeable future action is the North Steens Ecosystem Restoration Project. Effects of reducing encroachment of juniper by cutting and burning will result in healthier and more vigorous sagebrush/bunchgrass plant communities. Increasing the composition of perennial

[44] Range Condition Class was determined for BLM-managed lands only.

[45] This table, and all Past and RFFAs tables throughout the document, do not include unplanned or speculative actions. This table and all Past and RFFAs tables throughout this document are estimated based on currently available information, and are subject to change.

grasses, forbs, and shrubs in these communities will inherently increase herbaceous forage production to all grazers. Reducing juniper dominance will also increase water infiltration into the soil profile and improve ground water recharge (Deboodt et al. 2008). More available ground water will lead to more water in streams, springs, and waterholes that would be provided to wild horses, livestock, and wildlife. Historically less reliable water sources are expected to become more reliable. Currently within the allotment, juniper treatments (cutting, piling, burning, etc…) are occurring within both the Tombstone and Steens Pastures, mostly north of the South Steens Mountain (Loop) Road. Other areas will be determined as funding becomes available, and would follow the North Steens Ecosystem Restoration ROD. At this point in time, no broadcast burns are planned within the allotment.

All alternatives would achieve the RMP (p. 53) objective to "Manage for a sustained level of livestock grazing while maintaining healthy public land resources." However, some degree of uncertainty would remain with respect to full use of authorized AUMs from year-to-year and would require an increased level of monitoring to ensure ecological damage did not occur, especially in places where use areas are smaller than the estimated 2 miles.

Alternative A: No Action

The No Action Alternative is a continuation of the current AMP, under a renewed Term Grazing Permit. The Grazing Permit would be renewed with no changes to Terms and Conditions. Livestock are currently authorized to graze the allotment from April 1 through October 31. This season of use allows for the season of use in each pasture to be rotated, conforming to guidelines. The permittee would continue to be authorized for up to 9,577 AUMs. Use would continue to be annually authorized, often at levels lower than the 9,577 AUMs, due to limited water and the resulting poor distribution of livestock throughout the pastures. The percent Public Land (%PL) on the permit would remain at 94% and all authorized AUMs would be billed at this level, with no adjustment for each pasture, resulting in the permittee being over or under charged depending on which pastures were used during the grazing season.

Since no new water developments would be constructed and existing reservoirs would not be maintained, the permittee may choose to continue to use fewer AUMs in order to prevent any long-term (10+ years) damage to the resources; however, the permittee could also request full use of all 9,577 permitted AUMs, and the BLM would authorize them, but would have to monitor the allotment at an increased level to ensure livestock were removed when utilization averaged 50% in accessible areas, possibly before all permitted AUMs were used, in order to protect the resources. This would result in heavy use around limited water sources, expected to be over 50% utilization as animals moved from recently dried up water sources to the limited remaining reliable water sources. Areas further from reliable water would have a lower level of use. Without any new reliable water sources, livestock would continue to utilize current reliable water sources heavily, especially late in the year as the unreliable and variable sources dry, since there wouldn’t be any additional water sources for them to use. Continued heavy grazing in these

limited areas accessible to water would eventually result in decreased vigor of plant species at these sites. Accumulation of dead material in areas inaccessible to livestock due to limited water would increase the risk of severe wildfire. Spring grazing may occur within the allotment to allow livestock to utilize intermittent creeks as a water source; however, this could only occur every other year to continue to meet guidelines.

Livestock distribution would continue to be uneven, and areas that have no water available for livestock would not be utilized. When unmanaged, livestock distribution can negatively affect the plant community composition of rangelands (Pinchak et al. 1991). When cattle have uneven distribution, they over-graze preferred areas while other areas receive little use (Bailey et al. 2001). This over-grazing results in ecosystem degradation under some circumstances (Coughenour 1991, Bailey et al. 1996). However, some level of uneven grazing is often required in order to maintain the early or late seral habitat often required by some wildlife such as sage-grouse (Bailey et al. 1996). When water is limiting and poorly distributed in an area, large sacrifice areas around watering areas often occur due to the increased presence of livestock at the water source (Holecheck et al. 2004). This would continue to occur, with sacrifice areas increasing in size if the permittee takes full use (9,577 AUMS) instead of voluntarily taking less as has been occurring over the past decade.

Under this alternative, no wet meadow or spring protection would occur. Livestock and wild horses would continue to trample the spring sources, and the springs and wet meadow area would continue to not achieve Standards 2 and 4. The springs would not make progress toward meeting Proper Functioning Condition (PFC) and livestock would continue to accumulate in these areas late in the year as upland vegetation becomes course and water becomes limited. Continued high levels of utilization in these areas would move riparian areas further away from meeting PFC and Standards, especially in years when full permitted use occurred. Kovalchick and Elmore (1992) found when not managed properly, grazing in riparian areas can severely affect the stability of those sites and suggest fencing, spring grazing, and riparian pastures as the best alternative to protect them from damage caused by grazing. The route realignment at Broken Leg Spring and the crossing at Weaver Spring would not be constructed. Therefore, there would be no improvement to access at this sites, and access would still require traveling through the spring area, with the risk of getting stuck at these sites increased and/or the ability to properly manage grazing in these areas reduced due to limited access.

Vegetation outside of the current use areas would only be grazed by wildlife, with occasional wild horse and livestock utilization. It is expected that this would continue to increase the fine fuel load in these areas, increasing the risk of severe wildfire spread. Since previous years' growth would be expected to remain on the plant, over many years this may increase the decadence of the plant as the old growth prevents some new growth from developing (Oesterheld and McNaughton 1991), especially where no fire or other event has occurred, which would remove accumulations of dead material. As plant decadence increases, the ecological condition of the site would be expected to decrease, resulting in fewer AUMs available for grazing animals.

Alternative B: Proposed Action

Under the proposed action, a new Term Grazing Permit would be created with Terms and Conditions that would allow the permittee to continue to be authorized for up to 9,577 AUMs, be billed on an after the fact (actual use) basis, and to be billed using the calculated % Public Land forage for each pasture. These administrative changes would allow for increased accuracy in the billing process. During completion of range improvements, grazing would follow the described livestock management, with the understanding that since water sources would still be limited, until approved range improvements are completed, livestock may have to be removed prior to receiving all permitted AUMs, when average utilization in areas accessible to livestock reached 50%. It is anticipated upon implementation of the proposed range improvements and planned grazing rotation, there would be adequate water and forage available to meet forage allocations from the RMP, while achieving utilization targets and allotment specific resource objectives. The permittee would be able to utilize all 9,577 AUMs authorized on the Term Grazing Permit, without risking damage to resources, which currently cannot occur due to the lack of reliable, late season water. There would be no increase in permitted AUMs. Grazing management would be modified to follow an updated rotation that applies to the four existing pastures, while using adaptive management to make sure no pasture is over utilized by wild horses and livestock. By providing for periodic deferment of three pastures, bunchgrasses are able to complete their physiological cycle before grazing, increasing plant vigor (Anderson et al. 1990). Adopting the new grazing management along with range improvements would allow the Standards currently being achieved to continue to be achieved and to continue to meet Guidelines. The change in the season of use would not be expected to affect grazing management since it is a small adjustment and actual use records show that in most years livestock have not turned out until after April 15 due to wet and muddy conditions.

The maintenance of 13 existing reservoirs would ensure water sources currently available would be able to continue functioning and become more reliable water sources. The benefits of maintaining these reservoirs is wild horses and livestock already know where they are located, and the disturbance associated with maintaining a reservoir is minor compared to replacing them with new developments. This alternative would also result in the abandonment of nine reservoirs, which currently have variable reliability or are unreliable. These reservoirs are near other, reliable water sources, and if reliable would service the same area, making them unnecessary. Although by abandoning them, the ability to potentially make them reliable would be lost, removing the potential of these reservoirs to spread out the effects of congregation to each reliable water source. However, since these reservoirs would be abandoned and not removed, they may continue to function, to some degree, for a while, allowing them to continue acting as a water source temporarily, and spreading out the congregation areas when they are holding water.

Under this alternative, nine new reservoirs are proposed. These reservoirs would replace the abandoned reservoirs, and would be strategically located throughout the allotment to improve grazing animal distribution and utilization patterns. In the long term (10+ years),

the total number of reservoirs would be the same as currently exists within the allotment; however, by changing the locations of some of them, ecological benefits seen by improving distribution would be realized. Some of the new proposed reservoirs have overlapping use areas, which would benefit grazing animals since the shown use areas do not take into account rockiness or terrain, and there are multiple areas throughout the allotment where rockiness or terrain between two water holes reduces the size of use areas for those waterholes. Overlapping use areas also increase the likelihood of the grazing animals readily moving between waterholes to access forage since travel distances would be smaller. The presence of three new wells would increase the amount of truly reliable water, as the wells would be able to be pumped at any time of year, even in drought years when normally reliable water sources dry.

One well (W3) would have a pipeline with two troughs, one at the well and one at the end of the pipeline, which would increase the reliable water sources to four. Another well (W6) would have a short pipeline that feeds into a maintained reservoir (no trough). The use of solar power at the wells would decrease the need to continually monitor a generator, which would make them more reliable than those that are powered by generators, especially during muddy periods when access to the well site is limited. The exclosure of four springs, as part of spring protection and spring development, would protect the spring sources and associated riparian areas. This would allow the allotment to move towards meeting Standards 2 and 4. Two of the springs would also be developed, allowing them to continue functioning as a water source for wild horses and livestock. In addition to developing and protecting springs, a riparian meadow would also be protected by the use of an exclosure. By protecting these five riparian areas, the allotment would move toward meeting the Standards currently not achieved.

Grazing management, with the benefit of the proposed range improvements, would focus on scattering livestock across the allotment near required resources, promoting the light to moderate use of all areas available to grazing animals, and the areas of heavy use caused by limiting resources or abiotic factors would be decreased due to the number of reliable water sources being increased. Under this grazing management, the desired level of even distribution would still result in some patchiness due to grazing animals being selective for palatable species and green plants. This grazing management should result in light to moderately grazed patches being spread evenly across the pasture, mixed with areas of no to slightly used areas still being present further from the reliable water sources.

Livestock, wild horses, and wildlife would have improved distribution and utilization patterns due to the increased number of water sources available and the presence of water sources within the two-mile use area of the eastern portion of the allotment, which currently does not receive use due to lack of reliable water. In order for livestock to graze in the late summer and fall, reliable water has to be available. The more reliable water sources, the better livestock distribution would be across the allotment since “[t]he location and number of watering points on grazing lands are important in controlling the movement, distribution and concentration of grazing animals” (Vallentine 2001). Stuth (1991) found the optimum grazing area is located in a 0.5-mile radius around the water.

In general, data shows livestock will travel up to 2 miles to access water (George et al. 2007, Ganskopp 2011, Holechek et al. 2001). Miller (1983) found cattle generally stayed within 3 miles of water sources during the summer. Holechek et al. (2001) found cattle will regularly utilize rangelands within 1 mile of water, but utilization will decline by about 50% between one and two miles from water. Holecheck et al. (2004) suggests that utilization around a water source can be as high as 100% directly next to the source, to over 50% 200 yards away from the water source, and decreasing further as distance from the water source increases. Valentine (1947) found at the water source, utilization was usually around 65%, and decreased to approximately 55% at 0.2 mile from the water and 50% at 0.4 mile from the water, and continued to decrease as distance increased. While the actual level of use depends on other factors such as stocking rate and other water source availability, the pattern described above is the normal pattern around water sources. Numerous studies support the conclusion that as livestock get father away from water, utilization levels will decrease and need to be accounted for (Cook 1966).

Roughness, steep topography, down timber, dense vegetation, weather, pests, and vegetation are a few of the other factors that can influence the distance livestock will travel for forage from water sources (George et al. 2007, Holechek et al. 2001, Stuth 1991, Cook 1966). All these factors are interrelated and play a role in feeding site selection, distribution, and utilization, which result in some degree of patchiness even when resources such as water are not limiting (Vavra 2005). Gillen et al. (1984) found as slope increased cattle preference for a site decreased. Cattle in southeastern Oregon were generally found to prefer slopes less than 10%, and avoid slopes of greater than 20% (Ganskopp and Vavra 1987). These results were similar to those obtained by Pinchak et al. (1991) who discovered cattle preferred slopes of less than 4% and found over 90% of total use occurred on slopes of less than 7%. Bailey (1999) found cows that had calves were less likely to graze steeper slopes and tended to stay closer to water. As more reliable water developments are constructed, the individual effects of livestock at any one water source would be lessened as the congregation effects are spread over the larger area that has become accessible to livestock and the increased number of congregation sites.

Water development placement can be used to alter habitat attributes of an area by changing or increasing the availability of a resource (Launchbaugh and Howery 2005), altering the landscape causing herbivores to adjust their grazing tactics (Stuth 1991), encouraging more uniform distribution. Numerous literature articles show that cattle distribution is largely determined by the availability of water (Miller and Krueger 1976; Gillen et al. 1984; Pinchak et al. 1991, George et al. 2007, Ganskopp 2011, Holechek et al. 2001). Bailey (2004) found by developing water in areas more than 0.62-miles (1 km) away from existing water, the overall uniformity of grazing increases. Ganskopp (2001) found moving water in arid pastures was the most effective tool for changing the distribution of cattle.

In areas where resources (i.e. water) have been limiting, but then become available, the use of these areas may not be as high as expected due to the occurrence of cured stems in the area. However, Ganskopp and Bohnert (2005) suggest after grasses complete their lifecycle and cure (i.e. during defer grazing treatments), cattle are much less aware of the

older cured stems and tend to graze the area with improved distribution (Ganskopp et al. 1992). During these times, cattle will often graze sites that have more abundant forage, regardless of greenness or plant species (Stuth 1991). Therefore, rotating grazing treatments, including a defer treatment in the two largest pastures, would help minimize this.

By providing reliable water sources off creeks and rivers, livestock are less likely to put large amounts of pressure on the riparian areas, (Bailey 2004, DelCurto et al. 1999) as well as on the fences that have been constructed to keep them out of those areas. Parsons et al. (2003) states off-stream water development achieves more uniform cattle distribution than only using streams for watering. Off-stream water development improves cattle performance (weight gains) and distribution (Porath et al. 2002, Delcurto et al. 1999). Grazing exclusion from riparian areas has been found to promote recovery of degraded riparian plant communities, though species richness may not respond to grazing exclusion (George et al. 2011). DelCurto et al. (1999) found cattle with access to offstream water and supplements displayed a more even average distance from streams, than those without offstream water, which moved closer to the stream throughout the day. It is expected that to some degree, this would also hold true for other riparian areas, such as springs. Research suggests alternative water sources were over 99% effective in attracting the grazing animals away from the riparian areas during the period when thirst was the driving factor for animals (instead of hunger or loafing), and that it was over 89% effective in drawing animals away from the stream for loafing purposes (Miner et al. 1992). It is expected that a portion of these results were due to other factors, such as offstream water temperature, the presence of dry, firm ground at the alternative water source, and the location of the alternative water source in an easily accessible area as compared to a stream located in a canyon (Miner et al. 1992). A research review was found to support the view water developments outside of riparian areas reduces both grazing use and the amount of time spent in riparian areas (George et al. 2011). Godwin and Miner (1996) also found that offstream water can decrease not only the time livestock spend in riparian areas, but it can reduce water quality impacts caused by grazing of livestock and horses. This is seen most when the alternative water source is located on gentle slopes in an area easily accessible to livestock (George et al. 2011). It is expected that additional water sources would result in the affects described by this research.

By realigning the route around Broken Leg Spring and constructing a crossing at Weaver Spring access for both the permittee and the BLM would be improved since travel through the springs areas would not occur (Broken Leg Spring) or would be stabilized (Weaver Spring). This would reducing the risk of getting stuck in these areas improving the ability to administer livestock grazing within the allotment.

Map 11 shows the estimated use area within the allotment following the development of all range improvements proposed under this alternative, based on a maximum two mile grazing radius for livestock from the proposed developments (George et al. 2007, Ganskopp 2011, Holechek et al. 2001), along with the current use area based on existing reliable water. This map suggests constructing the developments proposed under this

alternative would allow livestock to graze 99.3% (93,901 acres) of this allotment, with only a small section of the Hollywood Pasture remaining out of reach for livestock. That would be about a 19.1% increase in use area over No Action and Alternative F. While this map suggests these developments would provide livestock access to almost all of the forage within the allotment, it is important to note the map does not take into account topography, terrain, vegetation density (i.e. presence/absence of thickets), forage quality, digestion rate, cattle physiological state (i.e. lactating, dry, etc.), cattle species, cattle age, or numerous other factors that play a role in distance livestock will travel from water to graze (George et al. 2007, Ganskopp 2001). Therefore, under some circumstances and in some areas of the allotment, it is not expected livestock would travel a full two miles to water, possibly leaving some of the forage within the allotment unavailable to livestock. This is not expected to occur less in the areas where the use area of proposed developments overlap each other or use areas of existing developments. Increased overlap increases livestock willingness to travel between waterholes while grazing, further improving livestock distribution and utilization patterns.

The more even livestock utilization is across the allotment, the fewer areas that would accumulate large amounts of fine fuels (due to periodic removal by grazing), decreasing the likelihood of a detrimental wildfire and increasing the sites ability to recover from one, as well as decreasing the risk of postfire exotic plant invasion (Davies et al. 2010). Proposed range improvements would allow livestock grazing to once again occur in areas near the river, which were historically available but have not been accessible since the Donner und Blitzen WSR corridor was fenced to exclude livestock.

Anderson and McCuistion (2008) found grazing management, when upland birds are present, should be flexible, but limited to a light to moderate use (30-50% utilization), using deferred or rest-rotation grazing to limit grazing disturbances during critical bird life stages such as nesting. They concluded light to moderate use can increase forb quality and quantity since grazing can delay the maturation of forbs, extending their availability throughout the growing season (Anderson and McCuistion 2008). The Grazing Management described under this alternative would follow Anderson and McCuistion (2008) suggestion. Grazing management would include defer grazing treatments. Research suggests grazing deferral be utilized to prevent livestock caused disturbance to sage-grouse during nesting, as well as preventing competition for forage, specifically forbs, that are required during that time (Adams et al. 2004). Adams et al. (2004) found deferred grazing can improve both the plant vigor and the productivity of grass communities, which in turn increases the amount of vegetative cover. By following the grazing management proposed under this alternative, a portion of the allotment would be deferred each year.

Based on the use areas under this alternative, which suggest improved distribution throughout the allotment, and utilization data, it is not expected average utilization of any key species would reach target utilization levels (50%), throughout the allotment, before the authorized season of use has ended. Therefore, Alternative B would achieve the RMP (p. 53) objective to "Manage for a sustained level of livestock grazing while maintaining healthy public land resources."

Alternative C: Maximum Water Distribution

Under this alternative, effects would be similar to those under the Proposed Action, with the only changes being in the number of each type of development, with the exception of the riparian meadow exclosure, which would not occur under this alternative. This alternative would result in almost five times more troughs, serviced by a total of ten wells and ten pipelines, and four spring developments.

These well and trough combinations provide the most reliable season-long water since wells can be pumped and fill troughs whenever necessary, even in years of extreme drought. This increase in reliable water sources would mean that in years of drought when even reliable reservoirs dry, grazing animals, including wild horses, would have more water options than under any other alternative, resulting in increased livestock and wild horse distribution in all years, along with more even levels of utilization. The increase in the number of reliable water sources also allows for more separation between livestock and wild horses, since all animals would be able to utilize the 24 troughs associated with wells and springs, instead of only 5 troughs under the Proposed Action.

In addition to the wells, pipelines, and troughs, the increased number of new reservoirs (17 versus nine in the Proposed Action) would further improve distribution throughout the allotment, especially in years of normal to above-average water, but even in drought years to some degree. This alternative also has 16 existing reservoirs being maintained and only seven being abandoned, increasing the benefit of the existing resources over that of the proposed action and other alternatives. All four springs would be developed under this alternative, providing protection for all the spring sources and riparian areas, allowing the allotment to move towards meeting Standards 2 and 4, while still utilizing them as water sources.

By increasing the number of reliable water sources, the use areas associated with each water source overlaps other use areas, increasing the likelihood that grazing animals would freely travel between water sources. This improvement in distribution, due to the arrangement of reliable watering sites, would ensure water would no longer limit full utilization of authorized AUMs, even during years when precipitation is below average. It would also decrease the occurrence of heavy utilization in the areas around the currently existing reliable water sources since grazing animals would be able to spread out more. Map 12 shows the estimated use area within the allotment following the development of all range improvements proposed under this alternative, and based on the maximum two-mile grazing radius for livestock from a water source (George et al. 2007, Ganskopp 2011, Holechek et al. 2001), along with the current use area, based on existing reliable water. This map suggests constructing the developments proposed under this alternative would allow livestock to graze approximately 99.4% (93,975 acres) of this allotment, and would maximize grazing animal distribution. This would be an increase of about 19.2% over the current use area. This map increases the use area over the proposed action by covering the entire Hollywood Pasture. In addition, the amount of overlap of use areas is greater under this alternative, due to the increased number of proposed developments. This would reduce the likelihood some forage areas would not be grazed,

due to factors other than distance to water (such as rim rock and canyons), since water developments would be much closer together. Due to the increased overlap of use areas around each development under this alternative, it is expected this alternative would promote better livestock distribution and utilization patterns than the proposed action or any of the other alternatives.

Based on the amount of overlap of use areas under this alternative it is not expected utilization of key species would reach target utilization levels (50%) throughout the allotment before the authorized season of use has ended. Therefore, Alternative C would achieve the RMP (p. 53) objective to "Manage for a sustained level of livestock grazing while maintaining healthy public land resources."

Due to the increased number of proposed water developments, under this alternative as compared to the Proposed Action, there would be less grazing impacts and disturbance around any given water sources. This alternative provides the water needed for wild horses and livestock to achieve the best distribution possible and reduces the chance of wild horses and livestock being affected due to drought.

Alternative D: Along Road Development

Under this alternative, the Term Grazing Permit renewal, billing, and grazing management would have the same effects as under the Proposed Action.

The presence of ten new wells associated with 13 pipelines and 22 troughs would increase the amount of reliable water, as the wells would be able to be pumped at any time of year, even in drought years when normally reliable water sources dry. This alternative would provide more reliable water (in the form of wells) than all other alternatives except for Alternative C. Only one new reservoir would be constructed under this alternative since generally the beneficial possible reservoir locations are located away from roads along drainages. Also, this alternative would only include the maintenance of 7 existing reservoirs (and the abandonment of 2) located near roads, resulting in this alternative not taking advantage of existing resources as much as occurs under Alternatives B and C. The development of 2 springs would protect the spring sources and associated riparian areas while still functioning as a water source for wild horses and livestock. The protection of 2 other springs would keep livestock and wild horses from damaging the riparian areas associated with the springs. These spring developments/protections would allow the springs to move toward meeting PFC (streams within the allotment are already meeting or moving toward PFC) and toward meeting Standards 2 and 4. The effects from the route realignment and crossing at Broken Leg and Weaver Spring, respectively, would be the same as under the proposed action.

Under this alternative, livestock would have increased distribution. Utilization patterns would be slightly improved due to the increased number of water sources available and the presence of water sources on the eastern portion of the allotment, which currently does not receive much use due to lack of reliable water. However, this improved distribution is expected to be less than under the Proposed Action or Alternative C due to

proposed developments being limited to locations adjacent to roads. This does not allow for developments to be made in all areas where use is currently limited due to the lack of reliable water.

In addition to proposed water developments, this alternative includes the relocation of a portion of pasture boundary fence. Moving this fence is expected to result in some confusion for wild horses and livestock, which have already come to know where the fence is located, and where gates associated with the fence are. In the long term (3+ years), grazing animals would learn the new fence location and adjust their movements accordingly. However, moving this section of fence would place a reliable reservoir within Steens Pasture, which is the main pasture affected by limited water, and out of Home Creek Pasture, which is not water limited due to the presence of Home Creek. By removing the reservoir from Home Creek Pasture, it is expected wild horses and livestock within that pasture would congregate along Home Creek more than they have in the past.

Map 13 shows the estimated use area within the allotment following the development of all range improvements proposed under this alternative, based on a maximum two-mile grazing radius for livestock from proposed water developments (George et al. 2007, Ganskopp 2011, Holechek et al. 2001), along with the current use area based on existing reliable water. This map suggests constructing the developments proposed under this alternative would allow livestock to graze approximately 98.5% (93,129 acres) of this allotment, with two small areas (one approximately 803 acres and the other approximately 40.8 acres) in Steens Pasture remaining out of reach for livestock. One area would be located in the northeast corner of the pasture and the other would be in the southeast corner. This would be an approximate 18.2% increase in use area over what is currently available. While there is an increase in use area over the No Action Alternative and Alternative F, the increase in use area is less under this alternative than under Alternatives B and C. The majority of the vegetation within Home Creek Pasture is accessible to livestock even with the loss of one reliable reservoir. The amount of use area overlap under this alternative is less than under Alternative C. Therefore, in the areas of the allotment not located near routes, it is expected livestock would not use the entire use area (due to other factors mentioned in the Proposed Action), possibly leaving some of the forage within the allotment unavailable to livestock. In areas along routes, where use areas overlap each other, forage would be available to livestock. The more overlap of use areas, the better livestock distribution and utilization patterns would be due to the increased willingness of grazing animals to travel between water sources and the negating of other factor affecting forage availability.

Based on the use areas under this alternative, it is not expected that utilization of key species would reach target utilization levels (50%) throughout the allotment before the authorized season of use has ended. However, this would need to be monitored carefully as livestock develop use areas with less than a two mile radius, utilization levels in some areas would increase, possibly over the 50% target maximum utilization, which may require modification using adaptive management.

Alternative E: Edge Development

Under this alternative, the Term Grazing Permit renewal, billing, and grazing management would have the same effects as under the Proposed Action.

Three reservoirs would be maintained and none would be abandoned; this doesn't allow full benefits to be recognized from existing water sources since less than 5% of existing water sources would be maintained (at this time under this analysis) to ensure functionality. One spring would be developed and three springs would be protected, allowing the allotment to move towards meeting Standards 2 and 4. However, by only developing one spring source the allotment would be losing three reliable water sources, changing distribution and utilization, but not improving it. Under this alternative the route realignment at Broken Leg Spring and the crossing at Weaver Spring would not be constructed. Therefore, there would be no improvement to access at this sites, and access would still require traveling through the spring area, with the risk of getting stuck at these sites increased and/or the ability to properly manage grazing in these areas reduced due to limited access.

Nine new wells, six new pipelines, and 12 associated troughs would provide new reliable, late season water throughout the allotment. Since no new reservoirs would be constructed, and only three existing reservoirs maintained, these troughs would be the driving factor behind changing wild horse and livestock distribution within the allotment.

This alternative also includes two fence removals totaling 4.6 miles, and four fence constructions of 6.6-6.7miles. Three of the fence construction developments would be for water gaps located on the eastern side of the allotment on Donner und Blitzen River. The three water gaps would provide reliable, late season water that would require minimal management, with the only annual requirement being fence maintenance. As these would not require a power source due to being a naturally flowing water source, these water gaps would be the most reliable water within this alternative. However, as the river is generally situated in a small canyon, grazing animals would have to enter the canyon to utilize these water sources, and it is expected they would congregate in these areas, which have riparian vegetation they can easily graze. The other fence construction development is a pasture boundary fence relocation. This fence relocation would move eight reservoirs currently in the south end of Home Creek Pasture, into Steens Pasture. Of these eight reservoirs, one is reliable and the other seven are considered variable. These waterholes would allow the south end of the Steens Pasture to have increased water and distribution, to some extent, in all years, but the benefit may be minimal in drought years when the variable reservoirs do not hold water. In addition, the Home Creek Pasture would be affected by the loss of these reservoirs. While water is not generally limiting in the south end of Home Creek Pasture due to Home Creek bisecting it, the loss of these waterholes would result in Home Creek being the only water available in the south end of the pasture. The waterholes would be replaced by one well and two troughs (located in the same general area the waterholes that would become part of the Steens Pasture would have serviced), which would provide a new source of reliable water in the pasture. However, the number of watering areas would be decreased from eight to two, with the

expected result being increased use of Home Creek, and increased congregation along the river (mostly on private). Over time, the increased presence of grazing animals along Home Creek is expected to result in Home Creek being at risk of no longer meeting PFC and Home Creek Pasture would be at risk for not meeting Standards 2 and 4, with livestock and wild horses being the causal factors. In addition, distribution and utilization patterns in Home Creek Pasture are expected to decrease due to a reduction in overlap of use areas, making the benefits of improved distribution in Steens Pasture less beneficial to the allotment as a whole due to the fence relocation.

Distribution in the northern portion of Home Creek Pasture would be improved due to the presence of two wells providing reliable water. All proposed developments, with the exception of the spring protections and fence relocation, would be located along the edge of the WSAs and/or Steens Mountain Wilderness. Currently unreliable reservoirs, located within the WSAs, would remain unreliable, but may still function as a water source in some years. By not abandoning any reservoir, maintenance of them may be possible in the future, under appropriate analysis.

Under this alternative, livestock would have increased distribution and utilization patterns compared to the No Action alternative and Alternative F, within the Steens and Tombstone Pastures. However, distribution would be decreased, compared to the same alternatives, in Home Creek Pasture due to the loss of all the reservoirs in the southern half of that pasture being greater than the proposed range improvements for that area. Overall, this improved distribution would be less than under the other action alternatives, due to proposed developments being limited to locations adjacent to, and not in the interior, of WSAs. The presence of nine new wells, associated troughs, and water gaps, would increase the amount of reliable water, and would provide more reliable water than the proposed action, but less than Alternatives C and D. In addition, the water gaps would allow portions of the allotment not regularly grazed since the river was fenced off, to be grazed again, further increasing the amount of forage accessible to grazing animals.

The benefits of reliable water within the allotment would be limited to within the two mile use area of the proposed developments located along the edge of WSAs, or within BLM-managed land that does not currently have a special designation. There are five proposed developments located on private inholdings within WSAs, making some forage in the WSA interior accessible to livestock, but due to the locations of the inholdings, especially in Steens Pasture, the benefit would be limited.

The protection of three springs would keep livestock and wild horses from damaging the riparian areas associated with the springs and the one spring development would also protect the spring while providing a reliable water source. These spring developments/protections would allow the springs to move toward meeting PFC (streams are currently meeting or moving toward PFC) and toward meeting Standards 2 and 4. However, in Home Creek Pasture, the increased use of Home Creek is expected to move the creek away from meeting these Standards and PFC, and the creek would require increased monitoring to determine any effects. This alternative would not provide

reliable, late season water throughout the entire allotment, but would concentrate livestock use on regular BLM-managed and private lands, and along the edges of WSAs.

Map 14 shows the estimated use area within the allotment following the development of all range improvements proposed under this alternative, based on a maximum two mile grazing radius for livestock from the proposed developments (George et al. 2007, Ganskopp 2011, Holechek et al. 2001), along with the current use area based on existing reliable water. This map suggests that constructing the developments proposed under this alternative would allow livestock to graze all of Tombstone, Hollywood, and Home Creek pastures. However, within Steens Pasture, the use areas developed for this alternative suggest the two miles on the east side of the pasture along the river would be accessible for livestock to graze, but approximately 4,000 acres in the middle of the pasture would remain inaccessible due to being in the interior of WSAs, away from water sources. This alternative would allow for approximately 95.0% (89,799 acres) of the allotment to be accessible to livestock. This would be an increase in use area of about 13.9% over the non-action alternatives, but would be less of an increase than under the other action alternatives. The amount of use area overlap under this alternative, is less than under all other action alternatives, but would be improved from the No Action Alternative and Alternative F. The more overlap of use areas, the better livestock distribution and utilization patterns would be.

Based on the use areas under this alternative, utilization patterns of key species would be improved over the No Action Alternative and Alternative F. However, the limited locations of proposed developments would make it uncertain as to whether or not livestock would exceed utilization levels (50%) throughout the allotment (within use areas) before the authorized season of use has ended. This would need to be monitored carefully as livestock develop use areas, to determine if the allotment can support full authorized active use without causing ecological damage by consistently exceeding the 50% target maximum utilization. In drought years, this alternative is expected to still limit full use of authorized AUMs. Therefore, Alternative E is not expected to achieve the RMP (p. 53) objective to "Manage for a sustained level of livestock grazing while maintaining healthy public land resources," due to the degree of uncertainty that would remain with respect to full use of authorized AUMs from year-to-year.

Alternative F: Reduced Grazing with No Development

Under this alternative, no range developments would be constructed. Current range improvements would continue to be maintained, under the appropriate analysis, as needed, in order to ensure functionality for wild horses and livestock. Livestock grazing management would follow the grazing rotation analyzed in the proposed action (as would billing procedures), with a decrease in livestock numbers and AUMs. This alternative would result in the renewal of the 10-year grazing permit, with changes to terms and condition encompassing all changes within this AMP. The 10-year term livestock grazing permit would be issued with 7,875 active use AUMs of livestock grazing on public land (a decrease of 1,702 AUMs), which is the maximum number of AUMs utilized in a year since the Steens Act of 2000 was implemented.

By decreasing authorized AUMs within this allotment, the risk of livestock exceeding the 50% maximum target utilization would be decreased from the No Action alternative, due to fewer animals utilizing each of the currently reliable water sources. This would allow the ecological health of the allotment to remain stable in commonly grazed areas, and continue to improve in areas that remain inaccessible to grazing animals due to a lack of water. Due to the decreased level of AUMs, it would be even less common for areas outside of the current use areas to be grazed, allowing for greater accumulation of fine fuels and increasing the risk of wildfire spread. Effects of having large areas of accumulating fine fuels would be similar to the No Action alternative, only increased since fewer AUMs would be required in all years, while it is currently voluntary under the No Action alternative.

Since no developments would be constructed to protect the four springs within the allotment, and livestock have a strong preference for riparian areas, especially later in the year, these springs would continue to receive heavy utilization by wild horses and livestock. Animals would continue to congregate in these areas with available water and moist forage (Kauffman and Krueger 1984). However, due to decreased numbers, these effects would be expected to be slightly less than under the No Action Alternative (assuming full permitted use). The springs would not be expected to move toward meeting PFC and the allotment is expected to continue to not achieve Standards 2 and 4 since both livestock and wild horses would continue to congregate in these areas.

Under this alternative the route realignment at Broken Leg Spring and the crossing at Weaver Spring would not be constructed. Therefore, there would be no improvement to access at this sites, and access would still require traveling through the spring area, with the risk of getting stuck at these sites increased and/or the ability to properly manage grazing in these areas reduced due to limited access.

In addition, unless the permittee agrees to voluntary non-use, the BLM would have to process a decrease in authorized AUMs, which is considered an adverse action by most permittees, often causing the BLM to lose their cooperation. The permittee for this allotment is currently willing to cooperate with the BLM in finding alternative solutions that meet the needs of the allotment, including protecting ecological resources.

Alternative G: Complete Removal of Livestock Grazing

Under this alternative, livestock grazing would be eliminated from the allotment and therefore, no grazing permit would be renewed or issued for this allotment. No new range improvements would be constructed, and those that currently exist would not be maintained unless found to benefit wildlife or wild horses. Currently, all water sources benefit (at a minimum) wild horses, and those sources would be expected to continue to be maintained under appropriate NEPA analysis. However, existing improvements such as fences may or may not be beneficial to the management of wild horses or wildlife and their continue maintenance would likely be site specific.

Livestock would not over utilize riparian areas, since no livestock use would occur. However, wild horses would continue to have access to and use these areas, resulting in Standards 2 and 4 continuing to not be achieved. Analysis of habitat use by free-ranging horses in sagebrush communities reported that horses seek riparian habitats (Crane et al., 1997). In a feral horse habitat use study in the northern sagebrush steppe by Ganskopp and Vavra (1986) horses rapidly vacated the watering areas after drinking; however, a seasonal trend was observed in which horses remained slightly closer to perennial water sources during warm, dry summer months. Ganskopp and Vavra (1986) noted that there were adequate year-round sources of water available for the horses in their study. Considering the limited supply of year-round water sources available in South Steens Allotment, concentration of wild horses at these sites during the warm summer months is expected. In a study on the Sheldon National Wildlife Refuge, approximately 40 air miles south of the South Steens Allotment, estimates of feral horse use from September to October on standing riparian biomass varied from negligible to nearly 100 percent (Boyd et al. 2012). Crane et al. (1997) concluded streamside and bog/meadow habitats were preferentially selected by feral horses during the growing season, the most probable season of negative grazing impact. While removing livestock would reduce a large portion of total AUMs used within the allotment, the draw of riparian areas to grazing animals, including wild horses, is strong, especially when you consider the proportionate size and availability of the riparian areas to upland sagebrush communities within the allotment. Removing livestock would reduce the inter-species competition for these sites, but the intra-species competition would remain. In a wild horse behavior study in Grand Canyon, Berger (1977) summarized home ranges for all bands decreased in size in successive warm months, probably due to increased ambient temperature and drought, resulting in greater utilization of spring areas that led to increased inter-band confrontation and agonistic display. Miller and Denniston (1979) reported that even females participated along with male group mates when threatening another group of horses at water. It is expected that wild horses that made limited use of these areas due to competition, would begin to use these areas, but the small size of these areas would still result in intra-species competition. Therefore, the benefit of removing livestock in these areas would be reduced, potentially to no net improvement. However, the fluctuation in wild horse numbers between gathers, may result in some progress towards meeting PFC and Standards when wild horse numbers are low and intra-species competition for these sites is reduced. Overall, it would be expected that no to little progress would be made towards meeting PFC or Standards in these riparian areas by only removing livestock.

Livestock would not be present to reduce the accumulation of fine fuels and livestock grazing would not reduce the risk of community altering wildfire (Davies et al. 2010). Davies et al. (2009) found grazing exclusion decreases the ability of the native herbaceous community to tolerate fire due to the accumulation of fine fuels, which can result in increased mortality of desirable vegetation during fire events. Davies (2010) found wildfires that occur in areas without grazing would “increase the probability of postfire exotic plant invasion by increasing the risk of fire-induced mortality of perennial bunchgrasses.” This risk would be greater than under all under alternatives since no livestock grazing would occur. Also, no livestock would be present to remove old

growth from plants, preventing some new growth from developing and possibly increasing the overall decadence of the plant since old growth may prevent new growth from developing (Oesterheld and McNaughton 1991).

The complete removal of livestock would eliminate ecological damage currently caused by livestock in areas of current livestock congregation, specifically around existing water sources. Since livestock related affects would be removed some of these congregation areas would improve in ecological health, due to reduced grazing and trampling at the sites. This improvement would occur in the long-term (more than five years) as desirable perennial species become reestablished and/or improve in vigor. Wild horses would still congregate in some of the existing congregation areas, especially around existing water sources, reducing the benefit of removing livestock. Improvement in ecological condition at existing livestock congregation sites would be expected to be largest at sites that wild horses rarely use, and smallest at sites that have large levels of existing wild horse congregation. However, since there would be fewer total grazing animals within these congregation areas, overall, some improvement would be expected to occur at all existing congregation sites. At existing congregation sites where existing desirable vegetative species are limited, annual grasses or other weed species may begin to dominate, which would limit the improvement in ecological condition and sites would take a longer time to improve in ecological condition.

Since no new developments would be constructed, distribution of wild horses would remain the same, with the majority of use centered around existing water sources.

3. Noxious Weeds

Affected Environment: Noxious Weeds

Noxious weeds are currently present within the area and require continued monitoring and treatment. The allotment is susceptible to introduction and spread of noxious weeds, in particular, Scotch thistle, due to the presence of noxious weed species within and near the allotment. Livestock, wildlife, and wild horses tend to concentrate at existing water developments and recreational visitors are often present within the area, all of which are capable of spreading noxious weeds. Recreational visitors to Steens Mountain travel the road network and camp in many areas. Hikers spread out across incidentally monitored trails. Each visit creates opportunities for new weed introductions. New introductions can spread quickly in disturbed areas, potentially infesting many new acres. Many reservoirs in the area already have infestations of Scotch thistle. Depending on climatic conditions in any given year, weed infestations vary from a few plants to several acres. Once Scotch thistle establishes in an area, the seed can be viable onsite for 25+ years. Seeds are windborne and can travel miles; they can also be dispersed by water (Sheley and Petroff 1999). Table 16 shows which noxious weeds are known to currently exist within the allotment, by pasture, as well as acres of infestation.

Table 16: Noxious Weeds by Pasture

Pasture	Noxious Weed	Infested Acres	Pasture Acres (BLM Only)
Hollywood	Scotch Thistle	34.52	-
	HOLLYWOOD TOTAL	**34.52**	**3,853**
Home Creek	Whitetop	0.11	-
	Bull Thistle	0.17	-
	Scotch Thistle	2.09	-
	HOME CREEK TOTAL	**2.37**	**14,762**
Steens	Whitetop	0.53	-
	Spotted Knapweed	3.20	-
	Diffuse Knapweed	<0.01	-
	Yellow Starthistle	<0.01	-
	Canada Thistle	50.03	-
	Bull Thistle	22.83	-
	St. Johnswort	<0.01	-
	Scotch Thistle	1.03	-
	STEENS TOTAL	**77.63**	**41,165**
Tombstone	Russian Knapweed	0.01	-
	Whitetop	1.06	-
	Diffuse Knapweed	0.00	-
	Field Bindweed	0.08	-
	Scotch Thistle	8.10	-
	Mediterranean Sage	5.92	-
	TOMBSTONE TOTAL	**15.17**	**29,745**

Table 15 shows the weed treatments that have occurred within South Steens Allotment between 2001 and 2010. The table includes the species and the acres treated, as well as the size of the project that was the driving factor in the weed monitoring and treatment. Note the project acres are not related to disturbance acres for proposed developments discussed within this document.

Table 17: Weed Treatments within South Steens Allotment

Year	Species	Acres Treated	Project Acres
2012	Scotch Thistle	.001	2.8
	Canada Thistle	.02	441
	TOTAL	**0.02**	---
2011	Scotch Thistle	1.1	1,735
	Canada Thistle	0.6	2.8
	White top	0.14	581
	Spotted knapweed	0.01	124
	TOTAL	**1.85**	---
2010	White top	0.04	12

	Scotch thistle	0.20	15
	TOTAL	**0.24**	---
2009	Spotted knapweed	0.12	124
	Scotch thistle	0.595	586
	Canada thistle	0.5	209
	TOTAL	**1.22**	---
2008	Scotch thistle	0.08	572
	Spotted knapweed	0.02	124
	TOTAL	**0.1**	---
2007	Scotch thistle	0.36	572
	TOTAL	**0.36**	---
2006	Scotch thistle	0.08	572
	White top	0.02	572
	TOTAL	**0.1**	---
2005	Scotch thistle	0.54	572
	TOTAL	**0.54**	---
2004	Scotch thistle	0.34	572
	TOTAL	**0.34**	---
2003	Scotch thistle	0.16	572
	TOTAL	**0.16**	---
2002	Scotch thistle	0.12	572
	TOTAL	**0.12**	---
2001	Scotch thistle	0.4	572
	TOTAL	**0.4**	---

Environmental Consequences: Noxious Weeds

Effects Common to All Alternatives:

The CEAA for this analysis is the South Steens Allotment. Past and RFFAs that have affected Noxious Weeds are found in Table 18. The North Steens Ecosystem Restoration Project, which includes numerous juniper control methods including prescribed fire and mechanical removal, will result in soil disturbance, which is expected to allow noxious weeds to become established. Prescribed fire also opens up the site to weed infestation by removing existing cover and reducing competition for weed species. Weed introduction and spread will still occur due to wildlife movements, wild horse movements, wind, water, and human activities.

Table 18: Noxious Weeds Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	37	---	---	Unknown
Wildfires	6041.4	---	6	Unknown	---	Unknown
Known Primitive Campsites	---	---	14	---	---	Unknown
Trails	---	13.9	---	---	None	---
Open Roads	---	100.3	---	---	None	---
Closed Roads	---	34.2	---	---	None	---
Fences	---	58.3	---	---	None	---
Pipeline	---	0.5	---	---	None	---
Exclosures	2.6	---	1	None	---	None
Water Developments	---	---	69	---	---	None
Gravel Pit	125.7	---	1	None	---	None
Cutting	5352.6	---	11	6745.4	---	14
Piling	2339.0	---	8	839.4	---	7
RX Burning	9985.0	---	16	6318.9	---	20
Seeding	681.5	---	2	5	---	1

Alternative A: No Action

Concentrated grazing, resulting in above average utilization around the limited currently reliable water sources, could affect the health of plant communities, creating opportunities for new weed introductions and spread. Impacts to vegetation caused by trampling or overgrazing can open up niches for noxious weed invasion and spread. This alternative could result in the increased size of existing weed sites around existing water developments. If the permittee attempted to use the full permitted use under the No Action Alternative (removing livestock when full use was achieved or when the 50% utilization ceiling was reached), the concentration of livestock at current reliable water sources would be increased over what has occurred during the past decade. Light to moderate livestock grazing can be used as a tool to decrease litter accumulation, which would indirectly prevent cheatgrass invasion by increasing the ability of the community to tolerate fire (Davies et al. 2009). A community that is better able to tolerate fire would be less susceptible to weed invasion. Under this alternative the route realignment at Broken Leg Spring and the crossing at Weaver Spring would not be constructed. Therefore, there would be no improvement to access at this sites, and access would still require traveling through the spring area, with the risk of getting stuck at these sites. The ability to properly monitor and treat weeds in these areas would be expected to be limited due to access problems when springs are flowing.

Alternative B: Proposed Action

Any new ground-disturbing activities that would be authorized under this alternative have potential to create opportunities for noxious weed establishment and spread. Therefore, there is a risk of new weed introductions. This risk would directly correlate to the numbers of ground-disturbing activities. Following project design elements listed in Chapter II would reduce opportunities for introduction of new weeds.

Additional water sources would help reduce concentrations of livestock, wildlife, and wild horses around currently reliable water sources, thereby, reducing impacts to plant communities in those areas. Livestock would congregate around new developments, but by having an increased number of developments, disturbance caused by livestock would be spread out over a larger area and would not be as severe as is currently occurring around existing reliable water sites. This would result in a lower level of disturbance occurring at each site, on average, than what currently occurs. The lower the level of disturbance, the fewer niches available for weed establishment. Productive, healthy plant communities would reduce opportunities for noxious weed introduction and spread. Light to moderate livestock grazing can be used as a tool to decrease litter accumulation, which would indirectly prevent cheatgrass invasion by increasing the ability of the community to tolerate fire (Davies et al. 2009). A community that is better able to tolerate fire would be less susceptible to weed invasion.

Locating water sources where they would be beneficial but also reasonable to monitor and treat for noxious weeds would help sustain proper function of this area, and minimize consequences associated with noxious weed introduction and spread. Monitoring, particularly in known weed-prone areas, is generally done using ATVs equipped with motorized spray equipment so when weeds are found, they can be treated promptly, appropriately, and efficiently. Under this alternative, the majority of range improvements would occur within ¼ mile of an existing road (open or closed) used for monitoring. However, four proposed new reservoirs are located further from roads and would require off-road travel over greater distances in order to monitor them. The route realignment and crossing at Broken Leg and Weaver Springs, respectively, would allow for improved access for monitoring and treating weeds in these areas.

Alternative C: Maximum Water Distribution

The effects of this alternative would be similar to the Proposed Action. However, this alternative would create the most disturbance due to the increased number of developments constructed, which would be spread across a greater area, resulting in a larger risk of new weed introductions throughout the allotment. As the level and intensity of disturbance increases, so does the density of weedy plants (Jensen 1995). Monitoring such a large number of new developments, on a regular basis, would be problematic for noxious weed management. Under this alternative nine proposed developments would be located further than ¼ mile from any road (open or closed), requiring an increased level of off-road travel when compared to the Proposed Action. The route realignment and crossing at Broken Leg and Weaver Springs, respectively, would allow for improved access for monitoring and treating weeds in these areas.

Alternative D: Along Road Development

The effects of this alternative would be less than Alternative C, but greater than the Proposed Action since the number of new developments would be between the two. However, this alternative keeps most new developments within already disturbed sites (e.g., roads and trails). This would be beneficial for annually recurring weed monitoring

and treatment due to existing access. This alternative would be the least problematic for both monitoring and treatment. The exception would be the areas of spring protection; however, these sites would only consist of new exclosure fences and disturbance to the surrounding vegetation would only occur from vehicles during construction and at the location of each post. Fence removal and new fence construction would cause temporary (<3 months) disturbance caused by construction activities. However, these disturbances would be localized to the area where the fence is placed (or removed), as well as where materials would be located prior to use or removal, and would only require monitoring following the construction phase. Since the new fence would be located along a road, monitoring would not be problematic. The route realignment and crossing at Broken Leg and Weaver Springs, respectively, would allow for improved access for monitoring and treating weeds in these areas.

Alternative E: Edge Development

The effects of this alternative would be similar, but slightly less than Alternative D due to one less reservoir being constructed, one less spring development, seven fewer troughs and seven fewer pipelines. Large areas with no reliable water would result in livestock and wild horses continuing to concentrate at reliable watered areas. The concentration would be somewhat lower than in the No Action Alternative since there would be some new water sources developed. However, the level of disturbance to vegetation around these sites would be higher than desired and would be more susceptible to noxious weed invasion and spread. The removal of a fence and construction of a new pasture boundary fence would have the same effects as under Alternative D; however, a portion of this fence follows the BLM and private property boundary, not a road, making monitoring after-construction more problematic. In addition, three of the proposed developments would be water gaps along Donner und Blitzen River. These sites currently do not have known weed infestations and opening the area to grazing would result in high levels of utilization in the narrow water gap areas, increasing the risk of noxious weed establishment and spread.

Under this alternative the route realignment at Broken Leg Spring and the crossing at Weaver Spring would not be constructed. Therefore, there would be no improvement to access at this sites, and access would still require traveling through the spring area, with the risk of getting stuck at these sites. The ability to properly monitor and treat weeds in these areas would be expected to be limited due to access problems when springs are flowing.

Alternative F: Reduced Grazing with No Development

This alternative would have effects similar to the No Action Alternative. If the permittee continued to willingly reduce utilized AUMs from the permitted AUMs under the No Action Alternative, the effects would be the same. However, if the permittee attempted to use the full permitted use under the No Action Alternative (removing livestock when full use was achieved or when the 50% utilization ceiling was reached), the concentration of livestock at current reliable water sources would be increased. In that situation, the

effects of this alternative would be less than the No Action Alternative due to fewer AUMs being removed from the allotment.

Under this alternative the route realignment at Broken Leg Spring and the crossing at Weaver Spring would not be constructed. Therefore, there would be no improvement to access at this sites, and access would still require traveling through the spring area, with the risk of getting stuck at these sites. The ability to properly monitor and treat weeds in these areas would be expected to be limited due to access problems when springs are flowing.

Alternative G: Complete Removal of Livestock Grazing

Under this alternative, no livestock grazing would occur within the allotment. This would eliminate livestock congregation around water sources, decreasing opportunities for new weed introductions and spread. The lack of livestock grazing would reduce impacts to vegetation from trampling and overgrazing, resulting in fewer disturbances where noxious weeds could establish and spread. However, congregation at these sites would still occur due to the presence of wild horses; it would just occur at a lower level across the allotment since livestock would be gone. This alternative could result in a decreased size of existing weed sites, especially around water sources where disturbance is often high. Since weeds are currently present within the allotment, monitoring and treatment would continue, although since there would be no livestock, there would be less range staff monitoring the allotment to document weed infestations.

Under this alternative the route realignment at Broken Leg Spring and the crossing at Weaver Spring would not be constructed. Therefore, there would be no improvement to access at this sites, and access would still require traveling through the spring area, with the risk of getting stuck at these sites. The ability to properly monitor and treat weeds in these areas would be expected to be limited due to access problems when springs are flowing.

4. Recreation and Visual Resources

Affected Environment: Recreation and Visual Resources

The primary recreation activities within the allotment include driving for pleasure, sightseeing, camping, hiking, backpacking, horseback riding, wildlife viewing, hunting, fishing, and photography. Other recreational opportunities include picnicking, biking, rock hounding, snowmobiling, cross-country skiing, and Off-Highway Vehicle use. The main season of use is generally July through November, with highest use occurring during the fall from late September through mid-October coinciding with rifle season for deer hunting.

Steens Loop Road is the main access route into the allotment and is suitable for passenger-car traffic. Other motorized and mechanized vehicle use is limited to designated roads. Most designated routes leading off the Loop Road in the allotment are

not suitable for passenger cars, but are designed for high clearance vehicles. As a result, recreational use in areas accessed by these routes is limited to those with an appropriate vehicle and is generally low, except during hunting season. Motorized access to the allotment is limited during part of the year when the Loop Road is gated from late November through late May, due to snow or wet road conditions, to protect resources.

Steens Loop Road is the Key Observation Point (KOP) for this area as it is regularly travelled (on a daily basis) when the road is open, generally from May to November. A KOP is defined as "one or a series of points on a travel route or at a use area or a potential use area, where the view of a management activity would be most revealing" (BLM Manual 8400). When travel on Loop Road is restricted, Loop Road is not a KOP.

Most of the allotment (69,251 acres) falls within a Visual Resource Management (VRM) Class I category. Class I management objectives provide for preservation of the existing character of the landscape. This class provides for natural ecological changes and allows for very limited management activity. Class I lands in the allotment correspond to BLM lands designated as wilderness or WSAs.

Most of the remaining area within the allotment (15,978 acres) falls within a VRM Class II category. Class II objectives provide for retention of the existing landscape character. Level of change to the characteristic landscape should be low, but some management activity is allowed. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements found in the predominant natural features of the characteristic landscape and be constructed to minimize visual disturbance.

There are small portions of the allotment (4,281 acres) that fall within a VRM Class III category. Class III objectives provide for partial retention of the existing character of the landscape. Level of change to the characteristic landscape can be moderate and management activities are often allowed. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape in order to minimize visual disturbance. Most Class III lands are south of Steens Loop Road adjacent to the Home Creek portion of Steens Mountain Wilderness.

Environmental Effects: Recreation and Visual Resources

Effects Common to All Alternatives:

For the purpose of this analysis, the CEAA for recreation and visual resources encompasses South Steens Allotment. Table 19 shows Past and RFFAs for this resource.

Other projects affecting recreation include potential removal of juniper trees as described in the North Steens Ecosystem Restoration Project ROD. These treatments are not expected to affect the types of recreation opportunities. Limitations on recreational use in areas treated would only last weeks. Depending on the type of treatments implemented, there may be some short-term (3-5 years) disturbance to visual resources in areas treated.

However, these treatments are expected to help restore the natural fire regime, and protect ecological integrity in the CMPA as a whole, over the long term (5+ years), as provided for under the Steens Act. To the extent possible, juniper trees that help screen developments or dispersed campsites would be left intact, which would limit the visual effects of these treatments. Overall, the character of the landscape would be preserved. There are no other known reasonably foreseeable future actions that would contribute to effects to recreation or visual resources.

Table 19: Recreation and Visual Resources Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	37	---	---	Unknown
Wildfires	6041.4	---	6	Unknown	---	Unknown
Known Primitive Campsites	---	---	14	---	---	Unknown
Trails	---	13.9	---	---	None	---
Open Roads	---	100.3	---	---	None	---
Closed Roads	---	34.2	---	---	None	---
Fences	---	58.3	---	---	None	---
Exclosures	2.6	---	1	None	---	None
Water Developments	---	---	69	---	---	None
Gravel Pit	125.7	---	1	None	---	None
Cutting	5352.6	---	11	6745.4	---	14
Piling	2339.0	---	8	839.4	---	7
RX Burning	9985.0	---	16	6318.9	---	20
Seeding	681.5	---	2	5	---	1

No changes to the types (i.e., hiking, horseback riding, hunting, etc.) of recreation opportunities available in the project would occur as a result of any of the alternatives.

Effects Common to All Action Alternatives:

Spring protection/development would result in improved riparian areas within the exclosures. This may draw more recreationists to these areas as the springs would have more vegetation and be more aesthetically pleasing. As these riparian areas also provide habitat to small wildlife species, recreationists may have increased opportunities to view such wildlife at these sites, with less disturbance associated with wild horses and livestock.

Alternative A: No Action

No changes to recreation opportunities or activities or to visual characteristics would occur under this alternative.

Alternative B: Proposed Action

If any encounters with visitors occur during installation of the proposed developments, there would be some temporary and short-term (days) disturbance to recreational activities in the immediate area.

Proposed developments are located away from known areas of prolonged visitor use (i.e., campsites) and would not be expected to have any effects on the quality of the recreational experience. Any visual or noise disturbance associated with developments would be expected to be short term, lasting minutes as visitors pass by on foot, horseback, or by vehicle. Such disturbance could last longer if developments are located near dispersed campsites. Dispersed campsites, by their nature, change locations over time as some sites grow over with vegetation or are abandoned in favor of new sites. The proposed developments would not affect a camper's ability to pick a desirable spot to camp. Some visitors may be displaced from some of the campsites either by noise or visual disturbance associated with developments or increased presence of cattle or wild horses, while other visitors may enjoy those developments and associated livestock and wild horse presence. However, it is expected livestock would be better distributed, in smaller groups, across the allotment, rather than concentrated in larger numbers around the limited reliable water sources. Overall, evidence of grazing animals may be reduced at each water source since there would be the same number of cattle as currently permitted and more water sources for them to utilize. The route realignment and crossing at Broken Leg and Weaver Springs, respectively, would allow for improved access for visitors by reducing the risk of getting stuck in these areas when the springs are flowing and/or ensure that all visitors have access to the areas serviced by these roads.

Table 20 shows a comparison of proposed developments within each VRM class.

Table 20: Proposed Developments by VRM Class for the Proposed Action

Development	VRM Class I	VRM Class II	VRM Class III
Reservoir Maintenance	9	3	1
New Reservoirs	9	0	0
Spring Development	2	0	0
Spring Protection	2	0	0
Exclosure	1	0	0
Wells	0	2	1
Pipeline	0	1 - 0.5 mile	1 – 0.1 miles
Troughs	2	3	0

It would not be expected that the land/water component of the landscape character would change given that none of the developments would require excavation that would noticeably modify landscape features. Reservoirs would have the most excavation, but they would be located in drainages and would not be expected to be large enough to modify the overall form of those drainages. Overall, the land/water component of the landscape character would be preserved.

Disturbance to the vegetation feature of the landscape would be the same for each development, as described in the WSA section of this document. With the exception of vegetation effects associated with livestock use of reservoirs and troughs, disturbed areas would be seeded and expected to have vegetation return within 1 to 5 years. Given the limited area affected by developments as a whole, the vegetation component of the landscape character would be preserved.

These developments would add structures to the landscape character that would introduce vertical lines associated with wells and fence posts, and horizontal lines associated with fences and troughs. Project design elements would ensure developments (especially those within WSAs) would blend in with the surrounding area to the maximum extent possible decreasing visual contrast and mitigating the visual effects (see Ch. II.A.7). The taller the power source for wells, the more visible it would be and the visual contrast would be greater; any moving parts would further increase the visual contrast in the landscape and draw visitor's attention. Length of time the development would be in view would be expected to be minutes as most visitors pass by in motorized vehicles but also by foot or horseback. Given topographic and vegetative screening, visitor encounters with most other developments not located near an area of prolonged visitor use (i.e., dispersed campsites) would also be expected to last only minutes as visitors pass. Exposure would be longer for those developments near dispersed campsites.

Map 15 shows both the estimated maximum and minimum viewshed disturbance[46] if all proposed improvements within this alternative were constructed. The maintenance or abandonment of existing reservoirs would not have any additional effects on visual resources as they are already occurring. Since pipelines would be almost exclusively buried, they would not affect visual resources; therefore, there are no viewshed analyses done for these developments. Under this alternative, there are five proposed developments with individual viewshed maps showing the estimated maximum viewshed would cross South Steens Loop Road. These developments are S2, W13, T11, R7, and R11. However, none of their estimated minimum viewsheds cross Loop Road, so it is not expected these developments would be obvious to visitors along Loop Road once all the PDEs are followed.

Alternative C: Maximum Water Distribution

The effects of this alternative would be similar to those described under the Proposed Action. However, the cumulative effects of this alternative would be greater due to the larger number of developments.

As more areas are developed, the opportunity to camp or recreate away from these developments would become more difficult. However, with the proposed mitigation efforts found under Project Design Elements Specifically for Proposed Range Improvements (see Ch.II.A.7) most recreationists would not directly feel the presence of these developments unless they were within close proximity (less than ¼ mile).

[46] See Appendix D for a discussion on how the viewshed analysis was completed and individual maps for each proposed development.

This alternative would have more effects to the visual resource than the Proposed Action since it would create more developments expected to be noticeable on the landscape. In this area of historic grazing and range improvements, this alternative would increase the number of developments but would not change the existing character of the landscape. With the mitigation measures applied, there would not be a noticeable contrast to the existing visual resource.

Table 21 shows a comparison of proposed developments within each VRM class under this alternative.

Table 21: Proposed Developments by VRM Class for Alternative C

Development	VRM Class I	VRM Class II	VRM Class III
Reservoir Maintenance	13	3	0
Reservoir Abandonment	7	0	0
New Reservoirs	17	0	0
Spring Development	4	0	0
Wells	4	2	1
Pipeline	7 – 9.5	4 – 5.1 miles	0
Troughs	14	5	1

Map 16 shows both the estimated maximum and minimum viewshed disturbance if all proposed improvements within this alternative were constructed. The maintenance or abandonment of existing reservoirs would not have any additional effects on visual resources as they are already occurring. Under this alternative, there are eleven proposed developments whose individual viewshed maps show the estimated maximum viewshed would cross South Steens Loop Road. These developments are S2, R7, R8, W4, W7, W8, T12, T13, T14, T23, and T29. However, none of their estimated minimum viewsheds cross Loop Road, so it is not expected these developments would be obvious to visitors along Loop Road once all the PDEs are followed (see Appendix D: Viewshed Analysis for Individual Viewshed Analysis Maps for proposed improvements).

Alternative D: Along Road Development

The effects of this alternative would be similar to those described under Alternative C except fewer developments would be implemented, especially on BLM-administered lands that fall within a VRM Class I category (WSAs), and six of the proposed developments would be located near dispersed campsites, which are generally located along roads. In addition, there would be approximately 3 miles of new fence under this alternative, not including that needed for spring exclosures and around wells. The new fence has potential to restrict travel of visitors in the area immediately surrounding the fence. However, no destinations or unique features were identified that would be affected by the fence and most visitors would be able to cross it with little difficulty. This effect on both recreation and visual resources would be offset by removal of 2.1 miles of fence that currently exists in the same general area.

Table 22 shows a comparison of proposed developments within each VRM class.

Table 22: Proposed Developments by VRM Class for Alternative D

Development	VRM Class I	VRM Class II	VRM Class III
Reservoir Maintenance	5	2	0
Reservoir Abandonment	2	0	0
New Reservoirs	1	0	0
Spring Development	2	0	0
Spring Protection	2	0	0
Wells	4	2	1
Pipeline	9 – 12.4 miles	4 – 5.1 miles	0
Troughs	10	5	1
Fence Removal	1 – 2.1 miles	0	0
Fence Construction	1 - 3.0 miles	0	0

Map 17 shows both the estimated maximum and minimum viewshed disturbance if all proposed improvements were constructed. The maintenance or abandonment of existing reservoirs would not have any additional effects on visual resources as they are already occurring. Under this alternative, there are eight proposed developments whose individual viewshed maps show the estimated maximum viewshed would cross South Steens Loop Road. These developments are S2, W4, W7, W8, T13, T14, T23, and T29. However, none of their estimated minimum viewsheds cross Loop Road, so it is not expected these developments would be obvious to visitors along Loop Road once all the PDEs are followed (see Appendix D: Viewshed Analysis for Individual Viewshed Analysis Maps for proposed improvements).

Alternative E: Edge Development

The types of effects under this alternative would similar to those under Alternative C except fewer developments would be constructed within lands classified as VRM Class I and four of the proposed developments would be located near dispersed campsites. In addition, there would be 6.7 miles of new fence (including fences for water gaps) under this alternative, not including that needed for spring exclosures and other developments. Approximately 2.5 miles of this fence would be located on the boundary between BLM and private land, and would not restrict visitor movement on BLM land. The rest of this fence would restrict the travel of visitors in the area immediately surrounding the fence. However, access to destinations or unique features would not be affected. The effect of the new fence construction would be offset by the removal of 4.7 miles of fence that currently exists in the same general area. Since route realignment and crossing at Broken Leg and Weaver Springs, respectively, would not be constructed, there would be no change to recreation in these areas.

Table 23 shows a comparison of proposed developments within each VRM class.

Table 23: Proposed Developments by VRM Class for Alternative E

Development	VRM Class I	VRM Class II	VRM Class III
Reservoir Maintenance	0	3	0
Spring Development	1	0	0
Spring Protection	3	0	0
Wells	1	2	1
Pipeline	1 – 0.6 mile	4 - 5.0 miles	0
Troughs	0	5	1
Fence Removal	1 - 4.6 miles	0	0
Fence Construction	4 - 4.1 miles	0	0

Map 18 shows both the estimated maximum and minimum viewshed disturbance if all proposed improvements within this alternative were constructed. The maintenance or abandonment of existing reservoirs would not have any additional effects on visual resources as they are already occurring. Under this alternative, there are six proposed developments whose individual viewshed maps show the estimated maximum viewshed would cross South Steens Loop Road. These developments are S2, W4, W7, T23, T29, and F3. However, none of their estimated minimum viewsheds cross Loop Road, so it is not expected these developments would be obvious to visitors along the loop road once all the PDEs are followed (see Appendix D: Viewshed Analysis for Individual Viewshed Analysis Maps for proposed improvements).

Alternative F: Reduced Grazing with No Development

Under this alternative, the effects would be the same as under the No Action Alternative.

Alternative G: Complete Removal of Livestock Grazing

Under this alternative, recreationists would no longer see livestock within the allotment. No changes to recreation opportunities or activities, or to visual characteristics, would occur.

5. Riparian Zones, Wetlands, and Water Quality

Affected Environment: Riparian Zones, Wetlands, and Water Quality

The allotment includes portions of ten, 6th field hydrologic units, i.e. subwatersheds. Only five of these subwatersheds include streams with perennial flows (3.05 miles) or intermittent streams (less than 0.5-mile) capable of supporting riparian vegetation. The remainder of the subwatersheds are composed of 227 miles of zero[47] and first[48] order stream channels, that do not have riparian soils or support riparian vegetation communities.

[47] A zero-order stream refers to intermittent streams that lack distinct stream banks but periodically function as conduits of water, sediment, nutrients, and other materials during some precipitation events.
[48] First order stream have the smallest distinct channel. These streams have no other recurring or perennial streams running into it.

Five springs are displayed by U.S. Geological Survey (USGS) topographic maps on BLM-administered land within the allotment, only two of which are known to emerge with surface flow; the others demonstrate sub-flow (below the surface). Neither of the springs with surface flow have been developed. None of these springs contributes to perennial stream flows that reach Donner und Blitzen River or Catlow Basin water bodies.

Numerous small (generally less than 1-acre) unmapped mesic/wet meadows with riparian vegetation are present, some of which originate at non-developed springs. Others are the result of subsurface flow from the surrounding areas. Most of these meadows do not maintain saturated soils through late spring and summer.

Informal assessments of two springs and one unmapped intermittent riparian-capable stream were conducted in 2008 utilizing factors considered in PFC field assessments, including hydrogeomorphic, vegetation, erosion and deposition, soils, water quality and biotic community factors. Each written assessment, including numerous photos, was reviewed by the assessment IDT for concurrence. The current condition of the springs with perennial flow is largely influenced by wild horses and livestock, resulting in concentrated hoof chiseling on saturated soils, and grazing on riparian vegetation. Short riparian-capable stream sections, small wetlands, and springs within large pastures are generally difficult to manage effectively without the use of exclosures (BLM TR 1737-20, 2006). This is especially true within South Steens Allotment as wild horses are present year-round, meaning even if livestock were removed from the area, damage to the springs and riparian areas would still occur (see the discussion in the Grazing Management section of this document, Ch. 3, Part A.2). Damage to these riparian areas is often increased in drought years since they provide green, soft, palatable grasses long after upland grass species become dormant.

Although waterholes may occasionally support aquatic and wetland vegetation, for the purposes of analysis, they do contribute to riparian functioning condition. This is because waterholes respond to surface runoff, lack contact with the water table, are intended to store water rather than transport water through watersheds, and cannot be assessed using Proper Functioning Condition (PFC) factors as described in interagency protocols (TR 1737-15, 1998a. or TR 1737-16, 2003).

Analysis of riparian condition is based on an assessment of PFC, a methodology developed by BLM and U.S. Forest Service (USFS) resource specialists to provide a consistent approach for considering hydrology, vegetation, and soil erosion/deposition attributes and processes to assess conditions of riparian and wetland areas. Assessments are conducted by IDTs of BLM resource specialists, and may include livestock operators and specialists from cooperating agencies. Seventeen factors of *hydrology*, *vegetation*, and *erosion/deposition* are evaluated for lotic (flowing stream) assessments (USDI BLM Tech Ref. 1737-15, 1998a.), and 20 factors are evaluated for lentic (wetland) assessments (TR 1737-16, 2003).

Approximately four stream miles (representing six stream reaches) within South Steens Allotment were assessed in 1998 and 1999. These assessment-miles are composed primarily of three reaches of Home Creek, in Home Creek Pasture, and two unnamed perennial tributaries to Donner und Blitzen River in Steens Pasture. This includes less than 0.02-mile of South Fork Donner und Blitzen River, where the Tabor Cabin water gap facilitates livestock access. All assessed stream reaches were determined to be in PFC or functioning at-risk with an upward trend.

South Fork Donner und Blitzen River (*Donner und Blitzen Sub-basin*) and Home Creek (*Guano Sub-basin*) are included on DEQ's 303(d)[49] list (2010 Integrated Report) because both streams exceed the water temperature standard for salmonid fish (spawning, rearing, or presence). Since less than 0.02-mile of South Fork Donner und Blitzen River is in the allotment, BLM's management and development within this allotment would not be expected to influence the 303(d) listing of the South Fork Donner und Blitzen River. A Water Quality Restoration Plan (WQRP) was completed and implemented for the Guano Sub-basin in 2007. The WQRP (p. 20) states: *The existing grazing management described under the Problem Description and Condition Assessment section* [for Home Creek] *has demonstrated maintenance and/or restoration of riparian vegetation communities and stream channel stability over historic management and condition.*

The DEQ was scheduled to complete TMDLs, for temperature, for the Donner und Blitzen and Guano Sub-basins in 2010; however, this deadline was not met and the TMDLs for these sub-basins have not yet been completed.

For pastures in which no perennial streams are present, the primary designated beneficial use of surface water is for livestock, wildlife, and aesthetic quality. Springs in the allotment receive unrestricted use year-round from wild horses, and seasonally from livestock, which results in poor-quality water (especially in the fall when congregation at these sites increases) and degraded spring condition.

Riparian vegetation has a much longer growing season than upland plants due to the increased water available to them; they also often provide diversity, shade, and loafing areas making them desirable locations for grazing animals (Myers 1989), as is the cases with the riparian areas within this allotment. In many cases, even if timing and frequency of grazing are managed for the riparian areas, if animals are allowed to excessively graze in the riparian areas, the plant-soil-water resource is expected to deteriorate (Mosley et al. 1999). Since wild horses are in the allotment year round, this occurs often, even when livestock are not present. Clary and Webster (1989) found there was no grazing system designed that was effective at ensuring the proper use of small riparian areas located within large upland pastures, which is what occurs within this allotment, and that it is not the grazing system used that matters, but the ability to control use in the riparian area that plays the largest role. Good management of use in riparian areas cannot occur unless all

[49] Oregon's water quality standards are contained in Oregon Administrative Rules 340 Division 41. Section 303(d) of the CWA requires the State to identify those waters not meeting the water quality standards, referred to as "water quality limited" or "impaired," and to develop Total Maximum Daily Loads (TMDLs). The TMDLs describe the amount of each pollutant a water body can receive without violating water quality standards.

grazing animals (specifically livestock and wild horses for this allotment) can be removed following the designated use period (Clary and Webster 1989). Kovalchick and Elmore (1992) found when not managed properly, grazing in riparian areas can severely affect the stability of those sites and suggest fencing as one of the best alternatives to protect the riparian vegetation from damage caused by grazing. Research also suggests the poor management of livestock grazing in these areas can negatively affect water quality (DelCurto et al. 1999). Other research, summarized in Chamberlain and Doverspike (2001), indicates cattle prefer to drink from troughs rather than from stock ponds or streams. This preference is thought to be due to problems with depth perception and behavioral adaptation for predator avoidance (BLM TR 1737-20, p. 25).

Where invasive western juniper has become well established in the allotment, as it has in parts of this allotment, the hydrologic cycle has been altered and precipitation available for infiltration or runoff is generally reduced (Pierson et al. 2007). Research has suggested that juniper establishment can result in changes to infiltration rates, sediment loss, and soil water storage and depletion rates (Miller et al. 2005). As juniper density increases on a site, the risk of resource loss may increase, due to increased runoff and erosion over areas of bare ground (Miller et al. 2005). Anecdotal evidence suggests that increases in western juniper can result in decreases in the amount of water present in streams, springs, and meadows (Miller et al. 2005). Water for these sources is from precipitation that has infiltrated the soil to an impermeable layer, along which it laterally moves until it reaches the ground surface, stream channel, or spring (Miller et al. 2005). The more groundwater utilized by juniper trees, the less that is available to augment late-season base flow for streams, springs, and other riparian areas, which is important since it contributes cool water to moderate stream temperatures.

Availability of water from precipitation, either as rainfall or as snowmelt, within South Steens Allotment, is determined by the amount of precipitation received annually and over consecutive years, and by the capability of subwatersheds to capture, store, and release water as base flow. Annual precipitation within the allotment ranges from 11” in the NW portion of the allotment (Hollywood Pasture) to 25” in the SE portion of the allotment (Steens Pasture). Capture and storage capability are determined by soils and by plant community composition and distribution relative to infiltration and runoff. Presence of expansion western juniper continues to have the greatest influence on capture and storage of precipitation within allotment subwatersheds, and by consequence, is expected to control aspects of ecological processes. Greater cover by juniper shifts the deposition of precipitation away from infiltration in favor of interception, evapotranspiration, and surface runoff (Pierson et al. 2007). This influences the degree to which precipitation can recharge springs and streams as infiltrated base flow, regardless of the arrangement of water developments within the allotment. It is expected that this is occurring within the allotment since estimated juniper cover ranges from 0-24%, based on the ESI data completed in 1990.

Current hydrologic conditions are summarized below by sub-basin and by 6th level subwatershed (a.k.a. 6th Field Hydrologic Unit Code (HUC)) within the allotment.

Donner und Blitzen Sub-basin

Dry Creek HUC (5,774 acres): Approximately 1.4 miles of two unnamed perennial tributaries to Donner und Blitzen River were assessed for PFC in 1999. These streams have rocky, very stable channels with diverse vegetative communities that include at least three woody riparian species. They were determined to be in PFC, and were at or very near potential.

Three Springs HUC (16,719 acres): The entire subwatershed is within the allotment. One riparian-capable stream flows from a spring complex, on BLM and private land, in the Three Springs area in T. 34 S., R. 32½ E., Section 25. Perennial flows are expected to extend no more than 0.1-mile during the wettest years. Intermittent flows support at least some riparian vegetation for another .25-mile below this, after which an ephemeral stream channel alternates with infrequent patches of mesic/wet meadow vegetation. Although this spring and associated stream channel have not been formally assessed for PFC, hoof chiseling from cattle and wild horses has altered soil topography, effectively shrinking the extent of saturated soils and the total area capable of supporting riparian vegetation. The amount of shrinkage has not been measured, but may be as much as 10 percent of the total riparian-capable area. Therefore, this spring is functional at-risk because the riparian area has shrunk, upland watershed is contributing to riparian degradation (loss of base flow potential), and none of the applicable vegetative factors (specifically age class distribution, species composition, and vigor) indicate maintenance of riparian function. Since flows from this spring are consistent and tributary areas are small (tens of acres), erosion/deposition factors are of lesser or no concern with respect to functioning condition. Three other springs emerge on adjacent private land (Three Springs) and are in worse condition, based on casual observation. A spring not displayed on USGS topographic maps has been located in T. 34 S., R. 32½ E., Section 9 (Weaver Place). This spring has a variable level of surface flow.

Deep Creek HUC (837 acres): No riparian-capable perennial or intermittent streams flow within the portion of this subwatershed located within the allotment.

Fivemile Lake HUC (248 acres): No riparian-capable perennial or intermittent streams flow within the portion of this subwatershed located within the allotment.

Mud Creek HUC (837 acres): The portion of the subwatershed within the allotment includes the existing water gap (Tabor Cabin) on Donner und Blitzen River. Since access to the river is limited, and forage is abundant around the water gap and the canyon used to access it, livestock do not appear to linger there. The banks of the water gap are well vegetated and stable. No other perennial or riparian-capable intermittent streams are within this subwatershed. Surface water emerges at Broken Leg Spring in T. 34 S., R. 32¾ E., Section 19, along Three Springs Road. The spring is capable of supporting only approximately 300 sq. ft. of wetland vegetation under regular conditions. Although the spring is wallowed-in by wild horses year-round, and by livestock while present, extensive root masses of sedges and rushes produce new growth every year. The road passes directly below the spring, and a gully has developed (probably decades ago) at the

crossing altering the outflow path from the spring, and is believed to have reduced the extent of saturated soils capable of supporting riparian vegetation in the small (0.3-acre) mesic/wet meadow below. Soils remain saturated throughout the dry portion of the year in less than 0.1-acre of this meadow. An informal assessment indicates hoof chiseling from cattle and wild horses has further reduced the seasonally saturated portion of the meadow. Therefore, this spring is functional at-risk because the riparian area has shrunk (at least in the portion that remains saturated year-round), upland watershed issues are contributing to riparian degradation (loss of base flow potential), and none of the applicable vegetative factors (specifically age class distribution, species composition, and vigor) indicate maintenance of riparian function within the portion saturated year-round. Since flows from this spring are consistent, and tributary areas are small (tens of acres), erosion/deposition factors are of lesser or no concern with respect to functioning condition.

Guano/Harney Sub-basin

Dry Creek HUC (20,392 acres): The entire subwatershed is within the allotment. One riparian-capable intermittent tributary to Dry Creek in T. 34 S., R. 32½ E., Section 36 supports facultative[50] wetland vegetation in the greenline for approximately 2,000 feet. A mesic/wet meadow system is supported by subsurface flow from the adjunct uplands along at least some of this stream channel. The stream and meadow complex have not been formally assessed for PFC, but an informal assessment conducted in 2008 indicates it is functioning at-risk, with a static or slow upward trend. Hoof-shear on streambanks from grazing animals is the main reason for the determination, but it is not certain whether this is due primarily to wild horses or cattle as it is a combination of both. Expansion juniper is also be reducing the subwatershed's capacity to capture and store precipitation, reducing subsurface flow to support meadow vegetation. Three mapped springs are identified on USGS maps in the sub-basin. These springs could not be located on the ground in 2008, and may no longer emerge due to reduction in base flow and watershed yield caused by expansion juniper.

Kueny Canyon HUC (17,167 acres): No riparian-capable perennial or intermittent streams flow within the portion of this subwatershed located within the allotment. One intermittent spring has been located in T. 34 S., R. 32 E., Section 2. This spring does not appear on USGS topographic maps.

Solomon Canyon HUC (17,703 acres): No riparian-capable perennial or intermittent streams flow within the portion of this subwatershed located within the allotment.

Threemile Creek HUC (1,621 acres): No riparian-capable perennial or intermittent streams flow within the portion of this subwatershed located within the allotment.

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[50] *Facultative wetland* species are plants that occur in wetlands (estimated probability of finding a specific facultative wetland species is greater than 67% - 99%), but are occasionally found in non-wetlands. *Obligate wetland* species are plants that almost always occur under natural conditions in wetlands (estimated probability of finding a specific obligate wetland species is greater than 99%).

Home Creek HUC (3,509 acres): Approximately 2.6 perennial miles of Home Creek is within the allotment, and all of it is in an area that has been designated wilderness. Home Creek was assessed for PFC in 1998, and the stream was determined to be functioning at-risk with an upward trend. A riparian inventory study of streams in the Guano Sub-basin was conducted in 2003. Based on the informal reassessment of factors used to determine riparian functioning condition, this reach of Home Creek is now expected to be in PFC. Expansion western juniper has become well established in riparian areas along Home Creek and may negatively affect riparian characteristics.

Environmental Consequences: Riparian Zones, Wetlands, and Water Quality

Effects Common to All Alternatives:

For the purpose of this analysis, the CEAA for Riparian Zones, Wetlands, and Water Quality extends to the subwatershed level (6th field HUC) beyond the allotment boundary.

Past, present and RFFAs in the CEAA that may contribute to cumulative effects to riparian habitat and water quality include livestock grazing, noxious weed treatments/removal, wildfire, sediment load from road crossings, conifer thinning/cutting, wildfire, and prescribed burning. Adherence to the Guidelines for Livestock Grazing Management on BLM-managed lands would minimize/negate cumulative effects from livestock grazing. Sediment loading from road crossings are planned to be addressed on a site-specific basis and fixed, as funding allows, following appropriate NEPA activities. The effects of wildfire on riparian/wetlands and water quality would be analyzed in post-fire rehabilitation plans. Past and RFFAs that have affected Riparian Zones, Wetlands, and Water Quality are found in Table 24.

Table 24: Riparian Zones, Wetlands, and Water Quality Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	127	---	---	Unknown
Wildfires	39,804.4	---	34	Unknown	---	Unknown
Open Roads	---	336.0	---	---	None	---
Water Developments	---	---	161	---	---	None
Gravel Pit	408.4	---	6	None	---	None
Cutting	7,206.6	---	20	11,817.1	---	17
Piling	2,362.0	---	10	1,951.5	---	21
RX Burning	9,985.0	---	16	16,555.3	---	22
Seeding	15,483.3	---	17	5	---	1
Weed Treatments	152,213[51]	---	2089	Unknown[52]		Unknown

[51] This number includes repetitive treatments on the same acres (for example along Highway 205 and the Steens Loop Road. Therefore, the number of specific acres ever treated would be substantially less than this if repeat treatments were not included.

[52] Since weed treatments are based on monitoring data, the amount of future treatments are unknown; however, future weed treatments would occur.

For the allotment, as a whole, the long-term cumulative effects (over decades) to riparian areas, from expansion western juniper, associated erosion, and effects to water quality and riparian vegetation, are greater than what is expected to occur from the grazing system currently in place or proposed. After planned juniper management activities occur as part of the North Steens Ecosystem Restoration Project, a greater proportion of precipitation is expected to reach the soil surface to become available for forbs, shrubs, and bunchgrasses within affected treatment units. Soil infiltration potential is also expected to increase, which may facilitate slower inflow to existing reservoirs and any new reservoirs, as well as springs and streams.

Effects Common to All Action Alternatives

Since new or rehabilitated reservoirs are, or would be, located on ephemeral stream channels, surface runoff would be captured that might otherwise flow further downstream. Some infiltrated subsurface water may also be captured, but ephemeral streams by nature remain in contact with the water table briefly (usually for a few weeks if at all). Since all reservoirs are designed to facilitate downstream passage of overflow, and since flow from these streams generally does not reach perennial streams lower in the watershed, except during pulse (storm) events or years with abnormally high snowpack, effects from reservoirs on water quality and flow volume in affected sub-basins as a whole would not be measurable. In general, any additional sediment generated by livestock presence around new or rehabilitated reservoirs is expected to be contained within the tributary area of the reservoir, where it would settle and be retained. Therefore, effects to downstream beneficial uses, primarily resident fish and aquatic life, is expected to be uncommon, episodic, occurring no more frequently than with the No Action Alternative, and not measurable after any specific storm event. There would be no affect to riparian areas, wetlands or water quality as a result of construction of new water developments and fence construction or fence removal.

Since stream channels below springs are ephemeral and are not capable of supporting wetland vegetation, and the tributary areas around springs are very small (tens of acres at most), the potential decrease in sediment yield from increased vegetation at springs, due to spring exclosures (protection), is not measurable.

<u>Alternative A: No Action</u>

Since no changes in the permitted active use AUMs or season of use would occur, the grazing system in place, with the current configuration of water availability, is expected to maintain PFC or an upward trend on portions of Home Creek functioning at-risk, and would maintain PFC in 1.4 miles of unnamed intermittent streams in Dry Creek 6th Field HUC in Donner und Blitzen sub-basin. However, if the permittee requested full use of the permitted AUMs, riparian areas would be expected to see an increase in grazing pressure while livestock are present, which would be expected to result in the allotment remaining in a stable condition or moving away from PFC and the achievement of Standards 2 and 4 along these streams.

For nonfunctional springs, or springs functioning at-risk, and the riparian meadow, factors contributing to current condition would not change. Therefore, trend in functioning condition of these springs would not improve, and would be expected to degrade further if full permitted use is requested by the permittee. Livestock would continue to utilize and damage the springs and riparian areas during the time they are present within the allotment and wild horses would continue to utilize and degrade them year round. Hoof chiseling would continue to channel flows such that the extent of wetland soils capable of supporting wetland vegetation would diminish. Although wetland vegetation would continue to be present at the springs, it is not expected to achieve adequate age class distribution, species diversity, and vigor required for the springs to achieve PFC.

The cumulative effect on watershed processes from nonfunctional or poorly functioning springs would not be measurable, since flows from springs are not tributary to any perennial streams that reach Donner und Blitzen River or Guano/Harney sub-basin.

The current condition and trend of surface water quality within the allotment, described as effects to designated beneficial uses, would not change. Springs would continue to receive unrestricted use year-round from wild horses and livestock, when present, resulting in poor-quality (muddy) water, especially in the fall.

Since no change would occur in grazing management, the trend to water quality (temperature) in Home Creek as described in the WQRP would continue, and cover of woody vegetation would expand and continue to provide additional shade to the stream.

Alternative B: Proposed Action

Maintenance of unreliable reservoirs would tend to pull livestock and wild horses away from Home Creek by providing alternative reliable water sources. A research review was found to support the view water developments outside of riparian areas reduces both grazing use and the amount of time spent in riparian areas (George et al. 2011). Godwin and Miner (1996) also found that offstream water can decrease not only the time livestock spend in riparian areas, but it can reduce water quality impacts caused by grazing of livestock and horses. This is seen most when the alternative water source is located on gentle slopes in an area easily accessible to livestock (George et al. 2011).This redistribution of grazing animals would be expected to accelerate the current upward trend in riparian functioning condition, which would be visible as cover of woody species, such as willows, alder, and dogwood increase in age class, abundance, and vigor.

The protection of springs would result in the associated riparian areas being protected although results of rehabilitation may not be obvious or immediate at springs were flow from the spring currently appears to be very low, specifically S2 (Weaver Spring). Development and protection of springs would eliminate wild horse and livestock access to riparian soils saturated year-round, forcing them to congregate on firmer upland soils. Without annual disturbance from hoof chiseling by wild horses and livestock, the extent and function of riparian soils would expand within topographic limits at the sites, and

support riparian vegetation over a larger area (estimated at 12 to 15 acres for the entire allotment). Since troughs fed by springs would include float valves and overflows to assure flows in excess of animal needs would not be removed from the spring or would be diverted back to riparian areas, response of wetland vegetation would be immediate, and is expected to reach potential extent within the following decade. The route realignment around Broken Leg Spring along Three Springs Road would facilitate recovery of riparian function below the spring and help with restoration of the spring and downstream meadow to PFC. The road crossing at Weaver Spring would protect the spring source from further degradation caused by vehicles.

The construction of the riparian meadow exclosure would protect that system from degradation caused by grazing of livestock and horses. Though wildlife would still be able to access the meadow, the meadow would improve in condition with protection.

Grazing exclusion from riparian areas has been found to promote recovery of degraded riparian plant communities, though species richness may not respond to grazing exclusion (George et al. 2011). Protection of the springs and riparian areas within Steens Pasture would result in the pasture moving towards meeting Standards 2 and 4 in that pasture.

Alternative C: Maximum Water Distribution

Effects under this development would be the same as under the Proposed Action, with two exceptions. One of the proposed reservoirs in Tombstone Pasture (R1) would be constructed on a riparian-capable stream (unnamed tributary to Donner und Blitzen River) now in PFC. At this reservoir, functioning condition would diminish to some extent due to the increased presence of grazing animals and disruption of persistent flows along the stream. In addition, the riparian meadow would not be protected since the riparian exclosure would not be constructed under this alternative.

Alternative D: Along Road Development

Effects under this development would be the same as under the Proposed Action, with one exception. The riparian meadow would not be protected since the exclosure would not be constructed under this alternative.

Alternative E: Edge Development

Under this alternative, the effects of spring protection and development of springs would be the same as under the Proposed Action. However, the route realignment around Broken Leg Spring and the crossing at Weaver Spring would not be constructed and degradation of these sites would continue, with the most degradation occurring in wet years when the springs are flowing at increased rates.

While no new reservoirs would be constructed or maintained within Home Creek Pasture, three new wells and one pipeline would be constructed within the pasture. However, by relocating the pasture fence, eight existing reservoirs currently in the southern end of

Home Creek Pasture would become part of Steens Pasture, and only one of the wells and pipelines (two troughs) would be located in an area that would replace these reservoirs. This would result in an overall decrease of six water sources in the southern end of Home Creek Pasture. Since Home Creek runs through the southern portion of this pasture, this is expected to result in livestock utilizing Home Creek more for reliable water, changing the riparian trend along the creek from upward to stable or downward depending on how much livestock use of the creek increases. While Standards 2 and 4 are expected to become achieved, or move toward being achieved, in Steens Pasture due to spring protection, it is expected these Standards, currently achieved in Home Creek Pasture, would be at risk of not being achieved in the future. This would increase the risk of the entire allotment continuing to not achieve all Standards in the future.

Based on riparian condition of the existing water gap (Tabor Cabin) on Donner und Blitzen River, it is not expected that the addition of three more water gaps would have any measurable influence on overall riparian condition or water quality along the Donner und Blitzen corridor. As with the existing water gap, access would be limited, terrain on the approach would be relatively steep, and forage would not be abundant near the water source. Therefore, grazing animals would not be expected to linger at any of the three proposed water gaps any more than they do now at Tabor Cabin.

Alternative F: Reduced Grazing with No Development

The effects of this alternative would be similar to the No Action Alternative, and the same if assuming the status quo. If the permittee was to utilize full permitted active use under the No Action Alternative, the effects to riparian areas under this alternative would be slightly less than under the No Action Alternative due to the decreased permitted levels of livestock use in riparian areas. Wild horse use would be the same as under the No Action Alternative; therefore, the overall decrease in the use of riparian areas would not be as beneficial to the riparian areas as full protection of the sites.

Alternative G: Complete Removal of Livestock Grazing

Under this alternative, effects would be less than the No Action Alternative. Livestock would no longer graze riparian areas, decreasing effects to riparian areas from overgrazing and trampling. However, these effects would still occur at a decreased level due to wild horses continuing to graze within the allotment and continuing to congregate in riparian areas. Therefore, the overall decrease in the use of riparian areas would not be as beneficial to the riparian areas as full protection of the sites under other alternatives. The reduction in grazing would result in PFC being maintained or showing an upward trend on streams within the allotment.

6. Social and Economic Values

Affected Environment: Social and Economic Values

Livestock raising and associated feed production industries are major contributors to the economy of Harney County. The highest individual agricultural sales revenue in the county is derived from cattle production (65 percent), which is inextricably linked to the commodity value of public rangelands. The cattle industry provided $37,955,000 in sales in Harney County in 2009 compared to $42,973,000 in 2008 [Oregon State University (OSU), Extension Service, 2010].

Those engaged in ranching and forage production are an important part of the history, culture, and economy of Harney County, and make up a strong component of the fabric of the local societies. Livestock grazing operations on public and private lands can have a stabilizing influence on local employment and quality of life (social, health, economic and environmental conditions). "Quality of life" is very individual when determining what is valued in a lifestyle and what features make up that lifestyle. Lifestyle features can be determined by historical activities of the area, career opportunities, and the general cultural features of the geographical area. Quality of life issues are subjective and can be modified over time with exposure to other ways of living.

Recreation is a component of most lifestyles in the area, and includes driving for pleasure, camping, backpacking, fishing, hunting, hiking, horseback riding, photography, wildlife viewing, and sightseeing for the overall quality of life for residents. In addition to local recreation use, the undeveloped, open spaces in the county are themselves a tourist attraction and contribute a "sense of place" for many. The attachment people feel to a setting, typically through repeated experiences, provides them with this sense of place. Attachments can be spiritual, cultural, aesthetic, economic, social, or recreational.

Tourism also contributes revenue to local businesses. The Steens Mountain area is central to Harney County tourism. A 2007 study found local economic effects associated with recreation visits to Malheur National Wildlife Refuge totaled approximately 4.4 million dollars during 2006 (Carver and Caudill 2007). Hunting and other types of dispersed outdoor recreational experiences contribute to the local economy on a seasonal basis. Fee hunting and recreation alone contributed $110,000 to Harney County in 2009 (http://oain.oregonstate.edu, 2009).

Currently the allotment is licensed for 9,577 AUMs at $1.35/AUM (subject to change on a grazing year basis). During drought years, the permittee has elected to remove livestock early from the allotment, using an average of 5,102 AUMs per year. Approximate revenue generated over the last 5 years is $34,438.5.

Environmental Consequences: Social and Economic Values

Effects Common to All Alternatives:

The CEAA for this project is Harney County. The North Steens Ecosystem Restoration Project is a reasonably foreseeable future project, having potential to improve rangeland health and increase forage production for wildlife, wild horses, and livestock, thereby, maintaining or possibly increasing economic opportunities and fostering more desirable recreation opportunities with associated economic benefits to the local economy. Rangeland improvement could also bring about increased sustainability for livestock operations, further improving the local economy and supporting a well-established, local, rural-oriented social fabric.

Alternative A: No Action

Under the No Action Alternative, the permittee is expected to continue to remove cattle early, as no new water developments would be constructed.

Costs associated with development of water features vary from $7,320 to develop a spring to $35,000 to drill a well. No contracts for construction or supplies would be purchased from local vendors under this alternative; therefore, no new revenue would be generated.

The value of livestock in the allotment is expected to remain at current levels as rangeland conditions remain stable. However, potential exists for rangelands to move toward a downward trend if uneven distribution of livestock continues or the permittee grazes all allotted AUMs in the portions of the allotment with access to reliable water. Poorer range conditions could lead to lower weaning weights or a reduction in overall cattle numbers affecting the economics of the ranch, as well as the chance of the BLM permanently reducing permitted AUMs on the allotment if grazing at current full permitted use did result in downward range conditions.

The Federal government would continue to collect grazing permit fees from the permittee, and this commodity use on public lands would continue to generate revenues for the Federal government and private sector. However, under this alternative the government does not expect to collect fees for all 9,577 AUMs allotted, as the permittee has historically removed cattle early and the BLM would require the permittee to have cattle removed if the 50% maximum utilization level is exceeded within the allotment or if the allotment was showing ecological damage.

At the same time, public lands in and around the allotment would also continue to contribute social amenities such as open space, scenic quality, and recreational opportunities (including hunting, hiking, sightseeing, and camping). These amenities enhance local communities and tourism, though the specific contribution of the allotment area is not known.

No effects to a visitor's experience or opportunities are expected by implementing the No Action Alternative.

Alternative B: Proposed Action

This alternative would allow the permittee to graze all 9,577 allotted AUMs, even during drought years, and increase the revenue generated to the Federal government. Payment to the Federal government would be $12,928.95/year at the current AUM rate of $1.35/AUM.

This alternative could utilize contracts to construct the proposed developments. To develop all rangeland improvements under this alternative the cost is estimated to be over $260,588. This number would not include costs associated with maintaining existing reservoirs as BLM or the permittee under a rangeland agreement would do this work.

Implementing the project could provide economic opportunities for local contractors and suppliers. Range improvement projects may be funded under a cost share between the Burns District BLM and the permittee, as would be specified in a future cooperative agreement. The permittee has verbally agreed to cost share range improvement projects.

The proposed developments are designed to better distribute livestock and wild horses, which in turn should continue to improve rangeland conditions over time by reducing utilization around current reliable water sources and increasing it in areas only slightly, or not currently, used. Improved rangeland conditions could increase forage production for livestock, wild horses, and wildlife. Providing for sustainable grazing management that improves habitat conditions for wildlife would in turn increase economic opportunities and foster more desirable social opportunities such as hunting and wildlife viewing. However, some visitors may feel additional range improvements would detract from their recreational experience.

There would be some temporary and short-term (days) disturbance to recreational activities in the immediate area during construction; however, no changes to the types of recreation opportunities are expected. Reservoirs would have the most excavation, but they would be located in drainages and would not be expected to be large enough to modify the overall form of those drainages.

Some visitor's perception of solitude and experience may also be affected by presence of livestock; however, it is expected livestock would be better distributed, in smaller numbers, over the entire area.

By maintaining a viable ranching operation and improving rangeland conditions in South Steens Allotment, the traditions associated with the ranching communities of Harney County would be maintained and possibly improved.

Alternative C: Maximum Water Distribution

Under this alternative, effects from implementation would be similar to the proposed action. The differences being that under this alternative, the cost to develop all range improvements would be estimated to be over $669,145, but does not include costs

associated with maintaining existing reservoirs, as BLM or the permittee under a cooperative rangeland agreement would do this work.

Alternative D: Along Road Development

Effects from implementing Alternative D would be similar to the Proposed Action. One difference is that costs associated with construction of developments would be approximately $746,419 assuming BLM would perform the work. In addition, 3.0 miles of new fencing could potentially restrict the travel of visitors but this would be partially offset by removal of 2.1 miles of existing fence. No destinations or unique features were identified that would be affected by the fence. Under this alternative, distribution of livestock and wild horses would not be realized as well as under Alternative B or C as development would be limited to areas along roads (with the exception of spring protections).

Alternative E: Edge Development

Costs associated with implementing Alternative E would be estimated to be $698,996. Livestock and wild horse distribution would not be realized as well as under Alternative B or C as development would be limited to outside, and along the edges, of WSAs. This alternative could mean lower weaning weights for calves, lower breed-back percentages and overall lower livestock health, affecting the permittee. Approximately 6.7 miles of new fence are proposed under this alternative and would restrict the travel of visitors in the area immediately surrounding the fence. However, no destinations or unique features were identified that would be affected by the fence. This effect would also be offset by the removal of 4.6 miles of existing fence. All other effects would be the same as Alternative B.

Alternative F: Reduced Grazing with No Development

Under this alternative, effects would be the same as under the No Action Alternative except that the Federal Government would only realize $10,631 (maximum) in grazing fees annually due to the reduced number of permitted AUMs.

Alternative G: Complete Removal of Livestock Grazing

Under this alternative, the Federal Government would not collect annual grazing fees and no revenue would be generated from the purchase of supplies or contracts since no livestock grazing or range improvements would occur within the allotment. Quality of life for the Ranch would be affected by the need to decrease herd size or find new rangelands for livestock to utilize. The actual extent of the effects to the ranch are unknown. Other social effects would be the same as the No Action Alternative.

7. Soils and Biological Soil Crusts

Affected Environment: Soils and Biological Soil Crusts

Four general soil types have been identified within the allotment. Table 25 contains a description of each type, by acres, within South Steens Allotment.

Table 25: Soil Types in the South Steens Allotment (BLM only)

Soil Type	Description	Acres
Spangenburg-Enko-Catlow	Very deep, somewhat poorly drained, hydric soils of basins and playas. Low potential for water erosion, moderate potential for wind erosion.	410
Reallis-Vergas-Lawen	Well-drained, very deep soils, formed on high lake terraces and fan terraces. Generally low potential for erosion from wind or water.	2,463
Raz-Brace-Anawalt	Well-drained, shallow or moderately deep soils formed in residuum and colluvium on tablelands. Generally low potential for erosion from wind or water.	11,595
Ninemile-Westbutte-Carryback	Well-drained, shallow and moderately deep soils formed in residuum and colluvium on tablelands. Generally low potential for erosion from water, moderate potential from wind erosion.	75,041
	TOTAL ACRES	**89,509**

Approximately 83,207 acres (92%) of the allotment is composed of claypan soils in the Ninemile-Westbutte-Carryback and Raz-Brace-Anawalt general soil series. The primary characteristic of these soils is a dense, compact, slowly permeable layer in the subsoil, having much higher clay content than the overlying material, from which it is separated by a sharply defined boundary. Claypans are usually hard when dry, and plastic and sticky when wet. These soils limit or slow the downward movement of water. Erosion potential is slight for both wind and water. Within the allotment, mountain big sagebrush and low sagebrush are dominant shrubs on claypan soils, usually with Sandberg's bluegrass, bluebunch wheatgrass and Idaho fescue being the dominant grasses. Forb diversity and density can be quite high on these soils.

Approximately 3,608 acres (4%) of the allotment in the Ninemile-Westbutte-Carryback soil series is composed of rock outcrops on mountainsides, hillsides, and escarpments with slopes steeper than 30 percent. These areas support communities primarily composed of mountain big sagebrush, bluebunch wheatgrass, Thurber's needlegrass, and Idaho fescue. Local stands of bitterbrush are also present. These areas are often less accessible (or inaccessible) to livestock.

Loamy soils in the Reallis-Vergas-Lawen series comprise approximately 2,463 acres (3%) of the allotment. Erosion potential is slight for water and moderate for wind. These soils are on slopes generally less than 25 percent and support vegetation communities including Wyoming big sagebrush, low sagebrush, needlegrass species, and bluebunch wheatgrass.

Three small areas encompassing approximately 410 acres (< 1 percent) consist of seasonal flood plains, and dry basins and playas, in the Spangenburg-Enko-Catlow soil series. These areas typically support communities consisting of silver sagebrush, basin wildrye, and Nevada bluegrass, and have a slight potential for both wind and water erosion.

Biological Soil Crusts (BSCs) are specialized organisms that occupy the nutrient-poor zones between vegetation clumps in many types of upland, arid vegetation communities. Biological Soil Crusts function as living mulch by retaining soil moisture, discouraging annual weed growth, reducing wind and water erosion, fixing atmospheric nitrogen, and contributing organic material to soil fertility (USDI TR 1730-2, 2001). The BSCs include such organisms as mosses, lichens, green algae, microfungi, cyanobacteria, and other bacteria. Presence and general health of BSCs are reflected in a site's soil surface stability and (USDI TR 1730-2, 2001) biological productivity, which in turn is a reflection of BSC contribution to ecological processes supporting these elements.

Potential types, cover area, and species composition of BSCs are influenced by a number of physical and biotic site-specific factors. Species composition is sensitive to subtle changes in soil chemistry (Ponzetti and McCune 2001), especially with respect to lichen species. Cover area by BSCs is generally greater at drier sites at lower elevations, especially salt desert shrub communities not subjected to periodic seasonal flooding and Wyoming big sagebrush sites. Several factors generally influencing the distribution and vigor of BSCs include elevation, precipitation (timing and amount), soils and topography, disturbance, vascular plant community structure, ecological gradients and microhabitats. Potential cover by BSCs is generally inhibited by wetter conditions that support vigorous cover by vascular plants at higher elevations (USDI TR 1730-2, 2001). Because BSCs increase infiltration of precipitation, as well as trap microscopic and macroscopic nutrient particles, the reduction in the diversity and cover of microbiotic crusts may disrupt the ecological processes of the nutrient and hydrologic cycles and energy flow, as well as site stability and resistance to undesirable species such as cheatgrass (Pellant 1996).

Within the allotment, dense vascular vegetation (especially mountain big sagebrush), accumulating plant litter, and high herbaceous plant density are the primary limitations to potential BSC cover (USFS 2000 ICBEMP Supplemental Draft EIS). The BSC cover is expected to be highest on soils with fine-textured silt, silt loam, and clay surface layers, where low sagebrush grows. Rangeland health assessments found short mosses to be the most common BSC type within the allotment. Foliose lichens are present on north slopes with deeper soils, usually in association with mountain big sagebrush communities. In areas of low sagebrush and shallower soils, the nitrogen fixing lichen, *Collema*, is present in varying degrees.

Grazing (livestock and wild horses) has occurred in the allotment for over 100 years. Effects to soil compaction and BSCs from grazing within the allotment are greatest around water and mineral supplement sites, and along frequent travel corridors, and are lowest on slopes steeper than 20 percent, areas with low forage quality or quantity, very rocky sites, and areas farthest from water and supplements. Over 90% of the allotment is

in slopes 0 to 12 percent; therefore, on 90% of the allotment, slope is not expected to be a factor in determining use by livestock and wild horses.

Environmental Consequences: Soils and Biological Soil Crusts

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for soils and BSCs is the allotment boundary. Past and present actions and events have influenced the existing environment within the CEAA. RFFAs in the CEAA that may contribute to cumulative effects to soils and BSCs include livestock grazing, hunting, and other recreational pursuits.

Effects Common to All Action Alternatives:

None of the action alternatives increase authorized number of AUMs for livestock grazing, and all slightly decrease (by 15 days) the authorized season of use. Since the alternatives change only distribution of soil disturbance from hoof impact from grazing, the net effect to soil surface stability, and extent and vigor of BSCs, within the allotment as a whole, are expected to be the same for any alternative, including No Action. The sum of differences in environmental consequences between alternatives is characterized by the extent, degree and distribution of *localized* impacts. The alternatives represent a range of impacts from greater extent and degree distributed within a smaller portion of the allotment, to lesser extent and degree of impacts distributed over a larger portion. To the extent these actions would occur once with infrequent return for maintenance over decades, effects are expected to be temporary, disappearing within a few years to a decade at most.

All action alternatives propose to select from a list of proposed developments to achieve allotment objectives. Alternatives differ only in the type, number, location, and arrangement of proposed developments. Potential environmental effects from individual developments are local in nature, but the cumulative effect of each alternative would be a change in distribution of grazing animals throughout the allotment. Degree and extent of disturbance at any particular site would vary by alternative, and would be determined primarily by the number and distribution of water locations available to grazing animals within the allotment. Localized impacts to soils and BSCs from grazing animal use, and trails at and around any single reliable water source, are expected to be light in wet years when unreliable sources are available, and heavier in drier years when only the reliable sources are available. However, during drought years localized impacts to soils and BSCs at unreliable reservoirs would be expected to be light, but during wet years they would be expected to be heavier.

Virtually all of the allotment (> 99%), is within an elevation band (4500’ to 8500’) subject to expansion juniper. Soil surface stability, health and vigor of vegetative communities, and the extent and vigor of BSCs is expected to decline over time (excluding areas that historically support old-growth juniper stands), due to juniper expansion. A separate analysis (North Steens Ecosystem Restoration Project FEIS, 2007)

was prepared and management of juniper is planned within the allotment, regardless of the alternative chosen under this EA. Because there is always soil compaction and disturbance associated with water developments, affects to soil stability and BSCs would be neutral from the North Steens Project. Juniper management provided through the North Steens FEIS will have a greater impact on stability and presence of soils and BSCs.

Reasonable foreseeable future actions include continued juniper management through the North Steens Ecosystem Restoration Project, recreation, hunting, grazing and wildlife use. Juniper management will have the greatest effect on soils and BSCs by reducing the competition from juniper and allowing native grasses, shrubs and forbs to reestablish and stabilize soils, as well as allowing BSCs to expand beyond their current sites. Establishment and reestablishment of BSCs is a slow process that can take anywhere from less than one year for mosses to 25+ years for some lichens.

The effect of each individual development, by type, is discussed below. The cumulative effects of each alternative would be dependent upon the number and type of proposed developments under that alternative.

New Reservoirs and Maintained Existing Reservoirs: Established upland soil profiles would be removed or turned-over. Compaction and disturbance to soils and BSCs would occur along access routes for equipment, during both construction and maintenance activities, but these effects would be temporary in nature, visible for <1 to 3 years. Annual frost action would restore soil bulk density on access routes within one to two winters.

At each reservoir, zones of locally heavier annual soil disturbance and compaction would develop due to livestock and wild horse use, diminishing with distance from the development, depending on terrain and available forage nearby. Where reservoirs are constructed at confined sites with steep banks, soil disturbance is expected to be limited to the inflow periphery and the berm/dam. At more open sites, soil impacts are expected to be more evenly distributed, or may be locally heavier where shade is available nearby since shaded areas are popular loafing areas.

Due to focused soil compaction resulting from annual hoof impacts, BSCs may be completely eliminated from a band of soil surface surrounding reservoirs. Width and configuration of this band depends on topography and proximity to shade during warmer months. However, effects to soil surface stability are offset by rocks, vegetative litter, manure, and soil physical properties, which generally have low to moderate potential for erosion within the allotment. Any surface erosion that does occur is mostly, if not entirely, captured by the reservoir itself, since the impact area is primarily sloped toward the catchment.

Wells: Soil would be compacted in an area approximately 100 feet by 100 feet. Soil compaction from presence of drilling equipment and materials would be temporary, requiring 1 to 2 years of frost action to recover.

Pipelines: Pipeline installation would turnover soil profiles in an area that would equate to approximately 0.25-acre per linear mile. Direct seeding and rocks would provide initial protection of soil surfaces, augmented by establishment of shrubs and other native vegetation naturally over the following decade.

Troughs: Bottomless troughs (30-foot diameter) would replace roughly 710 sq. ft. of soil surface with concrete, upon which the trough would be placed and sealed. Since bottomless troughs are usually placed on relatively flat terrain, it is expected this area would be somewhat uniform. Installation of metal troughs would disturb vegetation and compact soil over an area approximately 10 feet by 20 feet and completely cover an area 4 feet by 12 feet under the trough. At each trough, zones of locally heavier annual soil disturbance and compaction would develop due to grazing animal use, diminishing with distance, depending on terrain and available forage nearby.

As with reservoirs, focused soil compaction resulting from annual hoof impacts may completely prevent recovery or reestablishment of BSCs on a band of soil surface surrounding troughs, with the same dependent characteristics.

Storage Tanks: The process and equipment required to bury a 10,000-gallon water storage tank would turn over soil profiles over an area approximately 12 feet wide by 36 feet long, or 0.01-acre per site. Direct seeding and rocks would provide initial protection of soil surfaces, augmented by establishment of shrubs and other native vegetation naturally over the following decades. Should the tank need to be replaced, the process would occur again in 20 or more years.

Fencing: Since blading, grading, and brushing would not occur to facilitate construction of new fence in WSA and Wilderness, affects are expected be unnoticeable 1 to 2 years after construction. Some soil surface disturbance and compaction would occur adjacent to fence lines during construction, but frost action returns soils to previous conditions after one winter. The construction of wire fences would only have long-term (one or more decades) effects on soils and BSCs where the soil was disturbed at each post (less than four square inches per post). The construction of wood fences would have a greater effect on soils and BSCs than wire fences due to the removal of soil surface the size of the post (approximately 6” in diameter), which would require the turning of the soil profile for a post hole of 12-18” in diameter in order to properly set each post. Rocks would provide initial protection of soil surfaces, around the posts, augmented by establishment of vegetation naturally over the following decade. Effects to soils and BSCs from passage along fence lines to check maintenance needs would not be measurable.

Spring Development/Protection: Effects to upland soils and BSCs are addressed previously as those resulting from pipeline burial, trough placement, and fencing. Soil profile turnover would occur in a very small area (<10 square feet) where the head box is buried.

Route Realignment[53]: Soil compaction resulting from vehicle passage to create the alternate route would be offset as soils on the original route recover through frost action and other soil processes. Over the following decade, as the old route becomes rehabilitated, effects become a one-for-one exchange, with the area of the new route effecting soil more since the new route would be approximately 50 feet longer than the old route.

Water Gaps: Effects to soil and BSCs would be the same as under fencing.

Alternative A: No Action

The existing condition, trend of BSCs, and their contribution to soil surface stability, would be maintained. Livestock distribution would continue to be driven by availability of water as currently described, which would maintain the current uneven utilization of bunchgrasses and the pattern of effects to soil surface stability and BSCs within the allotment. Animals would continue to have access to currently existing reservoirs, in addition to existing springs. Effects to BSCs in any given year would generally be greatest around water sources used earliest, when clay soils are wet. Once clay soils have dried, the timing of which is variable from year-to-year, hoof shear from summer and fall livestock grazing would have less influence on BSCs (USDI TR 1730-2, 2001). Growth and expansion of juniper would continue to be the primary influence on vegetation and BSCs, and their effects on soil surface stability would continue until planned treatments are implemented. Temporary effects (lasting less than one decade, but generally 1 to 3 years) to soils and BSCs would continue to occur infrequently as part of existing range improvement maintenance.

Alternative B: Proposed Action

Direct long-term (one or more decades) and short-term (less than one decade) impacts to soils and BSCs from all ground-disturbing activities associated with implementing this alternative, would affect <1% of the allotment. The cumulative effect of the alternative, when all proposed projects have been completed, would be to distribute annual disturbance to BSCs and soils from livestock and wild horse grazing across the allotment by increasing the amount of area available to animals for grazing due to the increase in use area.

Alternative C: Maximum Water Distribution

Direct long-term (one or more decades) and short-term (less than one decade) impacts to soils and BSCs from all ground-disturbing activities associated with implementing this alternative would affect less than one-percent of the allotment. The cumulative effect of the alternative, when all proposed projects have been completed, would be to distribute annual disturbance to BSCs and soils from grazing over the largest portion of the allotment. Effects under this alternative would be greater than under the proposed action due to a large increase in the number of proposed developments; however, the more

[53] This effects would not occur under Alternative E as route realignment is not proposed under that alternative.

reliable developments, the more evenly these effects would be spread across the allotment.

Alternative D: Along Road Development

Direct short-term (less than one decade) impacts to soils and BSCs from range improvement development would affect less than one-percent of the allotment. Since only one new reservoir would be constructed, direct long-term effects would be less than under Alternatives B and C. The cumulative effect of the alternative, when all proposed projects have been completed, would be to increase distribution of annual disturbance to BSCs, soils, and vegetation from grazing along existing roads and ways; however, the effects would not be as evenly spread across the allotment as under Alternatives B or C.

Alternative E: Edge Development

Direct short-term (less than one decade) impacts to soils and BSCs from proposed range improvements would affect less than one-percent of the allotment. The cumulative effect of the alternative, when all proposed projects have been completed, would be to increase distribution of annual disturbance from livestock and horse grazing along the edges of WSAs and private inholdings, with the interiors of the WSAs remaining largely inaccessible to grazing animals due to distance from water. Grazing in the allotment and associated impacts to soil are expected to be consistent between years due to fewer reliable water sources. Since no new reservoirs would be constructed, which result in the largest, long-term disturbance to soils and BSCs, direct long-term effects would be less than under all other action alternatives.

Grazing in the allotment and associated impacts to soil and vegetation are expected to be consistent between years. Localized impacts to soils and BSCs from grazing and livestock trails, at and around any single water source, may be light in wet years when unreliable sources are available, and heavier in drier years when only reliable sources are available.

Alternative F: Reduced Grazing with No Development

Under this alternative, the effects to soils and biological crusts would be similar to the No Action Alternative, but would be expected to be less due to the permanent reduction in AUMs under this alternative (under the No Action Alternative the permittee can still request up to full use of 9,577 AUMs).

Alternative G: Complete Removal of Livestock Grazing

Under this alternative, effects to soils and biological crusts would be similar to the No Action Alternative, only less due to the permanent removal of livestock from the allotment. Since wild horses would still graze within the allotment, some effects of grazing would still occur on soils and BSCs.

8. Special Status Species

Affected Environment: Special Status Species-Wildlife

Special Status wildlife species occurring within the allotment include the Greater Sage-Grouse and two species of bats, the fringed myotis and Townsend's big-eared bat. Greater Sage-Grouse use the allotment yearlong and have seven leks within the allotment, three of which are known to be active at this time. The other four have intermittent use, where they are used some years and not others (for more information contact ODFW).

Table 26: Greater Sage-Grouse Habitat by Type.

Greater Sage-Grouse Habitat	Acres	Percent
Preliminary Priority Habitat (PPH)	74,755	79%
Preliminary General Habitat (PGH)	16,409	21%
TOTAL	94,563	100%

Approximately 79% of the allotment is designated PPH, and 21% is PGH. Nest sites were located in the allotment during a radio telemetry study from 1997 to 2000. Approximately 65% of nests were within two miles of a lek and 83% were within 3 miles of a lek. Seventy-five percent of this allotment is within three miles of a lek site. Nest sites were determined to be located mostly in big sagebrush/mountain shrub vegetation types with about one-third of nests occurring in low sagebrush sites (Crawford et al. 2000). Since most sage-grouse hens nest during late March to early April, new growth on perennial grasses is minimal and previous years' (residual) grass growth provides cover for nesting. Nest success for sage-grouse is higher when sagebrush canopy cover is high and residual tall grass cover (> 7 inches) is present at the nest site (Gregg et al. 1994, DeLong et al. 1995). Residual grass cover provides horizontal screening at the nest site, which blocks the view from predators. Utilization data for the allotment, which directly affects residual grass cover, is discussed under Grazing Management and Rangelands Section. Brood rearing also occurs in the allotment, but with few meadow areas in the allotment, sage-grouse hens with broods may move to higher elevations or south to Home Creek. During the summer months, sage-grouse seek water, usually associated with wet meadows and succulent vegetation (Call and Maser 1985). If the year has been unusually dry, sage-grouse may use any water source available, including reservoirs, but do not use livestock watering troughs as readily since access to the water is more difficult (Call and Maser 1985, Hanf et al. 1994). Partially buried water troughs or those set with the top near ground level may be accessed more easily by sage-grouse (Call and Maser 1985, Hanf et al. 1994). Sage-grouse winter in lower elevations of the allotment, depending on snow depth during winter.

Anderson and McCuistion (2008) found grazing management, when upland birds are present, should be flexible, but limited to a light to moderate use (30-50% utilization), using deferred or rest-rotation grazing to limit grazing disturbances during critical bird life stages such as nesting. They concluded light to moderate use can increase forb quality and quantity since grazing can delay the maturation of forbs, extending their

availability throughout the growing season (Anderson and McCuistion 2008). Adams et al. (2004) suggests grazing encourages the height and cover of sagebrush and other native species during nesting seasons, and light grazing is used to create patches in the vegetation, increasing the herbage of species preferred by sage-grouse, especially during nesting and brood-rearing. Sage-grouse often prefer the lightly grazed areas and desired grazing intensity should be light to moderate to meet their needs for litter and cover (Adams et al. 2004). France et al. (2008) found that in more arid sites sagebrush cover provides the bulk of screening cover (for wildlife including sage-grouse), which is contradictory to other research (Connelly et al. 1991; Delong et al. 1995; Sveum et al. 1998) that emphasizes the role of herbaceous cover for screening. While sage-grouse like some patchiness in grazing, due to the increased forb production that may occur on these sites, uneven livestock distribution can be undesirable since the impacts associated with heavy use often occur in preferred habitat (such as riparian areas) (Adams et al. 2004). In general, the desirable livestock distribution, as far as sage-grouse are concerned, would be healthy vegetation with good cover and small patches of moderate to heavy use (Adams et al. 2004). For sage-grouse, poor livestock management would result in large areas of uniform grazing at moderate to heavy (or higher) grazing intensities (Adams et al. 2004). This uniformity occurs when grazing animals have access to all forage, and are forced to utilize both palatable and unpalatable species within the pasture, with no topography, cover, or water factors limiting the use (Coughenour 1991). In reality, this is only possible in small pastures with large stocking rates over long-periods (Coughenour 1991). Grazing animals realistically lack the knowledge of where all the resources are located spatially, and at any given point in time, the populations are unlikely to be distributed perfectly across a pasture, especially when topography is a factor (Coughenour et al. 1991). Research also suggests grazing deferral be utilized to prevent livestock caused disturbance to sage-grouse during nesting, as well as preventing competition for forage, specifically forbs, that are required during that time (Adams et al. 2004). Adams et al. (2004) found deferred grazing can improve both the plant vigor and the productivity of grass communities, which in turn increases the amount of vegetative cover. Due to the complexities of sagebrush communities and the variation in grazing effects on these communities, it can be difficult to draw large-scale conclusions regarding the impact of current grazing on sage-grouse (Crawford et al. 2004).

The "Greater Sage-Grouse Conservation Assessment and Strategy for Oregon" (Strategy) (Hagen 2011) has an action item to “[p]romote vegetation that supports nesting, brood-rearing, and winter habitats including maintenance or recovery of shrub and herbaceous (native grasses and forbs) cover. Retain residual cover adequate to conceal sage-grouse nests and broods from predation, and plant communities that provide a diversity of plant and insect food sources.” The Strategy recognizes that appropriate livestock grazing can be compatible with sage-grouse habitat needs and has the following conservation guidelines for livestock grazing (Pg. 103-104):

1) Where livestock grazing management results in a level of forage use (use levels) that is consistent with Resource Management Plans, Allotment Management Plans, Terms and Conditions of Grazing Permits or Leases, other allotment specific direction, and

regulations, no changes to use or management are recommended if habitat quality meets Rangeland Health Standard and Guidelines.

2) Where livestock grazing management results in a forage use level detrimental to habitat quality, it is recommended changes in grazing management be made as soon as possible to recover habitat quality. Adjustments to grazing management should be conducted in accordance with regulations of responsible land management agency.

a) Adaptive management that should be considered include:
i) changes in salting and/or watering locations,
ii) change in the season, fencing, duration or intensity of use,
iii) reducing grazing use levels,
iv) temporary livestock non-use (rest), or
v) extended livestock non-use until specific local objectives are met as identified by implementation group.

3) The timing and location of livestock turnout and trailing should not contribute to livestock concentrations on leks during the sage-grouse breeding season.

4) Measurement of grazing levels should be conducted on that portion of the pasture which is known to be sage-grouse habitat and will not be based on "average use" throughout the entire pasture.

5) Reduce physical disturbance to sage-grouse leks from livestock through managing locations of salt or mineral supplements by placing them greater than 1 km (0.6 mi) from lek locations.

6) Avoid supplemental winter feeding of livestock in known/occupied habitat unless it is part of a plan to improve ecological health or to create mosaics in dense sagebrush stands that are needed for optimum grouse habitat. Although ecologically winter grazing may have a minimum ecological impact on the plant community, the impacts to residual cover for sage-grouse nesting can be detrimental.

The Strategy also has the following recommendations for livestock management infrastructure:

1) Locate new and/or relocate livestock water developments within sage grouse habitat to maintain or enhance habitat quality.

2) Spring developments both new and old should be constructed and/or modified to maintain their free-flowing natural and wet meadow characteristics.

3) Ensure wildlife accessibility to water and install escape ramps in all new and existing water troughs.

4) Construct new livestock facilities (livestock troughs, fences, corrals, handling facilities, "dusting bags," etc.) at least 1 km (0.6 mi.) from leks to avoid concentration of livestock, reduce collision hazards to flying birds, or eliminate avian predator perches.

> *a) Fences can be detrimental to local sage-grouse populations. Those fences identified as such or within 1.6 km (1 mile) of an active lek or known seasonal use area should be marked with anti-strike markers.*

These excerpts are not inclusive of all guidelines in the Strategy, but are the most pertinent to this document.

IM 2012-043 Greater Sage-Grouse Interim Management Policies and Procedures has the following to say about livestock grazing, "Grazing can have localized adverse effects on Greater Sage-Grouse habitat depending on the condition of the habitat and the grazing practices used." This IM also recognizes that appropriate livestock grazing can be compatible with sage-grouse habitat needs: "Depending on design and application, grazing practices can also be used as a tool to protect intact sagebrush habitat and increase habitat extent and continuity which is beneficial to Greater Sage-Grouse and its habitat. Given the potential financial constraints in addressing the primary threats identified by the FWS, enhanced management of livestock grazing may be the most cost-effective opportunity in many instances to improve Greater Sage-Grouse habitat on public lands."

This IM includes the following conservation guidelines for livestock grazing and associated facilities:

Propose and authorize livestock grazing and associated range improvement projects on BLM lands in a way that maintains and /or improves Greater Sage-Grouse and its habitat. Analyze through a reasonable range of alternatives any direct, indirect, and cumulative effects of grazing on Greater Sage-Grouse and its habitats through the NEPA process:

- *Evaluate and implement grazing practices that promote the growth and persistence of native shrubs, grasses, and forbs. Grazing practices include kind and numbers of livestock, distribution, seasons of use, and livestock management practices needed to meet both livestock management and Greater Sage-Grouse habitat objectives.*

- *Evaluate the potential risk to Greater Sage-Grouse and its habitats from existing structural range improvements. Address those structural range improvements identified as posing a risk during the renewal process.*

- *Balance grazing between riparian habitats and upland habitats to promote the production and availability of beneficial forbs to Greater Sage-Grouse in meadows, mesic habitats, and riparian pastures for Greater Sage-Grouse use during nesting and brood -rearing while maintaining upland conditions and*

functions. Consider changes to season-of-use in riparian/wetland areas before or after the summer growing season.

- *Evaluate the need for proposed fences, especially those within 1.25 miles of leks that have been active within the past 5 years and in movement corridors between leks and roost locations. Consider deferring fence construction unless the objective is to benefit Greater Sage-Grouse habitat, improve land health, promote successful reclamation, protect human health and safety, or provide resource protection. If the BLM authorizes a new fence, then, where appropriate, apply mitigation (e.g., proper siting, marking, post and pole construction) to minimize or eliminate potential impacts to Greater Sage-Grouse as determined in cooperation with the respective state wildlife agency.*

- *To improve visibility, mark existing fences that have been identified as a collision risk. Prioritizing fences within 1.25 miles of a lek, fences posing higher risks to Greater Sage-Grouse include those:*

  - *On flat topography;*
  - *Where spans exceed 12 feet between T-posts;*
  - *Without wooden posts; or*
  - *Where fence densities exceed 1.6 miles of fence per section (640 acres).*

- *NEPA analysis for all new water developments must assess impacts to Greater Sage-Grouse and its habitat.*

- *Install escape ramps and a mechanism such as a float or shut-off valve to control the flow of water in tanks and troughs.*

- *Design structures in a manner that minimizes potential for production of mosquitoes which may carry West Nile virus.*

These excerpts are not inclusive of all Interim Conservation Policies and Procedures in IM 2012-043, but are the most pertinent to this document.

The Strategy also contains guidelines for wild horse management as it relates to sagebrush habitat management (Pg. 104), it states, "The management goals for wild horses are to manage them as components of the public lands in a manner that preserves and maintains a thriving natural ecological balance in a multiple use relationship. Wild horses are managed in twenty Herd Management Areas (HMAs) that involve 2.8 million acres of public land, primarily in southeastern OR." The recommended conservation guidelines for wild horses from the strategy are:

*1) The cumulative Appropriate Management Level (AML) for horse numbers should be kept within current AML (1,351 to 2,650**)** in herd management areas.*

a) Management agencies are strongly encouraged to prioritize funding for wild horse round-ups in sage-grouse areas that are over AML

b) Evaluate the AMLs for impacts on sagebrush habitat

c) Further measures may be warranted to conserve sage-grouse habitat even if horses are at, above, or below the appropriate AML for a herd management area.

West Nile Virus (WNV) was documented in sage-grouse in Wyoming near coal bed methane wells (Naugle et al. 2004). Water in new ponds constructed at the well sites provided habitat for mosquitoes that carry WNV to live in areas that previously had little late season water. Sage-grouse mortality was 25 percent higher in these areas, versus control areas without late season water (Naugle et al. 2004). In 2006, approximately 60 sage-grouse carcasses/feather piles were discovered in a meadow area near Burns Junction, Oregon. Only three carcasses had enough body tissue left to be tested for WNV, which was found in all three (R. Garner, personal communication). While no instances of WNV have been documented, in Harney County, in sage-grouse populations, since 2006, Malheur County has had several cases of humans infected with WNV. The Sage-grouse National Technical Team Report (2011) addresses West Nile virus in "Appendix C: BMPs for how to make a pond that won't produce mosquitoes that transmit West Nile virus (from Doherty (2007))." These measures were considered but discounted due to the other constraints (WSA etc.) already occurring on the landscape that would be in discordance with these measures, as well as the lack of West Nile virus documented in the area, the closest documentation occurring in 2006, over 45 aerial miles (and on the other side of the Steens Mountain) from the allotment.

Bats are a migratory species with arrival in the allotment during May to June. Most species may migrate south in the fall but a few winter hibernacula are known to exist in the area. Bats roost in small caves or rock crevices and in loose bark of cottonwood or older juniper trees. Bats forage for insects anywhere they can find sufficient concentrations and use still water pools in streams, springs, reservoirs, and water troughs for watering. Bats may travel several miles from day roost sites for foraging and watering. Usually they roost during the night for a period of time, then forage before returning to their day roost.

Environmental Consequences: Special Status Species-Wildlife

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for SSS extends up to 10 miles beyond the allotment boundary to encompass regular movements of special status wildlife that may be using the allotment. The total acreage of the allotment plus the CEAA would be approximately 532,987 acres. Vegetation communities in the allotment are fairly representative of those across the CEAA.

RFFAs in the CEAA that may contribute to cumulative effects to SSS and habitat include management activities associated with livestock grazing, hunting and other recreational pursuits, and cutting and prescribed burning treatments to reduce expansion juniper and restore habitat. Several thousand acres of treatments are proposed in the CEAA, but funding, weather conditions, and other factors will affect timing of implementation. Completion of analyzed juniper treatments within CEAA would improve habitat quality

for sage-grouse, and decrease the risk of a community altering wildfire that would remove habitat. Past and RFFAs, from the previous fifteen years, that have affected SSS or their habitat in the CEAA are found in Table 27.

Table 27: Special Status Species - Wildlife Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	107	---	---	Unknown
Wildfires	163,660	---	36	Unknown	---	Unknown
Known Primitive Campsites	---	---	84	---	---	Unknown
Trails	---	95.0	---	---	38.5	---
Trailhead	---	---	4	---	---	None
Recreation Sites	---	---	9	---	---	None
Open Roads	---	785.0	---	---	None	---
Closed Roads	---	180.8	---	---	None	---
Fences	---	457.4	---	---	6.2	---
Pipeline	---	4.3	---	---	0.11	---
Exclosures	141.2	---	6	16.9	---	2
Water Developments	---	---	235	---	---	None
Gravel Pit	688.9	---	11	None	---	None
Cutting	8,264.0	---	32	17,062.8	---	21
Piling	3,736.8	---	12	2,975.6	---	25
RX Burning	54,304.6	---	62	16,555.3	---	21
Seeding	41,165	---	45	1,960.4	---	4

Other actions, mainly implementation of the North Steens Ecosystem Restoration Project, will have a positive effect on sage-grouse habitat by removing encroaching juniper from what was believed to be suitable nesting and brood-rearing habitat prior to juniper encroachment. Removal of juniper would be expected to increase the amount of forage available for livestock, wild horses, and certain wildlife species. This would leave more residual nesting cover in the long-term (10 to 15 years) for sage-grouse. Cutting, piling and burning of juniper within two miles of lek sites would retain much of the shrub cover and increase nesting habitat near leks. Removing juniper may also increase the amount of water available in seasonally wet areas that would improve sage-grouse brood-rearing habitat. Another project falling within the CEAA is the Miller Homestead Fire Emergency Stabilization and Rehabilitation Plan (DOI-BLM-OR-B060-2012-0047-EA). The Miller Homestead Fire occurred in 2012, burning over 160,000 acres of BLM-managed, private, and refuge lands, 91% of which is considered PPH and 7% of which is considered PGH, as well as six known leks. While there are some unburned areas within the fire perimeter, they are generally small in size and very scattered, with the fire removing most of the big sagebrush in its interior. Due to the limited cover and habitat currently found within the burned area, sage-grouse are likely to avoid the area until habitat components are restored. Some of these animals may move into unburned areas near the fire, including the South Steens Allotment. Projects associated with this plan included some seeding of the burned area (occurred fall 2012) to minimize ecological damage associated with the community altering wildfire that occurred in the fall of 2012. Two temporary fences were also constructed in the burn area to protect it from livestock and wild horse grazing. These fences are marked with anti-strike markers to reduce the

risk of collision. Also associated with this project is the planting of sagebrush plugs across the burn area in order to help restore sage-grouse habitat in the burned area by providing a seed source for sagebrush.

Within the allotment, and across the Burns District, Aroga moth infestation has been contributing to sagebrush mortality, increasing the risk of catastrophic wildfire, and decreases cover and food sources for birds. Mortality caused by Aroga moth have been observed in all sagebrush types within the allotment. It is believed that sagebrush mortality as a result of Aroga moth infestation was at least partially responsible for the large size of the Miller Homestead Fire and the limited number/size of unburned patches within the fire perimeter. These habitat component losses can result in declining sage-grouse populations due to increased nest predation and early brood mortality associated with decreased nest cover and food availability (Braun 1998, p.149; Moynahan 2007, p. 1781). Continued Aroga moth infestation within the allotment may result in Standard 5 not being achieved in the future.The sagebrush plant communities that support sage-grouse are very complex and successionally dynamic as is the effects of livestock grazing within these communities, often making it difficult to form large scale conclusions about the impacts of current livestock grazing practices on sage-grouse populations (Crawford et al. 2004). However, research suggests it is possible for grazing to be managed in a way that promotes forage quality for sage-grouse since grazing can set back succession which may result in increased forb presence (Vavra 2005). When grazing management is periodic and allows forbs to regrow or prevents their utilization by livestock, the number of forbs available to sage-grouse may increase (Vavra 2005). Anderson and McCuistion (2008) found grazing management, when upland birds are present, should be flexible, but limited to a light to moderate use (30-50% utilization) using deferred or rest-rotation grazing to limit grazing disturbances during critical bird life stages such as nesting. They recommended light to moderate use on their conclusion this level can increase forb quality and quantity since grazing can delay the maturation of forbs, extending their availability throughout the season (Anderson and McCuistion 2008). Anderson and McCuistion (2008) also acknowledge the complexity of managing grazing within sage-grouse habitat and determined no one grazing system is best suited in all cases, but should be site specific. While many of these references specifically refer to livestock, it is concluded that they to apply to wild horses as well, since they are also grazing animals.

Effects Common to All Action Alternatives:

Disturbance from construction of the different projects would have negligible temporary (during construction activities) effects on wildlife Special Status Species (SSS). Effects would be only during the actual construction and would be expected to have a negligible impact on SSS use of the habitat. Since not all projects would be constructed or completed at the same time, effects would be spread out over several years, and disturbance would be localized. Improvement construction work would occur after sage-grouse nesting season (April 1 to June 15). Once individual projects are completed, and humans are generally absent, SSS would be expected to use the areas again (Professional Judgement). About two acres of vegetation would be removed around each new trough mainly through use by livestock and wild horses. Vegetation would be removed during

construction of reservoirs (about two acres), but use by livestock and wild horses would not remove much more shrubby vegetation than would be removed during construction. Although vegetation would remain outside this area, grasses and forbs would be more heavily used in an area about 0.25-mile from these water sources. Based on location of these new sites, sage-grouse could be affected through the loss of nesting habitat. Exclusion of livestock and wild horses from existing spring sources would improve these areas for sage-grouse use, by providing water and restoring riparian/wetland vegetation, which sage-grouse depend on during the late summer months. Wire fences would be marked to reduce sage-grouse collisions with these fences. Spreading out water sources would allow for later season use in areas around new water sources. This late-season use would reduce the amount of residual grass near these sites and reduce herbaceous horizontal cover for nesting sage-grouse the following spring. Reduction in horizontal cover would be expected to affect nest success for sage-grouse through increased predation and would occur only on years when use occurred in a pasture late in the year (defer) when regrowth is not expected. Only vegetation receiving no use or early grazing treatments would allow for grasses to reach full height in years of normal precipitation although wild horses would still have access to graze these areas. The early/graze treatments would be expected to allow for some regrowth, depending on how late into the growing season livestock stay in an area, and available soil moisture for plant regrowth. While defer grazing treatments allow for full growth of grasses before livestock graze, there would be areas in Tombstone and Steens Pastures that would not have much in the way of residual vegetation every year. Wild horses would have access to these water sources yearlong, every year, and would be expected to have effects on residual nesting cover from season-long use. Maintenance of wild horse populations to within the AML would lessen late-season effects of grazing by wild horses on residual grass cover for sage-grouse nesting habitat. Spreading of water sources would help reduce season-long grazing use by wild horses on the limited reliable water sources available at present and increase vegetation vigor at these sites. This would increase brood rearing habitat at these sites.

Increased late-season water could provide sources for mosquitoes that carry WNV, which has reduced sage-grouse populations in certain areas (Naugle et al. 2004). However, increased late-season water could benefit bat species by providing more watering areas. This would be expected to lead to some increased population numbers but this would be dependent on available roost/maternity sites, as well as available insect populations. Bats would be expected to use some of the new water sources, such as troughs and reservoirs, for watering spots during evening foraging. Whether this would affect bat populations is not known since roosting sites (day roosts, maternity colonies) may already be fully occupied. Bats would forage on mosquitoes that carry WNV but would not reduce the population enough to eliminate the threat to sage-grouse.

Cumulative effects would be increased with late-season livestock and wild horse use in sage-grouse habitat. Late-season use outside of identified sage-grouse habitat would still have some effect on residual cover the following spring, but it is not known if or how much of these areas are used by sage-grouse for nesting. Fencing of several spring sources for protection, and spreading of livestock use to other areas, would provide more

late-season, brood-rearing areas for sage-grouse. While the number of yearlong water sources is increased from the No Action Alternative, several water sources already present in and near this allotment have provided possible breeding sites for WNV carrying mosquitoes, and mosquitos are already prevalent across the allotment. There have been no known outbreaks of WNV in this part of Steens Mountain, so an outbreak is not expected.

Cumulative effects for bats would be the increased water sources available for watering and foraging in the long term (more than three years).

Alternative A: No Action Alternative

In this alternative, wildlife SSS would have the same resources available as are currently present in the allotment. Some areas of the allotment near reliable water sources would continue to be affected by concentrated livestock and wild horse use. Portions of the allotment away from existing waterholes and springs would have non-grazed areas, which would be expected to provide more suitable nesting sites for sage-grouse due to more residual grass cover. This would be expected to be highest in areas outside of the current use area during drought years, and lowest in these areas during wet years since in those years it would be expected that all water sources would have water and attract livestock. Residual grass cover provides horizontal screening at nest sites, in addition to screening from shrubs, which is believed to reduce predation. During drought years, sage-grouse would have only those reliable water sources currently available to them, which have little vegetation for cover or have juniper nearby, and are often grazed heavily by wild horses and livestock. Bats would rely on the few reliable reservoirs with late-season water or use other slow moving waters nearby, such as pools in Little Blitzen River.

Alternative B: Proposed Action

This alternative would spread water around the allotment with five new troughs associated with wells and springs, and nine new reservoirs being constructed. About two acres of vegetation would be removed around each new trough, mainly through use by livestock and wild horses. Vegetation would be removed during construction of reservoirs (approximately two acres) but use by livestock and wild horses would not remove much more shrubby vegetation than removed during construction. With nine new reservoirs constructed and five new troughs installed, approximately 28 acres of vegetation would be removed around new water sources. Areas within 0.25-mile of water sources (about 1,750 acres) would show reduced grasses and forbs so sage-grouse would have to search other areas for sufficient food. Spring sources and riparian areas fenced (about 27 acres) to exclude livestock and wild horses and are returned to a more natural state would benefit sage-grouse for watering and riparian/wetland vegetation for foraging, which sage-grouse depend on during the late summer months especially for brood rearing purposes. Beck and Mitchell (2000) suggest that livestock use in riparian areas, within brood-rearing habitat, be regulated using fencing or herding management to protect the vegetation by restricting overuse of these nutritious areas.

New and maintained existing reservoirs would also provide watering sources for sage-grouse as long as water remains throughout the year. Troughs would be supplied with water mainly from wells, but also from the two springs that would be developed, which are more reliable than reservoirs, so water could remain in more areas later in summer than with the No Action Alternative. However, this would be dependent on when the wells were pumping and when they were turned off, as well as spring flow each year. Although late-season grazing effects would be spread out, this could affect residual grass cover for nesting sage-grouse the following spring. Wild horses would be expected to have a greater effect on residual grass cover than livestock since they are in the allotment year-round. With more late-season water sources available, the possibility of mosquitoes carrying WNV being found throughout the allotment and affecting sage-grouse populations is increased although the probability, based on professional judgment, is slight. This would be partially offset by the abandonment of nine existing reservoirs, which, when they stopped functioning, would no longer provide mosquito habitat.

Overall, effects of different developments on sage-grouse should not affect habitat. About 1,750 acres (about 0.36%) of sage-grouse habitat in the CEAA would have some reduced vegetation that would be expected to affect use such as nesting or feeding. Other areas that surround the allotment such as the wilderness area to the east would also provide habitat for sage-grouse so the amount of habitat affected would be less than 0.25% of available habitat within the CEAA. Since these projects are spread throughout the allotment and would occur over a number of years, there should be no effects on population numbers. All proposed new projects would be greater than one mile from a lek.

Bats would be provided with more opportunities from late-season watering sources and would have more areas to forage for insects near these water sources. Late-season water availability would depend on the reliability of new reservoirs to capture and retain water season-long, as well as the distribution of new troughs, and the period the troughs are being filled.

Alternative C: Maximum Water Distribution

This alternative would spread the most water around the allotment with 24 new troughs associated with wells, pipelines, and springs, and 17 new reservoirs constructed. Effects of this alternative in any one year would be similar to Alternative B, but would be increased due to more developments being installed over the years. Disturbance from well drilling would be the greatest in this alternative since 10 wells are proposed. Initially, there would be about 0.25 acre disturbed by well drilling at each location which would be rehabilitated after the well drilling was complete so that an area about 0.01 acre would be permanently disturbed around the well site. If most of the drilling is completed during September through March, disturbance to sage-grouse would be expected to be negligible since sage-grouse are not as dependent on specific habitats. Sage-grouse are expected to return to use areas near wells once the disturbance from drilling has ceased. If well drilling is completed during June 15 through July, there could be localized

disturbance to nesting within 0.5 mile radius of the drilling rig. Only one proposed well (W7) at Bald-Headed Camp would be within 0.5 mile of a lek and known nesting habitat near that lek. Although located on private land, drilling should occur during the fall and winter time frame to avoid disturbance to breeding and nesting sage-grouse. Pipelines (5.5 miles) to three troughs would be associated with this well and would increase livestock and wild horse grazing in known nesting habitat. Installation of these pipelines and troughs would occur during the fall or winter months to avoid disturbance to breeding or nesting sage-grouse. Use of this well and pipeline system would concentrate livestock near the lek and nesting habitat when the early/graze treatment is being used in the Tombstone Pasture and near nesting habitat when the early/graze treatment is being used in the Steens Pasture. Late-season grazing effects would be spread out due to increased water availability, but this could affect residual grass cover for nesting sage-grouse the following spring if livestock graze in nesting areas that were previously outside the use area. Wild horses are expected to have a greater effect on residual grass cover than livestock since they are in the allotment year-round. The chance of mosquitoes carrying WNV being found throughout the allotment would also be increased under this alternative, and may result in a larger effect to (typically increased mortality) sage-grouse populations due to the increased presence of standing water.

Once all reservoirs are constructed, and wells, troughs and pipelines installed, approximately 5,100 acres (about 1%) of the CEAA would have some reduced vegetation (ranging from large amounts at construction sites to lesser amounts further from those sites) that would affect sage-grouse habitat. Other areas, such as the wilderness area to the east, that surround the allotment would also provide habitat for sage-grouse so the amount of habitat affected would be less than 0.5% of available habitat within the CEAA. Since these projects are spread throughout the allotment and over a number of years, there should be no effects on sage-grouse population numbers. While this alternative proposes the maximum number of water developments, this would not necessarily lead to increased sage-grouse populations since carrying capacity is not based solely on water availability.

Bats would be provided the most opportunities from late-season watering sources as they may have more areas to forage for insects near these water sources. Late-season water availability would be greatly increased from the Proposed Action due to more new reservoirs, wells, pipelines, and associated troughs.

Alternative D: Along Road Development

The effects under this alternative, in any one year, would be similar to the Proposed Action; however, there would be fewer disturbances over the years due to the decreased number of developments proposed under this alternative. Disturbance from well drilling would be the same as in Alternative C since 10 wells are proposed. If most of the drilling is completed during September through March, then disturbance effects to sage-grouse would be negligible. There are twenty troughs proposed under this alternative which is four less than Alternative C, so effects of installing toughs would be about eight acres less than in Alternative C. Effects of new reservoir construction would be much less than

under Alternative B or C since only one new reservoir is proposed for construction. Although existing reservoirs would still be available for sage-grouse use, their reliability during dry years is variable and only seven existing reservoirs would be maintained under this alternative. Sage-grouse would have access to numerous troughs for water, which is more hazardous than reservoirs due to the trough edges being above ground level, although escape ramps would be installed on new troughs. Sage-grouse would probably move to other wet areas, located outside the allotment, for late brood-rearing habitat. There would be a gain of approximately one mile of new fence construction, which should not have any effect on sag-grouse populations but increasing the amount of fence would slightly increase the risk of collision.

Overall, there would be 42 acres of disturbance from installation of troughs and one new reservoir. The affected area around reservoirs and troughs would amount to about 2,625 acres or 0.54% of the CEAA area. Other areas, such as the wilderness area to the east, that surround the allotment would also provide habitat for sage-grouse so the amount of habitat affected would be less than 0.20% of available habitat within the CEAA. Since these projects are spread throughout the allotment and construction would occur over a number of years, there should be no effects on population numbers of the different species.

Bats would be provided the increased watering and feeding opportunities from late-season watering sources since insects may be more abundant near these water sources. Reliable late-season water availability would be greatly increased from the Proposed Action due to more new wells, pipelines, and associated troughs.

Alternative E: Edge Development

Of the action alternatives, this alternative would have the fewest effects on sage-grouse nesting habitat since fewer water developments would be installed or constructed. There would still be some effects, as described under the Proposed Action, around new water troughs where livestock and wild horses would gather during late summer when other water sources have dried. There would still be the increased possibility of WNV spread over the non-action alternative, although fewer late-season water sources would be present than Alternatives C and D, making the increased risk less than under those alternatives.

Effects under this alternative would be comparable to the Proposed Action since the number of new developments would be similar. Difference would be more troughs (13) and no new reservoirs. Therefore, about the same vegetative loss would occur as under the Proposed Action. The addition of about seven miles of fence and removal of about five miles, due to fence realignment, for a net gain of two miles of fence would occur under this alternative. The net gain of two miles of fence would have little effect on sage-grouse populations since it is greater than two miles from a lek or in areas sage-grouse would not readily use along the Donner und Blitzen River. However, by increasing the net amount of fence within the allotment would increase the risk of collision.

Overall, there would be about 26 acres of disturbance from trough installation and the affected area would be about 1,625 acres or about 0.34% of the CEAA. Other areas such as the wilderness area to the east that surround the allotment would also provide habitat for sage-grouse so the amount of habitat affected would be less than 0.14% of available habitat within the CEAA. Since these projects are spread throughout the allotment and construction would occur over a number of years, there should be no effects on sage-grouse populations.

Bats would have fewer late-season water sources than under alternatives C and D but would have more than under the No Action Alternative and the Proposed Action.

Alternative F: Reduced Gazing with No Development

Effects under this alternative would be similar as under the No Action Alternative for SSS wildlife. The only difference would be that since the permittee would be limited to lower AUMs under this alternative, there would always be more herbaceous cover available than if the permittee was able to take all 9,577 AUMs under the No Action Alternative..

Alternative G: Complete Livestock Removal

Effects under this alternative would be similar to those under the No Action Alternative for SSS Wildlife. The exception would be that since no livestock grazing would occur within the allotment, areas near perennial sources would no longer be affected by the concentration of livestock, although wild horse concentration would still occur in those areas. Since livestock would not remove 9,577 AUMs of forage, there would be more residual vegetation that would provide more suitable nesting for sage-grouse due to more residual grass cover.

9. Upland Vegetation

Affected Environment: Upland Vegetation

In 1990, the Burns District Ecological Site Inventory (ESI) was completed, and included South Steens Allotment. The Burns District ESI included both a soil and vegetation inventory. The vegetation inventory looked at current (at the time) vegetative cover and range condition interpretations. The Range Condition and Ecological Status for South Steens Allotment, at the time of the ESI, are shown in Tables 13 and 14 in the Grazing Management section of this document.

Within South Steens Allotment there are currently eighteen upland trend monitoring sites; however, many of the sites have only been visited once and there is no data available for comparison. Data on the trend plots has been periodically collected between 1976 and 2012. All of the plots are currently associated with Pace 180° transects and photo points. The complete trend analysis of the data collected from each of these plots

is in Appendix B. Long-term trend data collected at eighteen upland trend sites in 2012 shows bare ground ranging from 18% to 55%, with other types of cover being rock, litter, and vegetation. The trend analysis found that within the allotment 12 plots have an Observed Apparent Trend (OAT) of upward, with the remaining six plots showing a stable OAT. Soil Surface Factors (SSFs) determine the soils erosion condition class and was found to be stable at all sites, in all pastures, except one in Tombstone Pasture, which was slight. In addition to OAT and SSFs, the data and photos from each plot were analyzed and a trend was determined. The data analysis found 5 of the plots showed a stable trend, while one plot shows an upward trend and the other 12 had no data trend determined since data was collected only in 2012. The photo analysis showed six plots exhibited a stable trend while the remaining one showed a downward trend. Plot 6002-006 in Steens Pasture showed a downward trend for both data and photo analysis. Overall, trend analysis for the entire allotment suggests the uplands are stable. However, in order to get a more accurate picture of what is going on within each of these large pastures, trend plots need to be read more often following a more specific protocol in order to reduce inconsistencies and make improved determinations that provide a better picture of the average condition of the allotment.

Approximately 6,041 acres within Steens, Hollywood and Home Creek pastures have burned as a result of wildfires since 1981. An additional 9,985 acres have been treated as part of prescribed burn projects. Approximately 790 acres have been subject to both wildfire and prescribed fire since 1981. Effects to vegetation resulting from fire, either prescribed or natural, are obvious, and can be compared easily at the edges of these disturbance areas. In addition to the burned and dead juniper trees, these burned areas typically support taller, more vigorous bunchgrass plants, few if any young juniper trees, and those shrubs that did not burn are vigorous and have little or no visible decadence. Cheatgrass is especially competitive with perennial plants after a wildfire when additional nitrogen is released by the burning of standing biomass and litter (Pellant 1996). Cheatgrass does not currently dominate any portion of the allotment, but it is present, especially along roads, and could become an issue in the future.

The introduction of cheatgrass into the Great Basin and Upper Columbia River Basin has upset the ecological balance. Ecological processes such as energy flow, nutrient and hydrologic cycles, and structure and dynamics, result in fauna and flora having been adversely affected. In addition to the ecological implications associated with cheatgrass invasion, the impacts to land uses in the area are also significant (Pellant 1996). Cheatgrass was found by Knapp (1996) to dominate approximately one-fifth of the potential sagebrush-bunchgrass habitat. Secondary succession following disturbance is often caused by damage and destruction from lagomorphs and rodent grazing (Knapp 1996), resulting in reduced competition for cheatgrass. Since cheatgrass is present within the community, it is at risk for effects associated with cheatgrass.

The biotic communities most at risk to the impacts of the “cheatgrass-wildfire cycle” are the Wyoming big sagebrush and more mesic salt desert shrub plant communities (Peters and Bunting 1994; Pellant 1990). Within the South Steens Allotment, approximately 16,310 acres are associated with Wyoming big sagebrush ESDs. Not only is cheatgrass

adapting to new environments, it is now being invaded by other noxious weeds (Pellant 1996). In the western United States, big sagebrush (*Artemisia tridentata*) steppe communities dominate approximately 60 million hectares (148 million acres) and comprise the largest vegetation type (Wambolt and Hoffman 2001). However, due to the invasion of exotic plants, fire has become a driving force in the ecology and management of sagebrush steppe communities. The high variability in cover and density of shrubs indicates the complexity of factors influencing recruitment and establishment of sagebrush from both natural populations and from artificial seeding (Lysne and Pellant 2004). If current sagebrush restoration efforts do not result in a more consistent establishment and persistence of this important shrub, large areas of sagebrush-steppe may be lost, and rehabilitation may no longer be a viable option (West 2000).

Western juniper occurs in a band between 4,500 and 8,500 feet on Steens Mountain, over 90 percent of which is comprised of trees established after the 1860s (Miller et al. 2008). Over half of the area of the present juniper forest in eastern Oregon was established between 1850 and 1900 (Gedney et al. 1999). Once established, juniper forests increased in density, with the greatest increase occurring between 1879 and 1918 (Gedney et al. 1999). This rapid increase in juniper stand establishment occurred during a period of favorable climatic conditions, and reduced fire frequency and intensity (Gedney et al. 1999). Larger trees are sometimes killed by fire, but many survive; survival is often dependent on fire intensity. The crowns of larger juniper trees often limit grass and other vegetative growth beneath them, thereby, reducing the fuel necessary to carry fire into the tree, fireproofing the crown and stem (Agee 1993).

In the absence of pre-settlement fire return intervals, western juniper has functioned as an invasive species over much of Steens Mountain, generally increasing in frequency to the greatest degree on north slopes and at higher elevations (Johnson and Miller 2006), encroaching into more productive mountain big sagebrush and low sagebrush plant communities. Expansion juniper intercepts precipitation and utilizes soil moisture, well beyond its own crown area, that would otherwise be available to competing native vegetation (Bates et al. 2000).

Within the allotment, based on ESI data, approximately 40% of the allotment is within the 0.5–3.0% cover class for juniper, 20% is within the 3.1–10.0% cover class, and 5% is within the 10.1–23.8% cover class. The remainder of the allotment, approximately 35%, is not classified within any of the above juniper encroachment cover classes. Since ESI was completed in 1990, western juniper cover has increased across the allotment. Under the North Steens Ecosystem Restoration Project, some juniper treatments have occurred, but it is not expected that they have prevented an overall increase in juniper cover across the allotment at this point. Since juniper expansion is occurring within the allotment, it is expected that effects associated with juniper expansion are occurring. Juniper has assumed control of ecological site processes (soil hydrologic cycle and nutrient transfer through the soil profile) within the allotment. Loss of shrubs, grasses, and forbs has occurred in some areas, and could lead to loss of soil surface stability over the next few decades.

Up to 10% of juniper stands within the allotment are comprised of older juniper trees (over 100 years) inhabiting rocky ridges or shallow soil areas where fires are not expected to burn. Tree age may exceed 1,000 years in these stands, and at these sites the rocky surface controls soil infiltration and maintains soil surface stability.

Since watering sites are not well-distributed across the allotment, especially in Steens Pasture, visual effects to vegetation from grazing are more obvious in these areas and not easily observed in portions of the allotment away from water and not in the current use area. Bunchgrass vigor is declining, or expected to decline, in locally heavily-grazed areas of Hollywood Pasture due to utilization in excess of 50% over successive grazing seasons, primarily due to large levels of wild horse use since livestock are not allowed to utilize a pasture over the 50% utilization maximum and are removed before that point is reached. Conversely, bunchgrass vigor may also decline in lightly-grazed or non-grazed areas, due to plant decadence (growth may be limited by accumulation of old and dead tissue; Oesterheld and McNaughton 1991), especially where no fire or other event has occurred, which would remove accumulations of dead material. Both of the above conditions have been observed in the allotment.

Vigor of bunchgrass plants may be maintained, or even improved, by some disturbance that removes buildup of previous years' growth, either infrequently through large sudden events as wildfire, which may kill the plant, or more frequently with less intensity, as with grazing. The effect of defoliation to bunchgrasses, before and after prescribed and wildfire, can be directly observed within the allotment. The effect on plant vigor from grazing is more subtle, and involves interplay between a plant's ability to reestablish photosynthetic activity and its ability to retain a competitive position in the plant community (Oesterheld and McNaughton 1991).

The impacts of grazing on the sagebrush communities can vary greatly depending upon the management of the livestock (Davies et al. 2011). Davies et al. (2011) determined livestock grazing is not necessarily a threat to the sustainability of sagebrush ecosystems, but that appropriately managed grazing is critical to protecting it. The major impacts are due to the interaction of grazing with other factors, which combined result in changes in vegetation (Davies et al. 2011). Grazing impacts vegetation by reducing the photosynthetic capacity caused by the reduction in the leaf area of the plant (Briske 1991). When species are grazed severely, they are placed at a competitive disadvantage compared to species grazed to a lesser extent since the species grazed less severely are able to grow more rapidly following grazing and are able to be more competitive for resources in the community (Briske 1991). Vegetation that has a competitive advantage under light grazing, and dominates a site, may decrease or be replaced as grazing pressure on it increases (Archer and Smeins 1991). Appropriate grazing management can help maintain or improve species composition, diversity, and production (Archer and Smeins 1991). Due to the current distribution of reliable water within the allotment, the allotment is receiving a large range of grazing pressure from no use to heavy use. Grazing management is able to limit the frequency and intensity of grazing on plant species and lenient grazing may not alter species composition on a site (Briske 1991). However, as utilization increases, the competitive interactions of vegetation become

intensified, increasing the likelihood that palatable species may become replaced (Briske 1991, Archer and Smeins 1991). In addition to frequency and intensity of grazing, the season of grazing can have different effects on vegetation (Briske 1991). When vegetation is grazed continuously during their growing period, they are at a larger competitive disadvantage than species that have previously completed their growth cycle (Briske 1991). Communities are often relatively stable and resilient to change under some grazing; however, when grazing intensity crosses a threshold level, the community changes often occur rapidly (Archer and Smeins 1991). When species are severely overgrazed, the production potential of the site can be changed due to the alteration of hydrological properties, soil erosion (Briske 1991), reduced nitrogen fixation, increased ammonia volatilization, and leaching (Archer and Smeins 1991). Moderate utilization and defer grazing treatments have been found to result in the accumulation of stubble and litter that helps retain precipitation, increase infiltration, and reduce evaporation of water while providing the shaded micro-environment that many grass and forb seedlings need for survival (Anderson et al. 1990). Both moderate utilization and defer grazing are occurring within the allotment.

Studies have shown that while grazing does affect vegetation, the removal of grazing may not result in an increase in total herbaceous standing crop. West et al. (1984) found there was no increase in standing herbaceous crop after 13 years of rest from livestock grazing, and that there was actually a decrease for many perennial grass species. He also found that cheatgrass increased in the area (West et al. 1984). Davies et al. (2011) also determined removal of livestock grazing will not conserve the sagebrush ecosystem and that to protect the sagebrush ecosystem other factors such as fire and conifer encroachment need to be addressed as well. Manier and Hobbs (2006) found grazing exclusion resulted in a reduction on both cover and frequency of forbs, with no significant effects on cover or frequency of grasses, biological crusts, or bare ground. They also found that areas excluded from grazing had more shrub cover (Manier and Hobbs 2006). Forty years of grazing exclusion also seemed to have little effect on plant diversity (Manier and Hobbs 2006). Daddy et al. (1988) found areas protected from grazing had vigorous sagebrush while heavily grazed sites had a large amount of decadent sagebrush with numerous seedlings in the interspaces suggesting that livestock exclusion may accelerate woody plant growth. However, they found total herbaceous cover and the amount of above-ground biomass were greater on a moderately grazed site than on heavily grazed sites and areas with no grazing for 21 years (Daddy et al. 1988). Courtois et al. (2004) found greater plant densities outside of grazing exclosures, and suggested this might be the result of increased seed dispersal and seed-soil contact resulting from grazing. In addition they found exclusion of grazing did not conclusively increase species richness, and species richness was generally greater under grazing treatments (Courtois et al. 2004). The limited changes in vegetation characteristics between moderately grazed sites and those excluded from grazing for 65 years suggest recovery rates [from heavy utilization] have been similar under both treatments (Courtois et al. 2004). Daddy et al. (1988) found evapotranspiration loss was greatest at the heavily grazed and not grazed sites, and there was a lack of soil water recharge at the heavily grazed site, which was likely due to poorer infiltration and increased surface evaporation at the heavily grazed site compared to the moderately grazed and not grazed sites.

Research suggests if the site has not crossed an ecological threshold, into a different steady state, the site can be returned to good ecological condition under both grazing exclusion and light to moderate grazing (Miller et al. 1994). However, research also suggests once a community has entered a new steady state, the removal of livestock is not expected to return the system to the good ecological condition it was previously in (Miller et al. 1994). Svejcar and Tausch (1991) found a significant disturbance, such as livestock grazing, does not need to occur in order for annual grasses to establish and dominate an area, and therefore, the absence of the same disturbance will not necessarily favor a return of the system to its previous, native species dominated condition. Another study found cheatgrass was higher in two areas excluded from livestock grazing than in the grazed areas and 65 years of grazing exclusion did not prevent cheatgrass invasion on the sites (Courtois et al. 2004). Research shows managers should not assume reduction or removal of grazing will result in the successional pathway being reversed and that the site will return to a pre-disturbance community (Archer and Smeins 1991). The effects of grazing on vegetation composition and productivity can be minor when compared to changes resulting from variation in precipitation patterns, and it can be difficult to separate if it is grazing or precipitation that is the main driving force of community changes in the short-term (Archer and Smeins 1991).

Although assessments have found the allotment meets rangeland health standards for upland watershed health, local areas of declining bunchgrass health have been observed, generally in areas affected by juniper expansion and directly around the limited reliable water sources that regularly experience heavy use. This suggests without juniper control in these areas, the allotment is at risk for not meeting Standards in the future, despite management of grazing animals. In addition to juniper encroachment across the allotment, Aroga moth infestations have also been contributing to sagebrush mortality, increasing the risk of catastrophic wildfire. This has been seen occurring in Wyoming and Mountain big sagebrush, low sagebrush, and silver sagebrush both within the allotment and district wide.

Environmental Consequences: Upland Vegetation

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for upland vegetation consists of the South Steens Allotment. While vegetation types do not end at the allotment boundary, cumulative effects to the vegetation would not occur outside the allotment. Past and present actions, such as those described in Affected Environment, have influenced the existing environment within the CEAA. RFFAs in the CEAA that may contribute to cumulative effects to upland vegetation include livestock grazing, wildlife use, hunting and other recreational pursuits, and wildfire. Past and RFFAs that have affected upland vegetation are found in Table 28.

Table 28: Upland Vegetation Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	37	---	---	Unknown
Wildfires	6041.4	---	6	Unknown	---	Unknown
Known Primitive Campsites	---	---	14	---	---	Unknown
Trails	---	13.9	---	---	None	---
Open Roads	---	100.3	---	---	None	---
Closed Roads	---	34.2	---	---	None	---
Water Developments	---	---	69	---	---	None
Gravel Pit	125.7	---	1	None	---	None
Cutting	5352.6	---	5	6745.4	---	14
Piling	2339.0	---	8	1270.0	---	11
RX Burning	9985.0	---	16	6318.9	---	20
Seeding	1446.5	---	2	5	---	1

Effects Common to All Action Alternatives:

None of the action alternatives increase authorized number of AUMs for livestock grazing; however, all action alternatives (with range improvements) would provide the opportunity to utilize full permitted use. There would be a reduction in utilization levels in the areas of current heavy utilization, with an increase in utilization around new water sources. The degree and extent of reduction or increase would depend on the number of new and maintained water sources.

Other environmental effects to vegetation are the extent of vegetative disturbance required to access and construct proposed developments. These actions would occur once during initial construction, with infrequent return for maintenance over decades; effects are expected to be temporary, disappearing within a few years to a decade at most.

Virtually all of the allotment (> 99%) is within an elevation band of 4,500’ to 8,500’ subject to the expansion of juniper, leading to an expected decline in the health and vigor of vegetative communities over time. A separate analysis (North Steens Ecosystem Restoration Project FEIS, 2007) was prepared and management of juniper is planned within the allotment, regardless of the decision made on this document.

Reasonable foreseeable future actions include continued juniper management through the North Steens Ecosystem Restoration Project FEIS, recreation, hunting, grazing by wild horses and livestock, weed treatments, and wildlife use. Juniper management will have the greatest effect on vegetation by reducing the competition from juniper and allowing native grasses, shrubs, and forbs to reestablish and stabilize soils.

The effect of each individual development, by type, is discussed below. The cumulative effects of each alternative would be dependent upon the number and type of proposed developments under that alternative.

New Reservoirs and Maintained Existing Reservoirs: Upland vegetation would be removed and prevented from becoming reestablished (by saturated soils) during construction of new reservoirs and maintenance at existing reservoir sites. Disturbance to vegetation would occur along access routes for equipment, during both construction and infrequent maintenance, but these effects would be temporary in nature, visible for <1 to 3 years. Vegetation disturbance associated with construction would be no more than one acre, and disturbance caused by livestock and wild horse concentration would be approximately two acres for each water source due to the increased level of use.

Reservoir Abandonment: The abandonment of reservoirs would not disturb vegetation any more than was previously disturbed. As the reservoir stops functioning (i.e. holding water), soils in the reservoir would no longer be saturated, grazing animals would no longer congregate at them, and upland vegetation would become established. Seeding would occur as described in the PDEs, which would increase the rate of vegetation reestablishment. The increase in vegetation would be dependent on the size of the reservoir and the currently disturbed area. The increase in vegetation for these reservoirs would occur in the long-term, from two years to decades, depending on the current condition of the reservoir.

Wells: Vegetation would be crushed or damaged during well construction in an area approximately 100 feet by 100 feet. Vegetative damage from the presence of drilling equipment and materials would be temporary, requiring <1 to 3 years for full recovery. Vegetation would only be permanently removed where the actual well is placed, as well as where the posts for solar panels and fences are placed; this would be less than five square feet of total vegetation loss per site. Disturbed areas would be rehabilitated and seeded as needed to promote vegetative recovery.

Pipelines: Pipeline installation would damage vegetation in an area equating to approximately one acre per linear mile. Direct seeding would be augmented by establishment of native vegetation, and vegetation would return in 1-3 years. Periodic maintenance of the pipeline may remove small areas (size would depend on the length of the area needing maintenance, but would be within the original area of disturbance) of vegetation, but this would only occur in areas where the pipeline broke and needed to be replaced. Areas of disturbance would be reseeded to promote recovery of the vegetation on the site, increasing the speed of recovery.

Troughs: Bottomless troughs (30 foot diameter) would replace approximately 710 square feet of vegetation with concrete, upon which the trough would be placed and sealed. Installation of 1,200 gallon metal troughs would disturb vegetation over an area approximately 10 feet by 20 feet and the trough would completely cover an area 48 square feet. Vegetation disturbance associated with construction would be no more than 0.05 acre for each trough, and these disturbed areas would be rehabilitated if needed, increasing the vegetative recovery rate. Disturbance caused by livestock and wild horse concentration would be approximately two acres for each trough due to the increased level of use in the area.

Storage Tanks: The process and equipment required to bury a 10,000 gallon water storage tank would remove vegetation on an area approximately 12 feet wide by 36 feet long, or 0.01 acre per site. Direct seeding would help the establishment of native vegetation and the site would recover in 1-3 years.

Fencing: Since blading, grading, and brushing would not occur to facilitate construction of new fences, visual effects to vegetation are expected to be unnoticeable <1 to 2 years after construction. Vegetation would be crushed or damaged to a greater extent (approximately 0.73 acre/linear mile), where vehicles are used to deliver fence material, or to a lesser extent where pack animals are trailed, and where material is placed. These effects would not be expected to affect vigor of vegetation, and disturbance would be undetectable after one or two growing seasons.

Spring Development/Protection: Effects to vegetation are addressed previously as those resulting from pipeline burial, trough placement, and fencing. Vegetation would be temporarily (lasting fewer than three years) lost during the installation of the headbox (<10 square feet), and vegetation would recover naturally in 1-3 years.

Route Realignment[54]: The route realignment at S3 would result in the loss of upland vegetation in areas where vehicles create the new route; however, as the route would be created by use and not equipment (except where needed to remove large rock) or bladed, the loss of vegetation would only be in the vehicle tracks. Over the following decade, as the old route becomes rehabilitated, effects become a one-for-one exchange, with the area of the new route effecting soil more since the new route would be approximately 50 feet longer than the old route.

Water Gaps: Effects to vegetation would be the same as under fencing. The majority of the vegetation in these areas would be riparian vegetation and the associated effects are covered under the Riparian Zones, Wetlands, and Water Quality portion of this document.

Alternative A: No Action

The existing condition and trend of vegetation would be maintained throughout the allotment, but would show a downward trend in areas near reliable water sources, especially in less than average water years as less reliable water sources become dry, or if the permittee were to request full permitted use. Livestock distribution would continue to be driven by availability of water as currently described, which would maintain the current utilization pattern of bunchgrasses within the allotment. Under this alternative, livestock would continue to be physically precluded from utilizing full permitted use annually during drought years without resulting in impairment to vegetation overtime; this may also occur in normal precipitation years, depending on vegetation production annually. The number of AUMs unavailable in any given year would depend on the time of grazing and the availability of water; livestock would be required to be removed if utilization exceeded the maximum utilization of 50%, which would often occur prior to

[54] These effects would not occur under Alternative E since route realignment in not proposed under that alternative.

full use being taken. Areas outside of the current use areas would be expected to continue building up fine fuels increasing the risk for wildfire and resulting in bunchgrasses becoming decadent due to lack of removal of old growth (Oesterheld and McNaughton 1991).

Alternative B: Proposed Action

Direct long-term (one or more decades) and short-term (less than one decade) impacts to vegetation from ground-disturbing activities (vegetation loss, reduction, trampling), associated with implementing this alternative, would affect <1% of the allotment. These long-term effects would be offset by the abandonment of nine reservoirs, which would result in an increase in vegetation at those sites in the long-term (one or more decades).

Providing additional water sources is anticipated to maintain utilization, from all grazers, at or below target levels of 50%, across the allotment, as seen by Map 11 – Alternative B Use Area. This improved distribution, combined with the proposed grazing rotation which provides growing season rest to key forage plant species, is anticipated to cause a stable to upward trend in rangeland condition on upland plant communities across the allotment. Over the next decade, as livestock access portions of the allotment where bunchgrasses have become decadent due to lack of removal of old vegetation, trampling and light to moderate grazing would be expected to begin to improve vigor of plants (Oesterheld and McNaughton 1991, Archer and Smeins 1991, Anderson et al. 1990).

Alternative C: Maximum Water Distribution

Under this alternative, the effects would be similar to under the Proposed Action, only they would occur in more areas due to the increased developments. Direct long-term (one or more decades) and short-term (less than one decade) impacts to vegetation from ground-disturbing activities (vegetation loss, reduction, trampling), associated with implementing this alternative would affect less than 1% of the allotment.

Alternative D: Along Road Development

Under this alternative, the effects would be similar to the Proposed Action. Direct short-term impacts to vegetation from reservoir construction and pipeline and trough placement affect less than 1% of the allotment. Since only one new reservoir would be constructed, direct long-term effects would be less than the Proposed Action. While livestock would be able to access portions of the allotment previously unavailable due to limited water, a larger proportion (compared to the Proposed Action) of the allotment would remain inaccessible due to limited water and would still be lightly used or unused, especially in dry years.

Alternative E: Edge Development

Under this alternative effects would be similar to the Proposed Action alternative. Direct short-term impacts to vegetation from development construction would affect less than

1% of the allotment. Since new water sources would be mostly at or near WSA edges, livestock and wild horse distribution in WSA interiors, especially in Steens Pasture and Home Creek Pasture, would be minimally changed. Areas that remain inaccessible to livestock and wild horses would have the same effects as the No Action Alternative.

Alternative F: Reduced Grazing with No Development

The effects of this alternative would be similar to the No Action Alternative. The exception being, that under this alternative, the permittee would be precluded from using the current full permitted use. Under the new Terms and Conditions associated with this alternative, the permittee would only be allowed to utilize 7,875 AUMs. While this would be an 18% reduction in numbers, the remaining livestock and wild horses would continue to utilize the allotment as in the past. They would utilize the same trailing routes to and from resources and continue to use preferred grazing sites within the allotment. Heavy use areas would remain the same resulting in negligible changes to vegetation.

Alternative G: Complete Livestock Removal

Under this alternative, no livestock grazing would occur within the allotment, areas near reliable water sources and previous mineral sites would maintain or improve in condition due to the decreased congregation levels. Since no new water sources would be developed, wild horse distribution would continue to be driven by water availability, maintaining wild horse utilization patterns. Impacts to vegetation around these water sources would be expected to be negligible due to continued use by wild horses, which would limit the availability of vegetation to recover at these sites. Areas outside of the current use areas would be expected to continue building up fine fuels increasing the risk for wildfire and resulting in bunchgrasses becoming decadent due to lack of removal of old growth (Oesterheld and McNaughton 1991). The rate at which this would occur would be greater than that under Alternative A or F since livestock would not be present to remove any fine fuels.

10. Wild Horses

Affected Environment: Wild Horses

South Steens Herd Management Area (HMA) encompasses the South Steens Allotment, as well as portions of the Steens Mountain Wilderness and two adjacent allotments. Herd Areas (HAs) are locations where wild horse and burro populations were found when the Wild Free-Roaming Horses and Burros Act of 1971 was passed. The HMA was originally the same as the HA. The original Herd Area (HA) and HMA, from the 1979 South Steens Herd Management Area Plan (HMAP), written in response to the Wild Free-Roaming Horses and Burros Act, consisted of 175,605 acres of federal land, 12,390 acres of state land, and 64,240 acres of private land for a total of 252,235 acres. The AML was established as 150-300 animals in the original 1979 HMAP. As a result of the 1982 Andrews Management Framework Plan (MFP), the 1984 Andrews Rangeland

Program Summary (RPS), 1984 State Land Exchange, and 2000 Steens Act Land Exchanges, the HMA boundary has been changed several times which separated the active HMA acreage from inactive HA acres. The 1984 Andrews RPS reduced the size of the South Steens HMA by eliminating the Alvord Peak area where there was existing forage conflict between horses and bighorn sheep (no specific acreage was given). The 1984 State Land Exchanges added 9,151 Acres to the South Steens HMA in order to block up the BLM managed lands. Since the early 1980's, 34,745 acres within the original HA have been disposed of and 27,290 acres have been acquired through multiple land exchanges including the Steens Act Land Exchanges which had the purpose of "protecting and consolidating Federal lands within the CMPA" (Steens Act 2000). Since 1979, the original active HA acres went from 252,235 to 134,491 total acres in the current HMA and 146,256 acres total acres within the inactive HA. Current boundaries for the HMA (active HA) and inactive HA were finalized in the 2005 AMU and CMPA RODs. Table 29 shows the public and private acres in the HMA and inactive HA both prior to and following the 2005 AMU/CMPA ROD.

Table 29: South Steens Herd Area Acres

	Public	Private	Malheur NWR	State	Total
HMA before RMP[55]	127,840	34,923	12	658	163,433
HMA after RMP	126,732	7,716	12	0	134,460
Inactive HA before RMP	58,948	58,336	0	0	117,284
Inactive HA after RMP	60,055	85,543	0	658	146,256

[55] Before the current 2005 RMP, but after HMA adjustment due to land exchanges following the Steens Act.

Although the HMA boundary adjustments had to be made, the AML was not adjusted due to lack of monitoring data to support a change. Approximately 75% of wild horse summer range containing the most reliable water in the HMA, and most of the winter range, have been lost following all the land exchanges over the years. Wild horse management has been impacted as the water sources lost in the exchanges were not replaced. The RMP states that "Permanent increases or decreases in AML and forage allocations will be considered if analysis of monitoring data indicates changes in long-term forage availability" (CMPA ROD/RMP, p. 50). Currently, wild horse management in South Steens HMA is being maintained within an AML of 159 to 304 animals, which has only been slightly modified (increased by a total of 5 animals) since the original 1979 determination, despite over a 50% reduction in the size of the HMA. Forage is allocated to ensure enough feed exists within the HMA to sustain AML of 304 horses throughout the year. Wild horses are allocated 3,648 AUMs of forage, with 3,540 AUMs being allocated in the South Steens Allotment. The last gather occurred in November 2009 with horses coming off the range in good health and quality, reflective of past management actions that returned the best animals to the range, thereby, improving and maintaining characteristics of good conformation, size, color, and temperament.

McInnis and Vavra (1987) found at least 88% of the mean annual diets of horses and cattle consisted of grasses; therefore, there is a direct competition for forage within the allotment. In McInnis and Vavra's (1987) work horses and cattle showed predilection for many of the same forages, and dietary overlap was substantial (62–78%) every season.

In addition, dietary overlap between horses and cattle grazing common sagebrush-grassland range in eastern Oregon average 67, 69, and 72% during spring, summer, and winter, respectively (Vavra and Sneva 1978). Dietary overlap is not sufficient evidence for exploitative competition (McInnis and Vavra 1987, Colwell and Futuyma 1971), and consequences of overlap partially depend upon availability of the resource. Site observations and utilization studies indicate wild horse utilization patterns are similar to livestock; however, wild horses will typically use range farther from water than cattle. Miller (1983) found that wild horses generally stay within 4.8 km (2.98 miles) of a water source during the summer, while Pellegrini (1971) found wild horses will roam up to seven miles from water before returning. Green and Green (1977) found wild horses range from three to seven miles from a water source, but the distance is related to forage availability. When water and forage are available together, the range will be smaller, and when they are not available together wild horses concentrate in areas of ample forage and travel further distances to water (Green and Green 1977). Research has also shown when wild horses have to share water sources with cattle and antelope, there is direct competition (Miller 1983). When water was abundant, there was no aggression noticed, however, at times when water was limited, both cattle and wild horse would force each other from the water source while antelope were always displaced (Miller 1983). Miller (1983) also found presence of horses did not limit sage-grouse or coyotes from drinking at the water source.

To maintain a thriving ecological balance "an adequate year round quantity of water must be present within the HMA to sustain wild horse and burro numbers within AML" (4700 Wild Free Roaming Wild Horse and Burro Management). The Merck Veterinary Manual (Kahn 2005) states that "[w]ater requirements depend largely on environment, amount of work or physical activity being performed, nature of the feed, and physiologic status of the horse." The manual suggests the minimum daily water requirement is 0.4 gallon per100 pounds of weight, with the average daily intake being closer to 0.65 gallon per100 pounds. The manual also recognizes this will increase under specific conditions, such as sweat loss, increased activity, and lactation, with the increase being as much as 200%, up to 1.3 gallons per 100 pounds per day. Wild horses within the South Steens HMA range from 900 to 1,200 pounds. Assuming an average weight of 1,050 pounds, horses within South Steens HMA require a minimum daily water intake of 4.2 gallons, with an average daily intake of 6.8 gallons, but the requirement may be as high as 13.65 gallons. This calculates out to 668 gallons per day when the HMA is at the low end of the AML (159 animals) and using only the minimum amount of water, to almost 4,150 gallons per day when the HMA is at the high end of the AML (304) and requiring a water intake 200% above average. Over the course of a year, this translates to a range of 243,747 gallons of water (minimum) to 1,514,604 gallons of water (maximum). The maximum water requirements would be even higher for the HMA when horse numbers exceed the AML.

The most common wild horse management action that occurs within the project area are wild horse gathers, which are to be done as the herd reaches the maximum established AML number and when monitoring data (census, utilization, use supervision, etc.) indicate ecological balance would be exceeded. Depending on reproductive rates, results of rangeland monitoring data, funding, and management considerations, horses within the

HMAs are typically gathered and removed on a four to five year cycle. Since 1998, there have been numerous census counts, gathers, and releases within the HMA. Table 30 shows the wild horse counts for each activity occurring since 1998.

Table 30: South Steens HMA - Census and Gather History since 1998

Year	Activity	Number of Horses
August 1998	Census	271
October 1998	Gather	259
October 1998	Release	91
June 2001	Census	321
September 2002	Census	387
October 2004	Gather	376
October 2004	Release	101
July 2009	Census	491
November 2009	Gather	376
November 2009	Release	143
June 2012	Census	385

Utilization of forage species within the HMA is not uniform due to a lack of reliable water. In part, this is due to a loss of approximately 28,973 acres of the existing HA that was crucial summer range and foaling areas with reliable live water. These acres were placed in inactive HA status due to legislated land exchanges and resulted in the concentration of horse use around limited reliable water sources within the active HA. Viable water sources in HMAs for wild horses are different than they are for domestic livestock. Water for domestic livestock need only last until the end of the grazing season and if water is unavailable, livestock can be gathered. HMAs must have reliable, year-round water to sustain wild horses. Reservoirs benefit livestock more than wild horses in that livestock are able to be gathered when the reservoirs go dry and wild horses must find other water sources. When there is little water present in reservoirs at livestock turn out, an evaluation must be done on the available water to ensure there is sufficient water present to ensure yearlong water for wild horses before the livestock are allowed to turn out. When drought results in little or no water available for wild horse use, the options available are to provide water using a well, to haul outside water into the HMA, or to conduct an emergency gather that would have the goal of temporarily removing all wild horses from the area; emergency gathers are not an immediate solution and must be planned prior to water running out to prevent wild horse loss.

Fencing of the Donner und Blitzen WSR corridor by court decree, as well as numerous miles of private land fences constructed before the land exchanges on the east side of Donner und Blitzen River, has resulted in additional reliable water being excluded from wild horse use. While some of the private land fences have been removed in the No Livestock Grazing Area, the openings (gates and water gap at Tabor Cabin) to Donner und Blitzen River are not suitable for wild horse use due to juniper encroachment. These three crossings are choked with juniper trees, which restrict the free movement of wild horses, due to their innate fear of predation. The needed juniper reduction in the area of these crossings is critical to the proper functioning of the HMA. Opening these crossings, by removing juniper trees, would redistribute use throughout the HMA. However, gates would only be able to be opened when livestock were not present in the pasture to

prevent livestock from entering the No Livestock Graze Area. An isolated population of approximately 20 wild horses that uses the HMA on the east side of the river does not access the remaining portion of their HMA within the South Steens Allotment. In winter months these horses have a harder existence due to lack of access to suitable winter range which may result in death and affect the reproductive health of these horses and lower recruitment (Garrott and Taylor 1990). These horses were not seen during the 2012 census.

In this HMA, external perimeter fences exist to contain wild horses within the HMA while internal fences are used to manage timing of livestock grazing, provide areas with periodic rest from livestock grazing, and exclude livestock from Donner und Blitzen WSR and No Livestock Grazing Area. Approximately 100 miles of fence exists in the interior of the HMA boundary within South Steens Allotment. While necessary for livestock grazing management, these internal fences create seasonal barriers to the free movement of wild horses within the HMA. If wild horses are continually unable to move through the allotment due to closed gates, they will stop trying to migrate through their HMA, resulting in overuse of certain areas. This can be seen in the Hollywood Pasture which is one of the most common locations to observe wild horses in South Steens Allotment. In order to provide this pasture with as much rest from wild horse use as possible, gates are occasionally left closed throughout the summer when the majority of the horses have moved into other pastures. To mitigate effects of fencing, once livestock have been removed from an HMA, internal fence gates are generally required to be opened by the permittee as a term and condition of their permit. In addition, during the livestock grazing season, pasture gates should be left open whenever livestock are not present in the affected pastures.

There has been no documented evidence of WNV in the South Steens wild horse herd. The disease affects a horse's immune system and is spread by mosquitoes and biting flies. Mosquitoes and biting flies are present within the HMA so caution must be adhered to with use by domestic horses that may be carriers of WNV. A BLM equestrian campground is located close to the HMA along the south section of Steens Mountain Loop Road. WNV infected flies could be transported in horse trailers or infected carrier horses could be transported to the HMA by the public or commercial concessionaires.

Within the northern Great Basin, drought conditions are common. In Nevada during 2007 and Oregon 2009, drought conditions affected water availability in several HMAs nationally. In Nevada, before wild horses were able to be gathered, many died and a large number (approximately 150) of animals gathered subsequently died from salmonella poisoning due to contaminated poor quality water. Emergency gather measures are always contingent on funding and space to hold animals resulting in potential compromise of forage conditions in addition to animal loss. As a result of drought, the habitat around drying water sources suffered from overgrazing. Proactive management of supplying adequate water could have prevented this situation as well as saved the lives of many wild horses. Addressing the habitat components (water, forage, cover & space) of wild horses as required in Wild Horse and Burros Management Handbook (H-4700-1, 2010) and Five Year Strategic Plan 2010 to 2015 is a priority in Oregon. Proper water

developments would disperse grazing use and reduce the chance of emergency gathers being required.

Horses of this HMA are managed to exhibit saddle horse conformation with the most common colors being pinto variations, sorrel, bay, and red roan, with several other colors present. Genetics analysis was completed by E. Gus Cothran from Texas A&M University using DNA collected from horses during the 2009 gather. Genetic similarity results suggest a herd with mixed ancestry that primarily is North American riding stock and possibly includes Thoroughbred, although this may be due to Quarter Horse ancestry (Cothran 2010). Cothran (2010) summarized that current variability levels are high enough that no action is needed at this point; although, with all herds with numbers less than several hundred, the herd should continue to be monitored for genetic variability.

Environmental Consequences: Wild Horses

Effects Common to All Alternatives:

Fences restricting access to Donner und Blitzen River have reduced the amount of remaining live water in the HMA. Fence construction has been partially mitigated by opening gates along the river corridor when livestock were not present on the allotment; this will continue under all alternatives, though the use of the openings by wild horses is limited due to juniper encroachment.

The CEAA for wild horses for this project is the South Steens Herd Management Area. RFFAs for wild horses would include future wild horse gathers and the North Steens Ecosystem Restoration Project. The Miller Homestead Fire burned approximately 731 acres of the South Steens HMA. However, the acres burned did not affect South Steens horses as this area is separated from the rest of the HMA by two fences and Hwy 205, and horses do not typically access this area.

Effects Common to Action Alternatives:

All action alternatives include development of reliable, water, in the form of wells, pipelines, and troughs, which would be essential and required to sustain wild horses within the HMA during drought conditions. Wells would allow the BLM to turn water on when needed during drought and supply water year-round to disperse use by wild horses. Development of reliable late-season water sources within the HMA would reduce concentrations of wild horses at individual water sources and reduce the chance of disease spread do to contaminated water.

<u>Alternative A: No Action</u>

Wild horse movement would continue to be restricted by the management fence for Donner und Blitzen River as well as other internal livestock management fences. Animal distribution would continue to be problematic as some areas would be over-utilized while other areas would be underutilized by wild horses due to a lack of reliable, water on the

eastern portion of the allotment. Wild horses would continue to congregate in the riparian areas around springs. In severe drought years, wild horse loss would be expected to occur due to lack of water and/or lack of clean water. Although gates to Donner und Blitzen River could be opened for access to the river during drought (when livestock are not present), wild horses may not be able to locate these openings. In severe drought years, an emergency gather may be conducted (following appropriate NEPA). In addition, juniper encroachment has occurred around many of these gates, increasing the presence of mountain lions (predators), and further reducing the likelihood that horses would use them. Therefore, just opening gates when livestock are not present and emergency gathers would remain the options during drought years.

Alternative B: Proposed Action

Under this alternative, three new reservoirs would be constructed, 15 existing reservoirs would be rehabilitated to improve functionality, four springs would be developed, and nine troughs would be installed, five of which would be associated with wells. Proper water developments would disperse grazing use and reduce the chance of emergency gathers being required. Spring protection, without development, would reduce reliable water sources within the allotment. However, the development of new water within the same area would replace the spring water, reducing the impact to wild horses. These new developments are spread throughout the allotment, which would allow for improved wild horse distribution and utilization across the allotment. The troughs associated with wells and pipelines would guarantee year-round water would be available, even in drought years. However, with only five troughs associated with wells, in drought years these locations would receive heavy utilization as other water sources dry, resulting in uneven distribution and utilization patterns during those years. Wells that are powered by solar panels would provide the most reliable power and therefore the most reliable water since there would be no reliance on fuel, which would requiring year round access. Wild horse movements and available live water would continue to be restricted by the management fence for protection of Donner und Blitzen River.

Alternative C: Maximum Water Distribution

Providing numerous reliable water sources throughout the HMA would result in animals being evenly distributed throughout the HMA. Under this alternative, 24 new troughs would be installed, 20 of which would be associated with a well and pipeline, 17 new reservoirs would be constructed, four springs would be developed, and 15 existing reservoirs would be rehabilitated to improve functionality. Proper water developments would disperse grazing use and reduce the chance of emergency gathers being required. These developments are spread throughout the allotment and would provide reliable water to wild horses in all areas of the allotment, including within WSAs. The proposed troughs associated with wells and pipelines would guarantee reliable, clean, year-round water was available to wild horses, and the locations of these proposed troughs would allow for even distribution patterns across the allotment. This would result in having forage utilization being more evenly distributed and reducing areas of overuse. Wild

horse movements and available live water would continue to be restricted by the management fence for protection of Donner und Blitzen River.

Alternative D: Along Road Development

Under this alternative, 18 new troughs, associated with wells and pipelines, would be constructed which would provide clean, reliable, year-long water sources for wild horses. In addition to the troughs, one new reservoir would be constructed, two springs would be developed, and seven existing reservoirs would be rehabilitated to increase functionality. While these water sources would not be as reliable as the troughs associated with pipelines and wells, they would provide water for at least part of the year, and may provide yearlong water in wet years. Proper water developments would disperse grazing use and reduce the chance of emergency gathers being required. Since the developments would only occur along roads, there would still be some areas wild horses would not graze regularly due to their distance from water, leaving an uneven distribution pattern. As the year progressed and water sources dried, wild horses would move to the remaining reliable sources resulting in concentrations of wild horses in areas with water. Distribution of grazing animals would not occur as well as under Alternative B or C as this alternative leaves portions of the area HMA overused and portions underused, but would still provide enough new water sources to sustain wild horses during droughts. Wild horse movements and available live water would continue to be restricted by the management fence for protection of Donner und Blitzen River.

Alternative E: Edge Development

This alternative would not have any well development inside the WSA in Steens Pasture, resulting in the center of the HMA being under-watered. This would continue the uneven distribution and utilization patterns of wild horses. However, the increase number of reliable water developments would disperse grazing use and reduce the chance of emergency gathers being required. Proposed wells, pipelines, and troughs on the edge of the WSAs within the Steens Pasture would slightly improve the distribution to include areas around the new developments. Proposed wells, pipelines, and troughs within Tombstone and Home Creek Pastures would provide reliable, clean water sources for wild horses while they were located within those pastures. The proposed water gaps along Donner und Blitzen River would also provide horses with a clean, reliable source of water year-round, partially compensating them for the fencing on the river in most areas. However, the proposed locations of these water gaps is generally near and through dense stands of juniper trees, which would limit wild horse use due to the innate fear of predation in those areas. For water gaps to be regularly used, the juniper within the water gaps and along the main access path would need to be removed. The proposed water gaps on the east side of the allotment would provide access to the Donner und Blitzen River; these improvements would have the largest effect on distribution and utilization patterns compared to the effect of other proposed improvements. Throughout the entire allotment, wild horses would have 16 more yearlong water sources (in the form of troughs connected to wells and water gaps) than they currently have available, reducing the possibility of wild horse loss due to drought conditions. Three existing reservoirs would

be maintained and one spring would be developed, all of which would provide additional reliable water sources to wild horses, but these may not be as reliable as troughs and wells during drought years. During drought conditions, wild horses would concentrate at these sources and forage use around these areas would be over-utilized while other areas located further from water or near water sources that had already dried would be unused or under-utilized.

Alternative F: Reduced Grazing with No Development

Under this alternative, there would be no new water sources developed for wild horse use. Therefore, the effects would be the same as under the No Action Alternative. The mandatory reduction in livestock grazing AUMs may result on more forage and water being available for wild horses compared to alternatives A through E. However, this would only occur for alternative A in years when the permittee elects to take AUMs above the average use that has been regularly taken. However, wild horse distribution and utilization patterns would remain limited to areas around existing water sources, and in severe drought years emergency gathers may still be needed. Wild horses would continue to heavily use the riparian areas around springs.

Alternative G: Complete Livestock Removal

Under this alternative, there would be no new water sources developed for wild horse use. Therefore, the effects would be the similar as under the No Action Alternative. The exception would be that permanently removing livestock grazing from the allotment would increase forage and water availability to wild horses by decreasing competition. However, wild horse distribution and utilization patterns would remain limited to areas around existing water sources, and in severe drought years emergency gathers may still be needed. Wild horses would continue to heavily use the riparian areas around springs.

11. Wild and Scenic Rivers and Wilderness

Affected Environment: Wild and Scenic Rivers, and Wilderness

Steens Mountain Wilderness consists of 172,911 acres of BLM-administered lands in two separate pieces. The main portion of the Steens Mountain Wilderness is directly east of the South Steens Allotment and on top of Steens Mountain. The smaller portion of the Steens Mountain Wilderness is known as the Home Creek portion; 16,609 acres of it is located in the southwestern corner of South Steens Allotment, within Home Creek Pasture (see Map 2).

The allotment borders Donner und Blitzen River WSR corridor, with approximately 242 acres of the corridor within the allotment. The river has a wild classification and the outstanding remarkable values (ORVs) identified include scenery, geology, recreation, fish, wildlife, and vegetation. The portion of the Project Area within the main wilderness area and WSR is relatively remote and has undesignated trails along the river, from

recreational use primarily associated with fishing and hunting. This main portion of the wilderness and the WSRs falls within the No Livestock Grazing Area established by the Steens Act.

One exception to the No Livestock Grazing Area is the water gap in the Tabor Cabin area, within Donner und Blitzen WSR corridor and Steens Mountain Wilderness. This water gap was previously on private property, which was exchanged through Title VI of the Steens Act. One element of the land exchange was that Roaring Springs Ranch, Inc., reserved a "nonexclusive easement" to use and maintain "for livestock, wild horse and wildlife watering purposes" the aforementioned water gap. This easement is recognized as a legal use of this portion of the No Livestock Grazing Area for said purposes. While no other portions of Donner und Blitzen River are part of the allotment, only portions of the river are fenced out of the allotment, with the remaining portions relying on topography to keep livestock from the river. Winter weather conditions in the area often damage the fence, resulting in additional areas the livestock may access the river. The fence is maintained multiple times per year, and the river corridor is inspected by horseback to find weak areas and push any livestock that are in the corridor back into the allotment. Livestock, knowing water is available at the river, occasionally find access to the river in the unfenced areas with steeper topography or put pressure on the fence, going through the weak spots, to access the river and utilize it as a water source. This often results in livestock loafing in and foraging on the riparian vegetation until they are discovered and forced out of the corridor.

Wilderness values in Steens Mountain Wilderness are outlined in section 2(c) of the Wilderness Act and are divided into several components including naturalness, opportunities for solitude, primitive and unconfined recreation, and supplemental values which may include values associated with ecological, geological, or other features of scientific, education, scenic, or historic importance. Naturalness refers to an area which “generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable” (BLM Manual 6340). Steens Mountain Wilderness is in a natural condition except for areas containing certain human-made elements (BLM 2005). Opportunities for solitude within the Steens Mountain Wilderness are plentiful because the area features a varied and rugged topography, as well as vegetated creek and canyon bottoms, enhancing the experience of seclusion and remoteness. There is outstanding opportunity throughout the Steens Mountain Wilderness for primitive and unconfined recreation, which includes hiking, backpacking, camping, horseback riding, hunting, fishing, photography, and sightseeing. Supplemental values of wilderness include geology, scenery, vegetation, wildlife, and historic values. Management within the wilderness is centered upon the protection of naturalness and wildness, while providing for public use and primitive recreation in a manner that would preserve wilderness characteristics.

Environmental Consequences: Wild and Scenic Rivers, and Wilderness

Actions Common to all Alternatives:

For the purpose of this analysis the CEAA area for WSRs and wilderness is the Steens Mountain Wilderness and the Donner und Blitzen WSR Corridor. The North Steens Transmission Line Project (EIS DOI-BLM-OR-B060-2010-0035-EIS) and the Echanis wind turbines are RFFAs and would be located approximately 1.5 miles north of the nearest point of Steens Mountain Wilderness. Neither the Echanis Project nor any Project transmission line alternatives would bisect or cross the Steens Mountain Wilderness. The North Steens Ecosystem Restoration Project (2007) would also be a RFFA; however there would be no cumulative effects on WSRs or wilderness from this project since the ROD (2007) does not include treatments within these areas.

Alternative A: No Action

Under this alternative, there would be no changes in grazing management and no new developments built within wilderness or the WSR. There would still be pressure from livestock attempting to get water from Donner und Blitzen River, which is in the wilderness, especially in drought years when many of the existing developments within the adjacent areas become dry. Livestock presence in the No Livestock Grazing area portion of the wilderness may affect recreationists. However, the affects may be positive or negative depending on the person. Livestock grazing in the No Livestock Grazing Area is in violation of the Steens Act, which established the area, and every effort should be made to ensure that it does not occur.

Alternative B: Proposed Action

Under this alternative the permittee would be able to fully use the total permitted AUMs. Since no range improvements are being proposed in the wilderness or WSR corridor and current grazing would continue within the Home Creek portion of the wilderness, there would be no anticipated effects to the Steens Mountain Wilderness. There would be a benefit to the Donner und Blitzen River WSR because there would be less to no pressure by livestock to get water from the river due to the increased number of off-stream watering sources.

Alternative C: Maximum Water Distribution

Under this alternative, effects to wilderness and Donner und Blitzen WSR would be the same as under the Proposed Action, with even less pressure by livestock to access Donner und Blitzen River due to the increased number of off-stream watering sources.

Alternative D: Along Road Development

Under this alternative, the effects to wilderness and Donner und Blitzen WSR would be the same as under the Proposed Action.

Alternative E: Edge Development

This alternative would authorize livestock watering in the No Livestock Grazing Area of Steens Mountain Wilderness. Construction of three water gaps would occur along Donner und Blitzen River and within the No Livestock Grazing Area.

Delivery of fence materials and construction of the water gap fences would be done with pack animals and hand tools. Naturalness would be reduced due to the construction of the new fences in the corridor. There could be temporary, short-term (days) disturbance to solitude and recreational use from noise during construction. The structures are not expected to restrict water movement, so the free-flowing character of the river segments would be maintained. Motorized access for monitoring and maintenance of the structures (e.g., replacing individual components or clearing debris) would not be allowed, so impacts to wilderness values associated with these activities would not occur. However, if major reconstruction of the structures is needed, impacts similar to those associated with construction would be expected.

Following construction, water gaps would be observable as unnatural features in the wilderness and WSR. Water gaps would impede visitor access immediately along the river, requiring visitors to climb over or hike around the structures, but encounters should last no more than several minutes as visitors approach and pass the structures.

Benefits to wilderness values include the ability of wild horses, which are a special feature, to use the proposed water gaps for water, attracting them to the wilderness portion of the HMA. However, these water gaps would also allow livestock to water within the wilderness and WSR, which may reduce the outstanding solitude and recreational opportunities to some visitors. Providing three additional areas where livestock would be allowed to access the river would reduce some pressure from livestock trying to access the river in other areas. The lack of off-stream developments within the use area of the river would limit this benefit, and some level of livestock pressure along the river fences would still occur.

Alternative F: Reduced Grazing with No Development

Under this alternative the number of AUMs on the grazing term permit would be reduced. The level of authorized use under this alternative would be similar to what has occurred in the past by the permittee voluntarily using fewer AUMs than permitted. Therefore, these changes to grazing management would maintain current effects on the wilderness values of Steens Mountain Wilderness. No proposed range improvements would be constructed under this alternative and no changes to wilderness values would occur. There would still be pressure from livestock to go to Donner und Blitzen River for water, especially in drought years when many of the existing developments go dry.

Alternative G: Complete Livestock Removal

Under this alternative no livestock grazing would occur within the allotment. No proposed range improvements would be constructed under this alternative and no direct changes to wilderness values would occur. However, since no livestock would be present, there would be no pressure on the river fences and livestock would not enter the No Livestock Grazing Area from this allotment. Since livestock would not be allowed to graze within the allotment, the Home Creek Portion of the Steens Mountain Wilderness would effectively become part of the No Livestock Grazing Area. Wild horse concentration around existing water sources would continue in the Home Creek Portion of the wilderness .

12. Wilderness Study Areas

Affected Environment: Wilderness Study Areas

There are three “remnant” WSAs within South Steens Allotment: Blitzen River WSA, South Fork Donner und Blitzen River WSA, and Home Creek WSA, with 23,415 acres, 27,904 acres, and 1,178 acres within the allotment, respectively (see Map 2). Each one of these WSAs was reduced in size due to the Steens Act of 2000.

Wilderness characteristics of the three WSAs, summarized below, are from the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980). Since the Steens Mountain Wilderness designation, the remnant WSAs have not been re-inventoried to determine what wilderness characteristics still exist. Therefore, current wilderness characteristics for each WSA may be different from described, due to the modification of the shape and size of each WSA.

Wilderness characteristics include are naturalness, outstanding opportunities for solitude, outstanding opportunities for primitive and unconfined recreation, and the presence of supplemental values (BLM Manual 6330). The size of the area must also be at least 5,000 acres (with some exceptions). If an area is found to have naturalness, outstanding opportunities for solitude or outstanding opportunities for primitive and unconfined recreation, and meets the size requirement, the area is determined to have wilderness characteristics. Supplemental values are not required for wilderness characteristics to be present, but add to the overall wilderness values of the area. The findings of the inventories for Oregon are found in the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980). Once designated as a WSA, an area is managed to preserve its wilderness values until Congress either releases it from WSA status or designates it as Wilderness. WSA management follows the BLM Manual 6330 – Management of Wilderness Study Areas. The following definitions are from the BLM Manual 6330.

Naturalness refers to an area that "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable."

Solitude is defined as "the state of being alone or remote from habitations; isolation. A lonely, unfrequented, or secluded place."

Primitive and Unconfined Recreation is defined as non-motorized and undeveloped types of outdoor recreation activities.

Supplemental Values are listed in the Wilderness Act as "ecological, geological, or other features of scientific, educational, scenic, or historical value."

Blitzen River WSA (2-86E)

Prior to the Steens Act the Blitzen River WSA was 58,560 acres, with 720 acres of private land and 520 acres of state land according to the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980). Currently, Blitzen River WSA is approximately 31,901 acres (23,415 acres are within the South Steens Allotment) and is in a generally natural condition.

Note: Wilderness characteristics of Blitzen River WSA summarized below (italicized) are from the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980), pages 188-190. Current wilderness characteristics, if still present, may be different from described.

This subunit primarily consists of the high desert plateau which forms the western slope of the Steens Mountain. The dominant feature within the subunit is the Donner und Blitzen River. This canyon ranges from one-fourth to one-half mile wide, is approximately ten miles long, and reaches 700 feet in depth as it runs from north to south across the subunit. West of the Donner und Blitzen River the topography consists of rolling hills and small rimrock edged ridges. To the east of the river the plateau rises sharply and the topography becomes much more pronounced. The vegetation is also varied, with stands of juniper occurring on the west side, and quaking aspen, mountain mahogany and mountain meadows occurring frequently on the east side. The canyons contain riparian plant common throughout the subunit.

Naturalness: Approximately 6,500 acres do not appear to be in a natural condition because they are affected by substantially noticeable imprints of man including a powerline (2,850), a concentration of reservoirs (3,510 acres), and a crested wheatgrass seeding (140 acres). The remainder of the subunit contains 20 reservoirs, 12 miles of fence, and approximately 35 miles of vehicle ways. These latter developments are well dispersed, overgrown, or otherwise screened so as not to appear substantially noticeable.

Note: Current unnatural features remaining within the remnant Blitzen River WSA consist of 17 reservoirs, a developed spring, 14 fences totaling 23.5 miles, a corral and 34 miles of ways. Approximately 3,115 acres (9.8 percent) of the remnant WSA is currently influenced by these unnatural features. Portions of this area have been identified as crucial deer habitat and sage-grouse leks.

<u>Solitude:</u> Because of the topographic and vegetative screening available within much of the area, the subunit provides many places for visitors to find a secluded spot. These factors, combined with the area's relatively large size and compact shape, create outstanding opportunities for solitude.

<u>Primitive Recreation:</u> This subunit provides opportunities for hiking, backpacking, viewing wildlife, sightseeing, photography, hunting, and fishing. Because of the quantity and quality of the recreational activities offered within this area, the subunit has outstanding opportunities for the pursuit of primitive and unconfined types of recreation.

<u>Supplemental Values:</u> The subunit contains a large concentration of raptor nesting sites within the rocky gorges of the canyons. Portions of the area have been identified as crucial deer habitat and sage-grouse booming grounds. Cultural resources of various types have also been identified within the subunit.

Note: Though not specifically mentioned, wild horses are present in this WSA and are generally considered a special feature that enhances the wilderness experience of some visitors. The WSA also provides important winter range habitat for elk. Most of the spectacular scenery and topography lies in the portion of the WSA that is now part of Steens Mountain Wilderness.

South Fork Donner und Blitzen River WSA (2-85G)

Prior to the Steens Act the South Fork Donner und Blitzen River WSA was 35,870 acres with 1,280 acres of private inholdings and 1,280 acres of State inholdings according to the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980). Currently, South Fork Donner und Blitzen River WSA is approximately 27,968 acres (27,904 acres are within the South Steens Allotment).

Note: Wilderness characteristics of South Fork Donner und Blitzen River WSA summarized below (italicized) are from the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980), pages 183-187. Current wilderness characteristics, if still present, may be different from described.

The area is characterized by gently rolling topography which gradually rises in elevation as one travels eastward from approximately 5,600 to 6,000 feet. The Donner und Blitzen River and Indian Creek have formed predominant drainages in the eastern portion of the area. The rest of the area has shallow intermittent streams. The general vegetative cover for the subunit is sagebrush, grass, and juniper. The perennial drainages hold water tolerant species such as willow and alder.

<u>Naturalness:</u> Developments include six reservoirs (five of these are along the western boundary road); 21 miles of ways found throughout the area…along the northern boundary road. In general, the developments are sufficiently dispersed throughout the subunit so that the rolling topography and the sage/juniper vegetative cover adequately screens and makes the developments substantially unnoticeable.

Note: Current unnatural features remaining within the remnant WSA consist of 17 reservoirs, one dugout, 28.2 miles of ways, four fences totaling 9.4 miles, and the Weaver Place. It is estimated approximately 2,636 acres (9.4 percent) of the remnant WSA is currently influenced by these unnatural features.

Solitude: *The average east-west length of the area is seven and one-half miles and the average north-south breadth is five and one-half miles. The gradually inclining topography and its accompanying low sagebrush vegetation offer limited screening in the western two-thirds of the area. However, the eastern one-third of the subunit with the Donner und Blitzen and Deep Creek drainages, ridge topography and juniper cover offers outstanding opportunities for screening visitors from each other. It is possible to find a secluded spot in much of the subunit because of the topographic and vegetative screening. The unit offers an outstanding opportunity for solitude.*

Primitive Recreation: *The unit offers opportunities for sightseeing, horseback riding, hiking, backpacking, hunting, and fishing. The user has ample opportunities to experience outstanding primitive and unconfined recreation within the area, especially fishing, backpacking, and hiking within the eastern portion.*

Supplemental Values: *Evidence of cultural resources has been found within this area.*

Note: Though not specifically mentioned as a special feature, wild horses are present in this WSA and are generally considered a special feature that enhances the wilderness experience of some visitors. The WSA also provides important winter range habitat for elk.

Home Creek WSA (2-85H)

Prior to the Steens Act the Home Creek WSA was 26,590 acres with 640 acres of State land inholdings and 80 acres of private land inholdings according to the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980). The majority of the original WSA has been incorporated into the Steens Mountain Wilderness. Currently, Home Creek WSA is approximately 1,178 acres (entirely within the South Steens Allotment). This WSA no longer meets the required 5,000 acres for a WSA, although it meets a size exception by being contiguous with the Steens Mountain Wilderness. The WSA is bordered by private lands to the south, Lauserica Road to the north and east, and a primitive route to the west. The remnant portion of Home Creek WSA is bordered by the Lauserica Road to the north and east, an unnamed route to the west, and private land to the south. The Steens Mountain Wilderness (Home Creek portion) is west of the unnamed route that makes up the remnant WSA's eastern boundary.

Note: Wilderness characteristics of Home Creek WSA summarized below (italicized) are from the BLM Oregon and Washington *Final Intensive Inventory Decisions* (1980), pages 184-187. Current wilderness characteristics, if still present, are different from described.

The area is characterized by a steep rim on its most west edge and gradual south and eastward inclining topography. The elevation varies from 4,500 feet to over 6,000 feet. The western rim elevation is from 5,200 to 5,400 feet. From the rim area the elevation changes gradually (600 to 800 feet) through the rest of the subunit. Three Mile Creek, Home Creek, Dry Creek, and Roaring Springs Canyon are dominant east/west drainage features. Home and Three Mile Canyons contain perennial creeks. Grass, sagebrush, and juniper are the dominant vegetative species, with willow, alder, and other water dependent plant species found in the riparian zones along the creeks.

Note: The current remnant Home Creek WSA contains only two intermittent streams and none of the creeks or canyons mentioned above. The elevation currently ranges from 5,880 to 6,040 feet.

<u>Naturalness:</u> *The subunit contains six reservoirs scattered along the eastern boundary road, four miles of ways, and 12 miles of fenceline just inside the midwestern and mideastern boundary of this area. These developments do not affect the general natural appearance of the subunit because they are sufficiently dispersed throughout the subunit making the area seem generally unaffected by the works of man.*

Note: Currently, five reservoirs and a one mile-long way remain within the remnant Home Creek WSA. It is estimated approximately 162 acres (13.9 percent) of the remnant WSA is currently influenced by these unnatural features.

<u>Solitude:</u> *The average east-west breadth of the subunit is five miles and the average north-south length is six miles. The canyon areas offer outstanding opportunities to find a secluded spot, even though they comprise a relatively small part of the total subunit. The area above them is sloping to flat and is vegetated with sagebrush and scattered juniper and would offer limited opportunities for solitude. The subunit does offer outstanding opportunities for solitude.*

Note: The current remnant WSA does not contain any of the canyons that offer outstanding opportunities for solitude. Therefore, the remnant WSA relies on the adjacent wilderness area to meet this criterion.

<u>Primitive Recreation:</u> *The subunit offers opportunities for hiking, photography, sightseeing, backpacking, horseback riding, fishing and hunting. The opportunities for hiking, backpacking, fishing, and sightseeing are outstanding especially within Dry and Home Creek Canyons.*

Note: The current remnant WSA does not contain any of the creeks or canyons previously mentioned. Currently, the recreation opportunities within this remnant WSA include hiking, photography, backpacking, horseback riding, and hunting, but there are no features to make these opportunities outstanding.

<u>Supplemental Values:</u> *Evidence of golden eagle and prairie falcon nesting areas have been found within the area.*

Note: Though not specifically mentioned, wild horses are present in this remnant WSA and are generally considered a special feature that enhances the wilderness experience of some visitors.

Environmental Effects: Wilderness Study Areas

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for WSAs is the Blitzen River, South Fork Donner und Blitzen River, and Home Creek WSAs. Past and present actions, such as those described in *Affected Environment*, have influenced the existing environment within the CEAA. Past and RFFAs in the CEAA that may contribute to cumulative effects to Wilderness Study Areas include hunting and other recreational pursuits which increase use in the area, range improvements, roads, and the North Steens Ecosystem Restoration Project. Depending on the type of treatments implemented within the WSAs under the North Steens Ecosystem Restoration Project, there may be some short-term (years) disturbance to the appearance of naturalness in areas treated for juniper encroachment. However, these treatments are expected to help restore the natural fire regime and protect ecological integrity in the WSAs and the CMPA as a whole over the long-term (decades) as provided for under the Steens Act, enhancing wilderness characteristics. There are no other known reasonably foreseeable future actions that would contribute to effects to wilderness values in the WSAs. Past and RFFAs that have affected Wilderness Study Areas in the CEAA are found in Table 31.

Table 31: Wilderness Study Areas Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	37	---	---	Unknown
Wildfires	6041.4	---	6	Unknown	---	Unknown
Known Primitive Campsites	---	---	14	---	---	Unknown
Trails	---	13.9	---	---	None	---
Open Roads	---	100.3	---	---	None	---
Closed Roads	---	34.2	---	---	None	---
Fences	---	58.3	---	---	None	---
Pipeline	---	0.5	---	---	None	---
Exclosures	2.6	---	1	None	---	None
Water Developments	---	---	69	---	---	None
Gravel Pit	125.7	---	1	None	---	None
Cutting	384.8	---	5	None	---	None
Piling	293.9	---	4	None	---	None
RX Burning	9985.0	---	16	100.3	---	3
Seeding	100	---	1	5	---	1

Effects Common to All Action Alternatives:

The general effects to naturalness from each type of development isdescribed below.

Wells and Tanks: The permanent development component observable aboveground after installation of wells would be the top portion of the well pipe (12 to 36 inches in

aboveground height) and the power source. The rest of the well pipe would be below ground. Any storage tanks associated with the well would also be buried. There would be less than 0.25-acre of soil and vegetation disturbance and after construction these areas would be rehabilitated. Seedings of native species and rock placement would help promote a more natural appearance within 3 to 5 years.

The viable options for power include solar panels and generators. If a portable generator was used to run the well pump, it would only be present during the period the well is in operation each year (approximately 2 months) between April and October, though it may be in operation longer in drought years if it is used to provide water for wild horses. This time period is when Steens Mountain area is most accessible to visitors.

Two proposed wells are adjacent to existing roads and three of the wells are along closed ways. Up to 10'x10'x36" of soil and vegetation may be disturbed if a pit was constructed to conceal the generator and reduce some noise pollution. Two of the proposed wells the pit would be within 30 feet of an existing road, or located in an area already disturbed by either storage tank placement or well construction. The access for three other proposed wells along closed ways would need to be improved to allow the drill rig entrance and some level of maintenance would be needed for motorized access the closed ways to install and remove the generator every year.

Total soil and vegetation disturbance for the generator pit would be less than 0.01 acre. The generator and trailer would be relatively small in size (similar to the bed of a standard-sized pickup) and covered to protect the generator and help buffer the sound of the motor. Depending on water use, the generator is expected to run 4 to 16 hours a day; however, the use of a level switch in a storage tank may reduce the time the generator needs to operate. Topography, vegetation, and wind would also help muffle the sound of the generator. It is not expected the generator would be heard for a distance of greater than 0.25 mile from the generator. When a generator is used, the area affected by sight and sound would be approximately 126 acres.

If power is provided by solar panels, it is expected no more than 0.25-acre of soil or vegetation disturbance would be associated with construction. These facilities would be observable year-round. Solar panels would stand out less than windmills, since they would be constructed as close to the ground as possible and fenced for protection, while windmills would have to be tall enough to intercept a maximum level of wind. The estimated area of visual disturbance for windmills would vary, depending on height, and topographic and vegetative screening, which ranges from 56 to 2,010 acres. Due to topographic screening, and the use of reduced glare solar panels, solar panels are not expected to be seen for a distance of greater than 0.25 mile from the panel (56 acres). The presence of topographic and vegetative screening would allow the visual disturbance area to be on the low end of the range.

The area affected by noise disturbance from generators would be similar to visual impacts of solar panels. Generators would be a temporary facility, present less than half the year and smaller in overall size.

If the WSA in which wells and tanks were located were designated as Wilderness, motorized access would not be required for maintenance; however, they would be expected to be abandoned if pumps needed replacement.

Pipelines: Impacts to soils, vegetation, and naturalness are expected to be minimal given all of the proposed pipelines would be located along existing roads, ways or closed roads. Some ways are currently not open to the public for use and are not shown on maps, but are available for administrative uses. In addition, the pipelines would be buried (unless limited by rock), with only occasional vents and valve boxes being visible above ground (4-6 inches). For each mile of pipeline there would be approximately one acre of ground disturbance; however, since pipelines would be placed along existing roads, ways or closed roads, a portion of this disturbance would take place in areas previously disturbed by the routes. The area disturbed by pipeline installation would be seeded, with native species in areas that had vegetation prior to pipeline installation, and rocks disturbed from the site would be placed in a manner that appears natural to break up the linear pattern of disturbance, as long as they would not reduce accessibility on the route. Following this rehabilitation, the disturbed area would be expected to appear natural within 3 to 5 years. Maintenance of pipelines, while more difficult, could be done using pack animals and without motorized equipment if the WSA was designated as wilderness in the future, though they may also be abandoned.

Troughs: Vegetation disturbance associated with construction would be no more than 0.05 acre for each trough, and disturbance caused by livestock and wild horse concentration would be approximately two acres for each trough. These areas would receive concentrated grazing and soil disturbance and naturalizing the area with vegetation may be difficult due to the increased level of use. To the extent possible, troughs would be located in a manner utilizing vegetative and topographic screening. As troughs would be partially buried, even with limited topographic screening, troughs would not be expected to be identifiable from a distance greater than $1/6^{th}$ of a mile. If the area is designated as wilderness, troughs could be maintained without motorized equipment. However, motorized equipment would be required to replace troughs or remove them.

Reservoir Construction: Vegetation disturbance associated with construction and concentrated use by livestock and wild horses around each reservoir would be approximately two acres, with actual construction resulting in less than one acre of disturbance. However, reservoirs would be located in drainages, which often have good topographic and vegetative screening, so reservoirs are not expected to be observable as a man-made structure until a visitor came into direct contact with them. Establishment of unauthorized motorized routes is not expected because any cross-country travel by motorized equipment for reservoir construction would be conducted to minimize soil and vegetation disturbance and any tracks observable near existing roads and ways would be raked and rehabilitated. Monitoring of the reservoirs would occur by primitive methods. Maintenance of reservoirs generally requires motorized equipment; however, most reservoirs can function for decades without any maintenance. If the WSA in which a reservoir is located is designated as wilderness, the application of bentonite, if needed,

could be packed in and spread by hand, and no maintenance requiring motorized equipment would occur.

Maintenance of Existing Reservoirs: Maintained reservoirs would be cleaned out, making them deeper, rather than wider or longer in size. Bentonite or another water-holding soil would be added to the bottom of the reservoir to increase water holding ability. Structural weaknesses (usually seen in the dam), would be fixed; this may require using soil and rock from nearby the reservoir. The additional area disturbed (outside the existing reservoir footprint) is not expected to be larger than 0.25 to 0.5 acre. Disturbance is not expected to influence an area greater than that which occurred during the original reservoir construction. Most existing reservoirs are adjacent or close to existing roads or ways, so cross-country travel by equipment is expected to be minimal and establishment of new routes would not occur as any tracks visible from currently open roads would be rehabilitated. Maintenance of reservoirs generally requires motorized equipment; however, most reservoirs can function for decades without any maintenance. If the WSA in which a reservoir is located is designated as wilderness, the application of bentonite, if needed could be packed in and spread by hand, and no maintenance requiring motorized equipment would occur.

Reservoir Abandonment: Reservoirs that would be abandoned would receive no maintenance or monitoring. In time, as these reservoirs stop working, native vegetation would become established and overtime, these reservoirs would appear more natural to the casual observer. In the long-term (decades) wilderness values would be enhanced in these areas. As they would hold little to no water, the disturbance around the reservoir caused by concentrated grazing would decrease. No motorized equipment would be utilized in the abandonment of reservoirs.

Spring Development/Protection: Each spring exclosure would be approximately two to six acres (on BLM-managed land). There would be soil and vegetative disturbance caused by exclosure fence construction. However no blading or scraping along the fences would be allowed and rocks and vegetation would only be removed in areas where they directly impede fence construction, such as the placement of a post. Riparian exclosures would have the same level of disturbance as spring protection exclosures. For each mile of fence constructed, up to 60 acres of naturalness may be affected due to fence visibility. Since less than 0.5 mile of fence would generally be constructed, on BLM-managed land, per spring exclosure, 30 acres of visual disturbance would occur. This would be used to calculate the affected area of naturalness when no development is occurring. For spring development, disturbance to soil and vegetation would occur where the spring box, pipeline, and trough(s) are installed, affecting less than 1 acre. The pipeline would be buried below ground and would not be observable after installation. If metal troughs are used, they would be follow PDE to blend in with the surrounding area, making it less observable, except when in close proximity. Vegetative and topographic features should help screen the fence from view except when a direct encounter occurs. The use of green posts and barbed wire would help camouflage the fence and would create less visual disturbance than fences using other materials. However, wood fences would be expected to have a more natural appearance and are more aesthetically pleasing

than barbed wire fences; wood fences would be more noticeable at a distance. If the area in which a spring is located is designated wilderness, maintenance could be done using pack animals and by hand. However, if a trough associated with the spring development needs to be replaced or removed, this would require motorized access.

Fence Construction/Removal: Soil and vegetation disturbance would be expected from construction or removal of fences; however no blading along the fence would be allowed in a WSA. Any area needing spot removal of rock or vegetation would be expected to return to a natural appearance within 3 to 5 years. Cross-country travel would not be allowed by motorized vehicles and visual impacts of the proposed fences would be along WSA boundaries, adjacent to existing roads. Up to 60 acres of naturalness would be affected for each mile of fence constructed. If the area in which a fence is located is designated wilderness, maintenance could be done using pack animals and by hand. Negligible disturbance would occur with fence removal using pack animals.

New developments proposed as part of this project occurring on BLM-administered or private lands outside but near the WSA would be expected to have some influence on naturalness. These effects would be limited as most developments would occur along the outer edges of the WSAs. The acre-affected estimates shown in the tables under each alternative include those areas affected not only by soil and vegetation disturbance, but also by the visual and noise effects as described above for the developments. Following rehabilitation, most acres estimated to be affected by developments would still have a generally natural appearance with shrubs and some grasses present, but would have some visual or noise disturbance associated with the presence of the improvement. Therefore, it is estimated that following successful rehabilitation the numbers in the tables would be overestimates of the areas affected by the development.

No changes to the types (e.g., hiking, horseback riding, hunting, etc.) of recreation opportunities available in any of the WSAs are expected. If encounters with visitors occur during installation of the proposed developments, there would be some temporary and short-term (days) loss of solitude and disturbance to recreational activities in the immediate area.

Most developments are located away from known areas of prolonged visitor use (e.g., campsites, trails). As a result, visual or noise disturbance associated with the presence of proposed developments to visitor solitude or their recreational experience is expected to be short term (minutes) and be limited to a visitor's direct encounter with a development as they pass by on foot, horseback, or motor vehicle.

Some visitor's perception of solitude and recreation experiences within all WSAs would be affected by the increased presence of livestock and wild horses, in areas they have not commonly occupied following the Steens Act, around the new water developments. Depending on the individual’s values, this affect may be negative or positive. In addition, it is expected livestock would be better distributed, in smaller groups over entire pastures, rather than concentrated in larger numbers around a few water sources. This may decrease possible negative perception if a visitor feels large groups of livestock are more disturbing than small groups. Even with the presence of livestock, some visitors

may find the areas around water developments desirable due to the increased chance of observing wildlife and wild horses.

With the exception of reservoirs, all proposed developments would be considered to be temporary facilities, and even reservoirs can be removed or abandoned and over the long-term (decades) return to natural, unnoticeable conditions. Monitoring and maintenance of the proposed developments would be done using motorized vehicle on existing roads and ways, or conducted by horseback or foot. Motorized equipment would be used in maintenance of reservoirs on a very infrequent (10 to 20 years) basis. Effects associated with replacement of any developments would be infrequent (10 to 20 years) and would be the same as that described for construction of the development.

To the extent possible, nearby juniper trees that help screen the proposed developments or dispersed campsites would be left intact when juniper treatments occur under the North Steens Ecosystem Restoration Project ROD.

Alternative A: No Action Alternative

No changes to naturalness, solitude, primitive and unconfined recreation, or supplemental values within the existing Blitzen River, Home Creek, and South Fork Donner und Blitzen River WSAs are expected. Current impacts include surface disturbance to the uplands and negative effects to solitude and primitive and unconfined recreation within the WSAs from wild horses and livestock concentrating around limited, existing facilities, would continue. Livestock and wild horses would continue to have limited access to areas outside of their use areas. In addition, current impacts include surface disturbance to the riparian area, negative effects to solitude and primitive and unconfined recreation within the Steens Mountain Wilderness from wild horses and livestock as well as incursions into the Wild & Scenic River, would continue.

Alternative B: Proposed Action

Table 32 summarizes the estimated area where naturalness would be influenced by developments proposed under this alternative (disturbance amounts for proposed improvements are discussed under the Effects Common to All Alternatives section above). In many cases, the disturbance associated with wells, pipelines, troughs, and spring developments, may overlap, resulting in the total disturbance being overestimated.

Table 32: Estimate of Acres in each WSA affected by Alternative B

WSA	Proposed Improvement	#/Length	Acres Affected per Development or Length of Development	Total Acres Affected	% of WSA
Blitzen River (31,901 acres)	Existing Reservoir Maintenance	1	0.1	0.1	0.0003
	New Reservoirs	3	31	93	0.29
	Spring Development	1	30	30	0.09
	Troughs	1	31	31	0.10
Blitzen River WSA Total				**154.1**	**0.48**
Home Creek (1,165 acres)	Existing Reservoir Maintenance	2	0.1	0.2	0.02
Home Creek WSA Total				**0.2**	**0.02**
South Fork Donner und Blitzen (27,968 acres)	Existing Reservoir Maintenance	6	0.1	0.6	0.002
	New Reservoirs	6	31	186	0.67
	Spring Development	1	30	30	0.11
	Spring Protection	2	30	60	0.21
	Troughs	1	31	31	0.11
	Route Realignment - New	1 - 250 Feet	0.03/ft.	7.5	0.03
	Route Realignment - Abandoned[56]	1 – 200 Feet	-0.03/ft.	-6.0	-0.02
	Exclosure	1 - 0.3 Mile	60/mile	18	0.06
South Fork Donner und Blitzen WSA Total				**327.1**	**1.17**

[56] Since this portion of the old route would be abandoned and allowed to naturalize in the short-term (1-5 years), it has a positive effect on naturalness, as seen by the negative acres of disturbance.

The total area influenced by existing and proposed developments in Blitzen River WSA would be approximately 10.25% (3,269 acres) for this alternative. The total area influenced by existing and proposed developments in Home Creek WSA would be approximately 162 acres (13.92%), and in South Fork Donner und Blitzen WSA would be 2,002 acres (10.59%). These values include all existing and proposed water developments, exclosures, fences, and pipelines; however, they do not take into account the acres of restoration that would be removed in the future following reservoir abandonment and naturalization.

The area influenced by existing unnatural features in Home Creek WSA would not be increased following implementation of the proposed action. In comparison, Blitzen River and South Fork Donner und Blitzen WSAs would still have less area influenced by unnatural features than two nearby WSAs (Bridge Creek and Stonehouse WSAs), both of which had approximately 12 percent of total area influenced by unnatural features at the time they were established (Volume I of the Oregon BLM Wilderness Study Report, 1991). While the total area influenced by developments appear to be staying at the same

level within the Home Creek WSA as it would be prior to the proposed developments, the total affected area would actually decrease. Over time, the three abandoned reservoirs would appear more natural and overall wilderness values would be enhanced. The same thing would happen within South Fork Donner und Blitzen WSA; however, in this WSA, the abandonment of six reservoirs would just offset the construction of new reservoirs, decreasing the actual net acres of naturalness affected from what is predicted within the table above, making the total acres affected of existing and proposed improvements slightly lower.

Under this alternative, there would be ecological benefits associated with better distribution of water resulting in better distribution of livestock and wild horses throughout the allotment. Following the construction of the water developments, health and vigor of key forage species and other upland grasses would be maintained or in some areas improved due to decreased levels of heavy grazing around the previously limited reliable water sources and grazing of areas that have not been grazed regularly (following the removal of the Donner und Blitzen River from within the allotment) (see Vegetation and Grazing Management & Rangelands sections for further discussion on ecological benefits).

The more reliable water sources available for watering, the less time livestock and wild horses would spend at any given water source, reducing the average level of disturbance around each water source. The spring developments/exclosures would protect riparian areas by eliminating hoof-shear and livestock and wild horse grazing so riparian vegetation can achieve desired potential (PFC), which would improve the habitat for riparian-associated wildlife and avian species. By protecting riparian areas, these areas would increase in naturalness.

At the proposed spring S3, the route realignment would result in some soil and vegetation disturbance related to clearing of rocks and vegetation, as needed. The segment to be realigned is short (approximately 250 feet), would not be bladed, would remain naturally surfaced, and would be offset by a similar length of former vehicle route segment being closed. As a result, overall appearance of the route as a whole would not be expected to change or become more noticeable. Overall, this realignment would enhance wilderness values by moving the route a short distance to avoid and help protect a sensitive spring area.

While the route realignment and spring development are unnatural features, the overall naturalness of the riparian areas would be enhanced by allowing them to reach PFC. Allowing the riparian areas to achieve PFC would also benefit supplemental features such as sage-grouse and other wildlife species.

The effects of other developments, individually, can be found under Effects Common to all Action Alternatives section above.

Alternative C: Maximum Water Distribution

Table 33 summarizes the estimated area where naturalness would be influenced by developments proposed under this alternative (disturbance amounts for each proposed improvement are discussed under the Effects Common to All Alternative section above). In many cases, the disturbance associated with wells, pipelines and troughs, and spring developments and troughs, may overlap, resulting in the total disturbance being overestimated.

Table 33: Estimate of Acres in each WSA affected by Alternative C

WSA	Proposed Improvement	#/Length	Acres Affected per Development or Length of Development	Total Acres Affected	% of WSA
Blitzen River (31,901 acres)	Existing Reservoir Maintenance	1	0.1	0.1	0.0003
	New Reservoirs	6	31	186	0.58
	Spring Development	1	30	30	0.09
	Well	1	56	56	0.18
	Pipeline	4 – 4.7 miles	0.97/mile	4.56	0.01
	Troughs	7	31	217	0.68
Blitzen River WSA Total				**493.7**	**1.55**
Home Creek (1,165 acres)	Existing Reservoir Maintenance	2	0.1	0.2	0.02
Home Creek WSA Total				**0.2**	**0.02**
South Fork Donner und Blitzen (27,968 acres)	Existing Reservoir Maintenance	10	0.1	1.0	0.004
	New Reservoirs	11	31	341	1.22
	Spring Development	3	30	90	0.32
	Well	3	56	168	0.60
	Pipeline	3 – 4.9 miles	0.97/mile	4.8	0.02
	Troughs	7	31	217	0.78
	Route Realignment - New	1 – 250 Feet	0.03/ft.	7.5	0.03
	Route Realignment - Abandoned[57]	1 – 200 Feet	-0.03/ft.	-6.0	-0.02
South Fork Donner und Blitzen WSA TOTAL				**823.3**	**2.94**

[57] Since this portion of the old route would be abandoned and allowed to naturalize in the short-term (1-5 years), it has a positive effect on naturalness, as seen by the negative acres of disturbance.

The total area influenced by existing and proposed developments in Blitzen River WSA would be approximately 3,609 acres (11.3%) for this alternative. The total area influenced by existing and proposed developments in the Home Creek WSA would be approximately 162 acres (13.9%), and in the South Fork Donner und Blitzen WSA would be 3,459 acres (12.4%). These values include all existing and proposed water

developments, exclosures, fences, and pipelines. However, they do not take into account the acres of restoration following reservoir abandonment and naturalization. The area influenced by existing unnatural features in Home Creek WSA would not be significantly increased following implementation of Alternative C. In comparison, the Blitzen River WSA would have about the same number of acres influenced by unnatural features as the two nearby WSAs (Bridge Creek and Stonehouse WSAs), both of which have approximately 12% of total area had influenced by unnatural features at the time they were established (Volume I of the Oregon BLM Wilderness Study Report, 1991).

While the total area influence by developments appear to be staying at the same level within the Home Creek WSA as it would be prior to the proposed developments, the total affected area would actually decrease. Over time, the three abandoned reservoirs would appear more natural and overall wilderness values would be enhanced. The same thing would happen within the South Fork Donner und Blitzen WSA; however, in this WSA, the abandonment of five reservoirs would just offset the construction of new reservoirs, decreasing the actual net acres of naturalness affected from what is predicted within the table above, making the total acres affected of existing and proposed improvements slightly lower.

Under this alternative, the ecological benefits associated with better distribution of water and, therefore livestock and wild horses, throughout the allotment would be similar to the Proposed Action. However, due to the increased number of developments under this alternative as compared to the proposed action, the ecological benefits to the area within the WSAs would be greater due to more even distribution. The effects of the route realignment at S3 would be the same as under the proposed action. The effects of other developments, individually, can be found under Effects Common to all Action Alternatives section above.

Alternative D: Along Road Development

Table 34 summarizes the estimated area where naturalness would be influenced by developments proposed under this alternative (disturbance amounts for each proposed improvement are discussed under the Effects Common to All Alternative section above). In many cases, the disturbance associated with wells, pipelines and troughs, and spring developments and troughs, may overlap, resulting in the total disturbance being overestimated.

Table 34: Estimate of Acres in each WSA affected by Alternative D

WSA	Proposed Improvement	#/Length	Acres Affected per Development or Length of Development	Total Acres Affected	% of WSA
Blitzen River (31,901 acres)	New Reservoirs	1	31	31	0.10
	Spring Protection	1	30	30	0.09
	Well	1	56	56	0.18
	Pipeline	3 – 3.8 Miles	0.97/mile	3.7	0.01
	Troughs	5	31	155	0.49
Blitzen River WSA Total				**275.7**	**0.86**
Home Creek (1,165 acres)	Existing Reservoir Maintenance	1	0.1	0.1	0.009
Home Creek WSA Total				**0.1**	**0.009**
South Fork Donner und Blitzen (27,968 acres)	Existing Reservoir Maintenance	4	0.1	0.4	0.001
	Spring Development	2	30	30	0.11
	Spring Protection	1	30	30	0.11
	Well	3	56	168	0.60
	Pipeline	6 – 6.5 Miles	0.97/mile	6.3	0.02
	Troughs	7	31	217	0.78
	Fence Removal[58]	1 - 2.1 Miles	-60/mile	-126	-0.45
	Fence Construction	1-3.0 Miles	60/mile	180	0.64
	Route Realignment - New	1 – 250 Feet	0.03/ft.	7.5	0.03
	Route Realignment - Abandoned[59]	1 – 200 Feet	-0.03/ft.	-6.0	-0.02
South Fork Donner und Blitzen WSA Total				**507.2**	**1.81**

[58] Since fence removal would make the area appear natural in the short-term (<2 years), it has a positive effect on naturalness, as seen by the negative acres of disturbance.
[59] Since this portion of the old route would be abandoned and allowed to naturalize in the short-term (1-5 years), it has a positive effect on naturalness, as seen by the negative acres of disturbance.

The total area influenced by existing and proposed developments in Blitzen River WSA would be approximately 10.6% (3,391 acres) for this alternative. The total area influenced by existing and proposed developments in the Home Creek WSA would be approximately 162 acres (13.9%), and in the South Fork Donner und Blitzen WSA would be 3,143 acres (11.2%). These values include all existing and proposed water developments, exclosures, fences, and pipelines. However, they do not take into account the acres of restoration that would occur in the future following reservoir abandonment and naturalization. The area influenced by existing unnatural features in Home Creek WSA would not be significantly increased following implementation of this alternative. In comparison, the Blitzen River WSA would have about the same number of acres influenced by unnatural features as the two nearby WSAs (Bridge Creek and Stonehouse WSAs), both of which approximately 12 percent of total area had influenced by unnatural

features at the time they were established (Volume I of the Oregon BLM Wilderness Study Report, 1991). While the total area influenced by developments appear to be staying at the same level within the Home Creek WSA, as it would be prior to the proposed developments, it is actually expected that the total affected area would decrease, and naturalness would increase within this WSA in response to the abandonment of a reservoir, slightly decreasing the actual net acres of naturalness affected from what is predicted within the table above. The same thing would happen within the South Fork Donner und Blitzen WSA; however, in this WSA, the abandonment of one reservoir would just offset the construction of one new trough.

Under this alternative, the ecological benefits associated with better distribution of water, and therefore livestock and wild horses, throughout the allotment would be similar as under the Proposed Action. However, due to the increased number of developments under this alternative as compared to the proposed action (specifically more pipelines and troughs), the ecological benefits to the area within the WSAs would be greater; as would the total effects to naturalness (approximately 1% more of the WSAs would be affected under this alternative compared to the proposed action). The effects of the route realignment at S3 would be the same as under the proposed action.

Except for the proposed fence removal, and 0.5 mile of the fence construction, all work would occur within 30 feet of existing roads, ways, or closed roads, so minimal cross-country travel would be needed for installation and maintenance of the developments.

The pipeline that would be constructed within Home Creek Pasture in South Fork Donner und Blitzen WSA would utilize two existing reservoirs rather than new troughs. Therefore, little visual changes to naturalness are expected around the reservoirs. Using existing reservoirs would not change livestock and wild horses distribution within this area, and should not result in any decrease to a visitor's perception of solitude or recreation experience.

Alternative E: Edge Development

Table 35 summarizes the estimated area where naturalness would be influenced by developments proposed under this alternative (disturbance amounts for each proposed improvement are discussed under the Effects Common to All Alternative section above). Under this alternative, proposed improvements, with the exception of the two spring protections, are located near the edge of WSAs. Therefore, the core of each WSA would remain intact under this alternative. In many cases, the disturbance associated with wells, pipelines and troughs, and spring developments and troughs, may overlap, resulting in the total disturbance being overestimated.

Table 35: Estimate of Acres in each WSA affected by Alternative E

WSA	Proposed Improvement	#/Length	Acres Affected per Development or Length of Development	Total Acres Affected	% of WSA
Blitzen River (31,901 acres)	Spring Protection	1	30	30	0.09
	Fence Construction (Water Gap)	1-0.1 Miles[60]	60/mile	6	0.02
Blitzen River WSA Total				**36**	**0.11**
Home Creek (1,165 acres)	Fence Construction	1-1.0 Miles	60/mile	60	5.2
Home Creek WSA Total				**60**	**5.2**
South Fork Donner und Blitzen (27,968 acres)	Spring Development	1	30	30	0.11
	Spring Protection	2	30	60	0.21
	Well	1	56	56	0.20
	Pipeline	1 - 0.6 Miles	0.97/mile	0.58	.002
	Fence Removal[61]	2 - 4.6 Miles	-60/mile	-276	-0.99
	Fence Construction (includes Water Gap)	2 - 1.7 Miles[62]	60/mile	102	0.36
South Fork Donner und Blitzen WSA Total				**-27.42**	**-0.10**

[60] The remaining 0.1-0.2 mile of this fence would be located within the Steens Mountain Wilderness.
[61] Since fence removal would make the area appear natural in the short-term (<2 years), it has a positive effect on naturalness, as seen by the negative acres of disturbance.
[62] The remaining 0.8 mile of this fence associated with F5 would be located within the Steens Mountain Wilderness.

The total area influenced by existing and proposed developments in Blitzen River WSA would be approximately 9.9% (3,151 acres) for this alternative. The total area in the Home Creek WSA influenced by existing and proposed developments would be 222 acres (19.1%) under this alternative. The total area influenced by existing and proposed developments in the South Fork Donner und Blitzen WSA is approximately 2,608.6 acres (9.3%). This is actually an increase in naturalness (decrease in disturbance) which comes as a result of removing 4.6 miles of fence from within the WSA. These values include all existing and proposed water developments, exclosures, fences, and pipelines. The proposed new fenceline F7 would follow a road that separates the Home Creek portion of Steens Mountain Wilderness from South Fork Donner und Blitzen and Home Creek WSAs. Depending on the exact location of the fenceline, it is expected portions of the fenceline would be placed within the 30 foot wilderness road buffer of the Lauserica Road, and therefore the total fence distance within the WSAs would be less than shown above. In comparison, the Blitzen River and South Fork Donner und Blitzen WSAs would still have less area influenced by unnatural features than two nearby WSAs (Bridge Creek and Stonehouse WSAs), both of which had approximately 12 percent of

total area influenced by unnatural features at the time they were established (Volume I of the Oregon BLM Wilderness Study Report, 1991).

Under this alternative, there would be ecological benefits associated with the proposed water developments, resulting in slightly better (an increase in use area of 13.9%) distribution of livestock and wild horses, throughout the allotment, due to the increase size of the estimated use area. This improvement would mainly be due to the water gaps along the Donner und Blitzen River. Following the construction of the water developments proposed under this alternative, health and vigor of key forage species and other upland grasses would be maintained, or in some areas improved, due to decreased levels of heavy grazing around some of the previously limited reliable water sources and the moderate grazing of areas that have not been grazed regularly (following the removal of the Donner und Blitzen River from within the allotment). By allowing access to the Donner und Blitzen River, wild horses and livestock would have three additional sources of free flowing, year-round water. The spring protection would help protect riparian areas by eliminating hoof-shear so riparian vegetation can reach potential, PFC can be achieved, and habitat can be improved for riparian-associated wildlife species, increasing naturalness at these sites.

The majority of the proposed developments would occur within 30 feet of existing roads, ways or closed roads, or outside WSAs (the exception being the protection fence of S4 and the proposed water gaps), so minimal cross-country travel would be needed for installation and maintenance of the developments within WSAs.

Alternative F: Reduced Grazing with No Development

The effects under this alternative would be the same as under the No Action Alternative; however, the pressure from livestock trying to access the river may be reduced due to the decreased permitted AUMs as compared to the number of AUMs currently permitted.

Alternative G: Complete Livestock Removal

Under the complete removal of livestock, ranching operations would no longer occur within the WSAs; therefore, there would be positives effects to solitude and primitive and unconfined recreation. In addition, over time naturalness would improve as the range improvements would no longer be maintained except for those needed for wild horses.

13. Wildlife and Locally Important Species

Affected Environment: Wildlife and Locally Important Species

Wildlife, other than migratory birds and SSS, include mule deer, elk, pronghorn antelope, badger, black-tailed jackrabbit, cottontails, magpies, ground squirrels, pocket gophers, deer mouse, cougar, bobcat, coyote, ducks, geese, swans, chukar, California quail, mountain quail, yellow-bellied marmot, wood rats, voles, chipmunks, bats, reptiles, and amphibians.

Mule deer, elk, pronghorn, and predators use the area most of the year. Deep snows may force big game animals, upland birds, and some small animals to lower elevations of the allotment. Other small mammals are not as mobile and may remain underground or stay active near the ground's surface throughout winter. Wild horses present throughout the allotment may exclude other wildlife use from water sources, especially in late summer when water sources are limited. Miller (1983) found that when antelope could get to water while being no closer than three meters from a wild horse or cow, they were able to water; otherwise, they would only circle the waterhole, leave, and return later to try again.

Mule deer use bitterbrush as a fall and winter browse. There are several areas throughout the allotment with extensive stands of bitterbrush. Currently, there are only about six reliable late-season water sources near most of the bitterbrush areas. These water sources allow for later use mainly in Tombstone Pasture but usually only until the end of July. Although bitterbrush stands in the allotment appear healthy for the most part, juniper encroachment into these stands is expected to affect the continued health of these plants.

The increase in wildfires in the Great Basin has resulted in loss of important big game winter ranges in the Great Basin (Pellant 1990; Updike et al. 1990), habitat supporting North America's densest concentration of nesting raptors (Kochert and Pellant 1986), native sensitive plant species (Rosentreter 1994) and nongame bird occurrence (Dobler 1994). In addition, plant diversity is reduced at both the local and landscape levels with frequent wildfires (Whisenant 1990). Not only is cheatgrass a permanent component of many Intermountain ecosystems, including within South Steens Allotment, it is the focal point for the disruption of many ecosystem processes and functions. Wildfire cycles are shorter and severity and extent of the area of fire impacts are greater with cheatgrass in the ecosystem. Wildlife species are affected both directly by alteration of habitat due to cheatgrass invasion and indirectly by the loss of habitat due to increased wildfires. In addition, the diversity and cover of microbiotic crusts are diminished with cheatgrass in the ecosystem allowing additional entry of cheatgrass and other weeds. The rangeland health of cheatgrass infested communities is either at risk or already in the unhealthy category with even more undesirable weeds invading some cheatgrass communities (Pellant 1996). Currently, no areas of the allotment are dominated by cheatgrass, but there would be a risk following wildfire due to cheatgrass presence. (More discussion of cheatgrass within the allotment can be found in the Upland Vegetation section.)

Livestock grazing at moderate utilization levels has been found to leave an abundance of forage for wild ungulates (Anderson et al. 1990). Anderson and McCuistion (2008) suggest livestock grazing can improve grazing conditions for elk by removing the dead, unpalatable material from bunchgrasses (especially under deferred grazing conditions) allowing for elk to utilize more nutritious green vegetation.

Environmental Consequences: Wildlife and Locally Important Species

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for wildlife extends up to 10 miles beyond the allotment boundary to encompass regular movements of most animals that may be using the allotment. The CEAA does not incorporate the entire annual use area for some animals, such as elk and mule deer, because this information is not available nor is it expected to change the analysis. Vegetation communities present in the allotment are representative of those in the CEAA.

Past and present actions, such as those described in *Affected Environment*, have influenced the existing environment within the CEAA. RFFAs in the CEAA that may contribute to cumulative effects to wildlife and habitat include livestock grazing, hunting and other recreational pursuits, North Steens Ecosystem Restoration Project, and North Steens Transmission Line ROW and Echanis Wind Development Project. Several thousand acres of treatments are proposed in the CEAA under the North Steens Ecosystem Restoration Project, but funding, weather conditions, and other factors will affect timing of implementation. Past and RFFAs that have affected wildlife or wildlife habitat in the CEAA are found in Table 36.

Table 36: Wildlife Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	224	---	---	Unknown
Wildfires	107,266.7	---	56	Unknown	---	Unknown
Known Primitive Campsites	---	---	84	---	---	Unknown
Trails	---	95.0	---	---	38.5	---
Trailhead	---	---	4	---	---	None
Recreation Sites	---	---	9	---	---	None
Open Roads	---	785.0	---	---	None	---
Closed Roads	---	180.8	---	---	None	---
Fences	---	457.4	---	---	6.2	---
Pipeline	---	4.3	---	---	0.11	---
Exclosures	141.2	---	6	16.9	---	2
Water Developments	---	---	235	---	---	None
Gravel Pit	688.9	---	11	None	---	None
Cutting	8,264.0	---	32	17,062.8	---	21
Piling	3,736.8	---	12	2,975.6	---	25
RX Burning	54,304.6	---	62	16,555.3	---	21
Seeding	32,542.4	---	43	1,960.4	---	4

There will be cumulative effects to wildlife habitat from the North Steens Ecosystem Restoration Project due to changes in habitat types from the use of mechanical removal or fire to reduce expansion juniper. Grassland habitat will increase as broadcast burn treatments are applied with reductions in sagebrush and woodland habitats. Depending on the type of treatment (cut and broadcast burn, cut and pile, etc.) some areas of sagebrush will return quicker to canopy cover that will support sagebrush dependent species throughout the duration of the project. Most bitterbrush stands would not be targeted for

broadcast burning so sufficient bitterbrush would still be available for mule deer use in the fall and early winter months. Woodland habitat will decrease for a longer period of time, as juniper reduction is a major purpose of the North Steens Ecosystem Restoration Project. There will still be woodland habitat available throughout the area, as not all junipers will be removed, and juniper trees in wilderness will not be treated unless other NEPA analysis is completed.

There would be effects to elk from the North Steens Transmission Line ROW and the Echanis wind development during construction since this action would affect elk movement in this area. Elk would probably move into some of the South Steens Allotment area during construction of the wind farm, powerline, and roads, and may avoid that area due to increased vehicle traffic, but this would occur in the short-term (weeks to months). Any effects from elk into the South Steens Allotment would be temporary and immeasurable.

Effects Common to All Action Alternatives:

Wildlife in general would be affected by noise and human presence during construction of projects. This disturbance would be localized and temporary in nature, and wildlife would return to these areas after the disturbance ceased. Different species of wildlife would be affected differently by human presence, construction noise and ground disturbance. Elk would be most affected and move out of the area while the disturbance is ongoing. Mule deer and pronghorn would initially move from the disturbance, but not as far as elk since elk are more sensitive to disturbance, and may become accustomed to the noise depending on the duration. Other smaller less mobile animals such as rodents and rabbits would lose some habitat depending on the type of construction activity (trough installation, burying pipeline, waterhole construction, etc.). Certain species of wildlife, such as pronghorn antelope, could benefit from increased water sources but there would not be any increase in population numbers since wildlife populations have additional habitat requirements. This would also apply to most species of wildlife. Small mammals, which are not as mobile, could experience loss of habitat near new water sources since there would be a loss of vegetation around them due to increased utilization at the watering sites.

With the protection of spring sources, there would be some benefit to wildlife from increased vegetation at these spring sources, which would not be available to livestock or wild horses due to exclosures. Although predators, such as coyotes and cougars, have access to plenty of water, new water sources would attract predators to those locations (Prasad 1986). This could affect other species of wildlife by exposing them to predation at these new water sources.

Bitterbrush stands could be affected by the increase of water sources near these stands. As the growing season progresses and grasses mature, livestock diets include bitterbrush, starting as early as June, with use of bitterbrush and the proportion of bitterbrush in the diet increasing through September (Ganskopp et al. 1999). The closer bitterbrush is to the water source, the more use will occur. Livestock use of bitterbrush during the graze and defer parts of the grazing cycle (Table 2: Proposed Grazing System) would increase. This

would affect availability of current year's growth of bitterbrush for mule deer during fall and winter, at a time when nutrition from other sources is low.

Alternative A: No Action

Wildlife would have the same resources available as are currently present in the allotment. Some areas of the allotment near perennial water sources, such as springs, would continue to be affected by concentrated livestock and wild horse use. Wildlife would still have access to Donner und Blitzen River for watering purposes. Areas with bitterbrush would not be affected by late-season grazing since late season water sources are limited and no new water sources would be developed to attract animals to other currently unaffected bitterbrush stands. Mule deer would have more bitterbrush available later in the fall and winter.

Alternative B: Proposed Action

Small, less mobile mammals would be affected most through loss of habitat near new water troughs and reservoirs. Up to two acres of vegetation would be removed around each new trough, mainly through use by livestock and wild horses. Vegetation would be removed during construction of reservoirs (approximately two acres) and use by livestock and wild horses would reduce grass and forb cover near the reservoirs, but would not remove much more shrubby vegetation than removed during construction. With nine new reservoirs constructed and five new troughs installed, approximately 28 acres of vegetation would be removed around new water sources. Areas within 0.25 mile of water sources (about 1,750 acres) would show some reduced grasses and forbs so wildlife would have to search other areas for sufficient food. However, this effect would not be measureable since grasses and forbs would still remain in the area. Spring sources and riparian areas fenced (about 27 acres) and returned to a more natural state would benefit wildlife for watering purposes as well as increase available forage for them. New and maintained existing reservoirs would also provide watering sources for wildlife as long as water remains throughout the year.

Overall, effects of different development on different wildlife species would be minimal and should not affect habitat for different species. About 1,750 acres (about 1.8%) of habitat in the allotment would have some reduced vegetation that might affect use. Other areas such as the wilderness area to the east that surround the allotment would also provide habitat for larger more mobile wildlife so the amount of habitat affected would be less than 1% of available habitat within the CEAA. Since these projects are spread throughout the allotment and would occur over a number of years, there should be no effects on wildlife population numbers or species diversity.

Alternative C: Maximum Water Distribution

The effects under this alternative, in any one year, would be the same as under the Proposed Action; however, there would be more disturbance over the years due to the increased number of developments proposed under this alternative. Disturbance from

well drilling would be the greatest in this alternative since 10 wells are proposed. Initially, there would be about 0.25 acre disturbed by well drilling at each location which would be rehabilitated after the well drilling was complete so that an area about 0.01 acre would disturbed around the well site. Noise from well drilling and reservoir construction would reduce wildlife use of the immediate area for the time of the disturbance. Most wells and reservoirs would be constructed during the year when access in not restricted by snow or wet soil conditions. Most wildlife would be able to move away from the disturbance with little effort being expended so there should be no mortality directly related to the disturbance. The increased number of wells and spring developments would result in 24 troughs being installed. Seventeen new reservoirs would be constructed as well. This would increase the total area of vegetation removal (80 acres) compared to the Proposed Action. At least 19 new water sources would be constructed near bitterbrush stands under this alternative. There would be more water troughs (11) associated with wells and more reservoirs (8) constructed to maintain late-season water near bitterbrush stands. Late-season use would affect bitterbrush resources the most under this alternative. If the reservoirs dry up during the late season, then livestock use of bitterbrush would decrease in these areas but increase where developments still have water available.

Once all reservoirs are constructed, and wells, troughs and pipelines installed, approximately 5,100 acres (about 5%) of the allotment would have some reduced vegetation that would affect wildlife habitat. Other areas such as the wilderness area to the east that surround the allotment would also provide habitat for larger more mobile wildlife so the amount of habitat affected would be less than 2% of available habitat within the CEAA. Since these projects are spread throughout the allotment and over a number of years, there should be no effects on population numbers of the different species. While this alternative proposes the maximum number of water developments, this would not necessarily lead to increased wildlife populations since carrying capacity of wildlife populations is not based on water availability alone.

Alternative D: Along Road Development

The effects under this alternative, in any one year, would be similar to the Proposed Action; however, there would be less disturbance over the years due to the decreased number of developments proposed under this alternative. Disturbance from well drilling would be the same as in Alternative C since 10 wells are proposed. There are twenty troughs proposed under this alternative which is four less than Alternative C, so effects of installing toughs would be about eight acres less than in Alternative C. Effects of new reservoir construction would be less than under Alternative B or C since only one new reservoir is proposed for construction. There would be a gain of approximately one mile of new fence construction, which is not expected to have any measurable effect on wildlife. At least 12 new water sources would be constructed near bitterbrush stands under this alternative. There would be 11 water troughs associated with wells and one reservoir constructed to maintain late-season water near bitterbrush stands so late-season use would affect bitterbrush resources. If the existing reservoirs dry up during the late

season, then livestock use of bitterbrush would decrease in these areas but increase where developments still have water available.

Overall, there would be 42 acres of disturbance from installation of the trough and the one new reservoir. The affected area around reservoirs and troughs would amount to about 2,625 acres or 2.8% of the allotment. Other areas such as the wilderness area to the east that surround the allotment would also provide habitat for larger more mobile wildlife so the amount of habitat affected would be less than 1% of available habitat within the CEAA. Since these projects are spread throughout the allotment and construction would occur over a number of years, there should be no effects on wildlife population numbers.

Alternative E: Edge Development

The effects under this alternative would be comparable to the Proposed Action since the number of new developments would be similar. One difference would be more troughs (13) and no new reservoirs. Vegetative loss would occur at these sites as previously described. Under this alternative there would be an addition of about seven miles of fence and removal of about five miles due to fence realignment for a net gain of two miles of fence. The net gain of two miles of fence would have no effect on wildlife populations. This alternative would develop the least amount of new water sources (six) near bitterbrush stands compared to Alternatives C and D, so late-season use by livestock would not affect availability of bitterbrush for mule deer fall and winter use as much as those alternatives although bitterbrush use by livestock would increase in the areas around the troughs. Depending on the ability of new reservoirs to hold water into the late season, there would be similar affects to bitterbrush as in the Proposed Action.

Overall, there would be about 26 acres of disturbance from trough installation and the affected area would be about 1,625 acres or about 1.6% of the allotment. Other areas such as the wilderness area to the east that surround the allotment would also provide habitat for wildlife so the amount of habitat affected would be less than 1% of available habitat within the CEAA. Since these projects are spread throughout the allotment and construction would occur over a number of years, there should be no effects on population numbers of the different species

Alternative F: Reduced Grazing with No Development

Under this alternative, livestock grazing would be authorized at a lower level than currently allowed but higher than the average actual use (5,102 AUMs, 2003-2010) that has been occurring. With the current water developments, use may still average lower than the permitted AUMs due to the lack of water on some years during the deferred grazing period. Levels of use of bitterbrush would be expected to be at the same level as currently observed. There would still be heavy use at the limited reliable water sources by livestock and wild horses but this affect would be slightly less than the No Action since fewer livestock would be present. Competition for water would also be slightly

decreased. Overall, the effects of this alternative similar to the the No Action Alternative.

Alternative G: Complete Livestock Removal

Under this alternative, livestock grazing would no longer be authorized. Use of bitterbrush would be limited to use by wildlife since no livestock would graze it and wild horses rarely utilize it, which would benefit wildlife that use it. There would still be heavy use at those water sources being heavily used by wild horses since they have yearlong access. However, the level of use would be less at these congregation sites since livestock would not be presence. Competition for water within the allotment would also be reduced, due to the lack of livestock, increasing the amount available for wildlife. Other effects of this alternative would be the same as the No Action Alternative.

B. Cumulative Effects

As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the Proposed Action." Use of information on the effects on past action may be useful in two ways according to the CEQ guidance. One is for consideration of the Proposed Action's cumulative effects, and secondly as a basis for identifying the Proposed Action's effects.

The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Our information on the current environmental condition is more comprehensive and more accurate for establishing a useful starting point for a cumulative effects analysis, than attempting to establish such a starting point by adding up the described effects of individual past actions to some environmental baseline condition in the past that, unlike current conditions, can no longer be verified by direct examination.

The second area in which the CEQ guidance states that information on past actions may be useful is in "illuminating or predicting the direct and indirect effects of a Proposed Action." The usefulness of such information is limited by the fact that it is anecdotal only, and extrapolation of data from such singular experiences is not generally accepted as a reliable predictor of effects.

However, "experience with and information about past direct and indirect effects of individual past actions" have been found useful in "illuminating or predicting the direct and indirect effects" of the Proposed Action in the following instances: the basis for predicting the effects of the Proposed Action and its alternatives is based on the general accumulated experience of the resource professionals in the agency with similar actions.

The environmental consequences discussion described all expected effects, including direct, indirect, and cumulative, on resources from enacting the proposed alternatives. Direct and indirect effects plus past actions become part of the cumulative effects analysis; therefore, use of these words may not appear. In addition, the Introduction Section of this EA, specifically the Background and Purpose of and Need for Action, identifies past actions creating the current situation.

Reasonably Foreseeable Future Actions (RFFAs), also relevant to cumulative effects, include those Federal and non-Federal activities not yet undertaken, but sufficiently likely to occur, that a Responsible Official of ordinary prudence would take such activities into account in reaching a decision. These Federal and non-Federal activities that must be taken into account in the analysis of cumulative impact include, but are not limited to, activities for which there are existing decisions, funding, or proposals identified by the bureau. These RFFAs must fall within the geographic scope and timeframe of the analysis being prepared. Continued livestock grazing, weed treatments, road maintenance, recreation activities, wild horse gathers, and North Steens Ecosystem Restoration Project, are all RFFAs. In addition, the Echanis wind farm and the associated North Steens Transmission Line were considered, but were found to be located outside the cumulative effects analysis area of this EA. The cumulative effects of these actions were thoroughly addressed throughout Chapter III, by resource, as applicable.

CHAPTER IV: CONSULTATION AND COORDINATION

A. Agencies and Individuals Consulted

Grazing Permittee
Oregon Department of Fish and Wildlife, Hines, Oregon
Steens Mountain Advisory Council
Steens Mountain Landowner Group

B. Interdisciplinary Team

Daryl Bingham, Fisheries and Riparian Specialist (Riparian, Water Quality, Fisheries)
Andy Daniels, Wildlife Biologist (SSS-Animals, Migratory Birds, Wildlife)
Lisa Grant, Wild Horse Specialist (Wild Horses)
Eric Haakenson, Outdoor Recreation Planner (Wilderness, WSR, WSAs, Recreation, VRM)
Tara McLain, Lands and Realty (Lands and Realty)
Caryn Meinicke, Natural Resource Specialist (Vegetation, Soils, BSCs, SSS-Plants)
Matt Obradovich, District Wildlife Biologist (SSS-Animals, Migratory Birds, Wildlife)
Holly Orr, District Planning and Environmental Coordinator (Social and Economics Values)
Lesley Richman, District Weed Specialist (Noxious Weeds)
Rob Sharp, Wild Horse Specialist (Wild Horses)
Scott Thomas, Archaeologist (Cultural Heritage)
Autumn Toelle, Rangeland Management Specialist (Lead Preparer, Grazing, GIS)

C. Advisory

Stacy Fenton, GIS Specialist
Charlie Fifield, State Range Specialist
Bob Hopper, State Range Specialist
Rhonda Karges, Andrews Resource Area Field Manager
Jerry Magee, State Recreation and Wilderness Specialist
Holly Orr, District Planning/Environmental Coordinator
Bill Pieratt, District Range Lead
Cam Swisher, Supervisory Natural Resource Specialist
Joe Toelle, Civil Engineering Technician
Maggie Langlas Ward, State Planning and Environmental Coordinator
Brenda Lincoln-Wojtanik, State Planning and Environmental Coordinator

D. References

Adams, B.A., J. Carlson, D. Milner, T. Hood, B. Cairns, and P. Herzog. 2004. Beneficial grazing management practices for Sage-Grouse (*Centrocercus urophasianus*) and ecology of silver sagebrush (*Artemisia cana*) in southeastern Alberta. Technical Report, Public Lands and Forests Division, Alberta Sustainable Resources Development. Pub. No. T/049. 60pp.

Agee, J.K. 1993. Fire ecology of Pacific Northwest forests. Island Press, pp. 371-385.

Anderson, E.W., D.L. Franzen, and J.E. Melland. 1990. Rx Grazing to Benefit Watershed-Wildlife-Livestock. Rangelands 12(2): 105-111.

Anderson, A., and K.C. McCuistion. 2008. Evaluating Strategies for Ranching in the 21st Century: Successfully Managing Rangeland for Wildlife and Livestock. Rangelands 30(2):8-14.

Archer, S., and F.E. Smeins. 1991. Chapter 5: Ecosystem – Level Processes. *In:* Grazing Management: An Ecological Perspective. Timber Press, Portland, OR. P. 264.

Bates, J.D., R.F. Miller, and J.J. Svejcar. 2000. Understory dynamics in cut and uncut western juniper woodlands. Journal of Range Management 53:119-126.

Bailey, D.W., J.E. Gross, E.A. Laca, L.R. Rittenhouse, M.B. Coughenour, D.M. Swift, and P.L. Sims. 1996. Mechanisms that result in large herbivory grazing distribution patterns. Journal of Range Management 49(5): 386-400.

Bailey, D.W. 1999. Influences of Species, Breed and Type of Animal on Habitat Selection. *In:* Grazing Behavior of Livestock and Wildlife; Idaho Forest, Wildlife and Range Experiment Station Bulletin 70, p.101-108.

Bailey, D.W., D.D. Kress, D.C. Anderson, D.L. Boss, and E.T. Miller. 2001. Relationship between terrain use and performance of beef cows grazing foothill rangeland. Journal of Animal Science 79:1883-1891.

Bailey, D.W. 2004. Management strategies for optimal grazing distribution and use of arid rangelands. Journal of Animal Science 82:E147-E153.

Beck, J.L., and D.L. Mitchell. 2000. Influences of Livestock Grazing on Sage Grouse Habitat. Wildlife Society Bulletin, 28(4):993-1002.

Berger, Joel. 1976. Organizational Systems and Dominance in Feral Horses in the Grand Canyon. Behavioral Ecology Sociobiology 2:131-146.

Boyd, C., K. Davies, G. Collins, and S. Petersen. 2012. Feral horse impacts to riparian areas and adjacent uplands. Presentation to the Society for Range Management Symposium on Free-Roaming, Wild, and Feral Horses. Spokane, WA. January 31.

Braun, C.E. 1998. Sage grouse declines in western North America: what are the problems? Transactions of Western Association of Fish and Wildlife Agencies 78: 139-156.

Briske, D.D. 1991. Chapter 4: Developmental Morphology and Physiology of Grasses. *In:* Grazing Management: An Ecological Perspective. Timber Press, Portland, OR., p. 264.

Butler, 2000. Cattle Distribution under Intensive Herded Management. Rangelands 22(2):21-23.

Busby, F.E. 1979. Riparian and stream ecosystems, livestock grazing, and multiple-use management. P.6-12. *In:* Proc. grazing and riparian-stream ecosystems forum. Trout Unlimited, Vienna, VA.

Call, M.W., and C. Maser. 1985. Wildlife habitats in managed rangelands: The Great Basin of southeastern Oregon: Sage-grouse. USDA Forest Service Pacific Northwest Forest and Range Experiment Station. General Technical Report PNW-187.

Carver, E., and J. Caudill. 2007. Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation. Division of Economics, U.S. Fish and Wildlife Service, Washington DC.

Chamberlain, D.J. and M.S. Doverspike. 2001. Water Tanks Protect Streambanks. Rangelands 23(2):3-5.

Clary, W.P., and B.F. Webster. 1989. Managing Grazing of Riparian Areas in the Intermountain Region. Gen. Tech. Rep. INT-263. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 11 p.

Connelly, J. W., W. L. Wakkinen, A. P. Apa, and K. P. Reese. 1991. Sage grouse use of nest sites in southeastern Idaho. Journal of Wildlife Management 55:521-524.

Cook, C.W. 1966. Factors affecting utilization of mountain slopes by cattle. Journal of Range Management, 19:200–204.

Cothran, E. Gus 2010. *Genetic Analysis of the South Steens HMA, OR.* Department of Veterinary Integrative Bioscience, Texas A&M University. College Station, TX 77843-4458.

Coughenour, M.B. 1991. Invited synthesis Paper: Spatial Components of Plant-Herbivore Interactions in Pastoral, Ranching, and Native Ungulate Ecosystems. Journal of Range Management 44(6):530-542.

Courtois, D.R., B.L. Perryman, and H.S. Hussein. 2004. Vegetation Change after 65 years of Grazing and Grazing Exclusion. Journal of Range Management 57(6): 574-582.

Crane, K.K., M.A. Smith, and D. Reynolds. 1997. Habitat Selection Patterns of Feral Horses in Southcentral Wyoming. Journal of Range Management 50(4): 374-380.

Crawford, J.A., T.H. Bliss, and M.K.D. McDowell. 2000. Habitat Use by Sage Grouse at South Steens BLM Allotment. Final Report. Unpublished report. Game Bird Research Program, Dept. of Fisheries and Wildlife, Oregon State University, Corvallis.

Crawford, J.A., R.A. Olson, N.E. West, J.C. Mosley, M.A. Schroeder, T.D. Whitson, R.F. Miller, M.A. Gregg, and C.S. Boyd. 2004. Ecology and Management of Sage-Grouse and Sage-Grouse Habitat. Journal of Range Management, 57(1):2-19.

Daddy, F., M.J. Trlica, and C.D. Bonham. 1988. Vegetation and Soil Water Differences among Big Sagebrush Communities with Different Grazing Histories. The Southwestern Naturalist 33(4):413-424.

Davies, K. W., T. J. Svejcar, and J.D. Bates. 2009. Interaction of historical and nonhistorical disturbances maintains native plant communities. Ecological Applications 19(6): 1536-1545.

Davies, K.W., J.D. Bates, T.J. Svejcar, and C.S. Boyd. 2010. Effects of Long-Term Livestock Grazing on Fuel Characteristics in Rangelands: An Example from the Sagebrush Steppe. Rangeland Ecology and Management 63(6):662-669.

Davies, K.W., C.S. Boyd, J.L. Beck, J.D. Bates, T.J. Svejcar, and M.A. Gregg. 2011. Saving the Sagebrush Sea: An ecosystem conservation plan for big sagebrush plant communities. Biological Conservation 144:2573-2584.

Deboodt, T.L., M.P. Fisher, J.C. Buckhouse, and J. Swanson. 2008. Monitoring Hydrological Changes Related to Western Juniper Removal: A Paired Watershed Approach. *IN:* The Third Interagency Conference on Research in the Watersheds, September 8-11, Estes Park, CO, pp. 227-232.

DelCurto, T., M. Porath, M. McInnis, P. Momont, and C. Parsons. 1999. Management Strategies for Optimal Beef Cattle Distribution and Use of Mountain Riparian Meadows. *In:* Grazing Behavior of Livestock and Wildlife; Idaho Forest, Wildlife & Range Experiment Station, Bulletin #70. University of Idaho, Moscow, ID. Editors: K.L. Launchbaugh, K.D. Sanders, J.C. Mosley; p. 119-129.

Delong, A. K., J. A. Crawford, and D. C Delong, Jr. 1995. Relationships between vegetational structure and predation of artificial sage grouse nests. Journal of Wildlife Management 59:88-92.

Denman, K. et al. 2007, 'Couplings Between Changes in the Climate System and Biogeochemistry' in IPCC, Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. Averyt, M. Tignor and H. Miller (eds.)], Cambridge University Press, Cambridge, United Kingdom and United States.

DeLong, A.K., J.A. Crawford, and D.C. DeLong, Jr. 1995. Relationships between vegetational structure and predation of artificial Sage-grouse nests. Journal of Wildlife Management 59(1):88-92.

DeRamus, H.A., T.C. Clement, D.D. Giampola, and P.C. Dickison. 2003. Methane Emissions of Beef Cattle on Forages: Efficiency of Grazing Management Systems. Journal of Environmental Quality 32:269-277.

Derner, J.D. and G.E. Schuman. 2007. Carbon sequestration and rangelands: a synthesis of land management and precipitation effects. Journal of Soil and Water Conservation 62(2): 77.

Dietz, Harland E. 1988. Special Report-Grass: The stockman's crop, How to harvest more of it. Soil Conservation Service. Sunshine Unlimited, Inc. pp. 16.

Dobler, F.C. 1994. Washington State shrub-steppe ecosystem studies with emphasis on the relationship between nongame birds and shrub and grass cover densities. In: Monsen, Stephen B.; Kitchen, Stanley G., comps. 1994. Proceedings--ecology and management of annual rangelands; 1992, May 18-22; Boise ID, Gen. Tech. Rep. INT-GTR-313. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 149-161.

Environmental Protection Agency. 2009. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007. U.S. EPA, Washington, D.C.

Follett, R.F., J.M. Kimble, and R. Lal. 2001. The potential of U.S. grazing lands to sequester soil carbon. Chapter 16 in R.F. Follett, J.M. Kimble, and R. Lal, eds. The Potential of U.S. Grazing Lands to Sequester Carbon and Mitigate the Greenhouse Effect. CRC Press LLC. Boca Raton, Florida.

Forster, P. et al. 2007. Changes in Atmospheric Constituents and in Radiative Forcing. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis,
K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

France, K.A., Ganskopp, D.C. and C.S. Boyd. 2008. Interspace/Undercanopy foraging patterns of beef cattle in sagebrush habitats. Rangeland Ecology and Management 61:389-393.

Ganskopp, D. and M. Vavra. 1986. Habitat Use by Feral Horses in the Northern Sagebrush Steppe. Journal of Range Management 39(3) 207-211.

Ganskopp, D. and M. Vavra. 1987. Slope use by cattle, feral horses, deer, and bighorn sheep. Northwest Science 61(2):74-81.

Ganskopp, D., R. Angell, and J. Rose. 1992. Response of cattle to cured reproductive stems in a Caespitose Grass. Journal of Range management 45(4):401-404.

Ganskopp, D.T., T. Svejcar, F. Taylor, J. Farstvedt, and K. Painter. 1999. *Seasonal cattle management in 3 to 5 year old bitterbrush stands*. Journal of Range Management 52:166-173.

Ganskopp, D. 2001. Manipulating cattle distribution with salt and water in large arid-land pastures: a GPS/GIS assessment. Applied Animal Behavior Science 73: 251-262.

Ganskopp, D.C, and D.W. Bohnert. 2005. Does Wolfy Forage Affect Cattle Distribution in Rangeland Pastures? *In:* Research Progress Report 2005: Eastern Oregon Agricultural Experiment Station Burns, p. 66-67.

Ganskopp, D. 2011. Range Improvements: Tools and Methods to Improve Cattle Distribution. Beef Cattle Library BEEF056, 5 pp. Oregon State University.

Garrott, R.A. and L. Taylor. 1990. Dynamics of a Feral Horse Population in Montana. The Journal of Wildlife Management, 54(4): 603-612.

Gedney, D.R., D.L. Azuma, C.L. Bolsinger, and N. McKay. 1999. Western Juniper in Eastern Oregon. USDA Pacific Northwest Research Station. General Technical Report PNW-GTR-464.

George, M., D. Bailey, M. Borman, D. Ganskopp, G. Surber, and N. Harris. 2007. Rangeland Management Series: Factors and Practices that Influence Livestock Distribution. Rangeland Management Series Publication 8217, 20 pp. University of California Division of Agriculture and Natural Resources.

George, M.R., R.D. Jackson, C.S. Boyd, and K. W. Tate. 2011. A scientific assessment of the effectiveness of riparian management practices. *In:* Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. USDA-NRCS.

Gillen, R.L., W.C. Krueger and R.F. Miller. 1984. Cattle distribution on mountain rangeland in northeastern Oregon. Journal of Range Management 37(6):549-553.

Godwin, D.C., and J.R. Miner. 1996. The potential of off-stream livestock watering to reduce water quality impacts. Bioresource Technology 58:285-290.

Goodman, T., G.B. Donart, H.E. Kiesling, J.L. Holechek, J. P. Neel, and D. Manzanares. 1989. Cattle behavior with emphasis on time and activity allocations between upland and riparian habitats. *In:* Practical Approaches to Riparian Resource Management, An Educational Workshop, pgs. 95- 102. U.S. BLM, Billings, Mont.

Green, N.F., and H.D. Green. 1977. Wild horse population of Stone Cabin Valley, Nevada: A preliminary report. p. 59-65 In: Proc. National Wild Horse Forum. Cooperative Extension Service, University of Nevada, Reno.

Gregg, M.A., J.A. Crawford, M.S. Drut, and A.K. DeLong. 1994. Vegetative cover and predation of sage-grouse nests in Oregon. Journal of Wildlife Management 58:162-166.

Hanf, J.M., P.A. Schmidt, and E.B. Groshend. 1994**.** Sage-grouse in the high desert of Central Oregon: results of a study, 1988-1993. U.S.D.I.-Bureau Land Management, Series P-SG-01, Prineville, OR.

Hagen, C.A. 2011. Greater Sage-Grouse conservation assessment and strategy for Oregon: a plan to maintain and enhance populations and habitat. Oregon Department of Fish and Wildlife, Salem, USA.

Herbel, C.H., and A.B. Nelson. 1966. Activities of Hereford and Santa Gertrudis Cattle on a Southern New Mexico Range. Journal of Range Management, 19(4):173-176.

Holechek, J.L., R.D. Pieper, and C.H. Herbel. 2001. Chapter 10 Methods of Improving Livestock Distribution. *In:* Range Management: Principles and Practices, 4th Edition. Prentice Hall: New Jersey.

Jensen, P.K. 1995. Effect of light environment during soil disturbance on germination and emergence pattern of weeds. Ann. Applied Biology 127: 561-671.

Jewett, T.K., M.A. Webb, J.W. Waggoner, M.E. Brainine, M.E. Hubbert, L.J. Krysl, B.F. Sowell, G.E. Plumb, S.L. Applegate, and M.A. Smith. 1983. Studying the Wild Ones: 'Strong as a Horse' Is No Joke. Rangelands 5(2): 66-69.

Johnson, K.A., and D.E. Johnson. 1995. Methane Emissions from Cattle. Journal of Animal Science 73:2483-2492.

Johnson, D.D. and R.F. Miller. 2006. Structure and development of expanding western juniper woodlands as influences by two topographic variables. Forest Ecology and Management 229:7-15.

Johnson, D.D. and R. Sharp. 2012. Pace 180° and repeat photography: Monitoring methods for documenting vegetation trend in sagebrush rangelands. BEEF091. *In*: R. Cooke (Ed.). Oregon State University Beef Cattle Library. Oregon State University, Corvallis, OR.

Kahn, C.M. (Ed). The Merck Veterinary Manual. Management and Nutrition; Nutrition: Horses; Nutritional Requirements. 9th ed. John Wiley & Sons, 2005. Retrieved from: www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/182602.htm. Accessed November 2, 2011.

Kauffman, J.B., and W.C. Krueger. 1984. Livestock Impacts on Riparian Ecosystems and Streamside Management Implications…A Review. Journal of Range Management 37(5): 430-438.

Knapp, S.T., 1996. Cheatgrass (Bromus tectorum L.) dominance in the Great Basin Desert: history, persistence, and influences to human activities. Global Environ. Change 6, 37-52.

Kochert, M. N.; Pellant, M. 1986. Multiple use in the Snake River Birds of Prey Area. Rangelands. 8: 217-220.

Kovalchick, B.L., and W. Elmore. 1992. Effects of Cattle grazing systems on willow-dominated plant associations in Oregon, p. 111-119. In: W.P. Clary, E.D. McArthur, D. Bedunah, and C.L. Wambolt, (eds.) Proc. Symposium on Ecology and Management of Riparian Shrub Communities, U.S.D.A. For. Serv., Gen. Tech. Rept. INT-GTR-289.

Launchbaugh, K.L., and L.D. Howery. 2005. Understanding Landscape Use Patterns of Livestock as a Consequence of Foraging Behavior. Rangeland Ecology & Management 58(2): 99-108.

Manier, D.J., and N.T. Hobbs. 2006. Large Herbivores Influence the Composition and Diversity of Shrub-Steppe Communities in the Rocky Mountains, USA. Oecologia 146(4):641-651.

McInnis, M.L., and M. Vavra. 1987. Dietary Relationships among Feral Horses, Cattle, and Pronghorn in Southeastern Oregon. Journal of Range Management 40(1):60-66.

McNaughton, S.J. 1993. Grasses and Grazers, Science and Management. Ecological Applications 3(1):17-20.

Miller, R. and R. H. Denniston II. 1979. Interband dominance in feral horses. Z. Tierpsychol. 51:41.

Miller, R. 1983. Habitat Use of Feral Horses and Cattle in Wyoming's Red Desert. Journal of Range management 36(2):195-199.

Miller, R.F., T. Svejcar, and N.E. West. 1994. Implications of livestock grazing in the Intermountain sagebrush region: plant composition, p. 101-146. *In:* M. Vavra, W.A. Laycock, and R.D. Pieper (eds.) Ecological Implications of Livestock Herbivory in the West. Soc. For Range Manage. Denver, Colo.

Miller, R. F., J. D. Bates, T. J. Svejcar, F. B. Pierson, and L. E. Eddleman. 2005. Biology, ecology, and management of western juniper. Corvallis, OR, USA: Agricultural Experiment Station, Oregon State University, Technical bulletin 152, 77 p.

Miller, R.F., R.J. Tausch, E.D. McArthur, D.D. Johnson, and S.C. Sanderson. 2008. Age Structure and Expansion of Piñon-Juniper Woodlands. A Regional Perspective in the Intermountain West. USDA. Rocky Mountain Research Station. Research Paper Report RMRS-RP-69.

Miner, J.R., J.C. Buckhouse, and J.A. Moore. 1992. Will a Water Trough Reduce the Amount of Time Hay-Fed Livestock Spend in the Stream (And Therefore Improve Water Quality)? Rangelands 14(1):35-38.

Mosley, J.C., P.S. Cook, A.J. Griffis, and J.O. Laughlin. 1999. Guidelines for Managing Cattle Grazing in Riparian Areas to Protect Water Quality: Review of Research and Best Management Practices Policy. Idaho Forest, Wildlife and Range Policy Analysis Group, Report No. 15. Internet Edition, retrieved from www.uidaho.edu/cfwr/pag on December 5, 2011.

Moynahan, B.J., M.S. Lindberg, J.J. Rotella, and J.W. Thomas. 2007. Factors affecting nest survival of Greater Sage-Grouse in north-central Montana. Journal of Wildlife Management 71:1173-1783.

Myers, L.H. 1989. Grazing and riparian management in southwestern Montana, p. 117-120. In: R.E. Gresswell, B.A. Barton, and J.L. Kershner (eds.) Practical Approaches to Riparian Resource Management – An Educational Workshop, U.S.D.I.-B.L.M., BLM-MT-PT-89-001-4351.

National Research Council. Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Washington, DC: The National Academies Press, 2000.

Naugle, D.E., C.L. Aldridge, B.L. Walker, T.E. Cornish, B.J. Moynahan, M.J. Holloran, K. Brown, G.D. Johnson, E T. Schmidtman, R.T. Mayer, C.Y. Kato, M.R. Matchett, T.J. Christiansen, W.E. Cook, T. Creekmore, R.D. Falise, E.T. Rinkes, and M.S. Boyce. 2004. West Nile virus: pending crisis for Greater Sage-Grouse. Ecology Letters 7(8):704-713.

Oesterheld, M. and S.J. McNaughton. 1991. Effect of Stress and Time for Recovery on the Amount of Compensatory Growth after Grazing. Oecologia 85(3):305-313.

Onderka, D.K. and W.D. Wishart. 1988. Experimental contact transmission of Pasteurella haemolytica from clinically normal domestic sheep causing pneumonia in Rocky Mountain bighorn sheep. Journal of Wildlife Diseases 24(4):663-667.

Ostermann-Kelm, S., E.R. Atwill, E.S. Rubin, M.C. Jorgensen, and W.M. Boyce. 2008. Interactions between Feral Horses and Desert Bighorn Sheep at Water. Journal of Mammalogy 89(2): 459-466.

Parsons, C., P.A. Momont, T. DeCurton, M. McInnis, and M.L. Porath. 2003. Cattle distribution patters and vegetation use in mountain riparian areas. Journal of Range Management 56(4):334-341.

Pellant, Mike. 1990. The cheatgrass-wildfire cycle--are there any solutions? In: McArthur, E. Durant; Romney, Evan M.; Smith, Stanley D.; Tueller, Paul T., compilers. Proceedings--symposium on cheatgrass invasion, shrub die-off, and other aspects of shrub biology and management; 1989 April 5-7; Las Vegas, NV. Gen. Tech. Rep. INT-276. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 11-17.

Pellant, Mike. Cheatgrass: The Invader That Won the West. 1996. Interior Columbia Basin Ecosystem Management Project, pp. 22.

Patton, B.D., X. Dong, P.E. Nyren, and A. Nyren. 2007. *Effects of Grazing Intensity, Precipitation, and Temperature on Forage Production.* Rangeland Ecology & Management 60(6):656-665.

Pellegrini, S.W. 1971. Home range, territoriality and movement patterns of wild horses in the Wassuck Range of western Nevada. M.S. Thesis, Univ. Nevada, Reno.

Phinney, T.S. 1950. How grazing capacity of mountain rangelands is affected by range condition and usability. J. For. 48, 106-107.

Pierson, F.B., J.D. Bates, T.J. Svejcar and S.P. Hardegree. 2007. *Runoff and Erosion after Cutting Western Juniper.* Rangeland Ecology & Management 60(3):285-292.

Pinchak, W.E., M.A. Smith, R.H. Hart and J.W. Waggoner Jr. 1991. Beef cattle distribution patterns on foothill range. Journal of Range Management 44(3):267-275.

Pellant, Mike. Cheatgrass: The Invader That Won the West. 1996. Interior Columbia Basin Ecosystem Management Project, pp. 22.

Platts, W.S. 1991. Livestock grazing. In: Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19.

Ponzetti, J.M. and B.P. McCune. 2001. Biotic Soil Crusts of Oregon's Shrub Steppe: Community of Composition in Relation to Soil Chemistry, Climate, and Livestock Activity. The Bryologist 104(2):212-225.

Porath, M.L., P.A. Momont, T. DelCurto, N.R. Rimbey, J.A. Tanaka, and M. McInnis. 2002. *Offstream water and trace mineral salt as management strategies for improved cattle distribution.* American Society of Animal Science. Journal of Animal Science 80(2):346-356.

Prasad, N.L.N.S., and F.S. Guthery. 1986. Wildlife use of Livestock water under short duration and continuous grazing. Wildlife Society Bulletin 14(4):450-454.

Rosentreter, R. 1994. Displacement of rare plants by exotic grasses. In: S.B. Monsen, and S.G. Kitchen, compilers. Proceedings: Ecology and Management of Annual Rangelands. Gen. Tech. Report INT-GTR-313, Ogden, Utah.

Schommer, Tim and Melanie Woolever. 2001. A process for finding management solutions to the incompatibility between domestic and bighorn sheep. United States Department of Agriculture Forest Service, Wallowa-Whitman National Forest, 40 pp.

Schuman, G.E., L.J. Ingram, P.D. Stahl, J.D. Derner, G.F. Vance, and J.A. Morgan. 2009. Influence of management on soil organic carbon dynamics in northern mixed-grass rangeland. Chapter 11 in Soil Carbon Sequestration and the Greenhouse Effect. 2nd Edition. SSSA Special Publication 57. Madison, Wisconsin.

Sheley, R.L., and J. K. Petroff (Eds.). 1999. Biology and Management of Noxious Rangeland Weeds. Corvallis, Oregon State University Press.

Stuth, J.W. 1991. Chapter 3: Foraging Behavior. *In:* Grazing Management: An Ecological Perspective. Timber Press, Portland, OR. P. 264.

Svejcar, T., and R. Tausch. 1991. Anaho Island, Nevada: A Relict Area Dominated by Annual Invader Species. Rangelands 13(5):233-236.

Sveum, C. M., D. Edge, and J. A. Crawford. 1998. Nesting habitat selection by sage grouse in south-central Washington. Journal of Range Management 51: 265-269.

Updike, D.R., E.R. Loft, and F.A. Hall. 1990. Wildfires on big sagebrush/antelope bitterbrush range in northeastern California: implications for deer. Pages 41–46 *in* Proceedings—Symposium on cheatgrass invasion, shrub die-off, and other aspects of shrub biology and management, Las Vegas, NV. General Technical Report INT-276, USDA Forest Service, Ogden, UT.

Valentine, K. A. 1947. Distance from Water as a Factor in Grazing Capacity of Rangeland. Journal of Forestry, Volume 45, Number 10, 1 October 1947, pp. 749-754(6).

Vallentine, John F. 2001. Grazing Management. Second Edition. Chapter 7: Spatial Patterns in Grazing. VII Distance from Water.

Vavra, M. 2005. Livestock Grazing and Wildlife: Developing Compatibilities. Rangeland Ecology & Management 58(2):128-134.

West, N.E, F.D. Provenza, P.S. Johnson, and M.K. Owens. 1984. Vegetation Change after 13 Years of Livestock Grazing Exclusion on Sagebrush Semidesert in West Central Utah. Journal of Range Management, 37(3): 262-264.

Whisenant, S. G. 1990. Changing fire frequencies on Idaho's Snake River plains: ecological and management implications. In: E. D. McArthur, E. M. Romney S. D. Smith, and P. T. Tuellar [EDS.]. Proceedings: Symposium on Cheatgrass invasion, shrub die-off, and other aspects of shrub biology and management, Las Vegas, NV. General Technical Report INT-276, USDA Forest Service, Ogden, UT.

Winder, J.A., D.A. Walker, and C.C. Bailey. 1996. Effect of Breed on Botanical Composition of Cattle Diets on Chihuahuan Desert Range. Journal of Range Management 49(3): 209-214.

___ 1980. BLM. *Wilderness Inventory - Oregon and Washington, Final Intensive Inventory Decisions.* Oregon State Office, Portland, Oregon.

___ 1984. BLM. *Rangeland Monitoring: Trend Studies* TR-*4400-4*. USDI, BLM Technical Reference.

___ 1988. BLM. *Rangeland Monitoring Handbook H-1734-2*. Oregon State Office, Portland, Oregon.

___ 1991. BLM. *Wilderness Study Report.* Volume I. Oregon State Office, Portland, Oregon.

___1993. BLM. *Donner Und Blitzen National Wild & Scenic River Management Plan and Environmental Assessment #EA-OR-020-2-72*. Burns District Office.

___1995. BLM. *Interim Management Policy and Guidelines for Lands under Wilderness Review H-8550-1*.

___ 1995. BLM. *South Steens Allotment Management Plan and Environmental Assessment #OR-026-93-015*. Burns District Office.

___1995. BLM. South Steens Wild Horse Herd Management Area Plan Update. *In:* 1995 South Steens Allotment Management Plan. Burns District Office.

___ 1997. BLM. *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington.*

___ 1997.Green Final Judgment Civil No. 95-2013-HA.

___ 1998. BLM. *Noxious Weed Management Program EA #OR-020-98-05.* Burns District Office.

___ 1998a. BLM, USFS, USDA NRCS. *Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas TR-1737-15.* Technical Reference.

___2000. USFS and BLM. *Interior Columbia Basin Supplemental Draft Environmental Impact Statement, Volume 2*. Interior Columbia Basin Ecosystem Management Project.

___ 2001. BLM, USGS. TR-1730-2. *Biological Soil Crusts: Ecology and Management*. USDI, BLM Technical Reference.

___ 2001. BLM. *Final Decision Record for Projects for Implementation of the Steens Mountain Cooperative Management and Protection Act of 2000 Environmental Assessment*, EA OR-027-01-27. Burns District Office, Hines, Oregon.

___ 2003. BLM, USFS, USDA NRCS. TR-1737-16. *Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas.* Technical Reference.

___2003. USDA NRCS. *National Range and Pasture Handbook*. Grazing Lands Technology Institute, Revision 1.

___ 2004. BLM. *Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area Proposed Resource Management Plan and Final Environmental Impact Statement.* Burns District BLM.

___ 2005. BLM. *Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area Record of Decisions and Resource Management Plans.* Burns District BLM.

___ 2006. BLM. *TR-1737-20. Grazing Management Processes and Strategies for Riparian-Wetland Areas.* USDI, BLM Technical Reference.

___ 2007. BLM. *North Steens Ecosystem Restoration Project, Final Environmental Impact Statement*. Burns District BLM.

___ 2007a. BLM. *North Steens Ecosystem Restoration Project, Record of Decision.* Burns District BLM.

___ 2008. USGS. Memorandum. *The Challenges of Linking Carbon Emissions, Atmospheric Greenhouse Gas Concentrations, Global Warming, and Consequential Impacts*.

___ 2007b. BLM. *Guano Sub-basin Water Quality Restoration Plan.* Burns District BLM.

___2010. BLM. *Wild Horse and Burros Management Handbook 4700-1*.

___2010. Oregon Department of Environmental Quality. *Oregon's 2010 Integrated Report*.

___ 2011. BLM. *Steens Mountain Cooperative Management and Protection Area (CMPA) and Andrews Management Unit (AMU) Monitoring Plan*. Burns District BLM.

___2011. Sage-grouse National Technical Team. *A Report on National Greater Sage-Grouse Conservation Measures.* 74 pp.

Appendix A: Grazing Treatment Descriptions

Early – (approximately March 1 to April 30) – This treatment provides the plants an opportunity to recover after utilization of early plant growth. By removing livestock before all spring and summer precipitation occurs, the plants will be able to store carbohydrates, set seed, and maintain their vigor. This "Early" treatment can be used every year with little effect on the plant.

The dates of April 1 to April 30 are a guideline for the "Early" treatment. Early use must take place before grass plants are in the boot stage. There must also be enough soil moisture in the ground to provide for regrowth after grazing. Therefore, flexibility in the early treatment will allow for use prior to April 1, but generally not after April 30 and will depend on climate.

Graze – (approximately May 1 to July 1-15) – This treatment allows for grazing during the critical growth period of most plants. Carbohydrate reserves are utilized when the plant grows or regrows because the green parts of the plants are removed by a grazing animal. The pastures currently under the "Graze" treatment will generally experience some other treatment the following year so as not to repeat graze treatments.

Defer – (approximately July 1 to October 15) – Grazing during this treatment will not begin until after most plants have reached seed ripe and have stored adequate carbohydrate reserves. This treatment will assist in meeting the objectives by providing all plants an opportunity to complete their life cycles and produce the maximum amount of cover and forage.

Winter – Grazing during this treatment will occur when most plant species are dormant. Most plants will have completed their life cycles and stored maximum carbohydrates for the next growing season.

Rest – This treatment provides the plants a full year of growth in the absence of grazing. They are allowed to store maximum carbohydrate reserves, set seed, and provide carryover herbage for the following year's turnout.

These dates are approximation based on general plant phenology. Year-to-year variation in phenology will occur based on climatological phenology.

Appendix B: Trend Analysis

Within the South Steens Allotment there are currently seven historic upland trend monitoring sites, which have more than one year's worth of data, and an additional eleven plots, which were established and read in 2012. Data was periodically collected between 1976 and 2012. All of the plots are currently associated with Pace 180° transects and photo points. The analysis of the data collected from each of these is shown in the tables below. Percentages are based on the Pace 180º data (Johnson and Sharp 2012). For data on the ecological sites, refer to the NRCS Rangeland Ecological Site Information System found on the internet at: https://esis.sc.egov.usda.gov/Default.aspx.

- ***Plot 6002-001, Hollywood Pasture***

This plot is located in the Loamy 10-12" ecological site, ID R023XY212OR. This ecological site typically occurs on rolling uplands and lake basin terraces with slopes of 2-20% and elevations of 4,000-6,000 feet.

Table 37: Data from Plot 6002-001 in Hollywood Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	47	22	4	27	95	0	5	Stable	Upward	---	Stable
1976	---	---	---	---	---	---	---	---	---	---	---
REFERENCE STATE	15-20%				80	5	15	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses that currently make up 95% of the plant community. No forbs were documented in the transect, and shrubs made up only 5% of the plant community. The reference plant community for this ecological site would be approximately 80% grasses, 5% forbs, and 15% shrubs. This site was read late in the year, during a drought year, which may be at least partially responsible for the lack of forbs. The low percentage of shrub cover suggests that some disturbance has occurred in the past that has reduced and/or limited shrub production. This area does get heavy use by wild horses, especially in the winter, and that may be partially responsible for the low shrub presence in the site. The dominant species at this site was Thurber's needlegrass (46%) and Sandberg's bluegrass (48%). The ESD has Thurber's needlegrass as being the dominant grass species on this site, with Sandberg's bluegrass being an important component. Bluebunch wheatgrass, green rabbitbrush, grey rabbitbrush, and big sagebrush were also present at 2% composition or lower. Wyoming sagebrush should be the dominant shrub according to the ESD. The reference state for this ecological site has approximate ground cover of 15-25%. There is some cheatgrass present, but it does not dominate the area. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is still in the reference state, but may be at risk of transitioning to State 2 – Shrub Steppe with Annuals.

The photos from 1976 suggest a site with numerous small perennial bunchgrasses being present, but also appear to have large amount of both cheatgrass and tumble mustard present. The 2012 picture, though showing heavier use in the area, also has small perennial bunchgrasses present, but there is little sign of annual grasses or weeds. Photos from both years show a decadent sagebrush stand. Based on these comparisons, it is believe that overall the photo trend is stable at this site.

Note: the Hollywood Pasture largely utilized by wild horses that were at peak numbers in 2004, above the high end of the Appropriate Management Level (AML) of 304 horses; heavy utilization by horses in the area of the trend plot (as noted under observer remarks on the 2004 form) most likely played a large factor in the downward photo trend at the site.

- ***Plot 6002-005, Hollywood Pasture***

This plot is located in the Loamy 10-12" ecological site, ID R023XY212OR. This ecological site typically occurs on rolling uplands and lake basin terraces with slopes of 2-20% and elevations of 4,000-6,000 feet.

Table 38: Data from Plot 6002-005 in Hollywood Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	47	25	0	28	85	0	15	Stable	Upward	Upward	Stable
2004	70	14	0	16	80	0	20	Stable	Stable	Stable	Down
1993	64	20	0	16	83	0	17	---	---	Down	Stable
1989	25	38	0	37	92	0	8	---	---	---	Stable
1976	---	---	---	---	---	---	---	---	---	---	Stable
1975*	---	---	---	---	---	---	---	---	---	---	---
REFERENCE STATE	15-20%	80	5	15	N/A	N/A	N/A	N/A			

*Range trend plot data was collected in 1975; however, the method used is not comparable to the Pace 180° data and therefore no comparison is available.

The site is dominated by perennial grasses that currently make up 85% of the plant community. While this is an increase from 80% in 2004, the change is not enough to suggest an upward trend. Shrubs seemed to have increased since 1989 and remained relatively stable since 1993. Some of the decrease in shrubs is potentially due to the aroga moth infestation that has occurred in the area over the past three years. Forbs have not been documented and any of the transects; however, all the transects were read in mid-August to September, after many forbs would have matured, and after grazing. Therefore, it is likely that forbs are present in higher numbers than the data suggests, and they were not present in the transects due to having previously completed their lifecycle and withered or were grazed. Observer remarks from the 1993 data estimate that forb cover is approximately 10%, based of visual observances. Species composition within each growth form was relatively consistent between 1993 and 2004. Composition is relatively consistent with what would be expected of the reference state, based on the ESD, which would be 80% grass, 5% forbs, and 15% shrubs. Thurber's needlegrass and Wyoming big sagebrush are the dominant species on this site, which match the reference state. Cover at the site was calculated and found that bare ground was 70%, litter 14%, and vegetation 16%. This plot has cover levels inline with the reference state range of 15-20%. By comparing these numbers to previous years' data, it appears that a decrease in vegetation of over one-half occurred between 1989 and 1993, and vegetation cover was stable from 1993 to 2004, but has shown an increase in 2012, which was also associated with a decrease in bare ground and in increase in litter. Due to these changes between 2004 and 2012, it is believed that the data trend at this site is upward.

It appears that the number and size of plants was similar between 2004 and 2012. However, it does appear that there is more cover in 2012 than there was in 2004. Overall, it is estimated that the photo

trend on this site is stable, with a upward lean.

Note: the Hollywood Pasture largely utilized by wild horses that were at peak numbers in 2004, above the high end of the Appropriate Management Level (AML) of 304 horses; heavy utilization by horses in the area of the trend plot (as noted under observer remarks on the 2004 form) most likely played a large factor in the downward photo trend at the site.

- ***Plot 6002-002, Tombstone Pasture***

This plot is located in the Claypan 10-12" ecological site, ID R023XY214OR. This site occurs on nearly level to moderately steep tablelands and alluvial fans. Slope ranges from 0-70%, but is commonly less than 30%. Elevations for this ecological site range from 4,200-6,200 feet.

Table 39: Data from Plot 6002-002 in Tombstone Pasture

	% Ground Cover				%Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	26	16	13	39	72	12	16	Stable	Stable	Stable	Stable
2004	36	32	16	16	72	0	28	Stable	Upward	Stable	Stable
2001	19	54	12	15	81	12	7	---	---	Down	Stable
1993	20	34	17	29	60	10	30	---	---	Stable	Stable
1989	18	30	27	25	79	0	21	---	---	---	Stable
1976	---	---	---	---	---	---	---	---	---	---	---
REFERENCE STATE	20-35%				65	10	25	N/A	N/A	N/A	N/A

The site is dominated by perennial grasses that currently make up 72% of the plant community. This is the same as in 2004. While it appears that sagebrush decrease between 2004 and 2012, this is probably due to the increased presence of forbs on the site. Sandberg's bluegrass accounted for approximately 70% while squirreltail accounted for 2%. The major difference is that bluebunch wheatgrass and Idaho fescue were not documented in the 2012 transect, but were all present in 2004. One potential reason for this change is that the exact plot location was not found in 2012, so it was reestablished as close to the original location as possible. Low sagebrush makes up the entire shrub component on the site. Cover at the site shows a large increase in vegetation while there was a decrease in litter of one-half, a small decrease in rock cover, and a 10% decrease in bare ground. When you compare the trend data to the reference state for this ESD, the site is favoring grasses more than shrubs, with the forb component being just about as expected. Ground cover at the site is also appropriate.

No comparison can be made between plot photos, since the exact plot location was not found in 2012. However, the landscape photos are obviously taken in the same vicinity and can be compared. The most obvious difference in the photos is that in 2012 there has been a large amount of fine fuels accumulating on the site. It is difficult to determine if the number of plants as also increased, though it is possible since the area went through a wet cycle in 2010 and 2011. Overall, it is estimated that the trend on this site is stable.

- ***Plot 6002-004, Tombstone Pasture***

This plot is located in the transition area between Claypan 12-16” ecological site, ID R023XY216OR and Juniper Tableland 12-16”, ID R023XY217OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Juniper Tableland site generally occurs on hills, ridges, and tablelands with slopes of 2-30% and elevations of 4,000-6,000 feet.

Table 40: Data from Plot 6002-004 in Tombstone Pasture

	% Ground Cover				% Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	33	16	10	41	76	16	8	Slight	Stable	Stable	Stable
2004	45	23	17	15	89	1	10	Stable	Stable	Stable	Down
2001	11	42	29	18	69	26	4	---	---	Stable	Stable
1993	22	33	20	25	69	4	27	---	---	Down	Stable
1989	23	18	27	32	96	0	4	---	---	---	Stable
1976	---	---	---	---	---	---	---	---	---	---	---
REFERENCE STATE	20-30% Claypan 35-45% Juniper Tableland				55-60	10	30-35	N/A	N/A	N/A	N/A

The site is dominated by perennial grasses that currently make up 76% of the plant community. While this is a decrease from 89% in 2001, it is likely that the majority of this increase is due to the lack of forbs that were found in the transect in 2004. Sandberg’s bluegrass accounted for approximately 64% while bottlebrush squirreltail and onespike danthonia comprised approximately 9% and 3% of the plant community, respectively. The main difference between these numbers and the 2004 numbers is that in 2004, Idaho fescue was recorded. However, it was not recorded in 2001 which may suggest an error in the reading. Low sagebrush makes up 8% of the plant composition, which is an increase from 2004 when no low sagebrush (only big sagebrush) was in the data. However, in 2001 4% low sagebrush was present and no big sagebrush, but 1993 data shows big sagebrush at 8% and low sagebrush at 19%. These changes in sagebrush type in the transect may be due to reading error, but may also be due to the site being located in a transition zone, and slight changes in how the transect is read may cause some inconsistencies with the shrub canopy. By comparing the shrub data, is appears that there was some disturbance to the shrub component between 1993 and 2001, most likely a wildfire. Cover at the site was calculated and found that bare ground was 33%, litter 16%, rock 10%, and vegetation 41%. By comparing these numbers to previous years’ data, it appears that a increase in vegetation of almost three times occurred between 2004 and 2012, but only some of that was associated with a decrease in bare ground, while the rest was due to a decrease in rock and litter. By comparing these values to that of the ESD reference state, it is determined that while the amount of cover is appropriate to the site, the site is favoring grasses and is lacking in the shrub component. In addition, the perennial grasses species that should be dominant (Idaho fescue and bluebunch wheatgrass) were not present on the site.

The landscape photos, show increase sagebrush loss; however, while there is evidence of wildfire sometime in the past, the recent shrub loss was not a result of fire, but likely a result of aroga infestation which has occurred in the past few years within the allotment and across the Burns District. The plot photo, while showing an increase in the number and vigor of grass plants, also shows a decrease in the shrub component ; no living shrubs are visible in the 2012 photo when at least four different plants were

visible in 2004. Overall, it is estimated that the trend on this site is stable, though moving more towards a grass site than a shrub site.

- ***Plot 6002-007, Tombstone Pasture***

This plot is located in the Claypan 10-12" ecological site, ID R023XY214OR. This site occurs on nearly level to moderately steep tablelands and alluvial fans. Slope ranges from 0-70%, but is commonly less than 30%. Elevations for this ecological site range from 4,200-6,200 feet.

Table 41: Data from Plot 6002-007 in Tombstone Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	27	21	5	47	80	4	16	Stable	Stable	Stable	Stable
2004	37	33	13	17	67	0	33	Stable	Stable	Stable	Stable
2001	21	48	9	22	79	10	11	---	Upward	Stable	Stable
1993	41	22	10	27	63	1	36	---	---	---	Stable
1976	---	---	---	---	---	---	---	---	---	---	---
REFERENCE STATE	20-35%				65	10	25	N/A	N/A	N/A	N/A

The site is dominated by perennial grasses that currently make up 80% of the plant community. This is an increase from 67% in 2004, but is similar to the 2001 data. While the 2004 data did not record any forbs, the photos show that the site had been grazed prior to reading the transect and the data was not collected until mid-August, after many forbs would have matured. The 2012 data, even though read late, found that forbs made up 4% of the plant community. Shrubs showed a decrease of 17% between 20012 and 2004, however, this number is much closer to the 2001 number of 11%, while the 2004 data was similar to the 1993 data. This may suggest some slight differences in how the transect was read. Low sagebrush was the only shrub found in the plot. Sandberg's bluegrass accounted for approximately 76% while bottlebrush squirreltail comprised approximately 4% of the plant community. However, unlike in 2004, no Idaho fescue was documented at the site; but that was also true in 2001 when Sandberg's bluegrass was found to make up 75% of the vegetation and squirreltail, not Idaho fescue, made up 4%. Cover at the site appears to have increase due to an increase in vegetation and decrease in litter, rock, and bare ground. Some of these minor fluctuations are likely partly due to slight differences in how the transect was read. When comparing this data to the reference state, the cover is adequate, but the site has a larger grass component and smaller shrub component than what would be expected. While bluebunch wheatgrass, which should be the dominant species, was not located in the plot, the other species are sub-dominant in the reference state suggesting that based on composition, there site is similar to expected.

The landscape photos suggest that while there was some sagebrush decadence in 2004, it has continued to increase in 2013. It is likely this decrease is a result of aroga moth infestation that has occurred within the allotment and across the Burns district. The 2012 photo shows numerous large perennial grass plants; however, these plants may have been present in 2004, just not obvious in the photo since grazing had been regularly occurring (Tombstone was rested in 2011 and 2012). The plot photo shows a small change in size and vigor of vegetation, but it is not large enough to suggest an upward photo trend, especially since the shrub component within the plot appears to have become more decadent from 2004.

Both photos show an increase in fuels, both fine and woody. verall, it is estimated that the trend on this site is stable.

- ***Plot 6002-008, Tombstone Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Juniper Tableland 12-16", ID R023XY217OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Juniper Tableland site generally occurs on hills, ridges, and tablelands with slopes of 2-30% and elevations of 4,000-6,000 feet.

Table 42: Data from Plot 6002-008 in Tombstone Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	40	25	1	34	76	13	11	Stable	Upward	---	---
REFERENCE STATE	20-30% Claypan 35-45% Juniper Tableland				55-60	10	30-35	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses that currently make up 76% of the plant community, dominated by Sandberg's bluegrass (64%), with bottlebrush squirreltail (8%), Thurber's needlegrass (2%) and Idaho fescue (2%) are also present. Forbs made up 13%, despite the late reading of the plot, and shrubs made up 11% of the plant community, with low sagebrush being the only shrub present. When compared to the reference plant community, this site has more grasses and not as many shrubs. The low percentage of shrub cover suggests that some disturbance has occurred in the past that has reduced and/or limited shrub production. Based on the ESDs associated with this site, Idaho Fescue and low sagebrush should be dominant on this site; however, Sandberg's bluegrass would also be prominent on the site. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-45%; vegetation cover alone is within this range. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is still in the reference state, but it most likely in the perennial grass and forb phase than the reference plant community phase.

Plot photo from this site shows numerous vigorous perennial bunchgrasses within the plot with an accumulation of fine fuels. There is no sagebrush within not only the plot, but the entire photo, with a small amount of woody litter in one corner of the photo. The landscape photo also shows good vigorous herbaceous cover. However, the sagebrush component at this site is minimal, with the majority of the shrubs appearing to be decadent. This may be due to a recent aroga moth infestation that has occurred across the allotment and district. The photo also shows some juniper trees in the background; however, they are far enough in the background that it is not likely juniper encroachment is an issue on this site. Due to the lack of woody litter in this photo (other than decadent shrubs) it is likely this site burned in the past, removing a large portion of the sagebrush.

- ***Plot 6002-009, Tombstone Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Juniper Tableland 12-16", ID R023XY217OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Juniper Tableland site generally occurs on hills, ridges, and tablelands with slopes of 2-30% and elevations of 4,000-6,000 feet.

Table 43: Data from Plot 6002-009 in Tombstone Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	18	14	11	57	49	4	47	Stable	Upward	---	---
REFERENCE STATE	20-30% Claypan 35-45% Juniper Tableland				55-60	10	30-35	N/A	N/A	N/A	N/A

This site is appears to be codominated by perennial grasses and shrubs. The site is dominated by Sandberg's bluegrass (22%) and bluebunch wheatgrass (18%), with bottlebrush squirreltail (5%), Thurber's needlegrass (2%), and Idaho fescue (2%) are also present on the site. Forbs made up 4%, despite the late reading of the plot. Antelope bitterbrush and low sagebrush dominant the site at 25% and 20%, respectively. When compared to the reference plant community, this site has more shrubs and fewer grasses, with forbs also being slightly lower (though this could just be due to the late season reading). Due to the high percentage of shrubs on the site, it is expected that they are suppressing the grasses due to increased competition. Based on the ESDs associated with this site, Idaho Fescue and low sagebrush should be dominant on this site; however, Sandberg's bluegrass would also be prominent on the site. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-45%; vegetation cover alone exceeds this. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is still in the reference state; however, lack of disturbance has resulted in shrubs dominating the site.

Plot photo from this site shows numerous vigorous perennial bunchgrasses within the plot with some decadent shrubs outside of the plot. Some of the bunchgrasses within the plot appear to be accumulating fine fuels within the crown of the plant. The landscape photo also shows good cover, with the shrubs being fairly healthy, though these is some decadence. The photo also shows some juniper trees in the background as well as some cut trees. This plot is located within an area that was originally proposed for a prescribed burn, but has been changed to a cut and pile area. Due to the nearness of juniper to this plot, it is expected that this site is at high risk of juniper encroachment, though juniper treatments should help slow encroachment down, minimizing the effects of juniper on this site.

- ***Plot 6002-003, Steens Pasture***

This plot is located in the Claypan 12-16" ecological site, ID R023XY216OR. This site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet.

Table 44: Data from Plot 6002-003 in Steens Pasture

	% Ground Cover				%Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	35	5	37	23	91	9	0	Stable	Upward	Stable	Stable
2004	21	6	61	12	91	4	5	Stable	Stable	Stable	Stable
2001	21	24	40	15	95	1	4	---	Upward	Stable	Stable
1993	20	11	52	17	88	2	10	---	---	Stable	Stable
1989	16	2	35	47	96	0	4	---	---	---	Stable
1976	---	---	---	---	---	---	---	---	---	---	---
REFERENCE STATE	20-30%				60	10	30	N/A	N/A	N/A	N/A

The site is dominated by perennial grasses that currently make up 91% of the plant community. Sandberg's bluegrass accounted for approximately 73% while squirreltail and Idaho fescue comprised approximately 14% and 4% of the plant community, respectively. This is consistent with the 2004 data. The major difference between 2004 and 2012 is that no shrubs were documents in 2012. One inconsistency is that in 2012 rock decreased from 61% to 37%. This suggests a slight variation in the direction the transect was read; however, this appears to have occurred in the past as well. Bare ground on the site showed an increase be 35%, but vegetation also increased to 23%, while litter stayed relatively the same. The decrease in rock cover is probably the main cause for the increase in vegetation and bare ground. When the data from all years is compared, it suggests that since 1976, this site has remained relatively stable, with only minor fluctuations in cover and composition. When compared to the reference plant community, this has a large grass component and is missing the shrub component. The reference state for this ecological site has approximate ground cover of 20-30%; vegetation cover alone at this site exceeds this. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the reference state, though it is not likely in the reference plant community phase, but in the perennial grass and forb phase.

The plot photo comparison between 2004 and 2012 shows a large increase in the production of perennial grasses on the site as well as three shrubs that have since died. There is a large amount of herbaceous and woody litter accumulating within the plot. The landscape photos also shows that the site has a larger herbaceous component and smaller shrub component. Since it does not appear that a fire occurred on this site recently, it is believe the at least a portion of shrub loss was caused by the recent aroga moth infestation that has occurred within the allotment and across the district. While there is some obvious shrub loss, the shrub component on the site was minor in 2004. Therefore, overall, it is estimated that the trend on this site is stable.

- ***Plot 6002-006, Steens Pasture***

This plot is located in the Claypan 12-16" ecological site, ID R023XY216OR. This site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet.

Table 45: Data from Plot 6002-006 in Steens Pasture

	% Ground Cover				% Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	44	2	14	40	79	16	5	Stable	Stable	Stable	Down
2004	53	28	6	13	84	0	16	Slight	Upward	Down	Down
2001	26	41	7	25	72	23	4	---	Upward	Up	---
1993	39	28	13	20	78	5	17	---	---	Stable	Up
1989	31	30	13	26	92	0	8	---	---	---	Up
1976	---	---	---	---	---	---	---	---	---	---	Stable
1975	---	---	---	---	---	---	---	---	---	---	---
REFERENCE STATE	20-30%				60	10	30	N/A	N/A	N/A	N/A

The site is dominated by perennial grasses that currently make up 79% of the plant community. This is a decrease from 84% in 2004, but an increase from 72% in 2001. Overall, since 1989 it appears that grasses have been relatively stable and have dominated the site. Shrubs also show a decrease from 2004, and is similar to the 2001 reading. The shrub values have fluctuated over the life of this plot, and that may suggest a slight difference in the reading of the transect. The 2004 data did not record any forbs. The photos for that year show that the site had been grazed prior to reading the transect, and the data was not collected until mid-August, after many forbs would have matured. While the plot was read late in 2012, forbs still made up a large component of the site; however, only one forb, big-headed clover, was recorded, and this is a small species. In 2001, big-headed clover was the dominant forb, but four other species were present. It is likely that forbs are present in higher numbers than the most current data suggests, and they were not present due to the late season reading of the plot and/or the fact that 2012 was a drought year. Sandberg's bluegrass accounted for approximately 68% (which is what it was in 2004), while bottlebrush squirreltail comprised approximately 11% of the plant community. Low sagebrush was the only shrub recorded. The increase in forbs may account for the decrease in composition of both shrubs and grasses since 2004. This is supported by the fact that while grasses and forbs decreases, overall ground cover on the site increased, with vegetation making up 40%, a significant increase from 2004 when it was only 13%. While bare ground has decreased since 2004, it is still higher than it had been in all other readings. However, there was hardly any litter documented in the transect in 2012 and it was found to make up only 2% of the ground cove, while in previous years it had ranged from 28-40%. Some of the litter cover from previous years was most likely bare ground in 2012. When compared to the reference plant community, this has a larger grass component and does not have the expected shrubs. Low sagebrush, which dominates the reference community, is the dominant shrub on this site. The reference state for this ecological site has approximate ground cover of 20-30%; vegetation cover alone at this site exceeds this. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the reference state, though it is not likely in the reference plant community phase, but in the perennial grass and forb phase.

No photos were taken in 2001; therefore, no photo trend for 1993 to 2001 or 2001 to 2004 can be determined. The photo trend in the 2004 row was determined using the 1993 and 2004 photos. The trend from the landscape photos of 1993 and 2004 show a decrease in shrub abundance and vigor across the site. This is also visible when comparing the plot photos for the two years. The increase in bare ground is also obvious when comparing the 1993 and 2004 photos. In comparing the plot photos between 2004

and 2012, it appears that there has been shrub mortality at the site and in increase in the herbaceous component. The landscape photo comparison shows a site the tends to get moderate to heavy use and us dominated by small perennial bunchgrasses. The sagebrush component at this site shows an obvious decrease in abundance and health from 2004 to 2012. This is likely due to the aroga moth infestation that has occurred in the past few years. However, since the site appears to receive livestock and wild horse use, some of the sagebrush loss could be due to trampling effects. While this site is over one-quarter mile from any reservoir, it is located near the beginning of an intermittent drainage. If this site has an increased level of ground water, there may be some green vegetation later in the year that would attract grazing animals.

- ***Plot 6002-010, Steens Pasture***

This plot is located in the Claypan 10-12" ecological site, ID R023XY214OR. This site occurs on nearly level to moderately steep tablelands and alluvial fans. Slope ranges from 0-70%, but is commonly less than 30%. Elevations for this ecological site range from 4,200-6,200 feet.

Table 46: Data from Plot 6002-010 in Steens Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	38	14	8	38	96	0	4	Stable	Upward	---	---
REFERENCE STATE	20-35%				65	10	25	N/A	N/A	N/A	N/A

This site is largely dominated by grasses, which make up 96% of the plant composition, with shrubs making up the other 4%. No forbs were documented within this transect, but that is probably at least in part due to the late season in which this plot was read. The grass component at this site was dominated by Sandberg's bluegrass (72%), with bluebunch wheatgrass (20%) and bottlebrush squirreltail (4%). According to the ESD, as the soil surfaces become thinner, the proportion of Sandberg's bluegrass increases (thicker soils favor Idaho fescue). Low sagebrush was the only shrub present. There is no specific STM developed by the NRCS for this ecological site.

The plot photo for this site shows large perennial bunchgrasses, with a large level of fine fuel accumulation. There are no shrubs in the photo. The landscape photo shows a site with good ground cover and fine fuel accumulation across it. Many of the shrubs that are present appear to be at least partially decadent. The lack of shrubs across the site, decadent or healthy, suggest that this site burned in the past and the shrub component has been unable to recover. There are some juniper trees in the distance, but there do not appear to be any present on the site.

- ***Plot 6002-011, Steens Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Juniper Tableland 12-16", ID R023XY217OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Juniper Tableland site generally occurs on hills, ridges, and tablelands with slopes of 2-30% and elevations of 4,000-6,000 feet.

Table 47: Data from Plot 6002-011 in Steens Pasture

	% Ground Cover				% Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	18	7	41	32	96	3	1	Stable	Stable	---	---
REFERENCE STATE	20-30% Claypan 35-45% Juniper Tableland				55-60	10	30-35	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses that currently make up 96% of the plant community. Forbs made up 3%, despite the late reading of the plot, and shrubs made up only 1% of the plant community. When compared to the reference plant community, this site has more grasses and not as many shrubs. The low percentage of shrub cover suggests that some disturbance has occurred in the past that has reduced and/or limited shrub production. Sandberg's blue grass was the dominant grass on this site, making up 66% of the composition, followed by bottlebrush squirreltail (14%), Thurber's needlegrass (10%), Idaho fescue (14%), and onespike danthonia (2%). Based on the ESDs associated with this site, Idaho Fescue and bluebunch wheatgrasses should be dominant on this site; however, Sandberg's bluegrass would be more common as the soil surface becomes thinner. The dominant shrub on this site should be low sagebrush; however, the only shrub documented was western juniper. Phlox was the only forb present, and would also be found in the reference state. The reference state for this ecological site has approximate ground cover of 20-45%; vegetation cover alone is within this range. There is an abundance of Japanese brome present on the site. Based on the trend data, this plot is showing cover data consistent with the Low Sagebrush – Bunchgrass with Annuals State. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the Low Sagebrush – Sandberg Bluegrass Phase due to the presence of Japanese brome.

Plot photo from this site shows numerous perennial bunchgrasses, though they are mostly small and most likely Sandberg's bluegrass. There is also a lot of fine fuel accumulating on the site. Within the plot, there is a sagebrush seedling, showing that some sagebrush recruitment is occurring. The landscape photo also shows good herbaceous cover; however, there are very few shrubs even visible, with the exception of juniper. The juniper, though posing a risk to the site, is still Phase I and it is not expected that it is causing degradation on this site. This site is located in the vicinity of a spring and reservoir, both of which get frequented by grazing animals (livestock and wild horses). It is possible that this has resulted in increased use at this site.

- ***Plot 6002-012, Steens Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Juniper Tableland 12-16", ID R023XY217OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Juniper Tableland site generally occurs on hills, ridges, and tablelands with slopes of 2-30% and elevations of 4,000-6,000 feet.

Table 48: Data from Plot 6002-012 in Steens Pasture

	% Ground Cover				% Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	42	12	9	37	88	5	7	Stable	Upward	---	---
REFERENCE STATE	20-30% Claypan 35-45% Juniper Tableland				55-60	10	30-35	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses that currently make up 88% of the plant community. Forbs made up 5%, despite the late reading of the plot, and shrubs made up only 7% of the plant community. When compared to the reference plant community, this site has more grasses and not as many shrubs. The low percentage of shrub cover suggests that some disturbance has occurred in the past that has reduced and/or limited shrub production. Sandberg's blue grass was the dominant grass on this site, making up 65% of the composition, followed by Idaho fescue at 14%. Based on the ESDs associated with this site, Idaho Fescue and bluebunch wheatgrasses should be dominant on this site; however, Sandberg's bluegrass would be more common as the soil surface becomes thinner. The dominant shrub on this site should be low sagebrush, which was the only shrub found in the transect. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-45%; vegetation cover alone is within this range. There is some Japanese brome present on the site. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is still in the reference state, but may be at risk of transitioning to State 2 – Low Sagebrush –Bunchgrass with Annuals due to the presence of Japanese brome.

Plot photo from this site shows numerous perennial bunchgrasses within the plot with large amounts of litter accumulation, especially woody litter. There are also some small low sagebrush plants becoming established. The landscape photo also shows good herbaceous cover; however, the low sagebrush at this site appears to be decadent. This may be due to a recent aroga moth infestation that has occurred across the district.

- ***Plot 6002-013, Steens Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Loamy 12-16", ID R023XY318OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Loamy site occurs in mountainous terrain on ridges and mountain shoulders, with slopes ranging from 2-35%, but typically no more than 20%, in an elevation range of 4,500-8,000 feet.

Table 49: Data from Plot 6002-013 in Steens Pasture

	% Ground Cover				% Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	35	10	17	38	75	10	15	Stable	Upward	---	---
REFERENCE STATE	20-30%				60-75	10	15-30	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses and have eight species currently making up 75% of the plant community. Forbs made up 10%, despite the late reading of the plot, and shrubs made up 15% of the plant community. When compared to the reference plant community, this site fits for functional group composition. Sandberg's blue grass was the dominant grass on this site, making up 47% of the composition, with bottlebrush squirreltail and Idaho fescue at 9% and 7%, respectively. Based on the ESDs associated with this site, Idaho Fescue and bluebunch wheatgrasses should be dominant on this site; however, Thurber's needlegrass, bottlebrush squirreltail, and Sandberg's bluegrass should be subdominant. No bluebunch wheatgrass was documented at this site. The dominant shrub on this site should be, and is, low sagebrush. Antelope bitterbrush and western juniper were also documented in the transect. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-30%; vegetation cover alone at this site exceeds this. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the reference state.

Plot photo from this site shows perennial bunchgrasses within the plot with large amounts of herbaceous litter accumulation. No landscape photo was taken.

- ***Plot 6002-014, Steens Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Loamy 12-16", ID R023XY318OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Loamy site occurs in mountainous terrain on ridges and mountain shoulders, with slopes ranging from 2-35%, but typically no more than 20%, in an elevation range of 4,500-8,000 feet.

Table 50: Data from Plot 6002-014 in Steens Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	42	9	5	44	74	5	21	Stable	Upward	---	---
REFERENCE STATE	20-30%				60-75	10	15-30	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses and have four species [Sandberg's bluegrass (38%), bottlebrush squirreltail (19%), Idaho fescue (14%), and Thurber's needlegrass (3%)] currently making up 74% of the plant community. Forbs, specifically lupine, made up 5%, despite the late reading of the plot, and shrubs made up 21% of the plant community. When compared to the reference plant community, this site almost fits the functional group composition, with only forbs being fewer than the reference state. Based on the ESDs associated with this site, Idaho Fescue and bluebunch wheatgrasses should be dominant on this site; however, Thurber's needlegrass, bottlebrush squirreltail, and Sandberg's bluegrass should be subdominant. No bluebunch wheatgrass was documented at this site. The dominant shrub on this site should be, and is, low sagebrush (8%). Antelope bitterbrush, green rabbitbrush, big sagebrush, grey rabbitbrush, and western juniper were also documented in the transect. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-30%; vegetation cover alone at this site exceeds

this. Based on the trend data, this plot is showing cover data consistent with the reference site. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the reference state.

Plot photo from this site shows perennial bunchgrasses within the plot with some herbaceous and woody litter accumulation. Landscape photo shows that this area was burned in the past (juniper skeletons in background), and a variety of shrubs. A range of perennial bunchgrasses are also visible.

- ***Plot 6002-015, Steens Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Loamy 12-16", ID R023XY318OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Loamy site occurs in mountainous terrain on ridges and mountain shoulders, with slopes ranging from 2-35%, but typically no more than 20%, in an elevation range of 4,500-8,000 feet.

Table 51: Data from Plot 6002-015 in Steens Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	55	3	6	36	81	12	7	Stable	Upward	---	---
REFERENCE STATE	20-30%				60-75	10	15-30	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses and have four species [Sandberg's bluegrass (56%), bottlebrush squirreltail (6%), Idaho fescue (10%), and Thurber's needlegrass (9%)] currently making up 81% of the plant community. Forbs, mainly lupine, made up 12% composition, despite the late reading of the plot, and shrubs made up 7% of the plant community. When compared to the reference plant community, this has a larger grass component and is lacking the expected shrubs. Based on the ESDs associated with this site, Idaho Fescue and bluebunch wheatgrasses should be dominant on this site; however, Thurber's needlegrass, bottlebrush squirreltail, and Sandberg's bluegrass should be subdominant. No bluebunch wheatgrass was documented at this site. The dominant shrub on this site should be low or big sagebrush; however, big sagebrush makes up only 1% of the species composition, while antelope bitterbrush and western juniper make up 3% each, with no low sagebrush in the transect. Ceanothis and both gray and green rabbitbrush was documented on the site. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-30%; vegetation cover alone at this site exceeds this. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the reference state, though it is not likely in the reference plant community phase, but in the perennial grass and forb phase.

Plot photo from this site shows small perennial bunchgrasses and some forbs within the plot. Landscape photo shows that this area was burned in the past (juniper skeletons in background). From the photos, it is obvious that this site has received heavy use, which was probably a combination of livestock and wild horse use. Four wild horses were in the plot area when the transect was read.

- ***Plot 6002-016, Home Creek Pasture***

This plot is located in the transition area between Claypan 12-16” ecological site, ID R023XY216OR and Loamy 12-16”, ID R023XY318OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Loamy site occurs in mountainous terrain on ridges and mountain shoulders, with slopes ranging from 2-35%, but typically no more than 20%, in an elevation range of 4,500-8,000 feet.

Table 52: Data from Plot 6002-016 in Home Creek Pasture

	% Ground Cover				% Composition			Trend			
Year	**Bare Grd.**	**Litter**	**Rock**	**Veg.**	**Grass**	**Forbs**	**Shrubs**	**Soil Surface**	**Observed Apparent**	**Data**	**Photo**
2012	31	6	8	55	63	15	22	Stable	Upward	---	---
REFERENCE STATE	20-30%				60-75	10	15-30	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses and have four species [Sandberg’s bluegrass (13%), bottlebrush squirreltail (12%), Idaho fescue (34%), and needle and thread grass (4%)] currently making up 63% of the plant community. Forbs, mainly lupine and buckwheat, made up 15% composition, despite the late reading of the plot, and shrubs made up 22% of the plant community. When compared to the reference plant community, this site has the appropriate grass and forb composition. While percentage wise, this site has an appropriate shrub component, antelope bitterbrush is the dominant shrub at 11% composition, while low sagebrush makes up only 6%, big sagebrush 1%, and western juniper 4%. The dominant shrub on this site should be low or big sagebrush. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-30%; vegetation cover alone at this site exceeds this. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the reference state, and most similar to the reference plant community phase.

Plot photo from this site shows some perennial bunchgrasses and some forbs within the plot, along with a sagebrush seeding. The grasses are dormant, and the is some fine and woody litter accumulating. Other small sagebrush seedlings are seen in the photo, though outside the plot. Landscape photo shows that this area is becoming dominated by western juniper; many different age classes of juniper are visible. While numerous shrubs are present in this photo, it appears that there is a large amount of decadent sagebrush. While some of this may be caused by the juniper encroachment, it is more likely that it is due either to old age or to aroga moth, which has infested many areas within the allotment and across the district.

- ***Plot 6002-017, Home Creek Pasture***

This plot is located in the Claypan 12-16” ecological site, ID R023XY216OR. This site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet.

Table 53: Data from Plot 6002-017 in Home Creek Pasture

	% Ground Cover				% Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	36	3	20	41	82	6	12	Stable	Upward	---	---
REFERENCE STATE	20-30%				60	10	30	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses and have five species [Sandberg's bluegrass (35%), bottlebrush squirreltail (9%), Idaho fescue (36%), bluebunch wheatgrass (1%), and Thurber's needlegrass (1%)] currently making up 82% of the plant community. Forbs, mainly lupine, made up 6% composition, despite the late reading of the plot, and shrubs made up 12% of the plant community. When compared to the reference plant community, this has a larger grass component and does not have the expected shrubs. As expected, Idaho Fescue is dominant on this site. Low sagebrush, which dominates the reference community, is the dominant shrub on this site, at 10% composition; green rabbitbrush is the other shrub documented on the site. The reference state for this ecological site has approximate ground cover of 20-30%; vegetation cover alone at this site exceeds this. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is in the reference state, though it is not likely in the reference plant community phase, but in the perennial grass and forb phase.

Plot photo from this site shows some vigorous perennial bunchgrasses and some decadent sagebrush, and a large amount of woody litter; there is very good ground cover within the plot. Landscape photo shows that this area has some decadent low sagebrush (potentially due to aroga moth) and is at risk of being encroached by western juniper since it is in the vicinity. However, its scattered presence and the lack of small trees in the photo suggest that juniper is not yet causing any degradation on the site. The landscape photo also shows numerous vigorous, deep-rooted bunchgrasses spread across the site.

- ***Plot 6002-018, Home Creek Pasture***

This plot is located in the transition area between Claypan 12-16" ecological site, ID R023XY216OR and Juniper Tableland 12-16", ID R023XY217OR. The Claypan site occurs on various landforms, ranging from nearly level tablelands and alluvial fans to moderately steep escarpments. Slopes on this ecological site range from 2-30%, but generally less than 20%, at elevations from 4,500-6,500 feet. The Juniper Tableland site generally occurs on hills, ridges, and tablelands with slopes of 2-30% and elevations of 4,000-6,000 feet.

Table 54: Data from Plot 6002-018 in Home Creek Pasture

	% Ground Cover				% Composition			Trend			
Year	Bare Grd.	Litter	Rock	Veg.	Grass	Forbs	Shrubs	Soil Surface	Observed Apparent	Data	Photo
2012	28	15	25	32	89	9	2	Stable	Stable	---	---
REFERENCE STATE	20-30% Claypan 35-45% Juniper Tableland				55-60	10	30-35	N/A	N/A	N/A	N/A

This site is dominated by perennial grasses that currently make up 89% of the plant community, dominated by Sandberg's bluegrass (53%) and bottlebrush squirreltail (28%). Forbs made up 9%, despite the late reading of the plot, and shrubs made up only 2% of the plant community, with low

sagebrush being the only shrub present. When compared to the reference plant community, this site has more grasses and not as many shrubs. The low percentage of shrub cover suggests that some disturbance has occurred in the past that has reduced and/or limited shrub production. Based on the ESDs associated with this site, Idaho Fescue and low sagebrush should be dominant on this site; however, Sandberg's bluegrass would also be prominent on the site. All of the forb species are species that would be present in the reference state. The reference state for this ecological site has approximate ground cover of 20-45%; vegetation cover alone is within this range. Based on the trend data, this plot is showing cover data consistent with the reference state. In comparison of this data with the ESD State and Transition Model (STM) it is believed that this site is still in the reference state, but it most likely in the perennial grass and forb phase than the reference plant community phase.

Plot photo from this site shows numerous perennial bunchgrasses within the plot with some decadent shrubs outside of the plot. The landscape photo also shows good herbaceous cover; however, the low sagebrush at this site appears to be very decadent with only some portions of some plants still alive. This may be due to a recent aroga moth infestation that has occurred across the allotment and district. The photo also shows some juniper trees in the background; however, they appear to be large older trees and it does not appear that juniper encroachment is an issue on this site.

Appendix C: Maps

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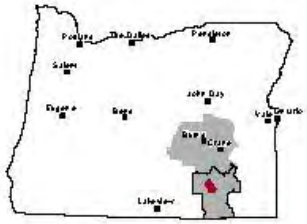
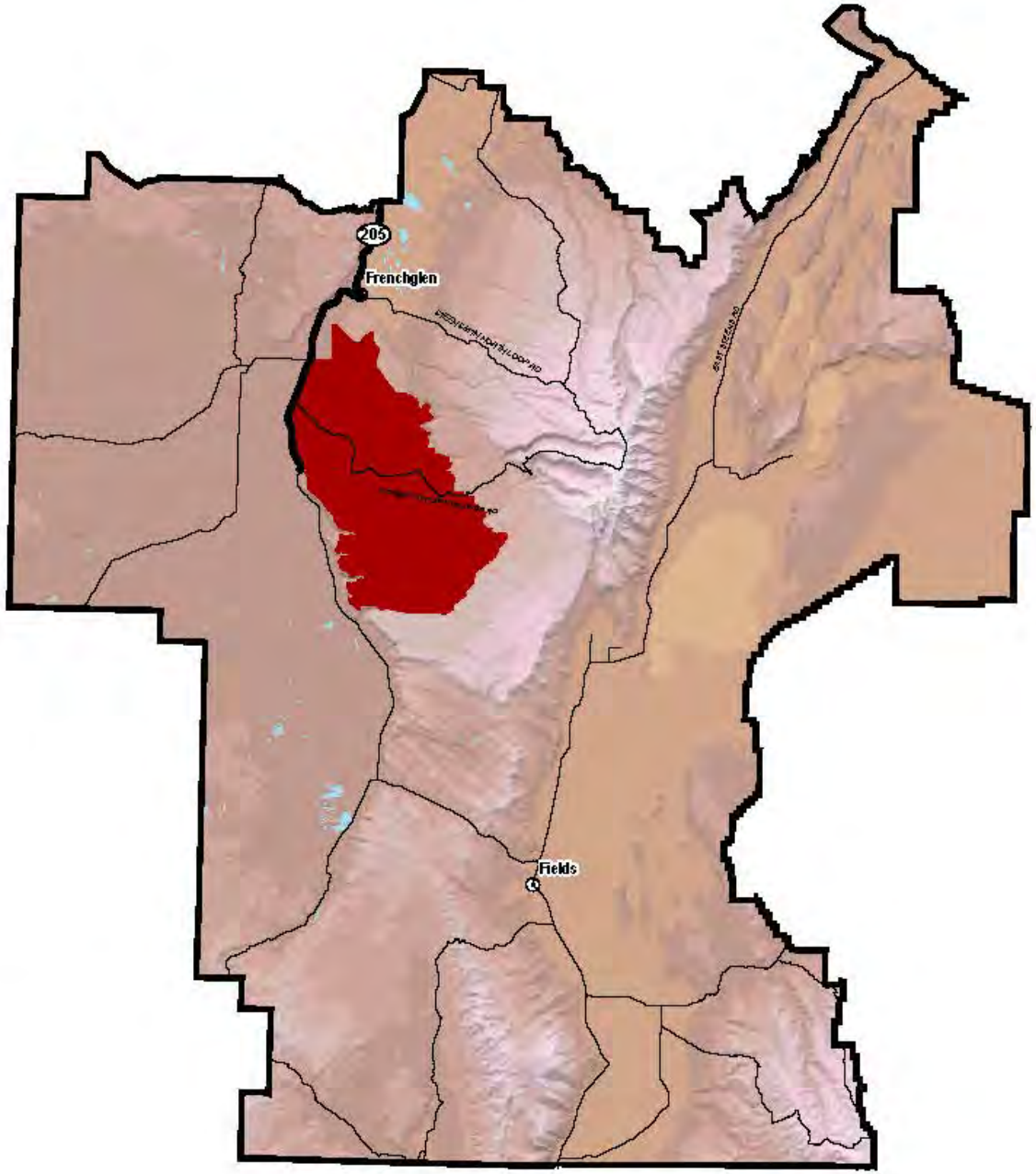
Map 11 – Alternative B: Proposed Use Area with Proposed Range Improvements C-12
Map 12 – Alternative C: Proposed Use Area with Proposed Range Improvements C-13
Map 13 – Alternative D: Proposed Use Area with Proposed Range Improvements.....C-14
Map 14 – Alternative E: Proposed Use Area with Proposed Range Improvements C-15
Map 15 – Alternative B: Estimated Viewshed Disturbance C-16
Map 16 – Alternative C: Estimated Viewshed Disturbance C-17
Map 17 – Alternative D: Estimated Viewshed Disturbance.....C-18
Map 18 – Alternative E: Estimated Viewshed Disturbance C-19

South Steens Allotment
Map 1 - Vicinity Map
Andrews Resource Area





Legend

- Allotment Boundary
- Andrews Resource Area Boundary
- Highways
- Major Roads

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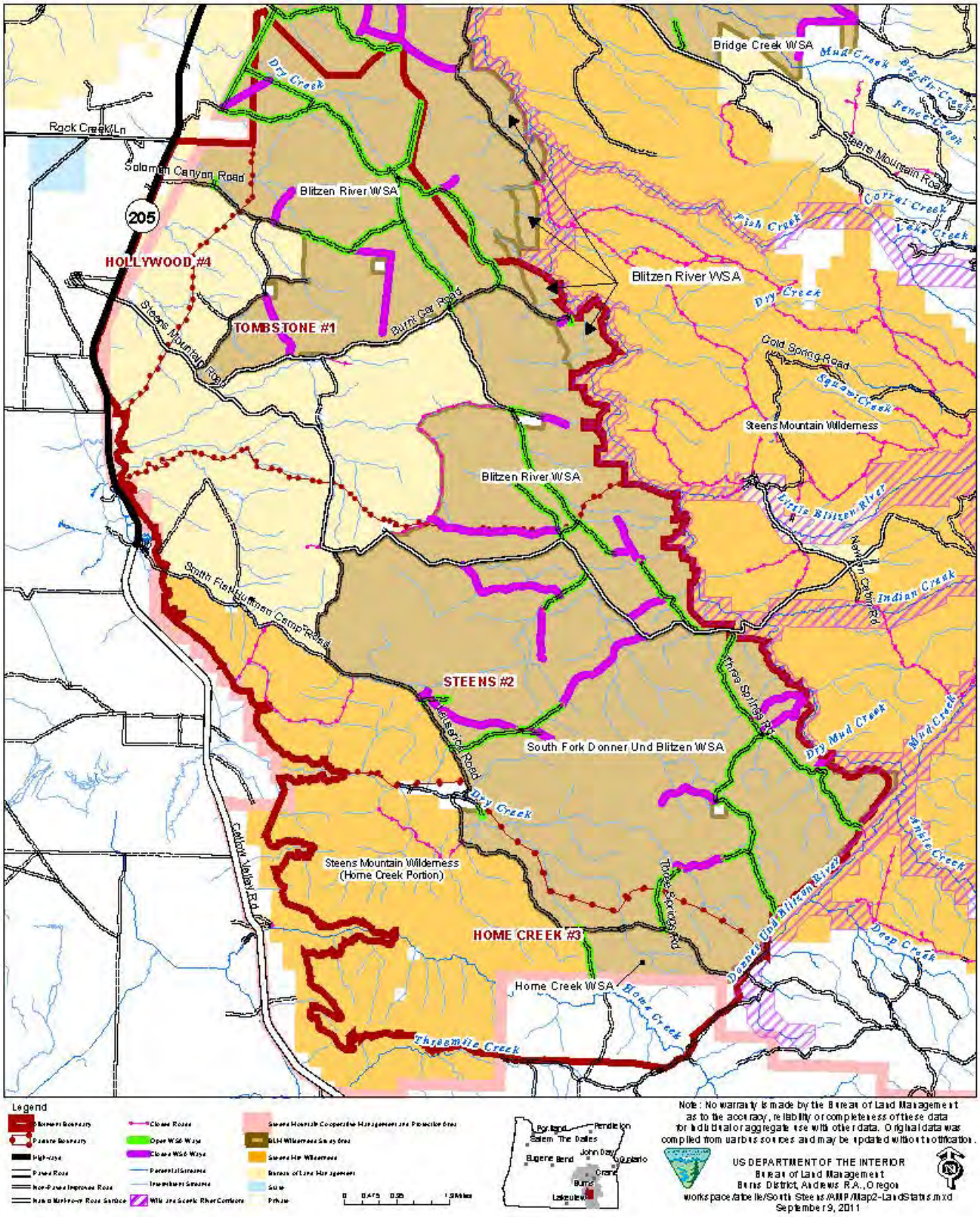
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Oregon

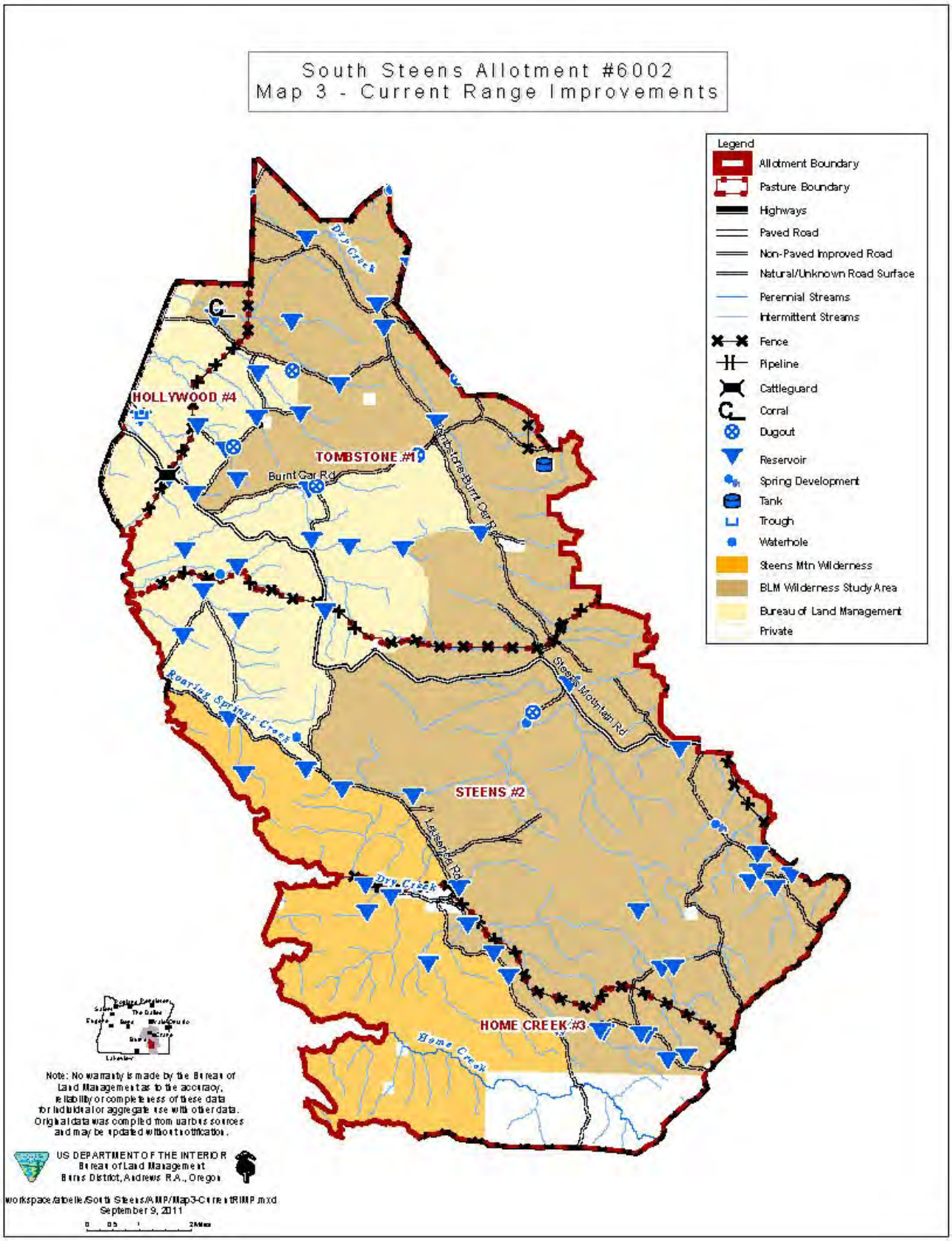
N

/Workspace/arbelle/South Steens/AMP/Map1-Vicinity.mxd
September 9, 2011

0 2.5 5 10 Miles

South Steens Allotment #6002
Map 2 - Land Status




South Steens Allotment #6002
Map 3 - Current Range Improvements
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Perennial Streams
Intermittent Streams
Fence
Pipeline
Cattleguard
Corral
Dugout
Reservoir
Spring Development
Tank
Trough
Waterhole
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
Private
HOLLYWOOD #4
TOMBSTONE #1
Burnt Car Rd
Tombstone-Burnt Car Rd
Dry Creek
Roaring Springs Creek
Steens Mountain Rd
STEENS #2
Leggett Rd
HOME CREEK #3
Home Creek
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Burns District, Andrews R.A., Oregon
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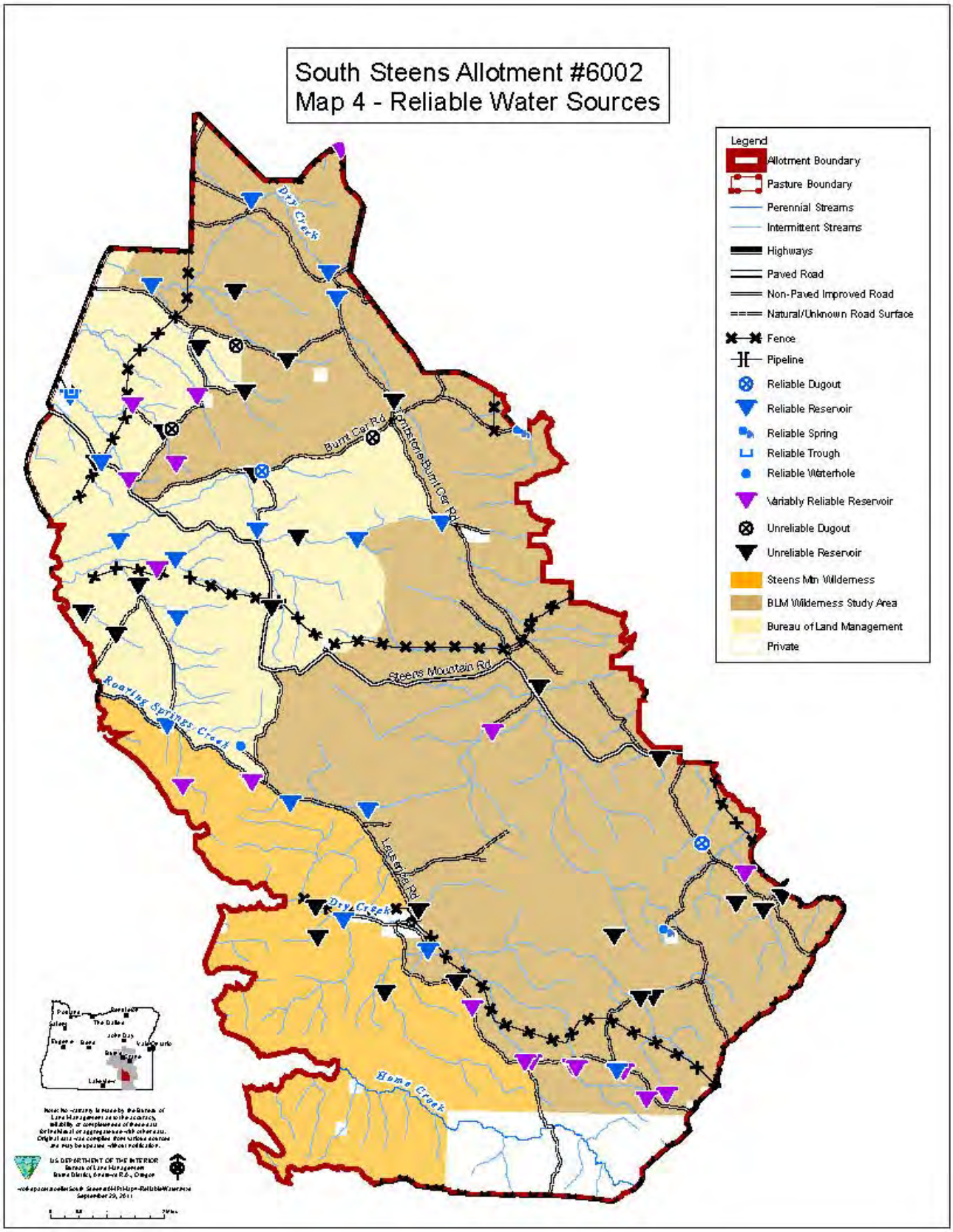
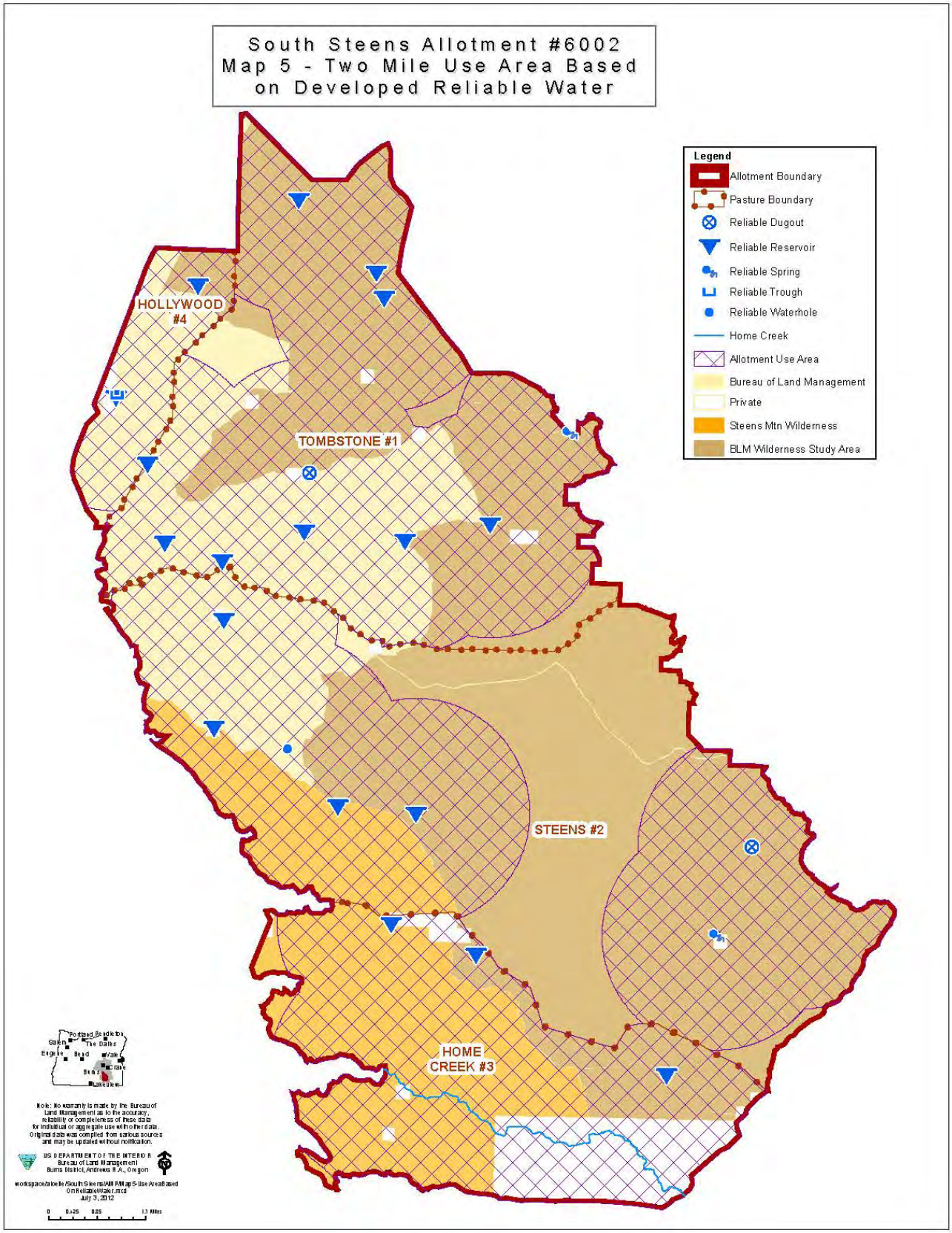
September 9, 2011


South Steens Allotment #6002
Map 4 - Reliable Water Sources
Legend
Allotment Boundary
Pasture Boundary
Perennial Streams
Intermittent Streams
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Fence
Pipeline
Reliable Dugout
Reliable Reservoir
Reliable Spring
Reliable Trough
Reliable Waterhole
Variably Reliable Reservoir
Unreliable Dugout
Unreliable Reservoir
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
Private
Dry Creek
Burnt Cart Rd
Pontiac Rd
Burnt Cart Rd
Steens Mountain Rd
Roaring Springs Creek
Lawshed Rd
Dry Creek
Home Creek


South Steens Allotment #6002
Map 5 - Two Mile Use Area Based
on Developed Reliable Water
Legend
Allotment Boundary
Pasture Boundary
Reliable Dugout
Reliable Reservoir
Reliable Spring
Reliable Trough
Reliable Waterhole
Home Creek
Allotment Use Area
Bureau of Land Management
Private
Steens Mtn Wilderness
BLM Wilderness Study Area
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
Portland
Bendleton
Salem
The Dalles
Eugene
Burns
Vale
Ontario
Lakeview
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Burns District, Andrews R.A., Oregon
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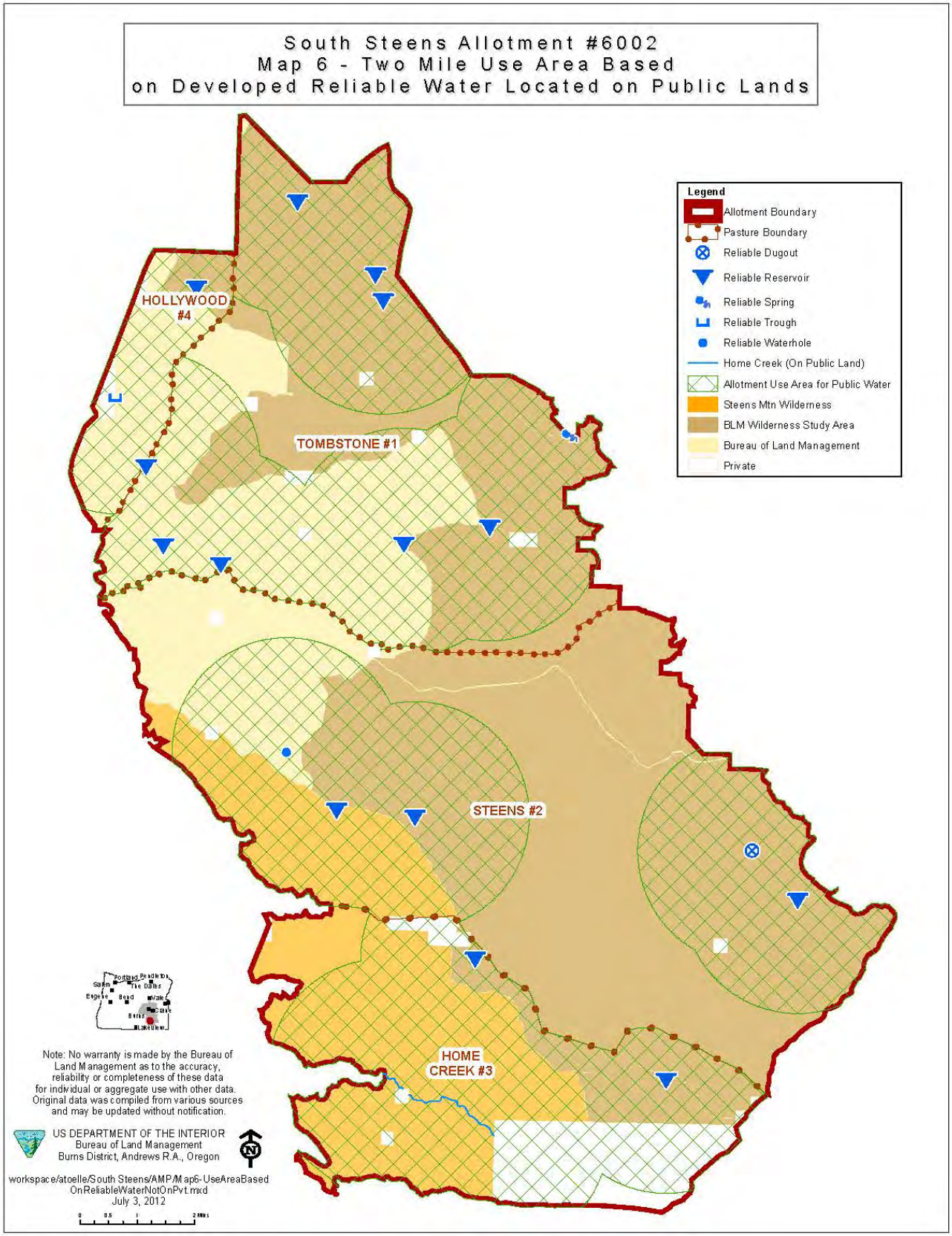
July 3, 2012
0 0.125 0.25 1.1 Miles


South Steens Allotment #6002
Map 6 - Two Mile Use Area Based
on Developed Reliable Water Located on Public Lands
Legend
Allotment Boundary
Pasture Boundary
Reliable Dugout
Reliable Reservoir
Reliable Spring
Reliable Trough
Reliable Waterhole
Home Creek (On Public Land)
Allotment Use Area for Public Water
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
Private
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
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Burns District, Andrews R.A., Oregon
workspace/atoelle/South Steens/AMP/Map6-UseAreaBased OnReliableWaterNotOnPvt.mxd
July 3, 2012

South Steens Allotment #6002
Map 7 - Alternative B: Proposed Action, Proposed Range Improvements
Legend
Allotment Boundary
Pasture Boundary
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Open WSA Ways
Closed WSA Ways
Closed Roads
Perennial Streams
Intermittent Streams
Fence
Pipeline
Proposed Riparian Exclosure
Proposed Pipeline
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Reservoir
Proposed Spring Protection
Proposed Spring Development
Proposed Trough
Proposed Well
Bureau of Land Management
Private
Steens Mtn Wilderness
BLM Wilderness Study Area
T32S-R32E
T33S-R32E
T33S-R32.5E
T34S-R32E
T34S-R32.5E
T35S-R32.5E
Solomon Canyon Rd
Burn Car Rd
Tomahawk Burn Cut Rd
Tomahawk Canyon Rd
Steens Mountain Rd
South Fork Heiman Canyon Rd
Tomahawk Spring Creek
Threemile Creek
ER1
ER2
ER3
ER5
ER6
ER7
ER8
ER9
ER10
ER11
ER12
ER13
ER14
ER15
ER17
ER18
ER19
ER20
ER21
ER22
ER23
ER24
R4
R5
R6
R7
R11
R12
R13
R14
R15
T6
T7
T11
T18
T24
W3
W6
W13
S1
S2
S3
S4
P8
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Burns District, Andrews R.A., Oregon
workspace/abelle/South Steens/AMP/Map7-Alternative B Proposed RIMPs.mxd
December 1, 2011

South Steens Allotment #6002
Map 8 - Alternative C: Maximum Water Development, Proposed Range Improvements
Legend
Allotment Boundary
Pasture Boundary
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Open WSA Ways
Closed WSA Ways
Closed Roads
Perennial Streams
Intermittent Streams
Fence
Pipeline
Proposed Pipeline
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Reservoir
Proposed Spring Development
Proposed Trough
Proposed Well
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
Private
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
T32S-R32E
T33S-R32E
T33S-R32.5E
T34S-R32E
T34S-R32.5E
T35S-R32.5E
Solomon Canyon Rd
Burnt Car Rd
Tombstone Canyon Rd
Steens Mountain Rd
Smith Flat-Riffman Camp Rd
Lawrence Creek Rd
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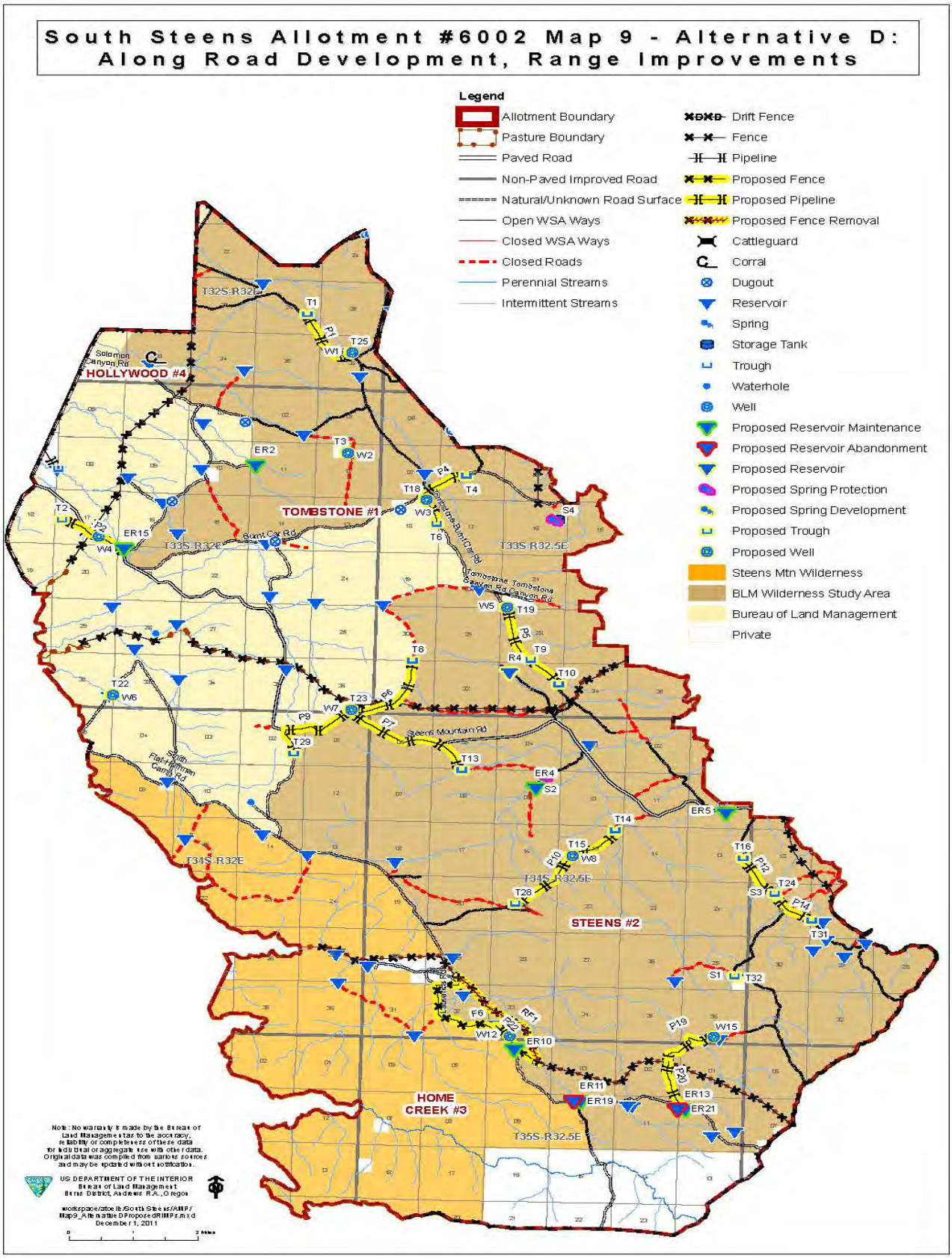
Bureau of Land Management
Burns District, Andrews R.A., Oregon
December 1, 2011


South Steens Allotment #6002 Map 9 - Alternative D:
Along Road Development, Range Improvements
Legend
Allotment Boundary
Pasture Boundary
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Open WSA Ways
Closed WSA Ways
Closed Roads
Perennial Streams
Intermittent Streams
Drift Fence
Fence
Pipeline
Proposed Fence
Proposed Pipeline
Proposed Fence Removal
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Well
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Reservoir
Proposed Spring Protection
Proposed Spring Development
Proposed Trough
Proposed Well
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
Private
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
T32S-R32E
T33S-R32E
T33S-R32.5E
T34S-R32E
T34S-R32.5E
T35S-R32.5E
Solomon Canyon Rd
Burnt Car Rd
Steens Mountain Rd
Tombstone Canyon Rd
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
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Burns District, Andrews R.A., Oregon
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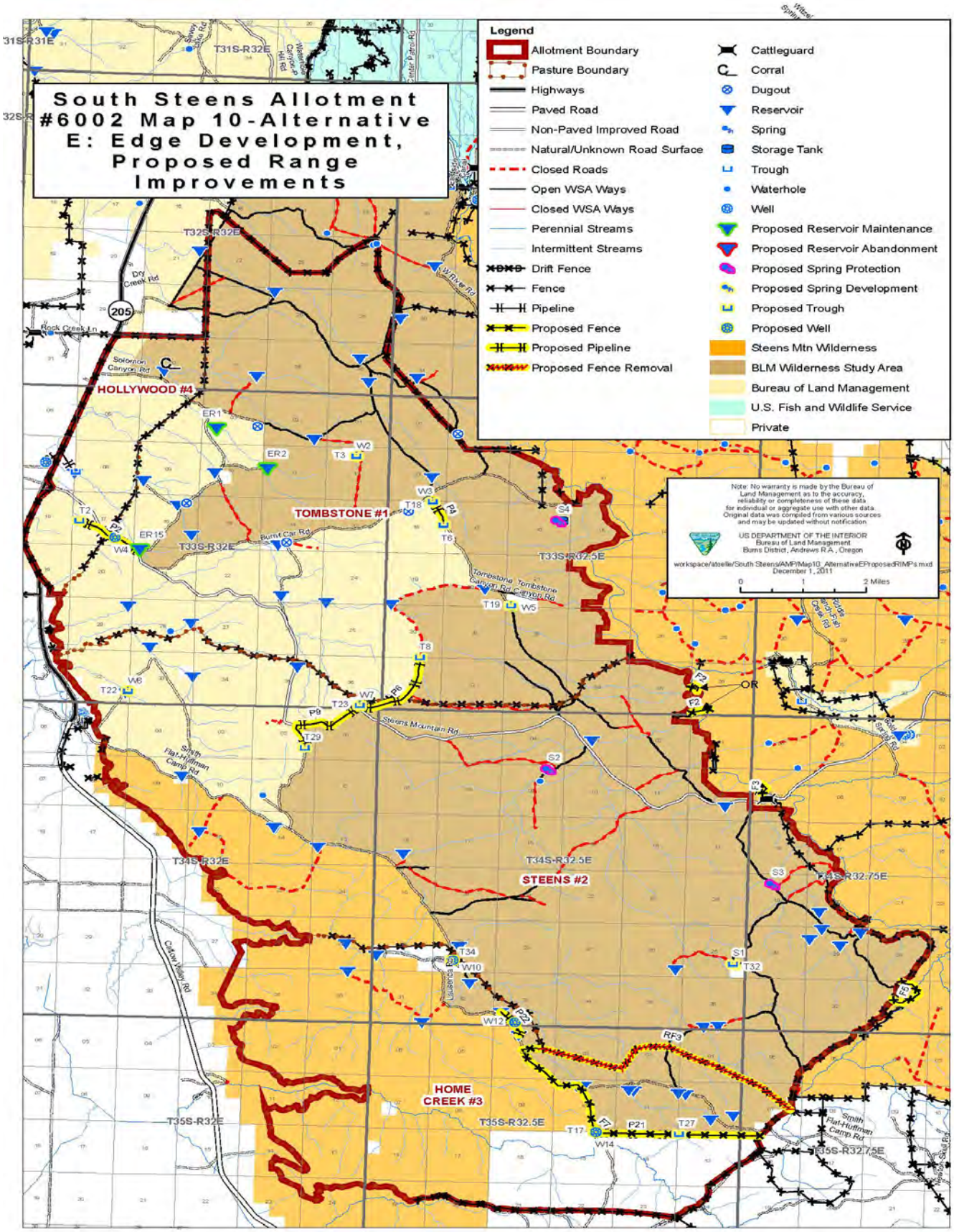
December 1, 2011


South Steens Allotment #6002 Map 10-Alternative E: Edge Development, Proposed Range Improvements
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Closed Roads
Open WSA Ways
Closed WSA Ways
Perennial Streams
Intermittent Streams
Drift Fence
Fence
Pipeline
Proposed Fence
Proposed Pipeline
Proposed Fence Removal
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Well
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Spring Protection
Proposed Spring Development
Proposed Trough
Proposed Well
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
U.S. Fish and Wildlife Service
Private
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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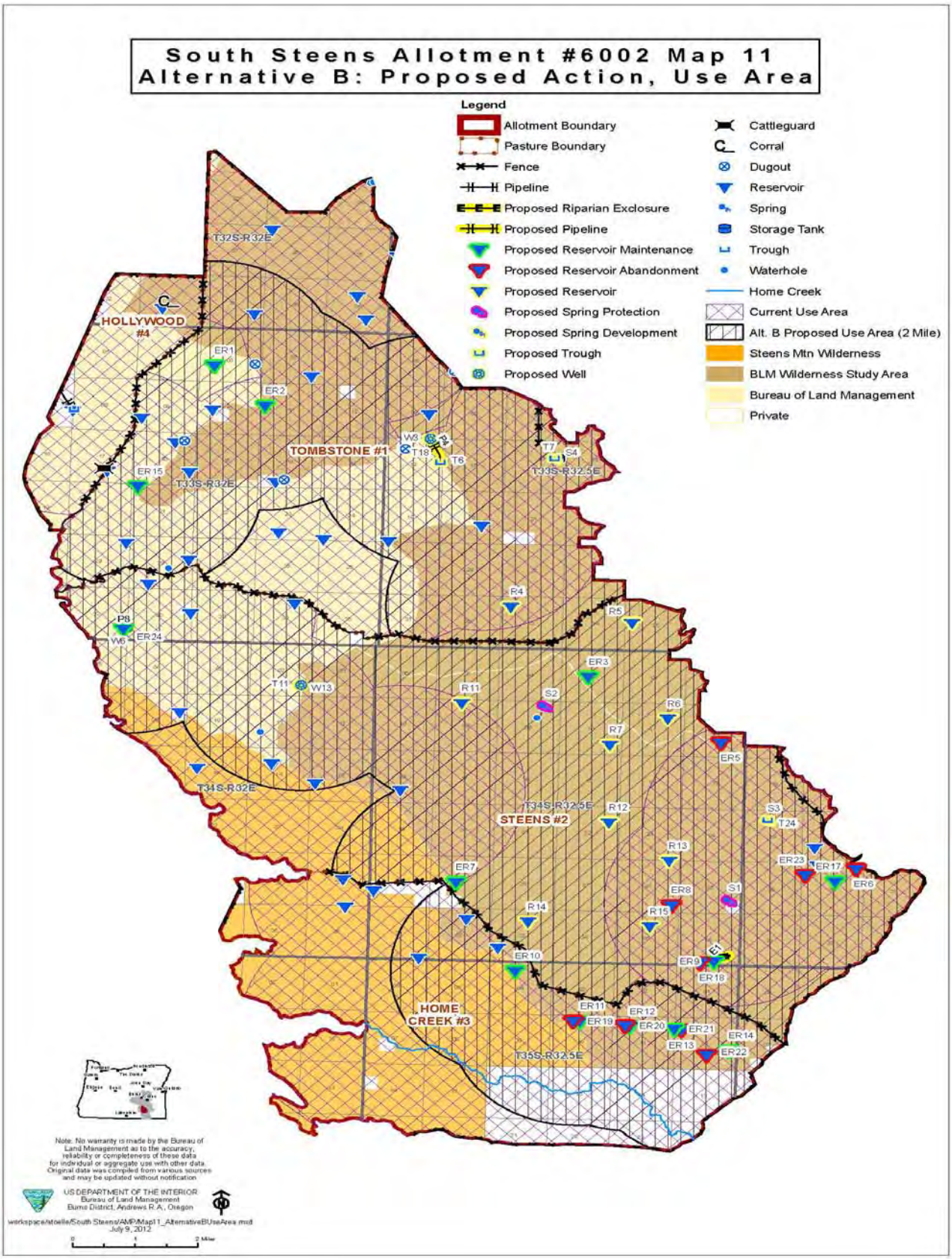
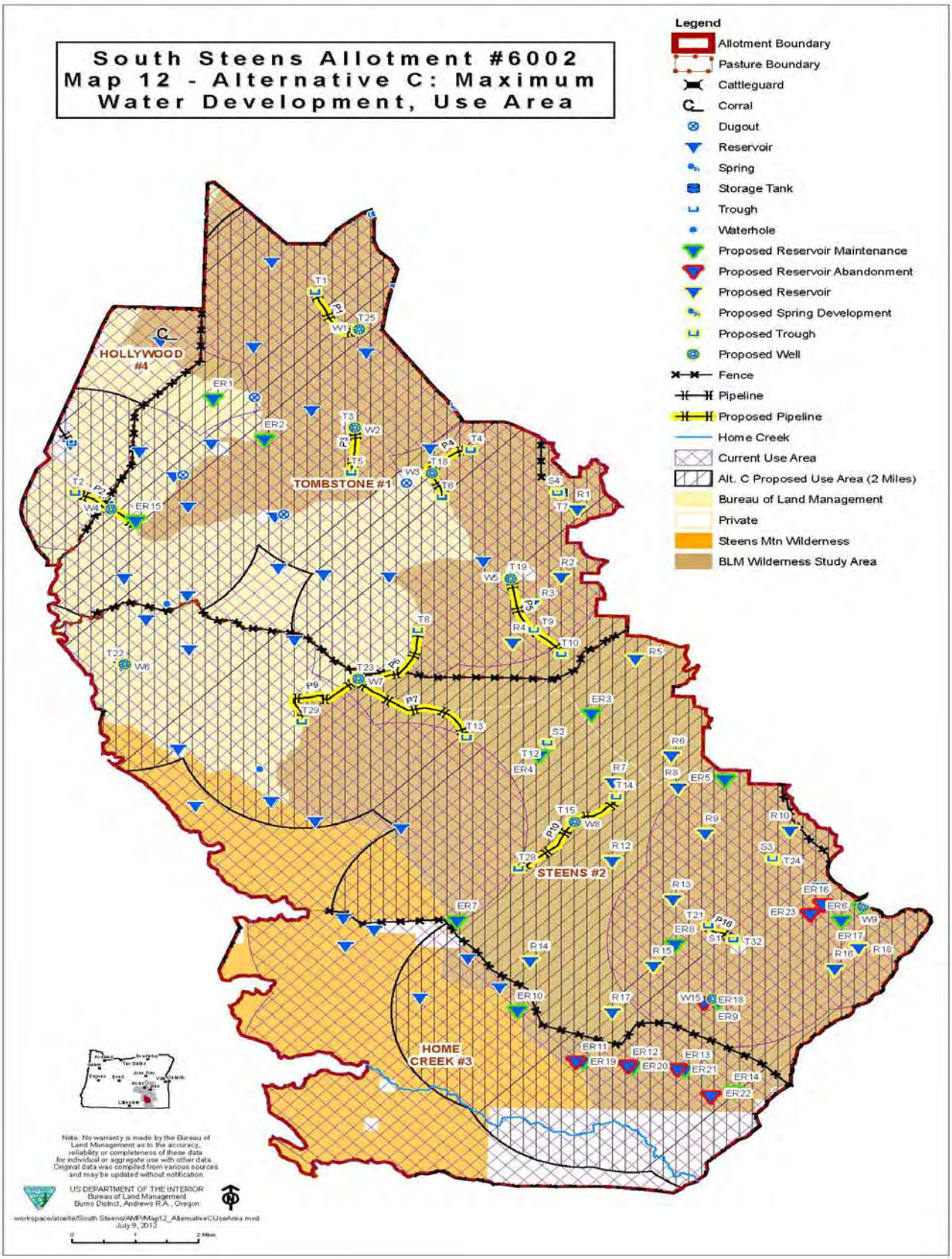
December 1, 2011
0 1 2 Miles
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
T31S-R32E
T32S-R32E
T33S-R32E
T33S-R32.5E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
Dry Creek Rd
Rock Creek Ln
Solomon Canyon Rd
Burnt Car Rd
Tombstone Canyon Rd
Steens Mountain Rd
Smith Flat-Huffman Camp Rd
Catlow Valley Rd
Wildhorse Creek Rd
Wildhorse Spring Rd
205
OR


South Steens Allotment #6002 Map 11
Alternative B: Proposed Action, Use Area
Legend
Allotment Boundary
Pasture Boundary
Fence
Pipeline
Proposed Riparian Exclosure
Proposed Pipeline
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Reservoir
Proposed Spring Protection
Proposed Spring Development
Proposed Trough
Proposed Well
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Home Creek
Current Use Area
Alt. B Proposed Use Area (2 Mile)
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
Private
T32S-R32E
HOLLYWOOD #4
TOMBSTONE #1
T33S-R32E
T33S-R32.5E
T34S-R32E
T34S-R32.5E
STEENS #2
HOME CREEK #3
T35S-R32.5E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
workspace/mtoelle/South Steens/AMP/Map11_AlternativeBUseArea.mxd
July 9, 2012


South Steens Allotment #6002
Map 12 - Alternative C: Maximum Water Development, Use Area
Legend
Allotment Boundary
Pasture Boundary
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Reservoir
Proposed Spring Development
Proposed Trough
Proposed Well
Fence
Pipeline
Proposed Pipeline
Home Creek
Current Use Area
Alt. C Proposed Use Area (2 Miles)
Bureau of Land Management
Private
Steens Mtn Wilderness
BLM Wilderness Study Area
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
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Burns District, Andrews R.A., Oregon
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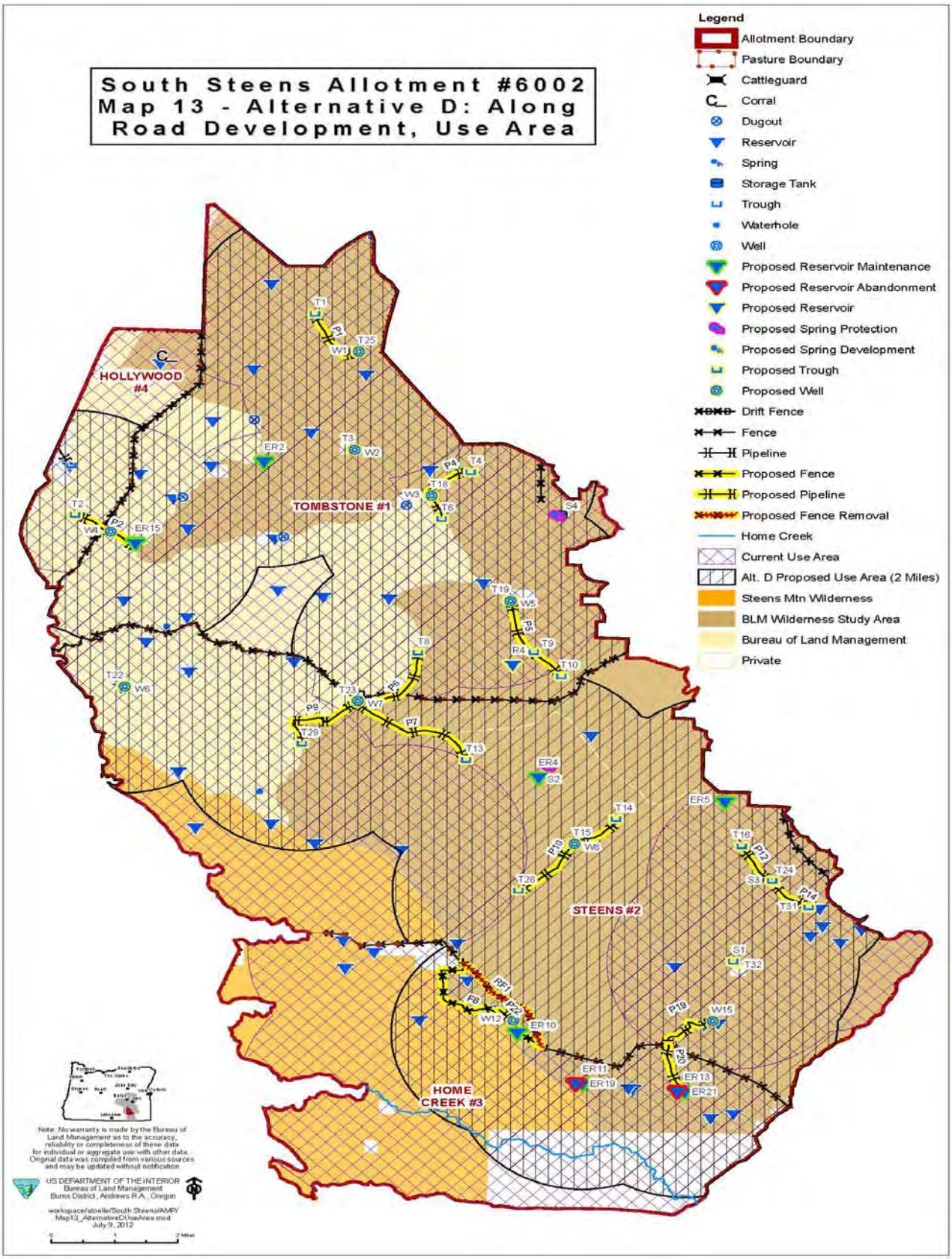
July 9, 2012


South Steens Allotment #6002
Map 13 - Alternative D: Along Road Development, Use Area
Legend
Allotment Boundary
Pasture Boundary
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Well
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Reservoir
Proposed Spring Protection
Proposed Spring Development
Proposed Trough
Proposed Well
Drift Fence
Fence
Pipeline
Proposed Fence
Proposed Pipeline
Proposed Fence Removal
Home Creek
Current Use Area
Alt. D Proposed Use Area (2 Miles)
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
Private
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
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Burns District, Andrews R.A., Oregon
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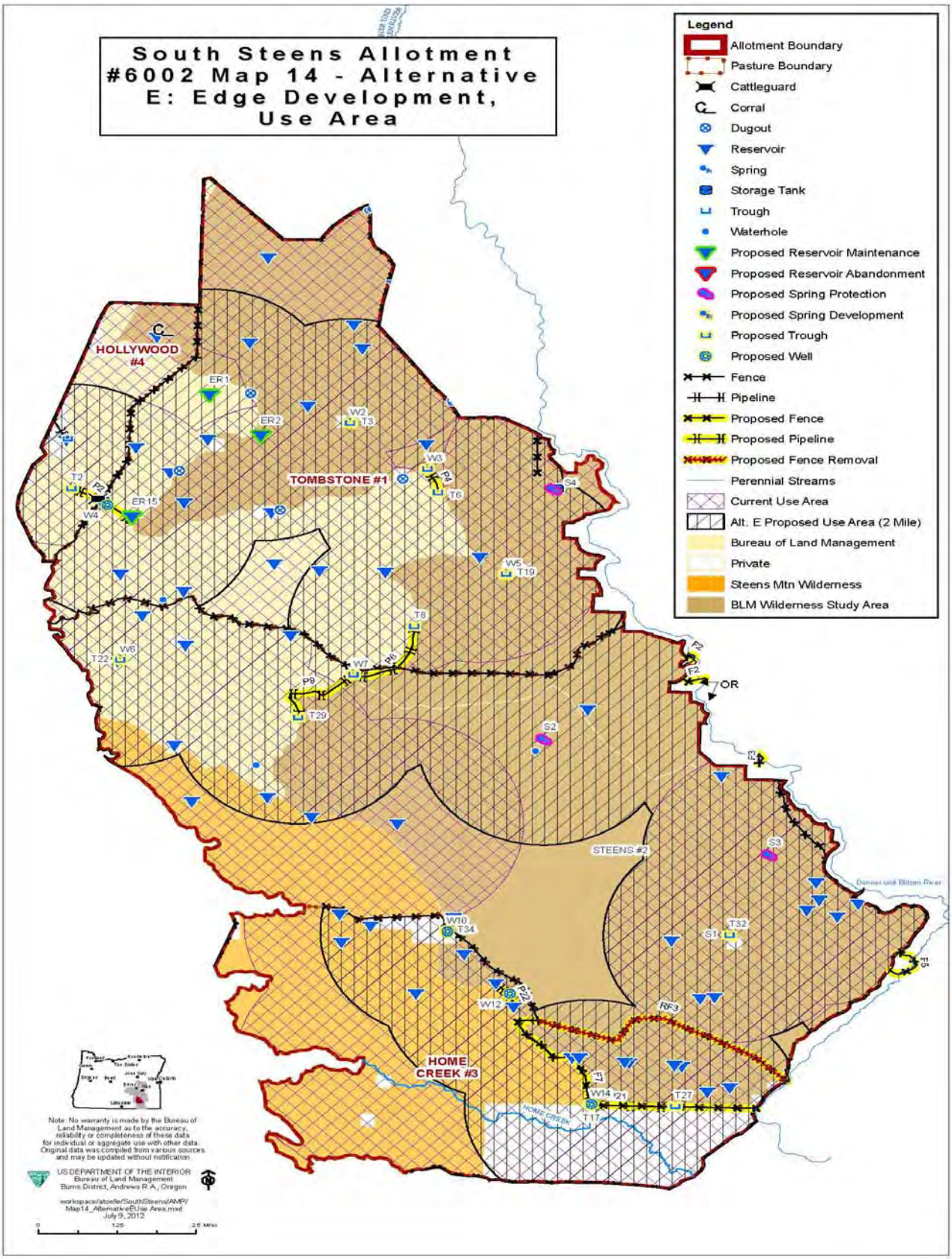
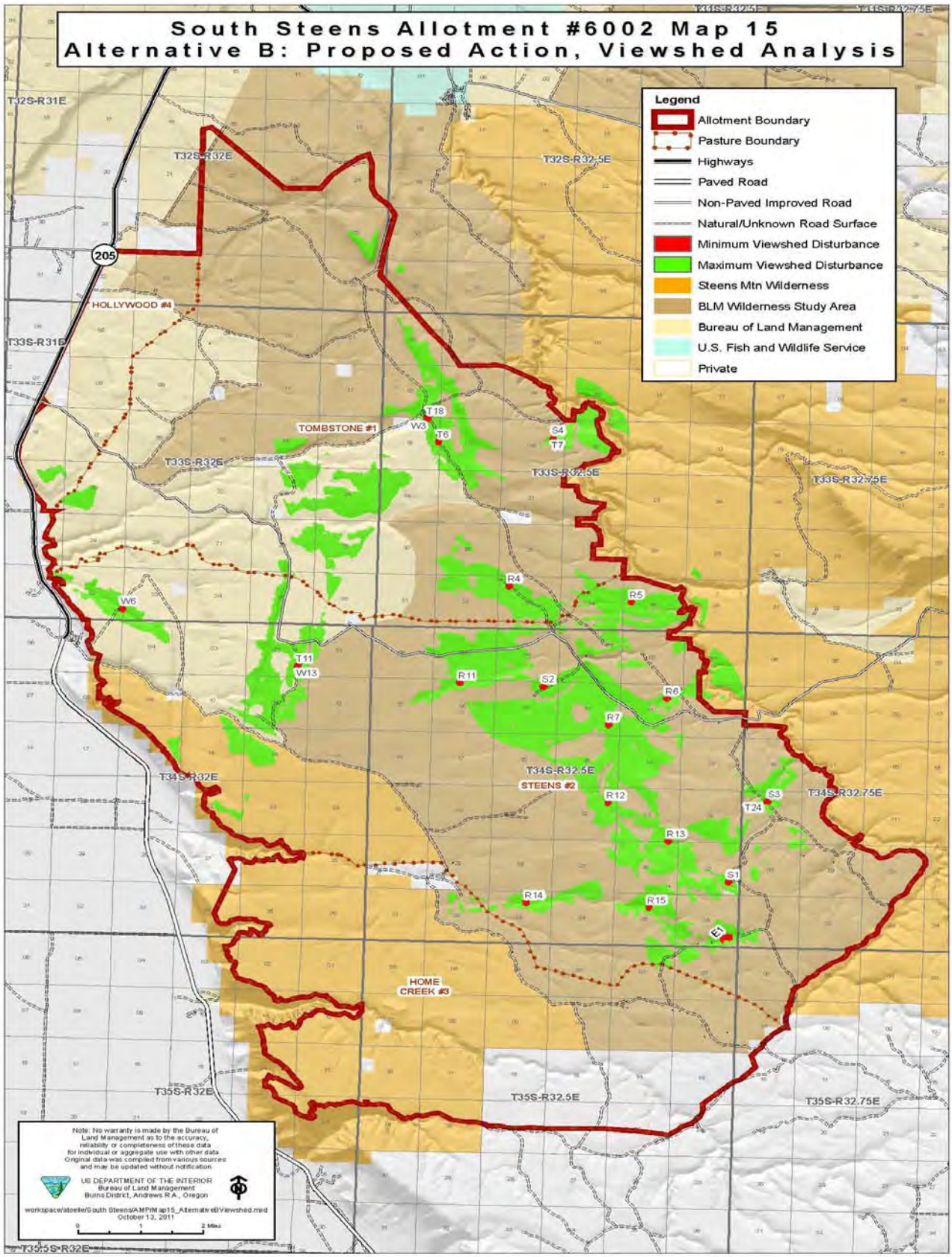
July 9, 2012


South Steens Allotment #6002 Map 14 - Alternative E: Edge Development, Use Area
Legend
Allotment Boundary
Pasture Boundary
Cattleguard
Corral
Dugout
Reservoir
Spring
Storage Tank
Trough
Waterhole
Proposed Reservoir Maintenance
Proposed Reservoir Abandonment
Proposed Spring Protection
Proposed Spring Development
Proposed Trough
Proposed Well
Fence
Pipeline
Proposed Fence
Proposed Pipeline
Proposed Fence Removal
Perennial Streams
Current Use Area
Alt. E Proposed Use Area (2 Mile)
Bureau of Land Management
Private
Steens Mtn Wilderness
BLM Wilderness Study Area
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
ER1
ER2
ER15
W2
T3
W3
T6
S4
T2
W4
W5
T19
T8
W6
T22
W7
P6
P9
T29
F2
OR
S2
S3
W10
T34
T32
S1
W12
RF3
W14
T27
T17
HOME CREEK
Donner und Blitzen River
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
workspace/atoelle/SouthSteens/AMP/Map14_AlternativeEUse Area.mxd
July 9, 2012


South Steens Allotment #6002 Map 15
Alternative B: Proposed Action, Viewshed Analysis
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
U.S. Fish and Wildlife Service
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
205
HOLLYWOOD #4
T33S-R31E
TOMBSTONE #1
T33S-R32E
T33S-R32.5E
T33S-R32.75E
T34S-R32E
T34S-R32.5E
STEENS #2
T34S-R32.75E
HOME CREEK #3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T18
W3
T6
S4
T7
R4
R5
W6
T11
W13
R11
S2
R6
R7
R12
S3
T24
R13
S1
R14
R15
E1
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
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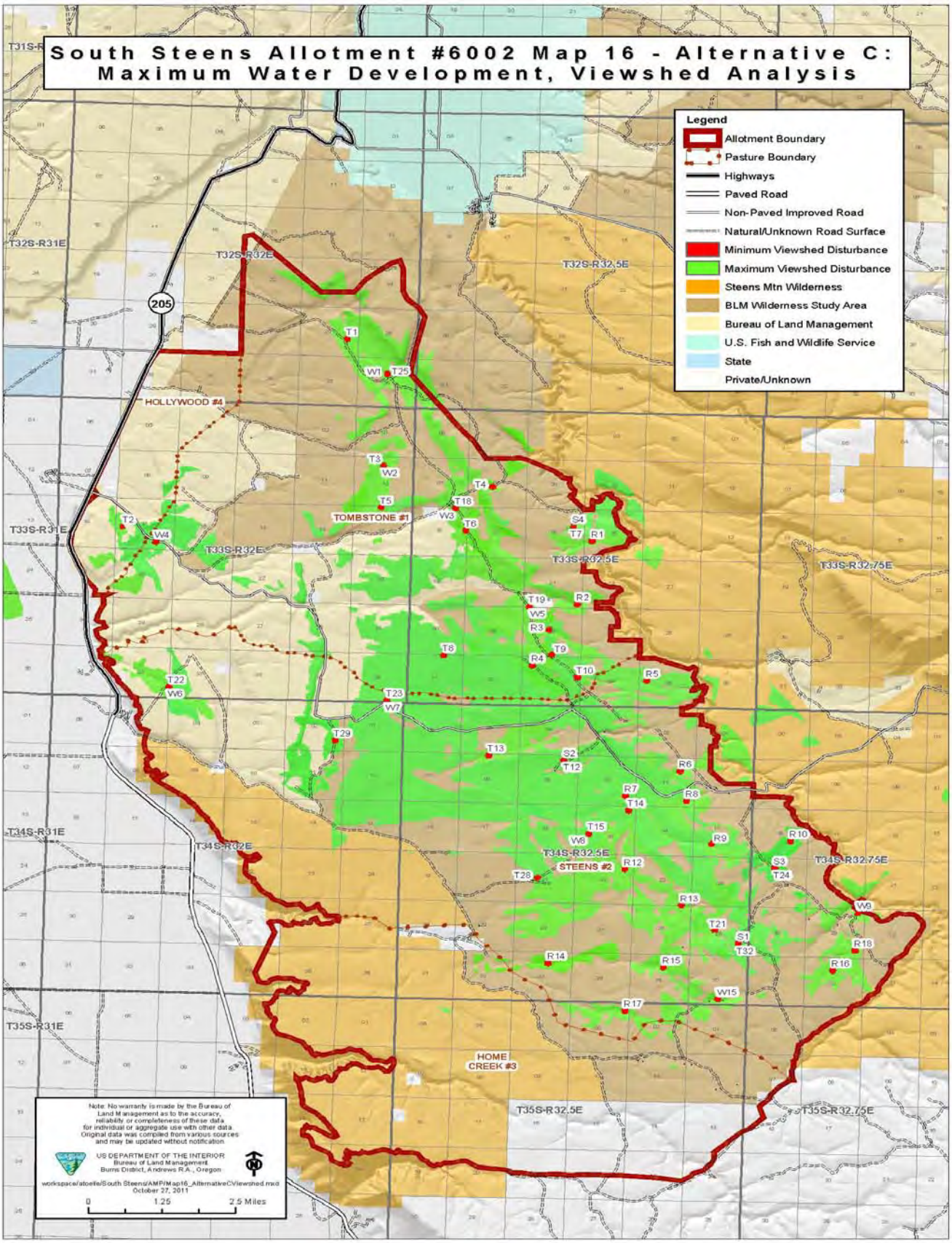
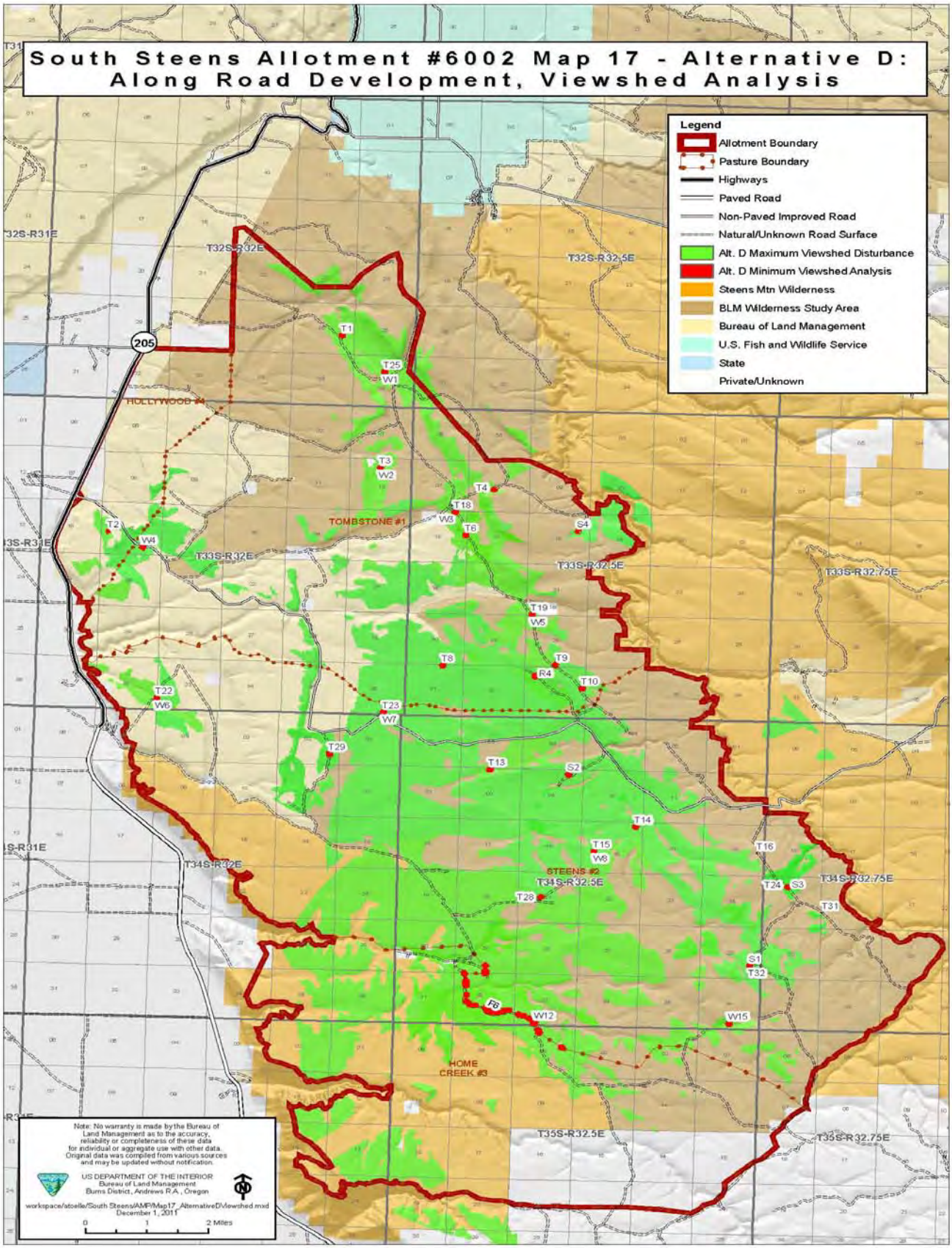
Bureau of Land Management
Burns District, Andrews R.A., Oregon
workspace/atoeller/South Steens/AMP/Map15_AlternativeB/Viewshed.mxd
October 13, 2011
0
1
2 Miles


South Steens Allotment #6002 Map 16 - Alternative C:
Maximum Water Development, Viewshed Analysis
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
U.S. Fish and Wildlife Service
State
Private/Unknown
T32S-R31E
T32S-R32E
T32S-R32.5E
205
HOLLYWOOD #4
T33S-R31E
T33S-R32E
T33S-R32.5E
T33S-R32.75E
TOMBSTONE #1
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
STEENS #2
T35S-R31E
T35S-R32.5E
T35S-R32.75E
HOME CREEK #3
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
workspace/atoelle/South Steens/AMP/Map16_AlternativeC/Viewshed.mxd
October 27, 2011
0
1.25
2.5 Miles


South Steens Allotment #6002 Map 17 - Alternative D:
Along Road Development, Viewshed Analysis
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Alt. D Maximum Viewshed Disturbance
Alt. D Minimum Viewshed Analysis
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
U.S. Fish and Wildlife Service
State
Private/Unknown
T32S-R31E
T32S-R32E
T32S-R32.5E
205
HOLLYWOOD #4
T1
T25
W1
T3
W2
T4
T18
W3
T6
TOMBSTONE #1
S4
T2
W4
T33S-R32E
T33S-R32.5E
T33S-R32.75E
T19
W5
T8
T9
R4
T10
T22
W6
T23
W7
T29
T13
S2
T14
T15
W8
T16
T34S-R32E
STEENS #2
T34S-R32.5E
T24
S3
T34S-R32.75E
T28
T31
S1
T32
F8
W12
W15
HOME
CREEK #3
T35S-R32.5E
T35S-R32.75E
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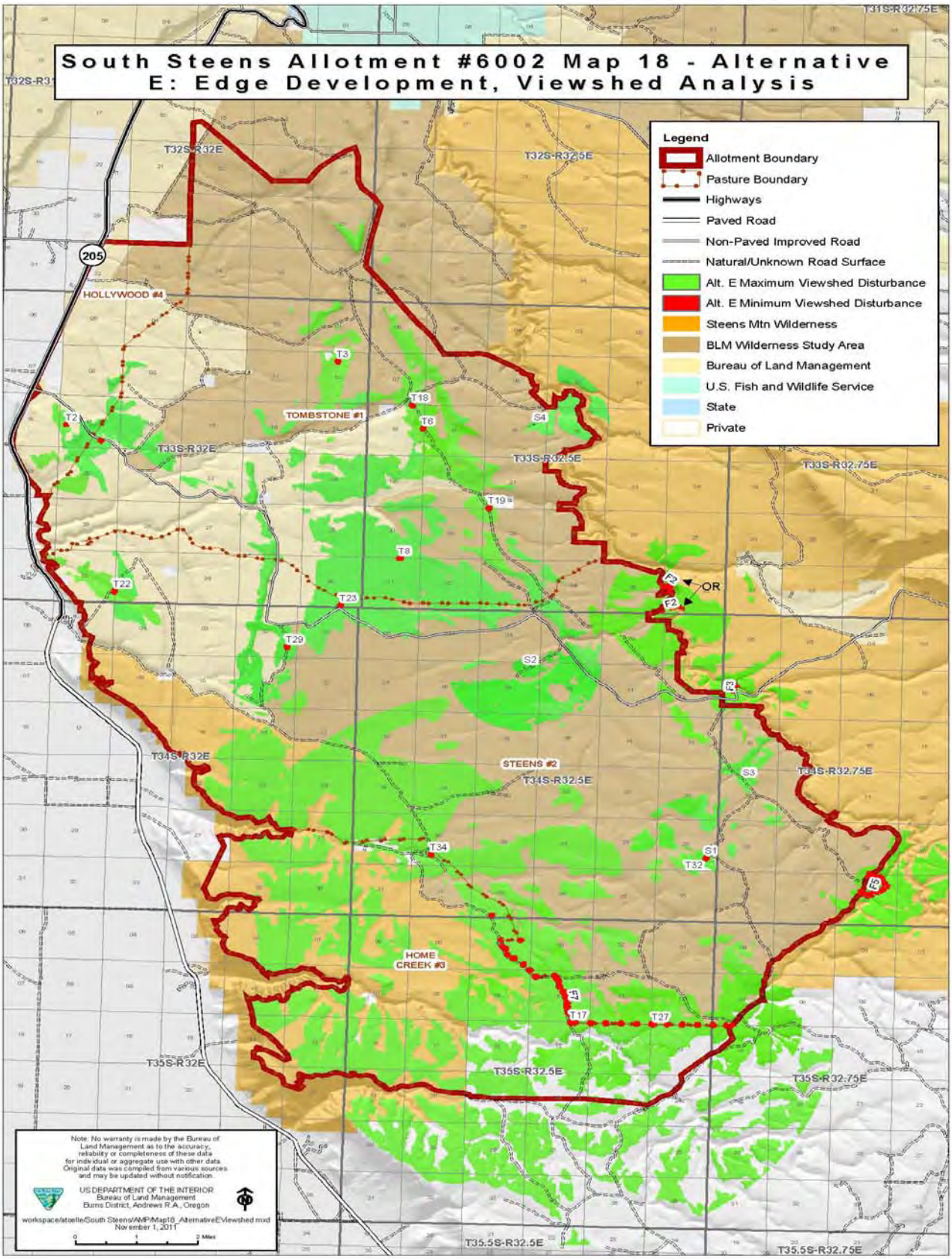
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
workspace/atoelle/South Steens/AMP/Map17_AlternativeD/Viewshed.mxd
December 1, 2011
0
1
2 Miles


South Steens Allotment #6002 Map 18 - Alternative E: Edge Development, Viewshed Analysis
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Alt. E Maximum Viewshed Disturbance
Alt. E Minimum Viewshed Disturbance
Steens Mtn Wilderness
BLM Wilderness Study Area
Bureau of Land Management
U.S. Fish and Wildlife Service
State
Private
T31S-R32.75E
T32S-R32E
T32S-R32.5E
205
HOLLYWOOD #4
T3
T18
T6
TOMBSTONE #1
T2
S4
T33S-R32E
T33S-R32.5E
T33S-R32.75E
T19
T8
T22
T23
F2
OR
T29
S2
T34S-R32E
STEENS #2
T34S-R32.5E
S3
T34S-R32.75E
T34
S1
T32
HOME CREEK #3
T17
T27
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32.5E
T35.5S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
workspace/atoelle/South Steens/AMP/Map18_AlternativeEViewshed.mxd
November 1, 2011
0 1 2 Miles

Appendix D: Estimated Viewshed Analysis Maps for Each Improvement

A Viewshed Analysis was completed for all proposed developments with the exceptions of pipelines. Pipelines were not included in this analysis due to the fact that they will be buried, with only valve covers periodically visible above ground; a viewshed analysis of the entire pipeline would inaccurately show a much larger viewshed disturbance than would actually occur.

The goal of this analysis was to estimate both the maximum and minimum visual disturbance of the proposed developments within the allotment and surrounding area. A viewshed analysis shows all possible locations, based on the input data, that a knowing observer would likely be able to see an object; a knowing observer is someone who knows to look for the object, a casual observer would not know to look for the object and may not notice it and be able to identify it from far distances. All values used to conduct the analysis were the best estimates based on professional judgment. It is important to note that this analysis is based on estimated numbers and only takes into consideration the information discussed below with the topography of the site. It does not take into account vegetation or rockiness, which would reduce the viewshed disturbance, or proposed design features which generally decrease the visual disturbance of developments. The estimated maximum and minimum viewshed disturbance areas are estimates and should be treated as such. In most cases, the actual visual disturbance of these proposed developments is closer to the minimum than the maximum disturbance, due the presence of vegetation and the associated project design features.

These viewshed analysis maps were created using ESRI ArcMap using the Viewshed Tool (Arc Toolbox→ 3D Analyst Tools→ Raster Surface→ Viewshed). The input raster was dem10bigbox; the input point was the individual proposed improvement. The output raster was labeled so that it would be identifiable by the appropriate proposed development; default Z Factor of 1 was used. In order for the viewshed analysis to occur, the height of the proposed development (OFFSETA), the height of the observer (OFFSETB), an outer radius to limit the analysis area based on the maximum distance it is estimated the development would be visible at (RADIUS2), and the upper and lower limits to the vertical angles to be included in the analysis (VERT1, VERT2) had to be determined. For all analysis's, the height of the observer (OFFSETB) was set at 6 feet (1.83 meters), and VERT1 was set at 90° while VERT2 was set at -90° in order to include all areas above and below the proposed development within the analysis.

Maximum Viewshed Disturbance Analysis: The values for OFFSETA varied depending on the type of development. For proposed reservoirs OFFSETA=6 meters (19.69 feet) which is the estimated maximum height of any portion of a new reservoir. For proposed springs OFFSETA=1.68 meters (5.5 feet) which would be the maximum height of the protection fence, which is the tallest part of the spring development. The proposed exclosure had the same OFFSETA as the proposed springs since it would only include a fence, as did proposed fences. For proposed wells, OFFSETA=6 meters (19.69 feet) since it was determined that this would be the maximum height of any power source at the well. Proposed troughs were assigned an OFFSETA of 0.92 meters (3.02 feet), which would be the maximum height of any trough. For the proposed reservoirs, spring development/protection, troughs, exclosure, and fences RADIUS2 was set to 2000 meters (6,561.68 feet, 1.24 miles), for proposed wells, it was set to

7000 meters (22,965.88 feet, 4.35 meters). These are the distances that were determined to be the maximum distance these developments would be visible at.

Minimum Viewshed Disturbance Analysis: The values for OFFSETA were the same as for the Maximum Viewshed Disturbance Analysis, with the exception of for wells, since the minimum analysis would have a very short power source, making the OFFSETA value lower. For proposed wells, OFFSETA=1.6 meters (5.25 feet). RADIUS2 was decreased for all developments to 100 meters (328.08 feet). In areas of dense juniper trees, this number could realistically be lower; however, since not all areas of the allotment is covered in dense juniper trees 100 meters was selected since it is likely that shrubs, grasses, and rocks would often hide the proposed development at this distance, especially when project design elements are utilized.

E1 ..... D-4
R1 ..... D-5
R2 ..... D-6
R3 ..... D-7
R4 ..... D-8
R5 ..... D-9
R6 ..... D-10
R7 ..... D-11
R8 ..... D-12
R9 ..... D-13
R10 ..... D-14
R11 ..... D-15
R12 ..... D-16
R13 ..... D-17
R14 ..... D-18
R15 ..... D-19
R16 ..... D-20
R17 ..... D-21
R18 ..... D-22
S1 ..... D-23
S2 ..... D-24
S3 ..... D-25
S4 ..... D-26
T1 ..... D-27
T2 ..... D-28
T3 ..... D-29
T4 ..... D-30
T5 ..... D-31
T6 ..... D-32
T7 ..... D-33
T8 ..... D-34
T9 ..... D-35
T10 ..... D-36
T11 ..... D-37

T12 ..... D-38
T13 ..... D-39
T14 ..... D-40
T15 ..... D-41
T16 ..... D-42
T17 ..... D-43
T18 ..... D-44
T19 ..... D-45
T21 ..... D-46
T22 ..... D-47
T23 ..... D-48
T24 ..... D-49
T25 ..... D-50
T27 ..... D-51
T28 ..... D-52
T29 ..... D-53
T31 ..... D-54
T32 ..... D-55
T34 ..... D-56
W1 ..... D-57
W2 ..... D-58
W3 ..... D-59
W4 ..... D-60
W5 ..... D-61
W6 ..... D-62
W7 ..... D-63
W8 ..... D-64
W9 ..... D-65
W10 ..... D-66
W12 ..... D-67
W13 ..... D-68
W14 ..... D-69
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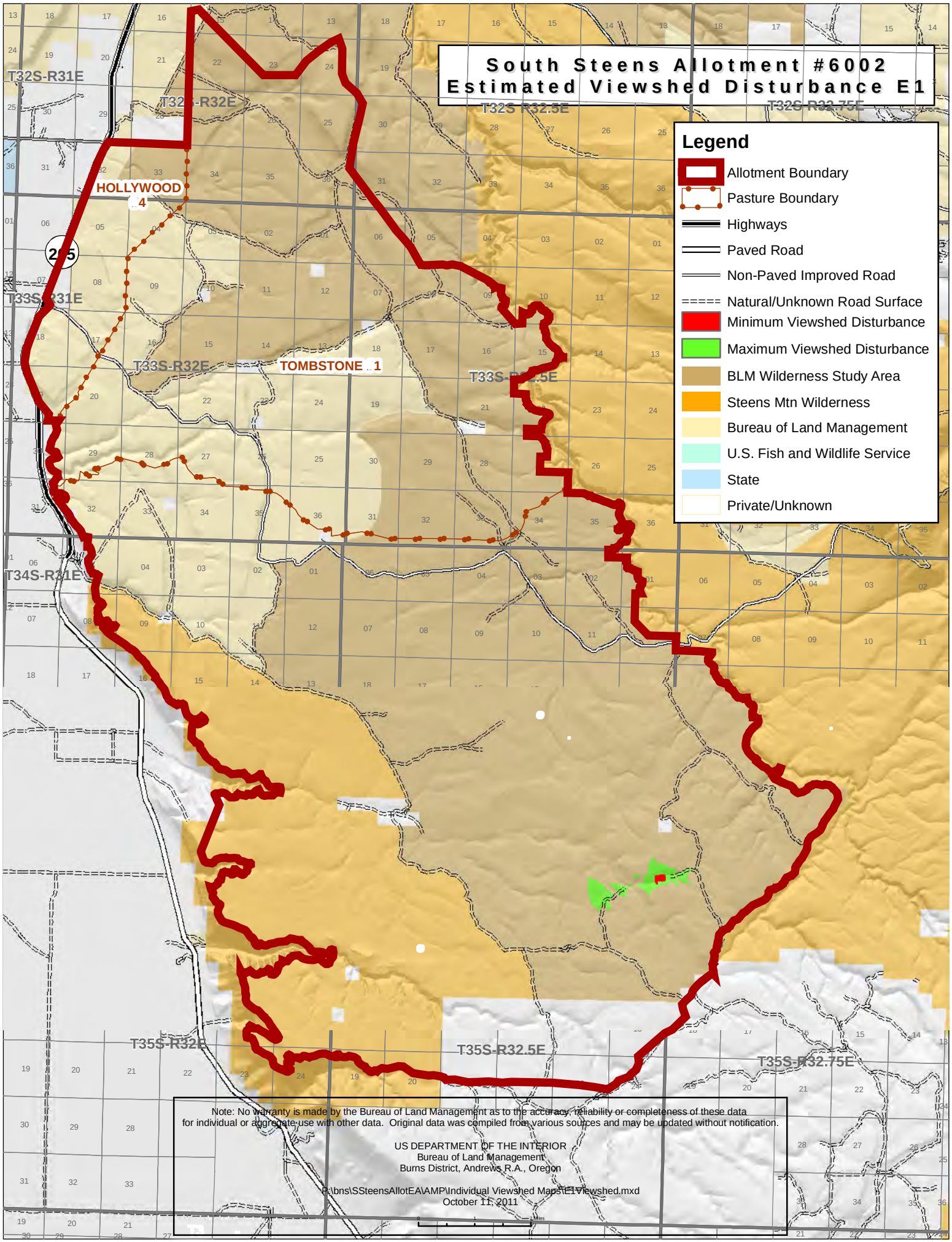
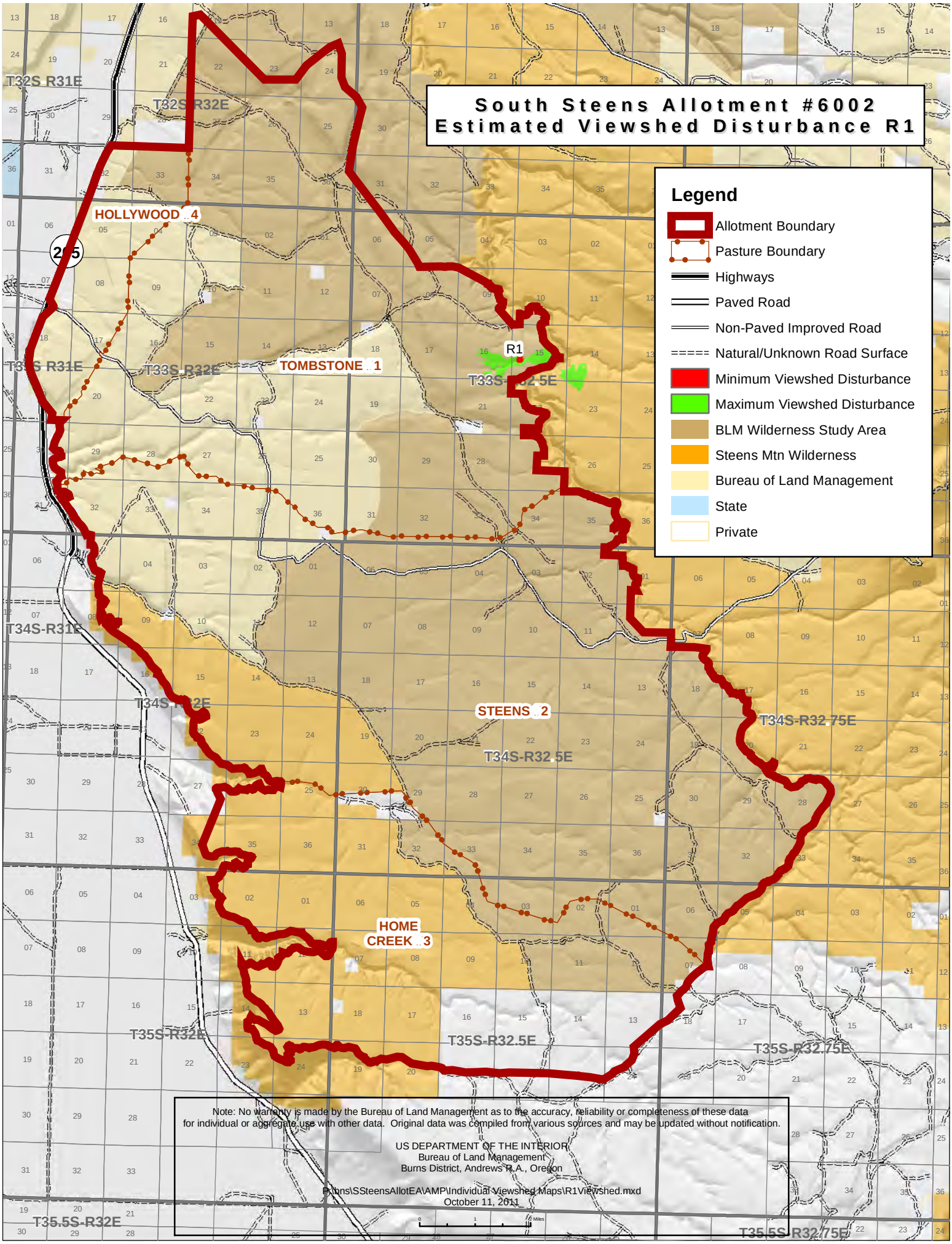
F5 ..... D-73
F6 ..... D-74
F7 ..... D-75


South Steens Allotment #6002
Estimated Viewshed Disturbance E1
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
U.S. Fish and Wildlife Service
State
Private/Unknown
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD
4
205
T33S-R31E
T33S-R32E
TOMBSTONE
1
T33S-R32.5E
T34S-R31E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
P:\bns\SSteensAllotEA\AMP\Individual Viewshed Maps\E1Viewshed.mxd
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R1
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD 4
TOMBSTONE 1
STEENS 2
HOME CREEK 3
R1
T32S-R31E
T32S-R32E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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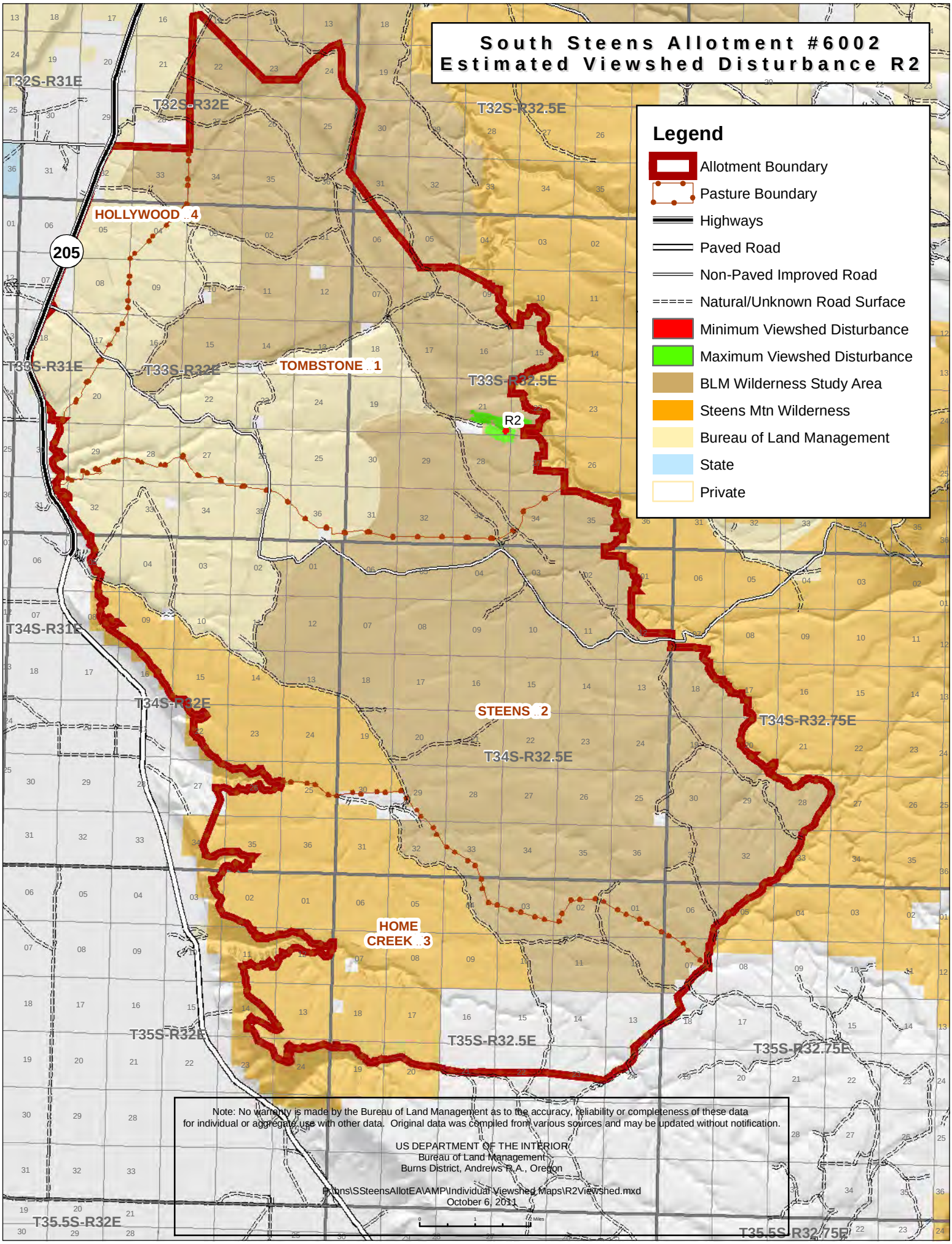
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R2
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
R2
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.75E
T34S-R32.5E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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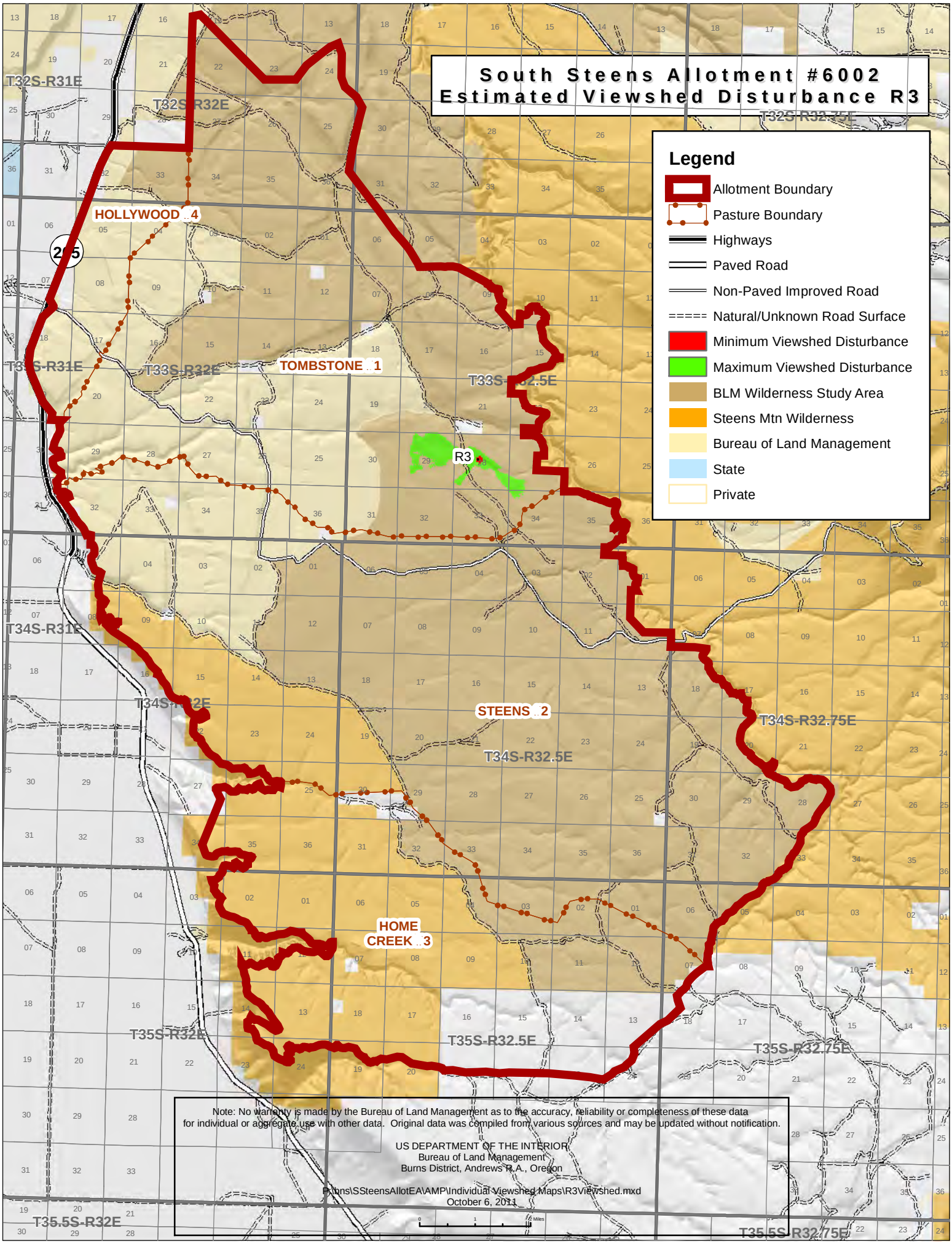
October 6, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R3
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD ..4
TOMBSTONE ..1
STEENS ..2
HOME CREEK ..3
R3
205
T32S-R31E
T32S-R32E
T32S-R32.75E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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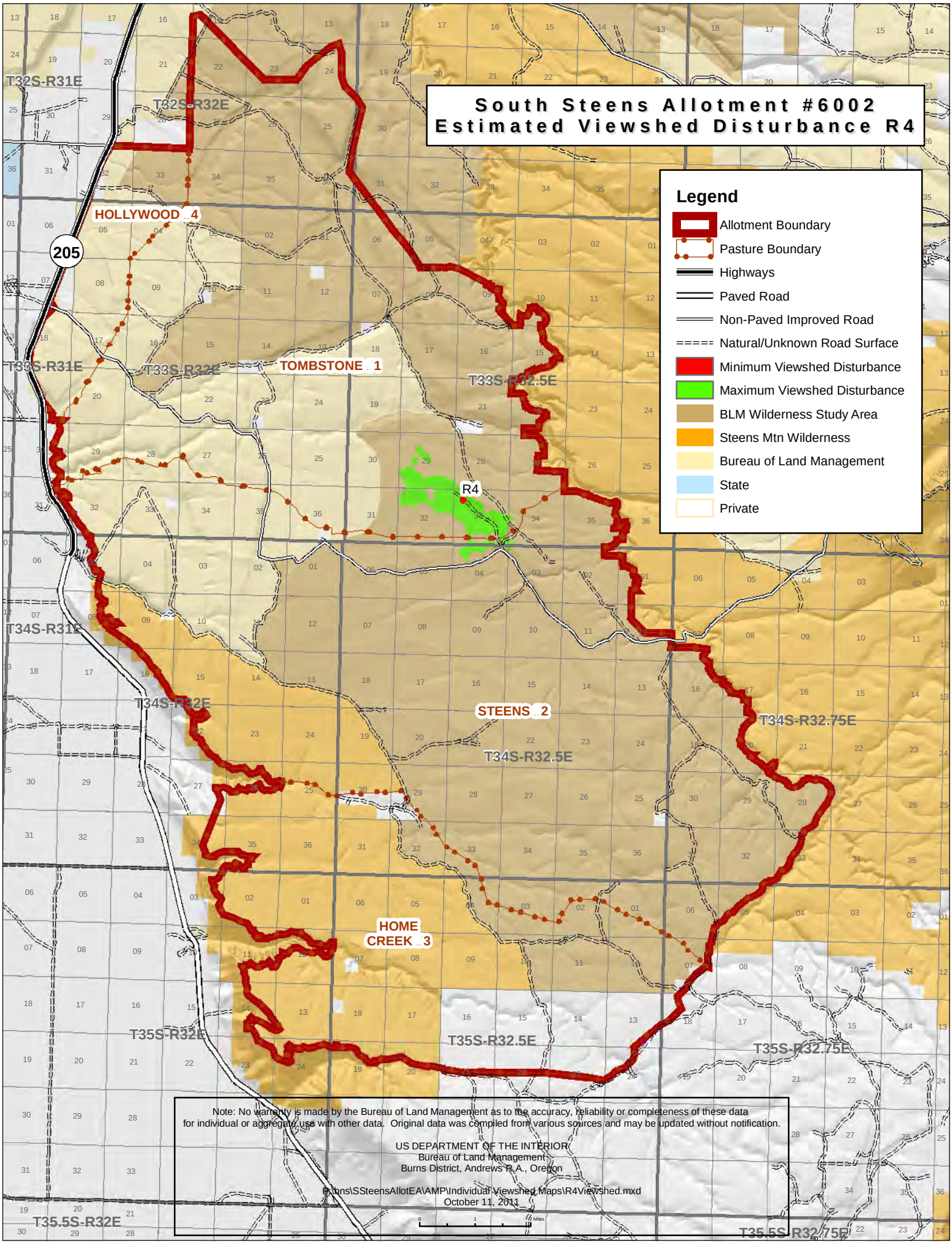
October 6, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R4
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
R4
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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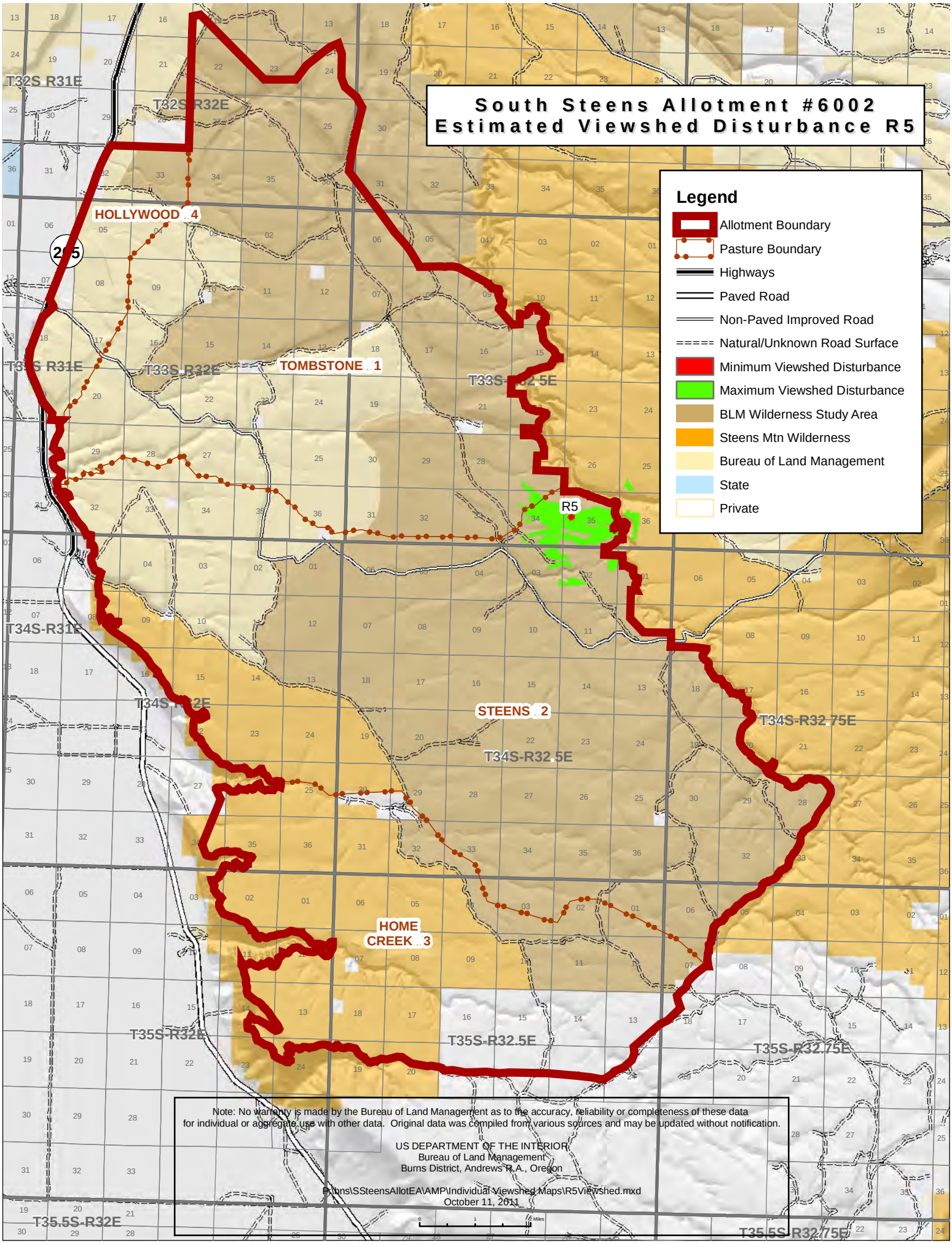
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R5
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD 4
TOMBSTONE 1
STEENS 2
HOME CREEK 3
R5
T32S-R31E
T32S-R32E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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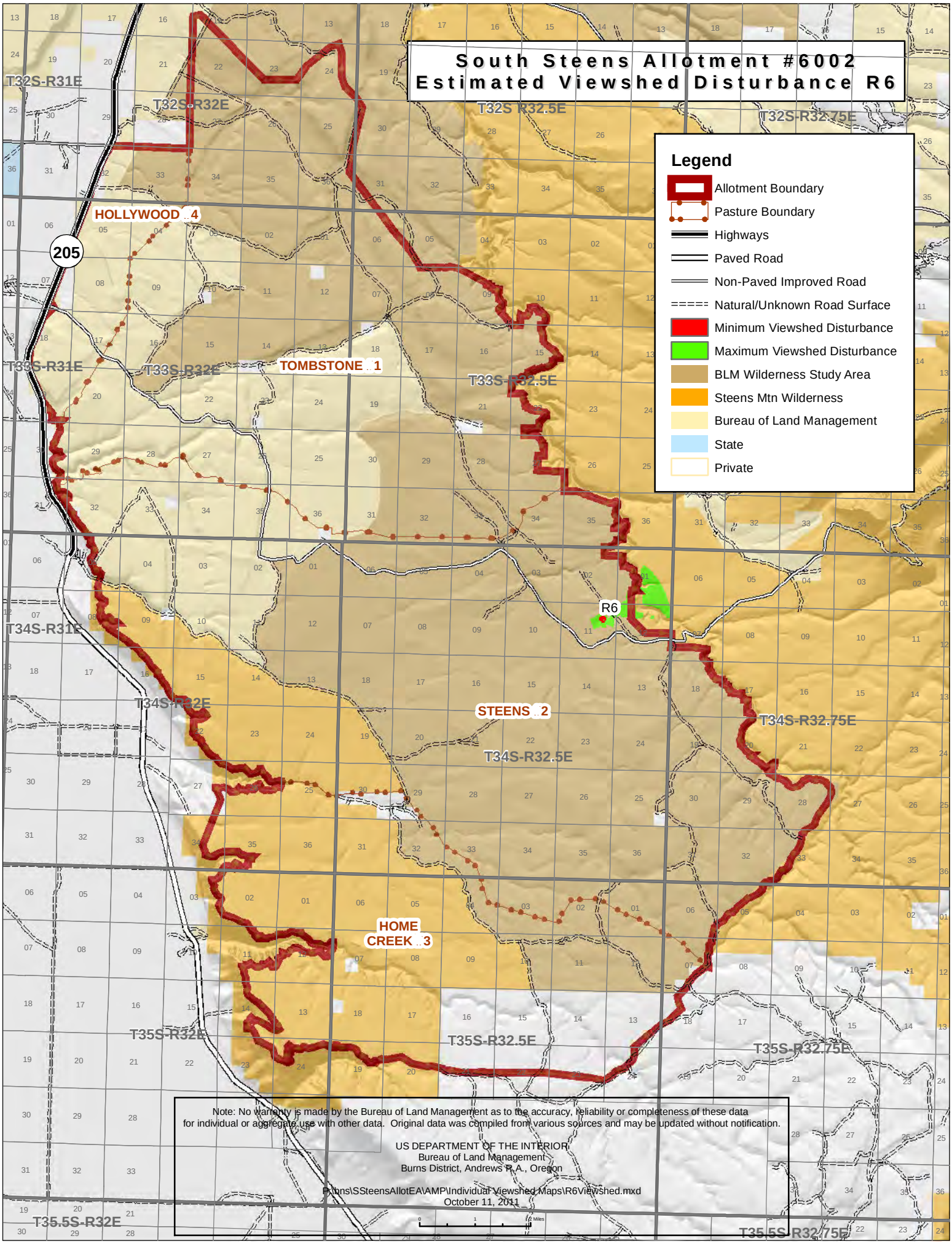
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R6
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD 4
205
T33S-R31E
T33S-R32E
TOMBSTONE 1
T33S-R32.5E
R6
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.5E
T34S-R32.75E
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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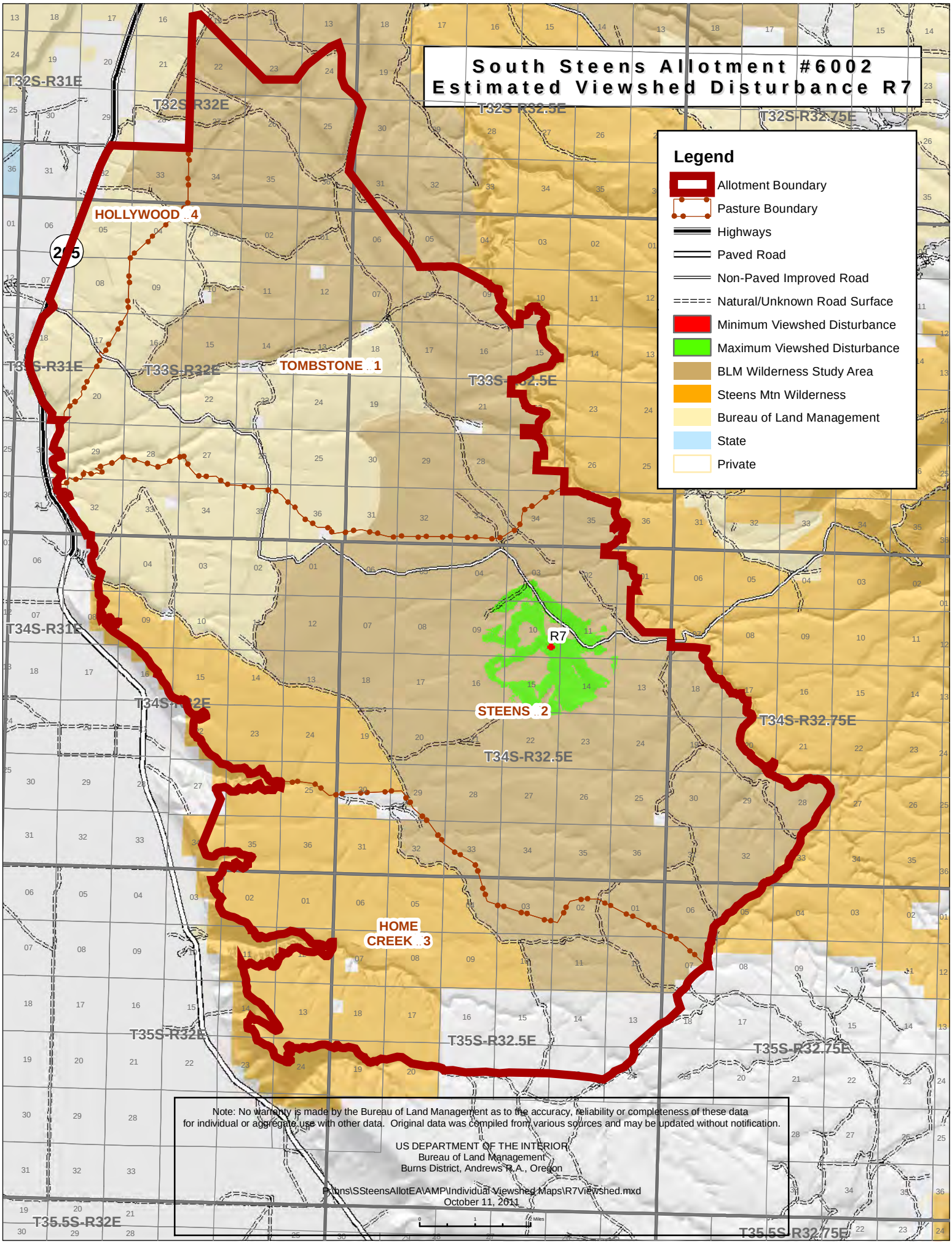
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R7
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
R7
STEENS ..2
T34S-R32.75E
T34S-R32.5E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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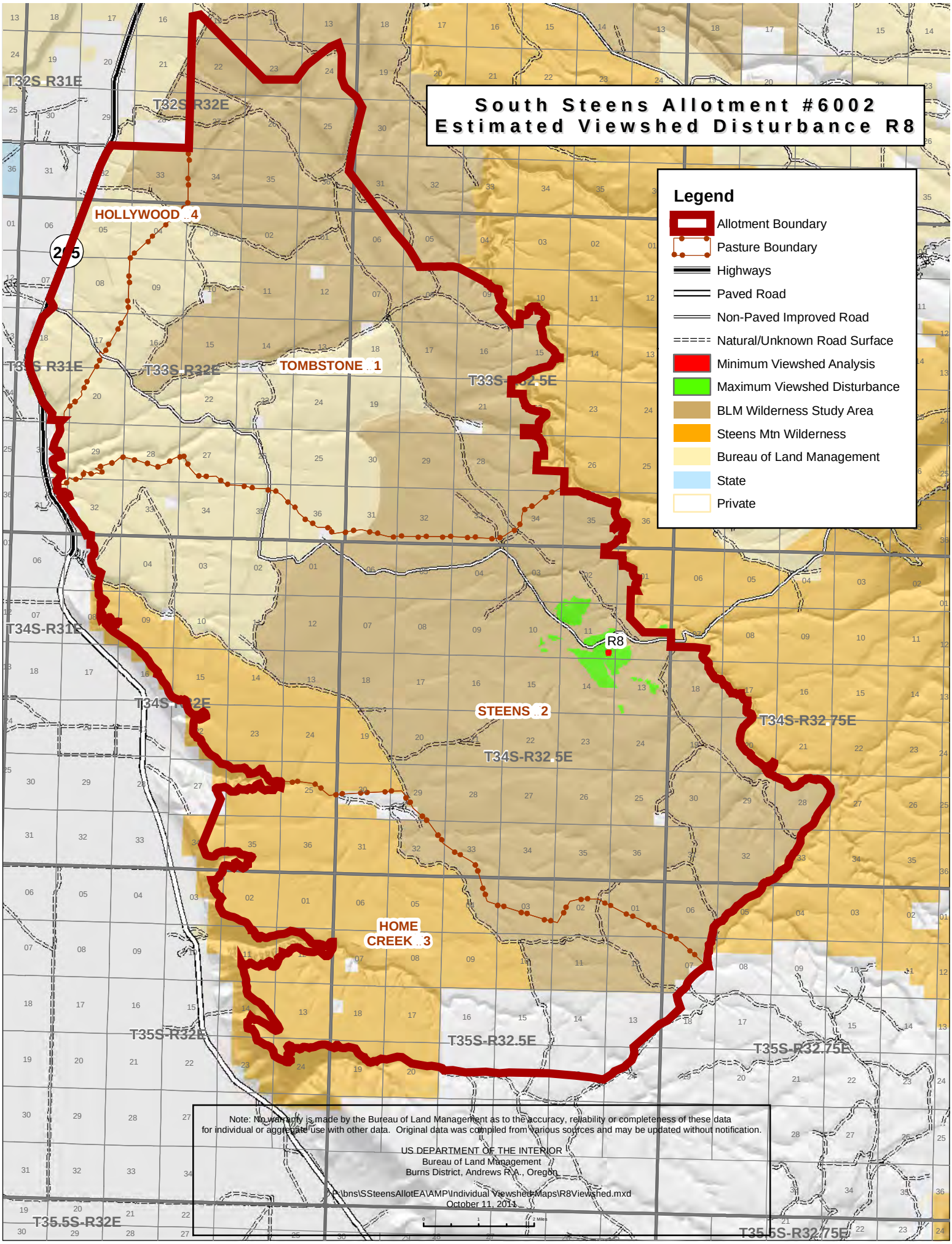
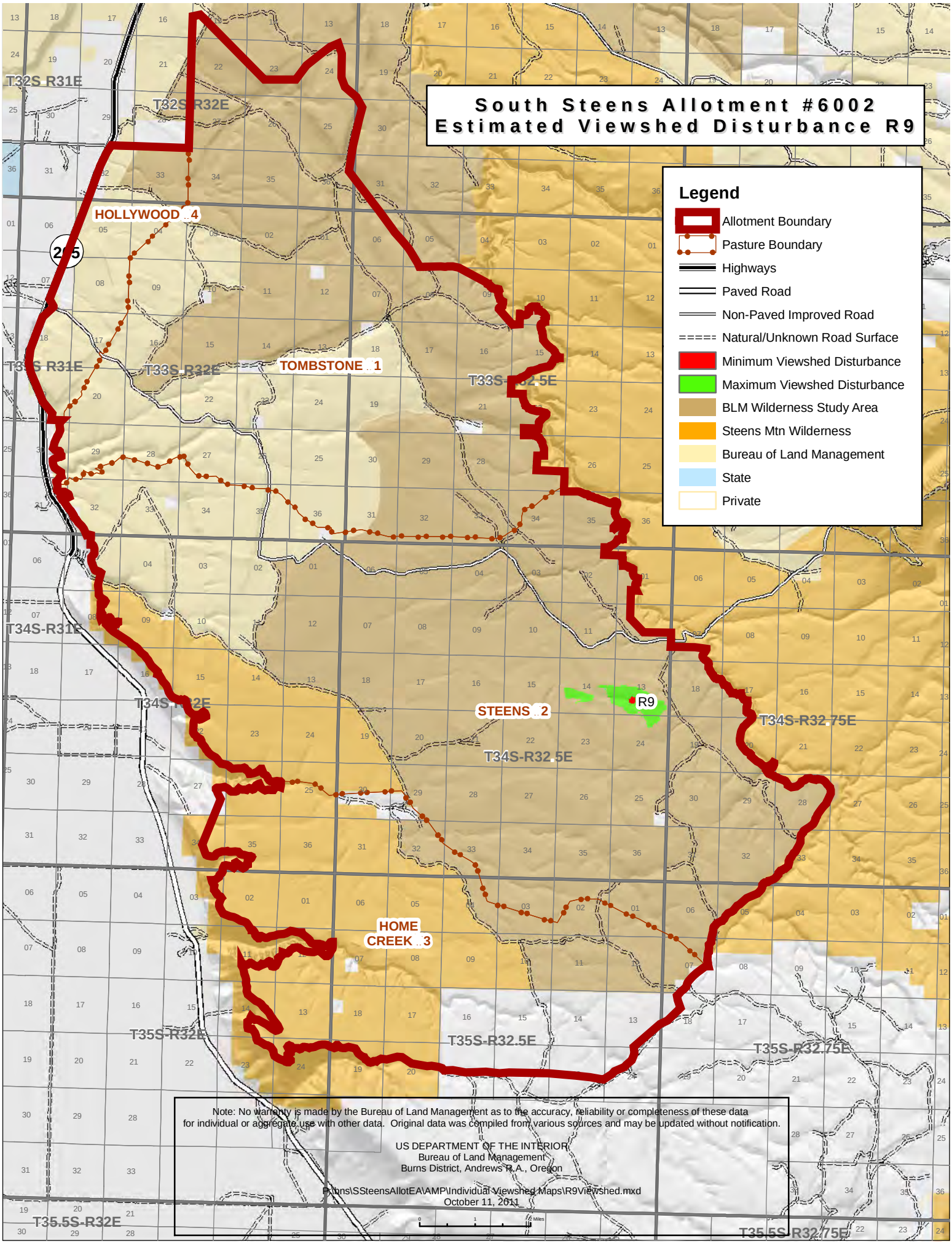
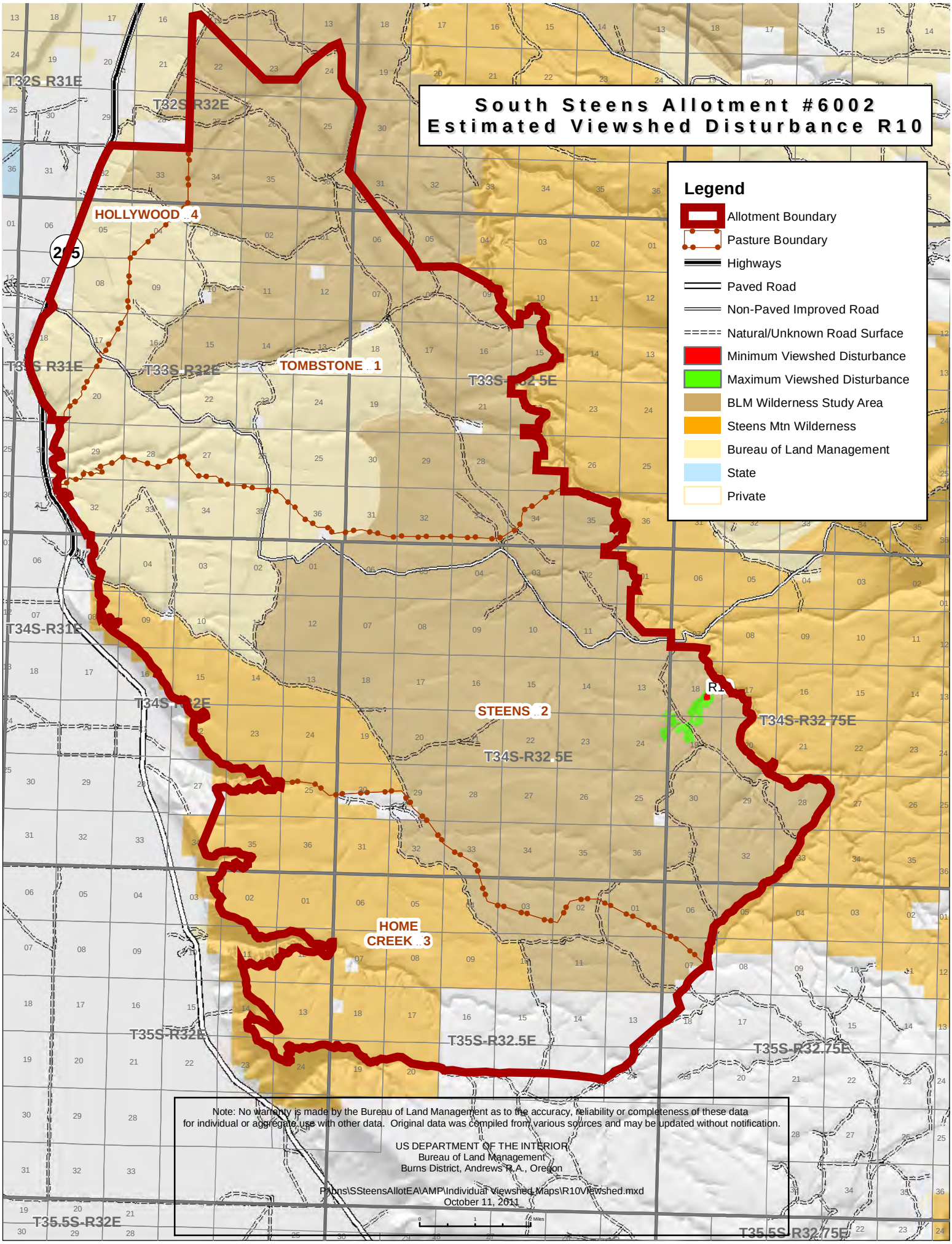
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R8
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Analysis
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD 4
TOMBSTONE 1
STEENS 2
HOME CREEK 3
R8
T32S R31E
T32S R32E
T33S R31E
T33S R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
P:\bns\SSteensAllotEA\AMP\Individual Viewshed Maps\R8Viewshed.mxd
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R9
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S R31E
T32S R32E
HOLLYWOOD 4
205
T33S R31E
T33S R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS 2
R9
T34S-R32.75E
T34S-R32.5E
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
P:\bns\SSteensAllotEA\AMP\Individual Viewshed Maps\R9Viewshed.mxd
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R10
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S R31E
T32S R32E
HOLLYWOOD 4
TOMBSTONE 1
T33S R31E
T33S R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.75E
T34S-R32.5E
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
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Burns District, Andrews R.A., Oregon
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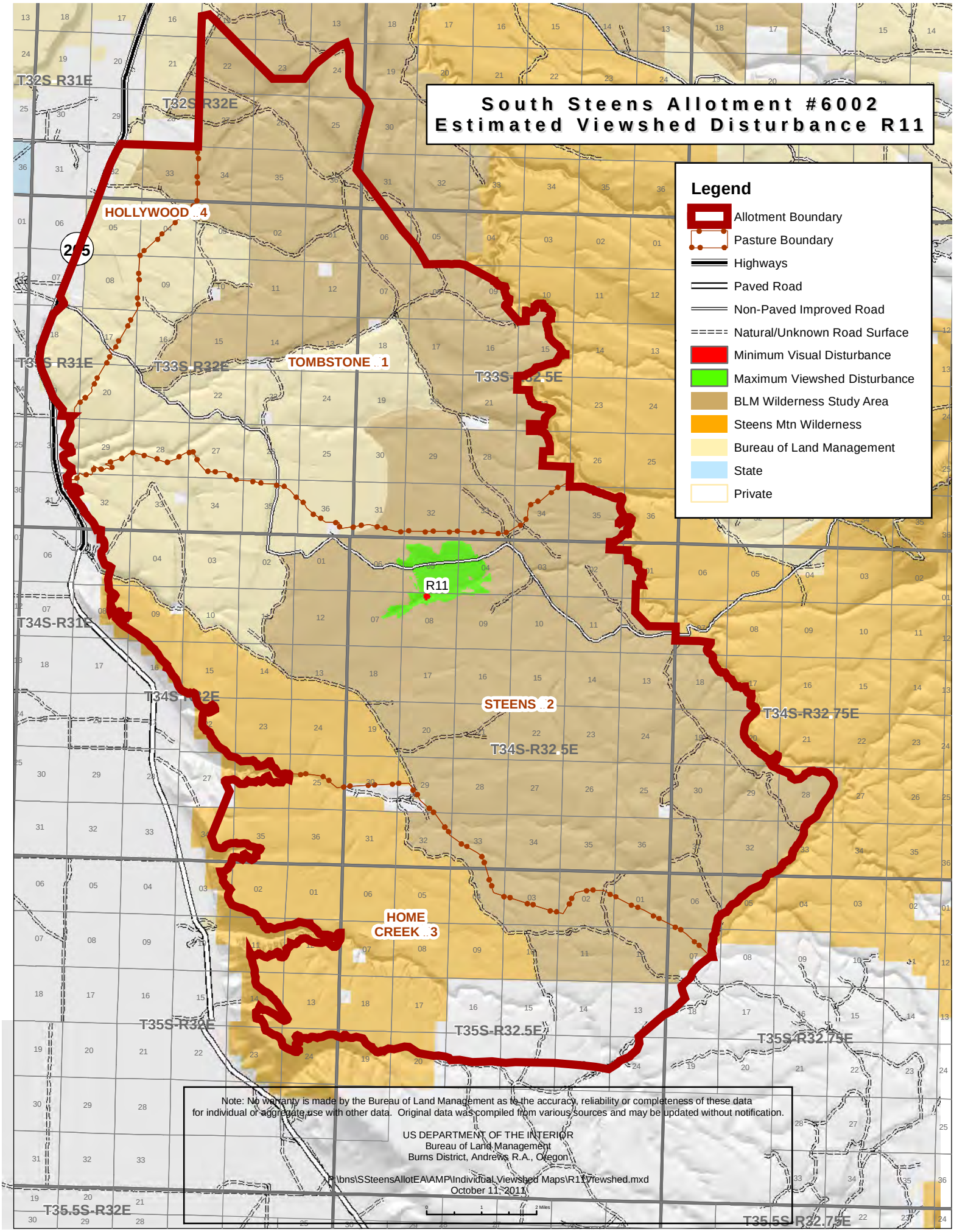
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R11
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Visual Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD 4
TOMBSTONE 1
STEENS 2
HOME CREEK 3
R11
T32S R31E
T32S R32E
T33S R31E
T33S R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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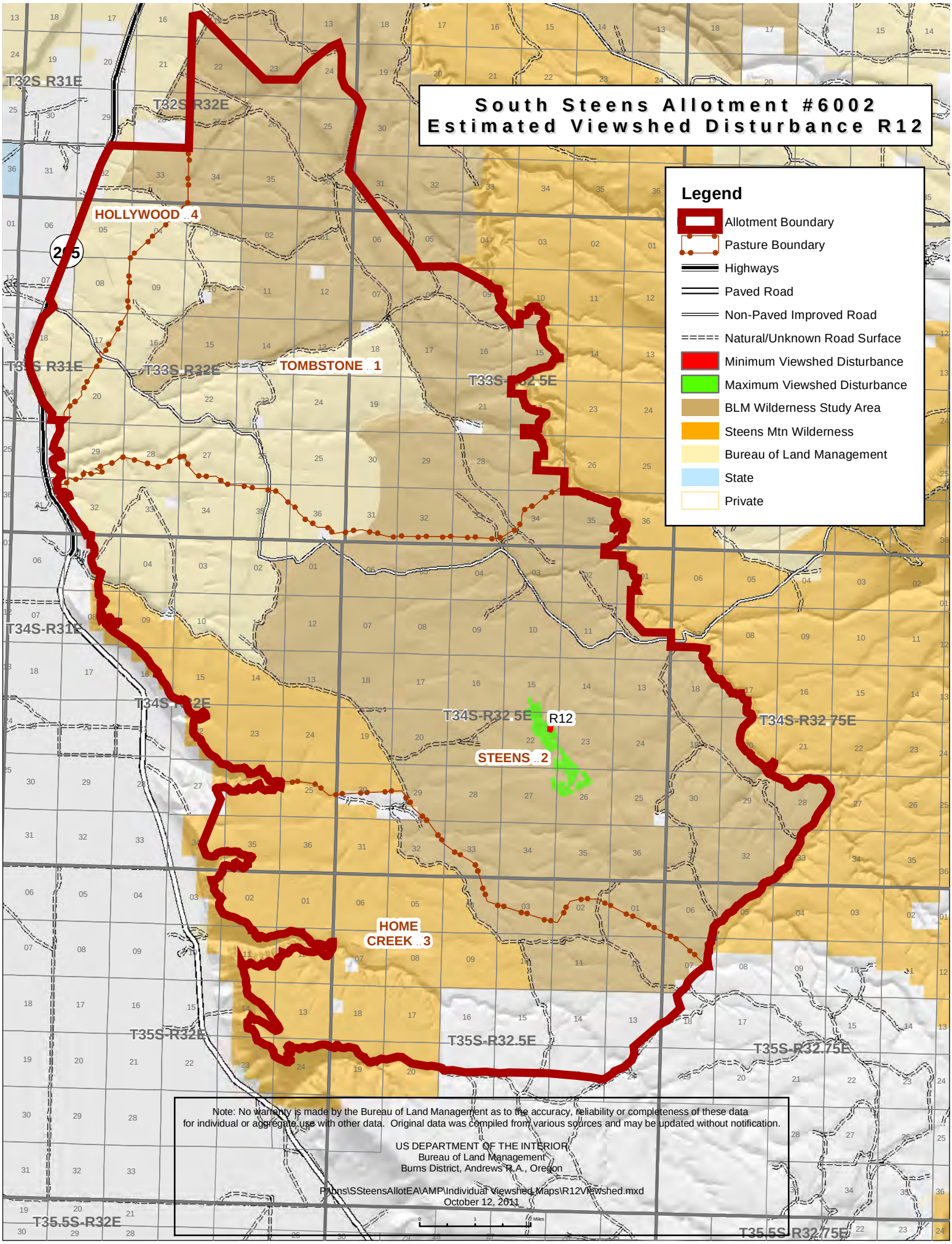
October 11, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance R12
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S R31E
T32S R32E
HOLLYWOOD 4
205
T33S R31E
T33S R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
R12
T34S-R32.75E
STEENS 2
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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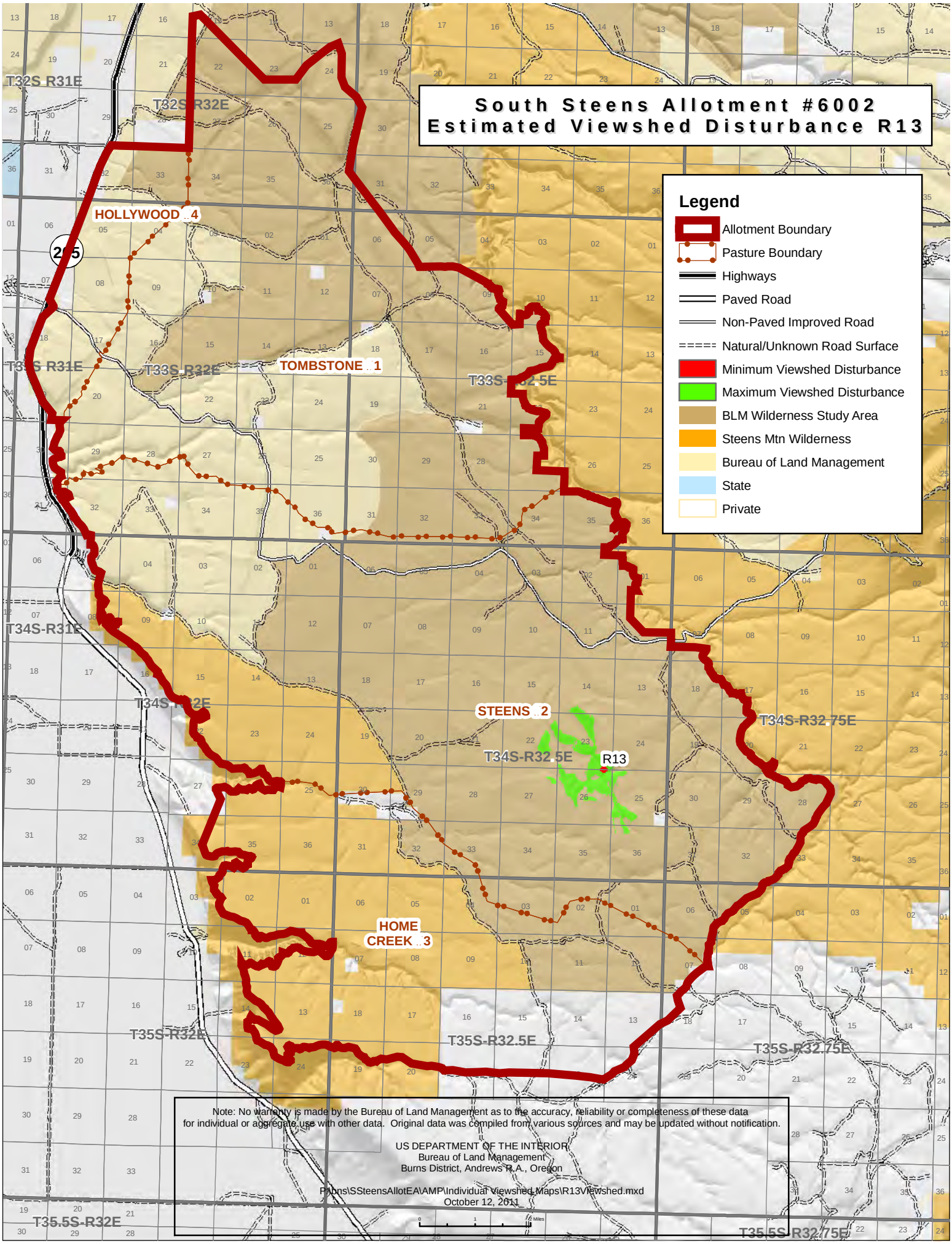
South Steens Allotment #6002
Estimated Viewshed Disturbance R13
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD 4
TOMBSTONE 1
STEENS 2
HOME CREEK 3
R13
T32S R31E
T32S R32E
T33S R32E
T33S-R32.5E
T34S-R31E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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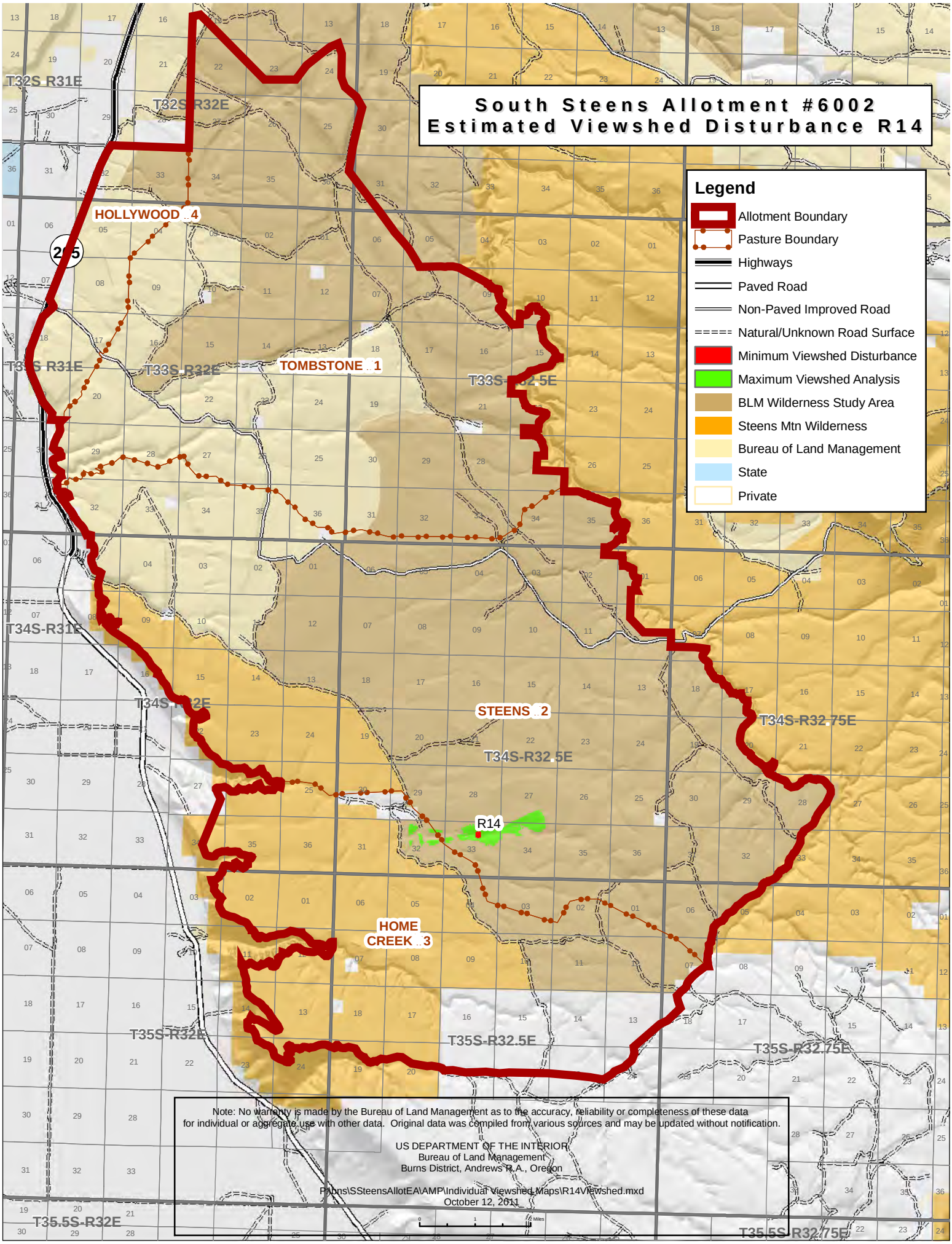
South Steens Allotment #6002
Estimated Viewshed Disturbance R14
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Analysis
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S R31E
T32S R32E
HOLLYWOOD 4
205
T33S R31E
T33S R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.75E
T34S-R32.5E
R14
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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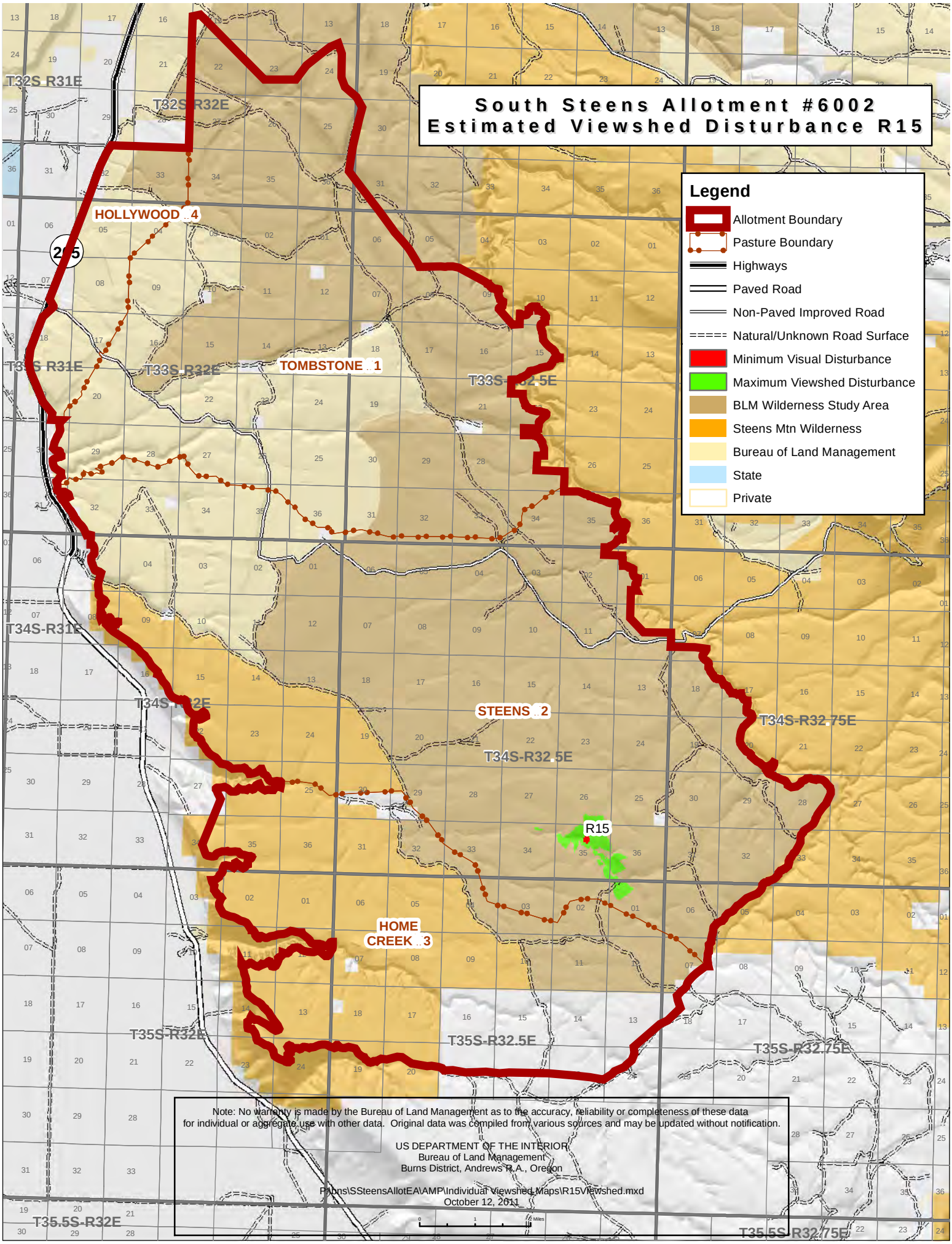
South Steens Allotment #6002
Estimated Viewshed Disturbance R15
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Visual Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD 4
TOMBSTONE 1
STEENS 2
HOME CREEK 3
R15
T32S R31E
T32S R32E
T33S R31E
T33S R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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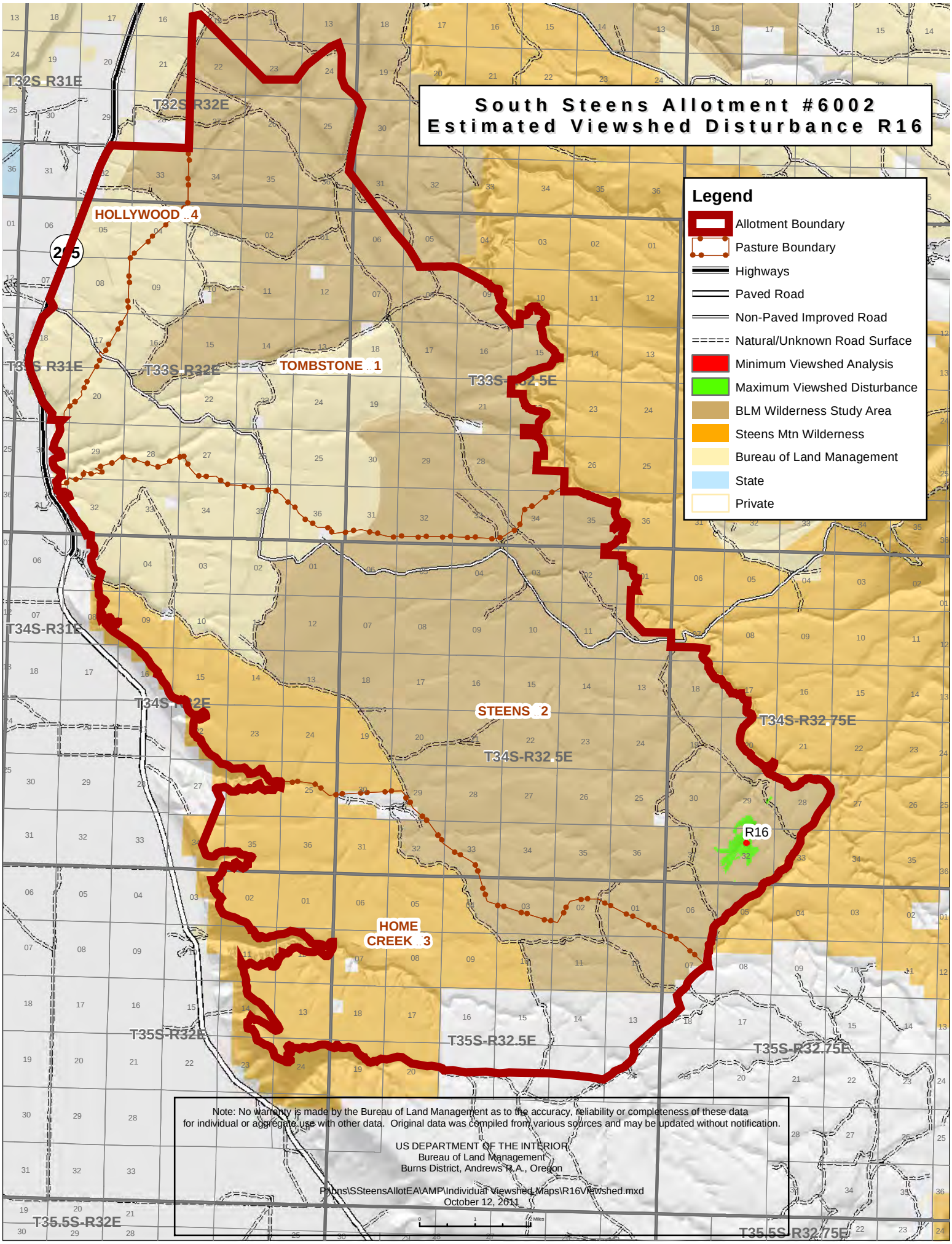
South Steens Allotment #6002
Estimated Viewshed Disturbance R16
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Analysis
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S R31E
T32S R32E
HOLLYWOOD 4
205
T33S R31E
T33S R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.75E
T34S-R32.5E
R16
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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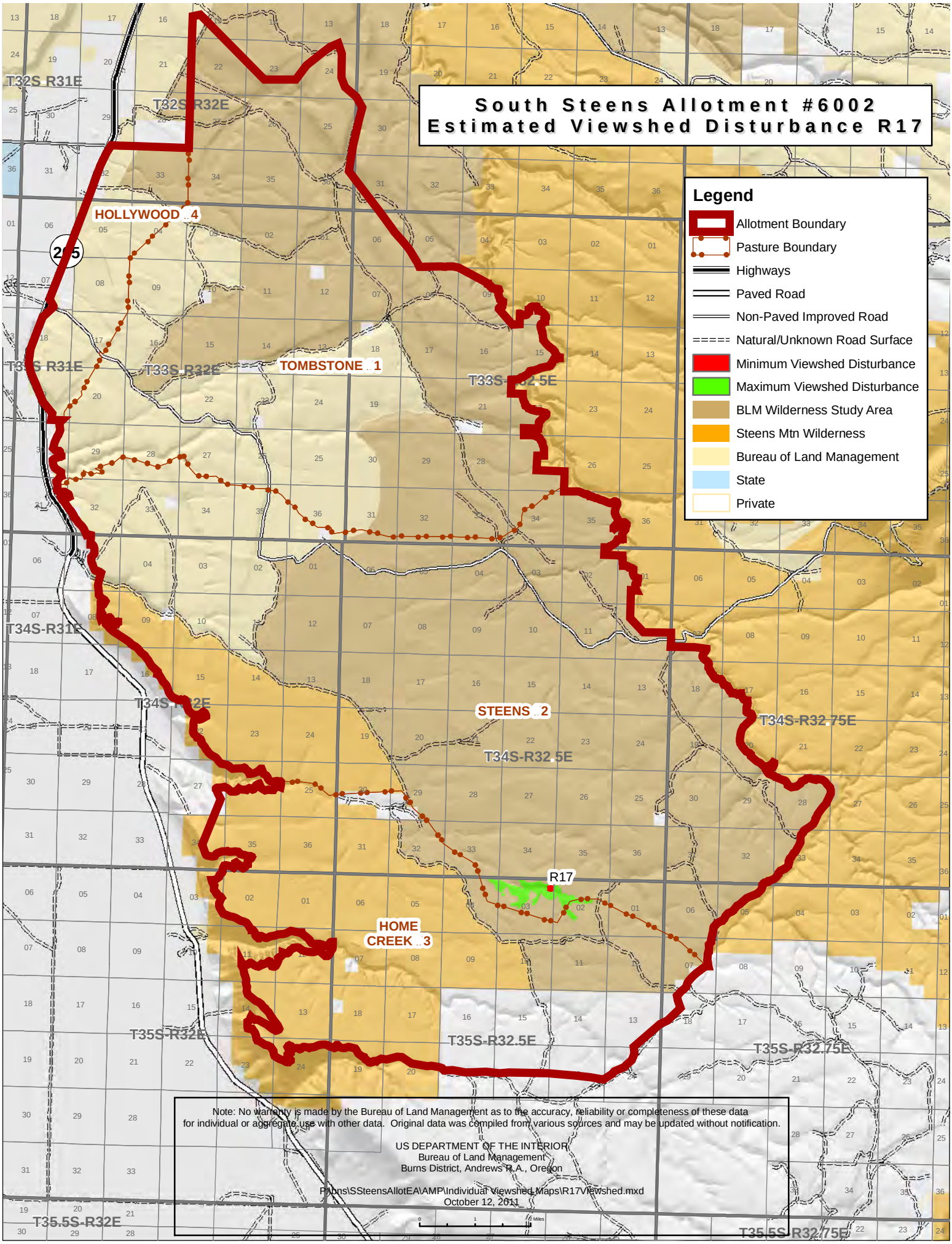
South Steens Allotment #6002
Estimated Viewshed Disturbance R17
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S R31E
T32S R32E
HOLLYWOOD 4
205
T33S R31E
T33S R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.75E
T34S-R32.5E
R17
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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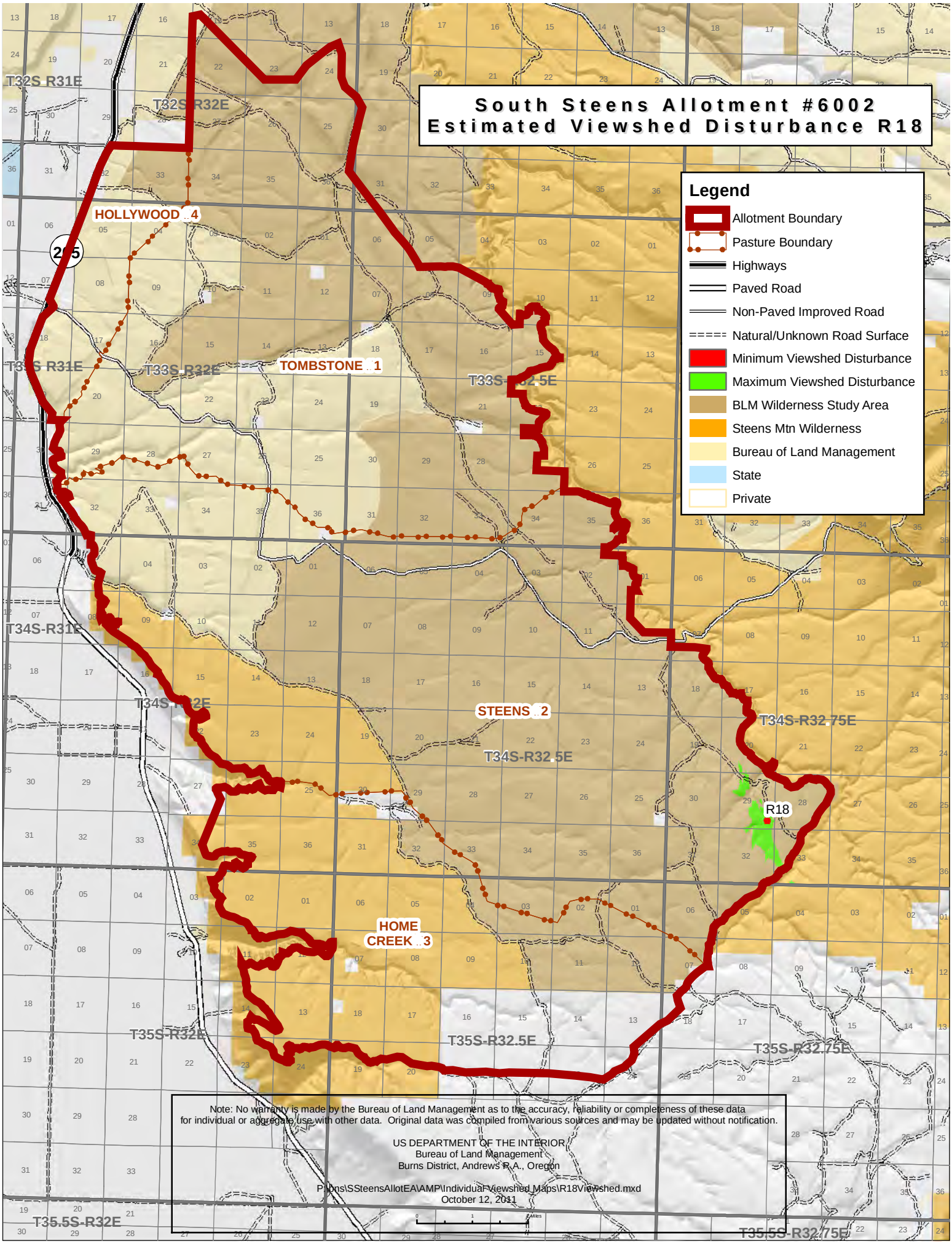
South Steens Allotment #6002
Estimated Viewshed Disturbance R18
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD 4
TOMBSTONE 1
STEENS 2
HOME CREEK 3
R18
T32S-R31E
T32S-R32E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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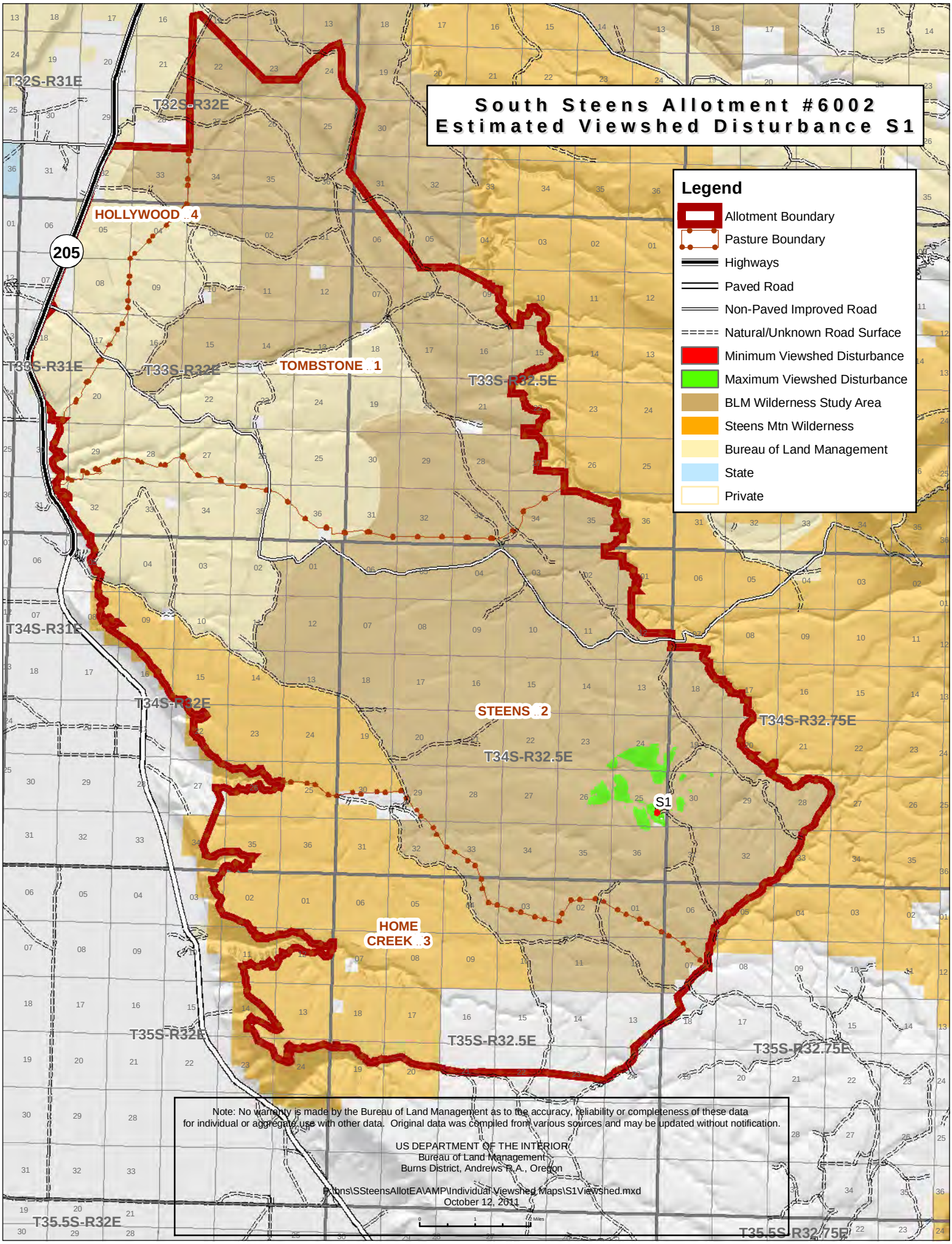
October 12, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance S1
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
S1
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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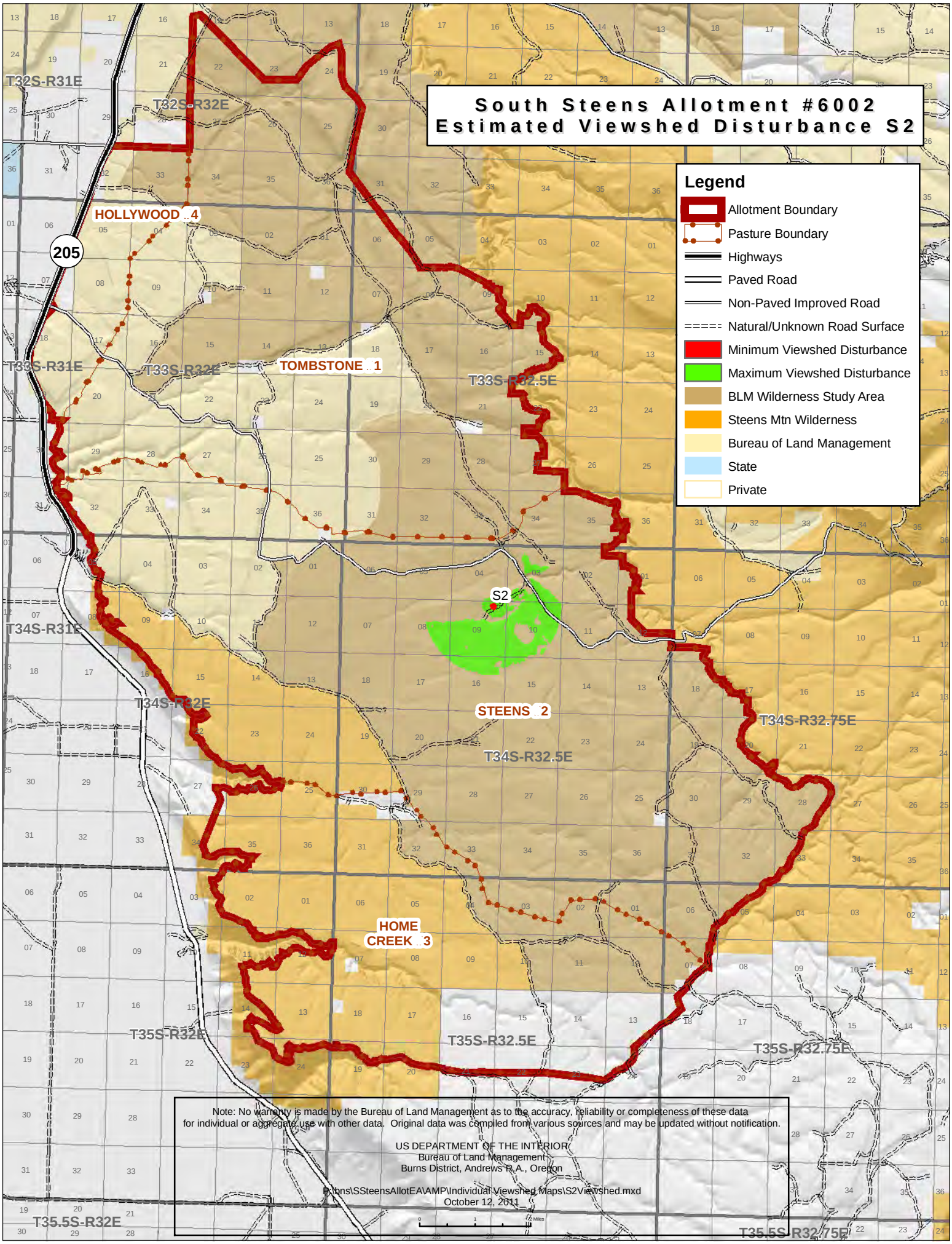
October 12, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance S2
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
S2
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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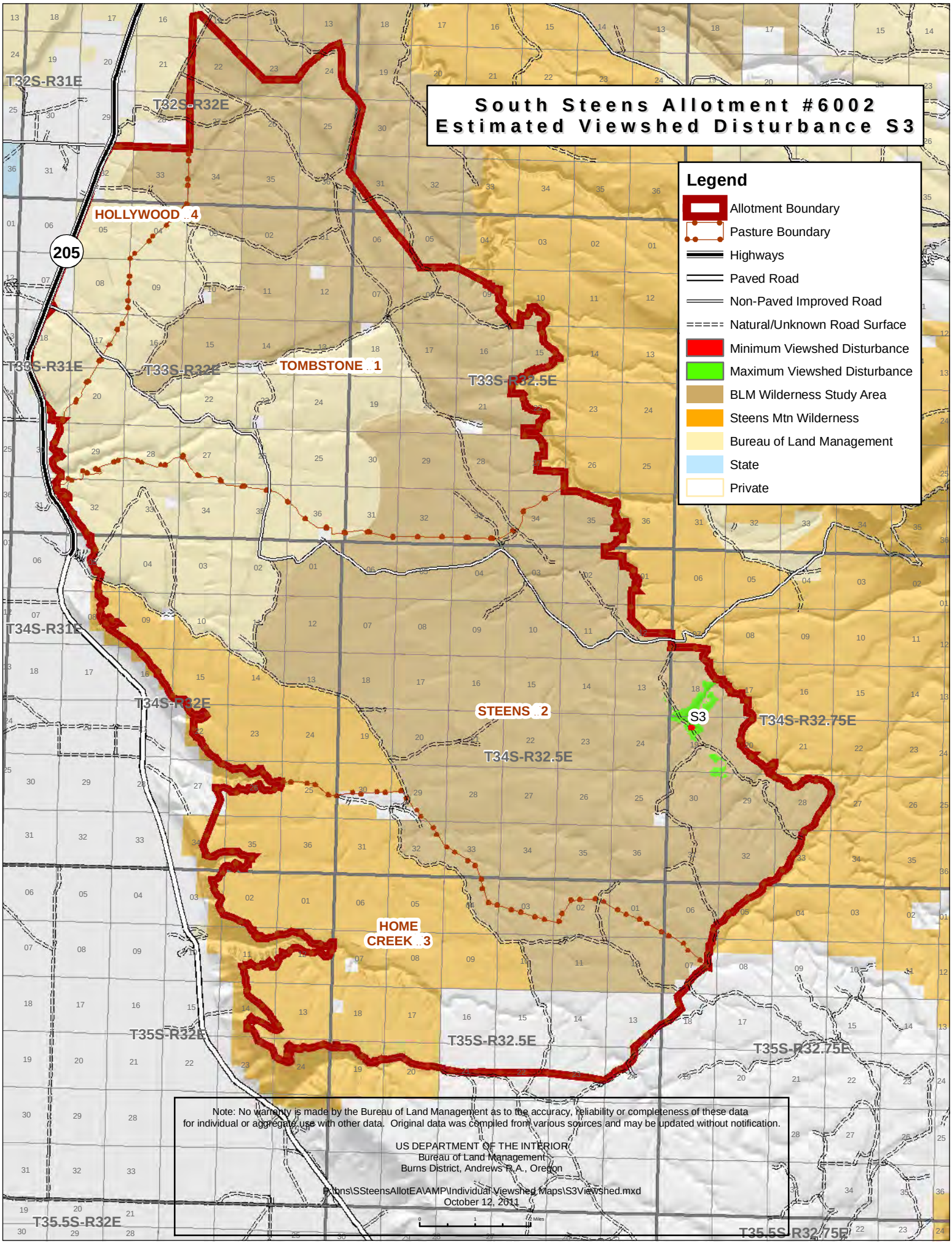
South Steens Allotment #6002
Estimated Viewshed Disturbance S3
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
S3
T34S-R32.75E
T34S-R32.5E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
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Burns District, Andrews R.A., Oregon
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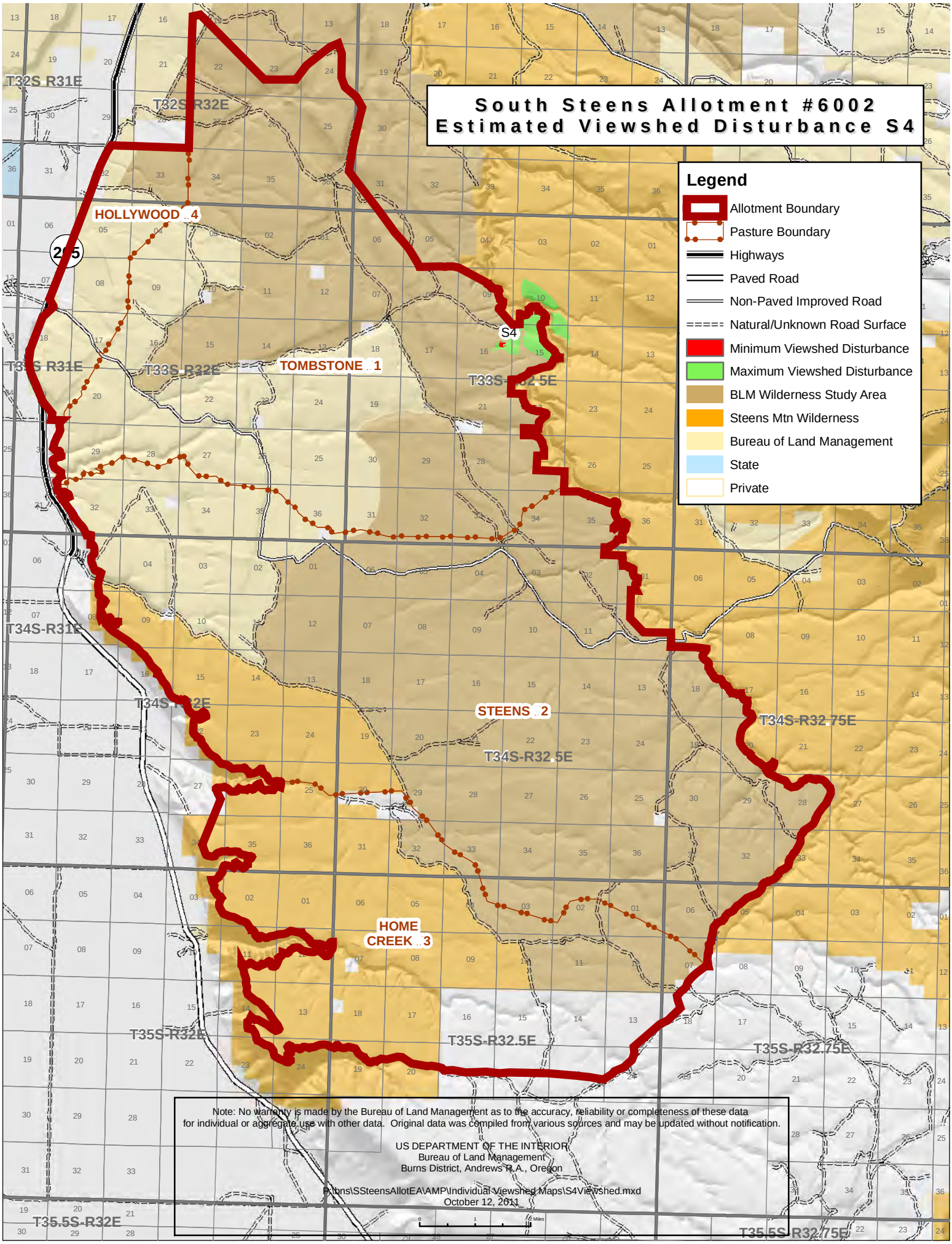
South Steens Allotment #6002
Estimated Viewshed Disturbance S4
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S R31E
T32S R32E
HOLLYWOOD 4
205
S4
T33S R31E
T33S R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.75E
T34S-R32.5E
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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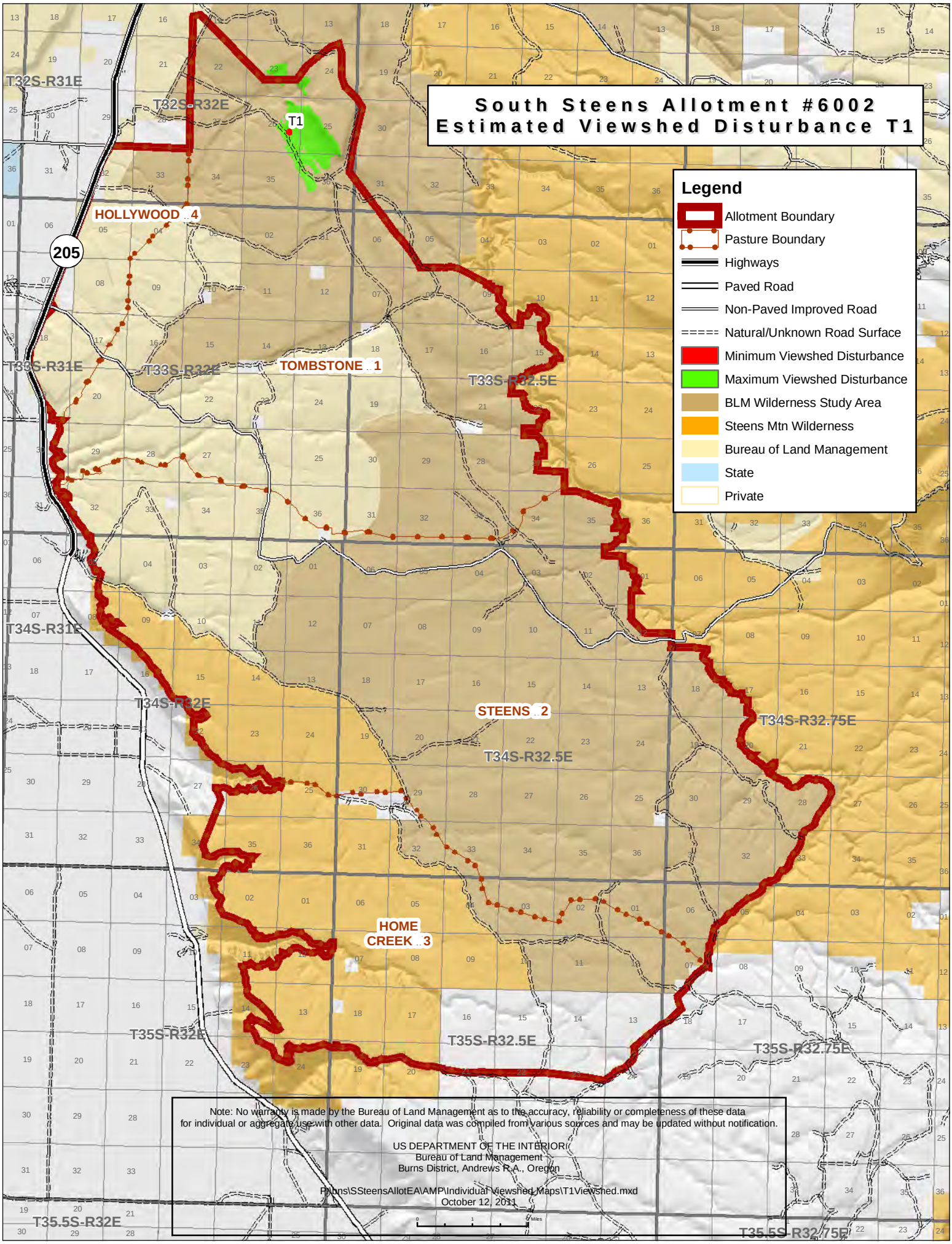
South Steens Allotment #6002
Estimated Viewshed Disturbance T1
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T1
HOLLYWOOD ..4
TOMBSTONE ..1
STEENS ..2
HOME CREEK ..3
205
T32S-R31E
T32S-R32E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
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T34S-R32.75E
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T35.5S-R32E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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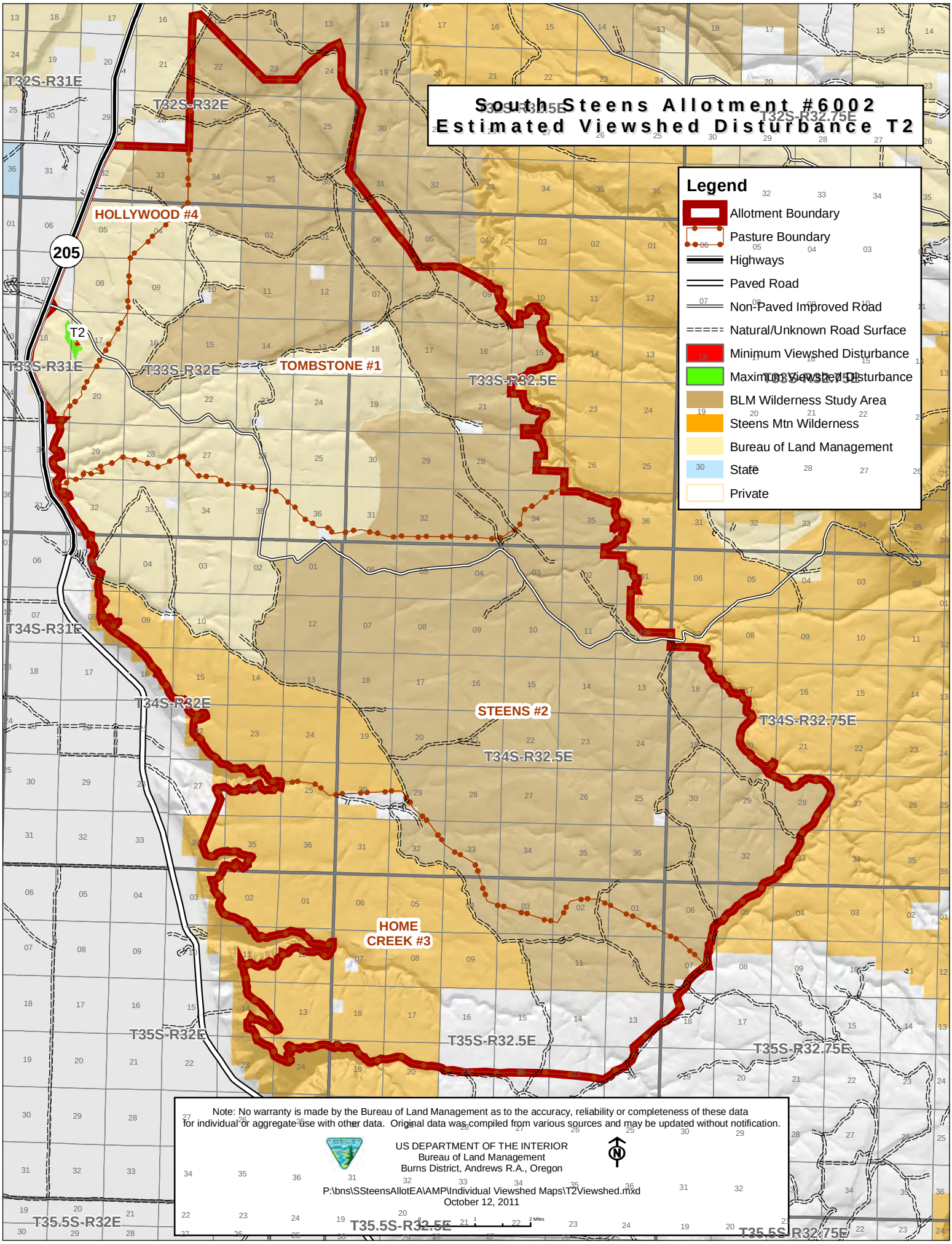
South Steens Allotment #6002
Estimated Viewshed Disturbance T2
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD #4
205
T2
T33S-R31E
T33S-R32E
TOMBSTONE #1
T33S-R32.5E
T33S-R32.75E
T34S-R31E
T34S-R32E
STEENS #2
T34S-R32.5E
T34S-R32.75E
HOME CREEK #3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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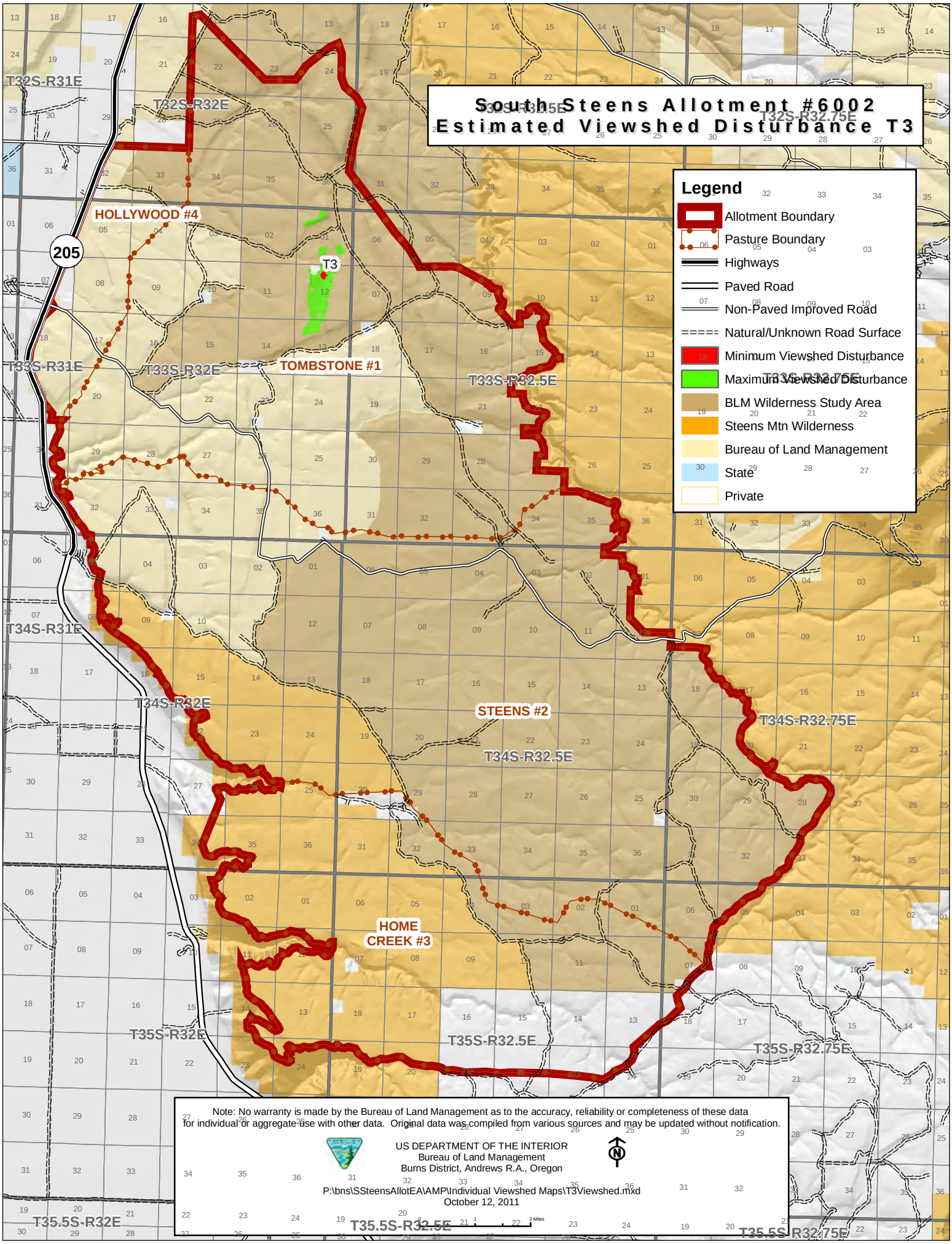
October 12, 2011
2 Miles


South Steens Allotment #6002
Estimated Viewshed Disturbance T3
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD #4
205
T3
T33S-R31E
T33S-R32E
TOMBSTONE #1
T33S-R32.5E
T33S-R32.75E
T34S-R31E
T34S-R32E
STEENS #2
T34S-R32.5E
T34S-R32.75E
HOME CREEK #3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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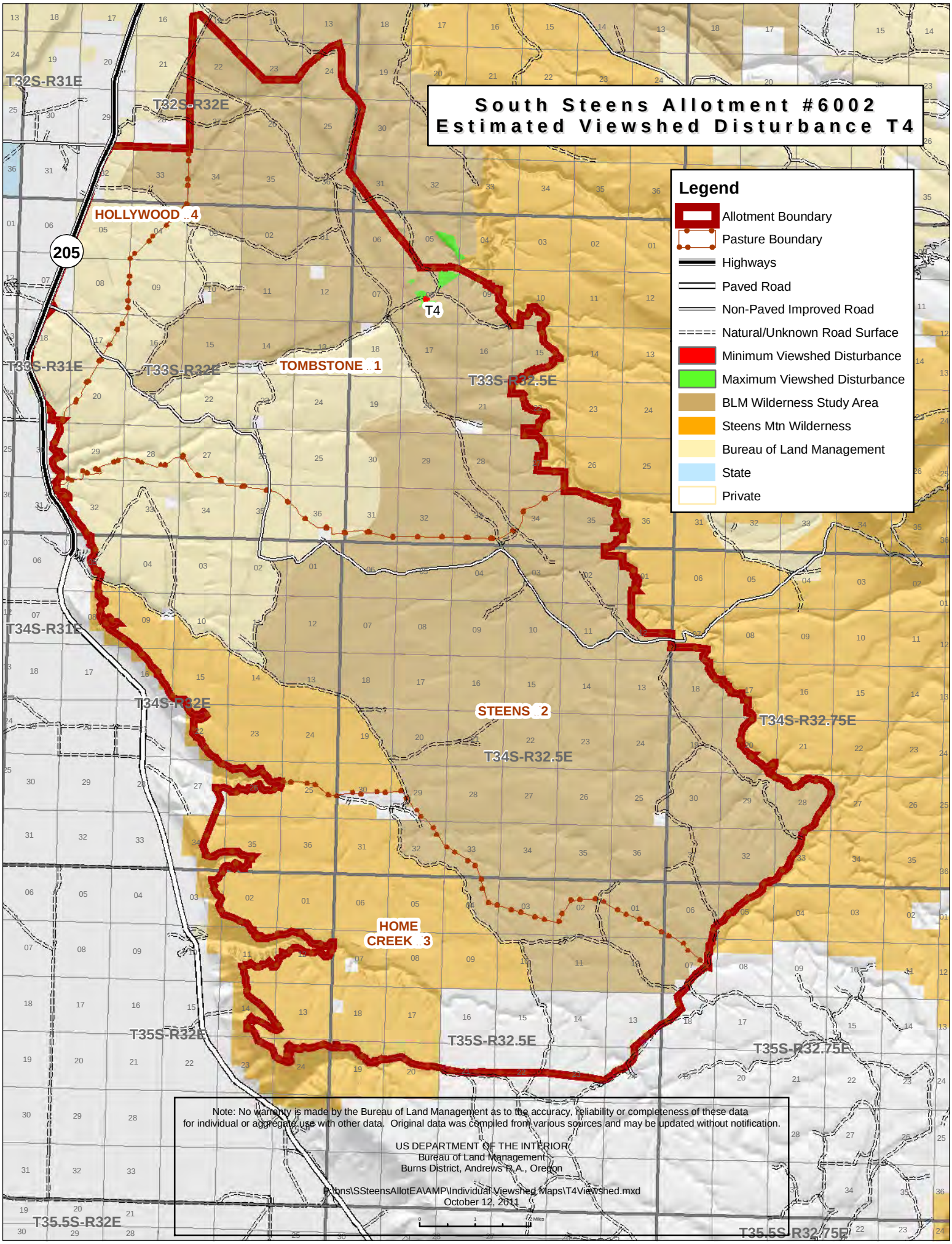
October 12, 2011
2 Miles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Estimated Viewshed Disturbance T4
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T4
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.75E
T34S-R32.5E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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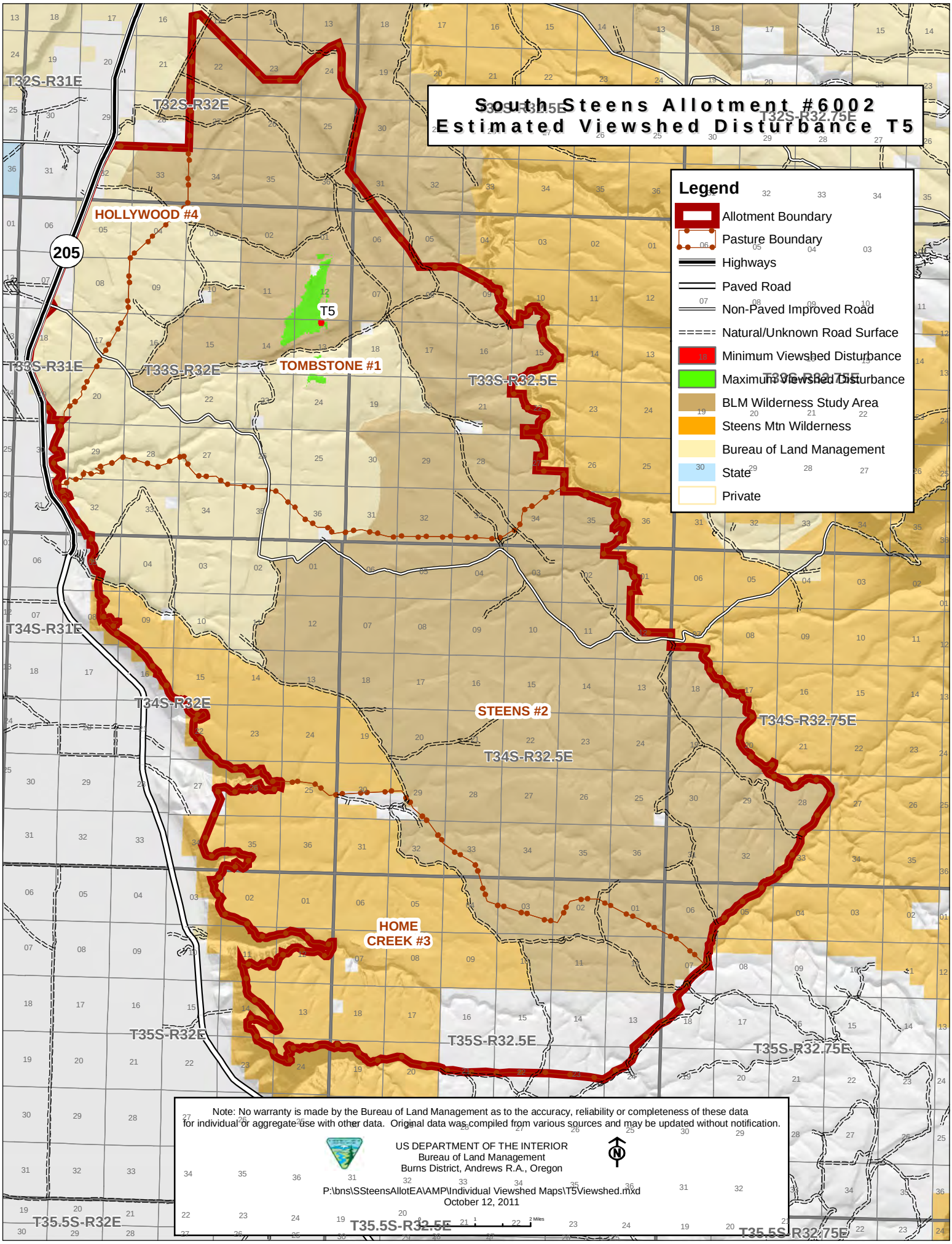
October 12, 2011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Estimated Viewshed Disturbance T5
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T5
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
205
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
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T33S-R32.5E
T33S-R32.75E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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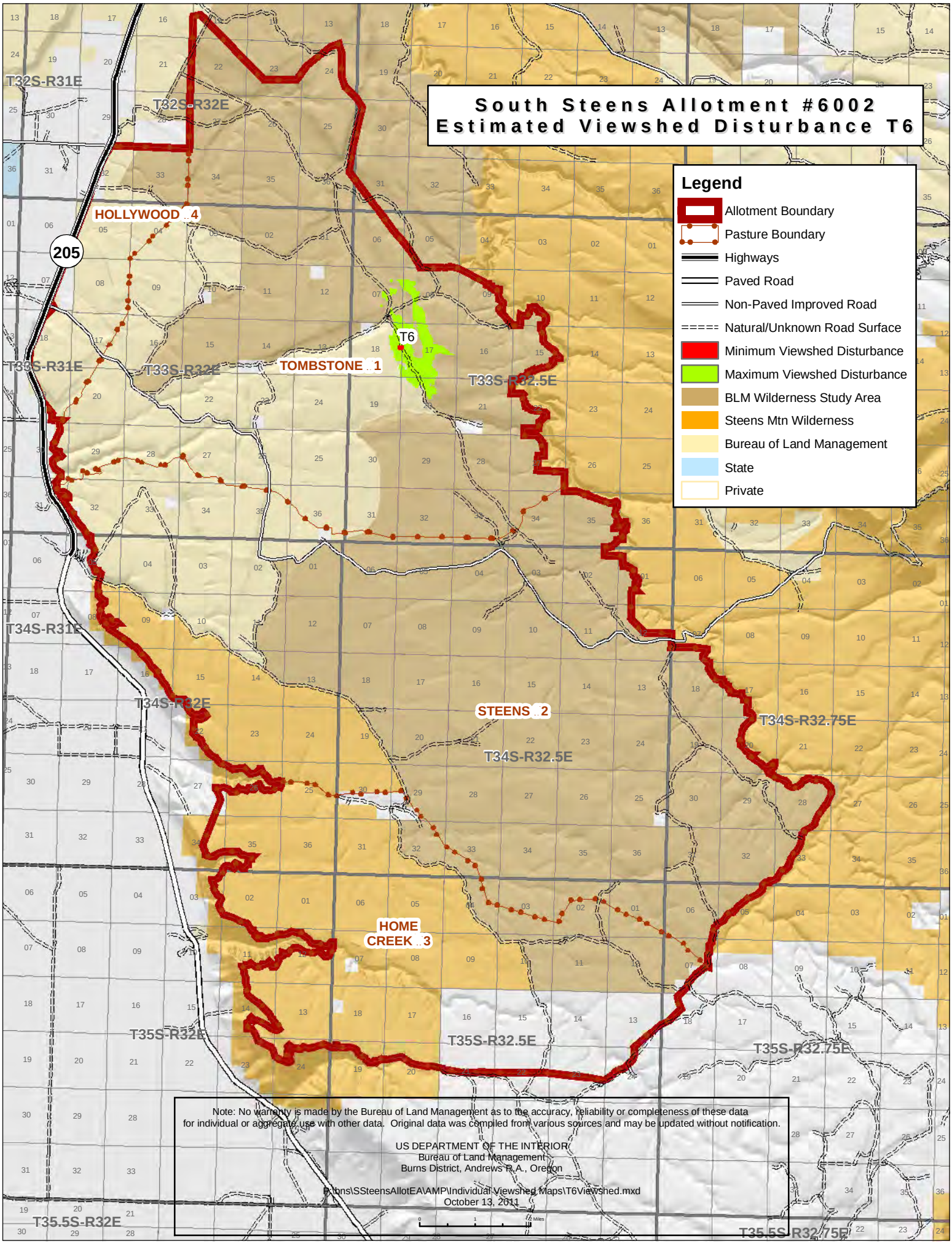
October 12, 2011
2 Miles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Estimated Viewshed Disturbance T6
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T6
TOMBSTONE ..1
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T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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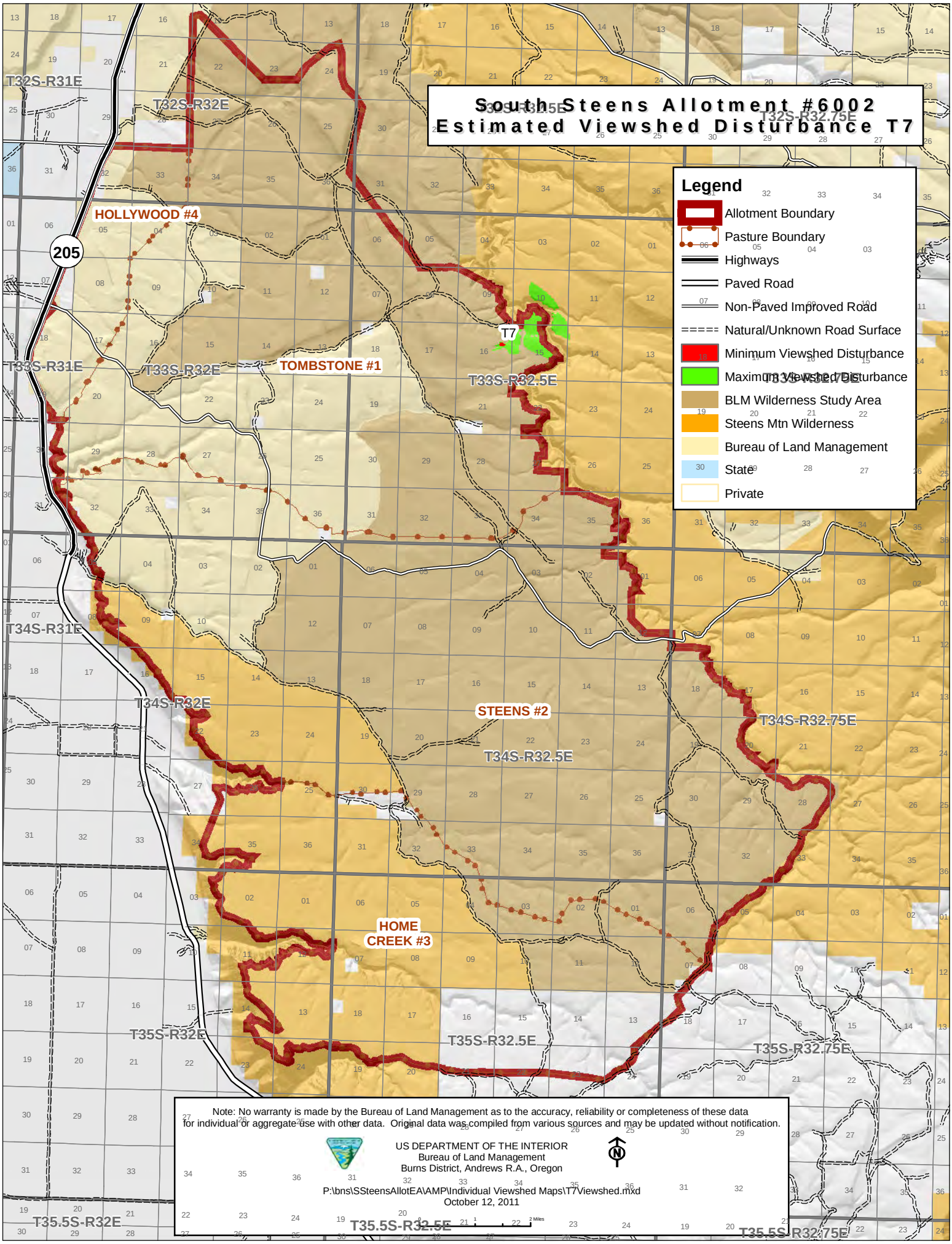
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Estimated Viewshed Disturbance T7
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T7
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
205
T32S-R31E
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T33S-R32E
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T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
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Burns District, Andrews R.A., Oregon
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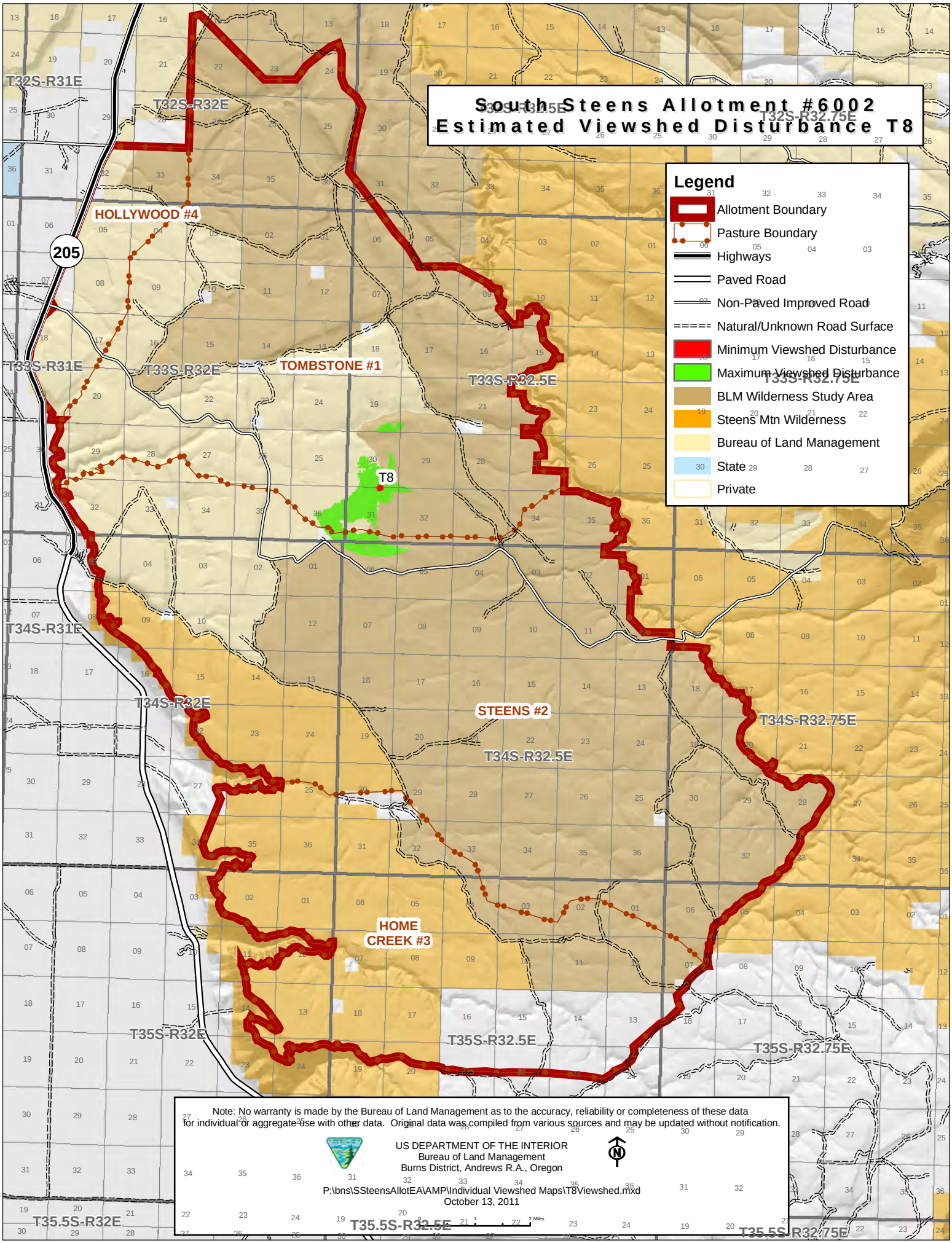
October 12, 2011
2 Miles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Estimated Viewshed Disturbance T8
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD #4
205
T33S-R31E
T33S-R32E
TOMBSTONE #1
T33S-R32.5E
T33S-R32.75E
T8
T34S-R31E
T34S-R32E
STEENS #2
T34S-R32.5E
T34S-R32.75E
HOME
CREEK #3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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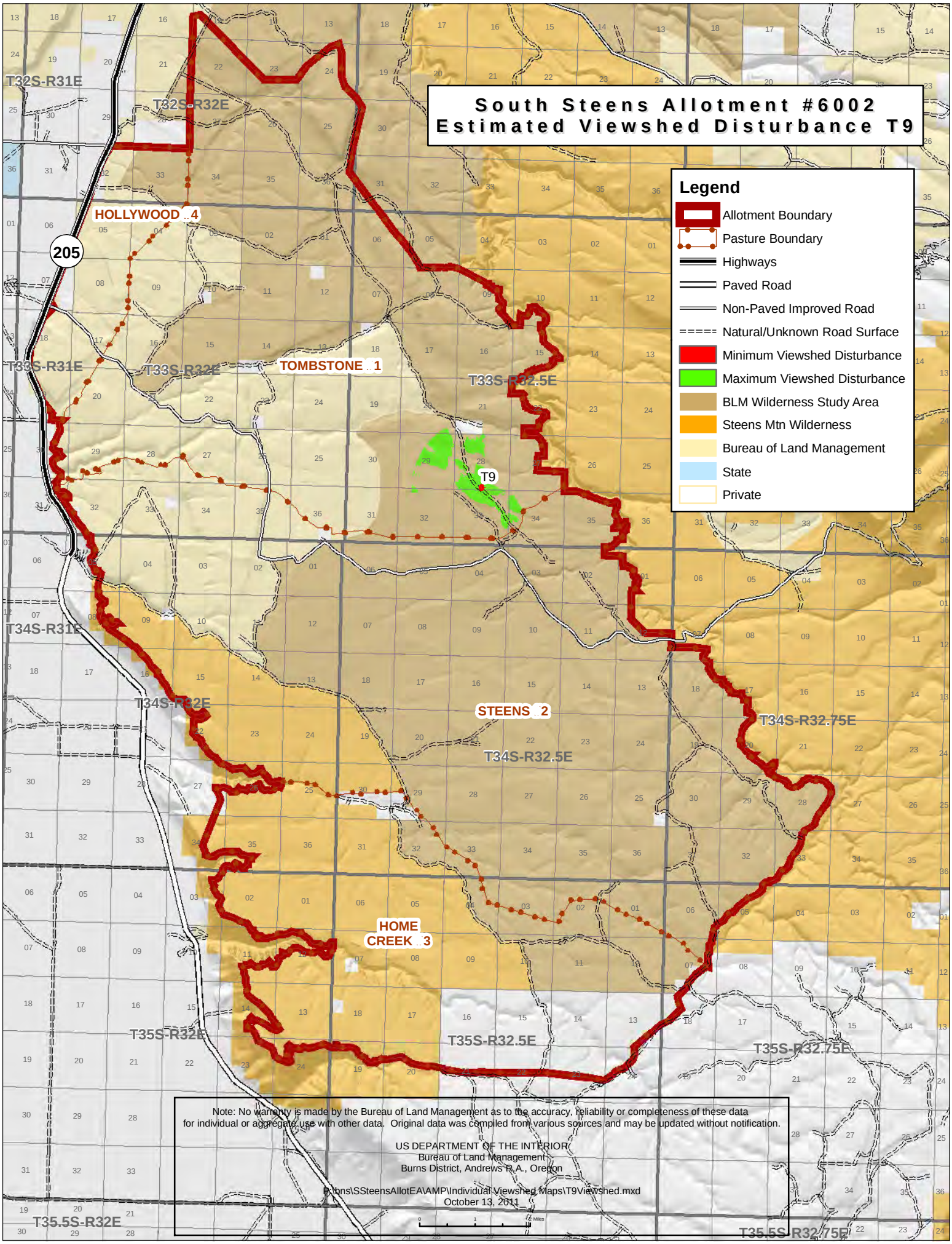
October 13, 2011
2 Miles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Estimated Viewshed Disturbance T9
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
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T33S-R32E
TOMBSTONE ..1
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T9
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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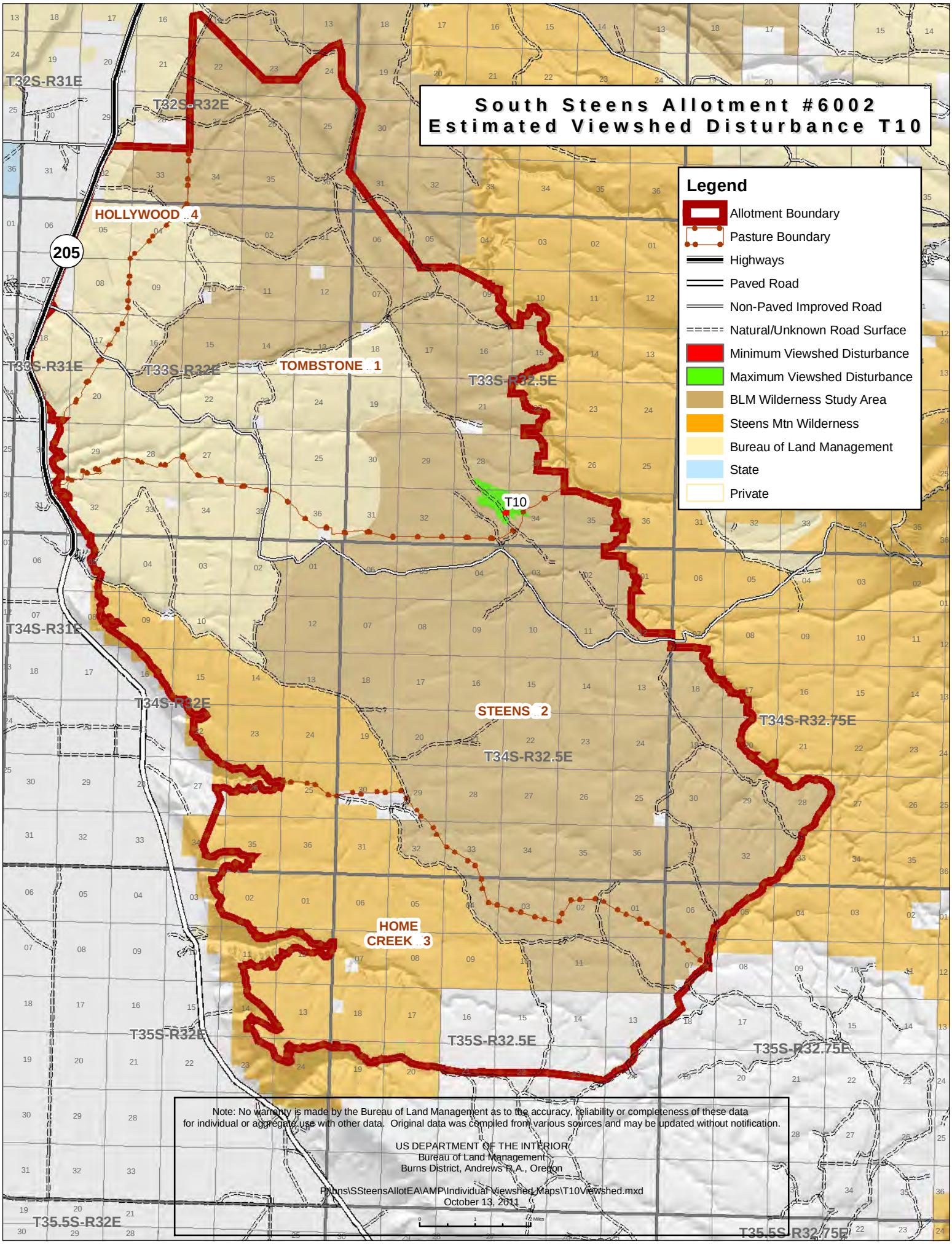
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Estimated Viewshed Disturbance T10
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Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
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T10
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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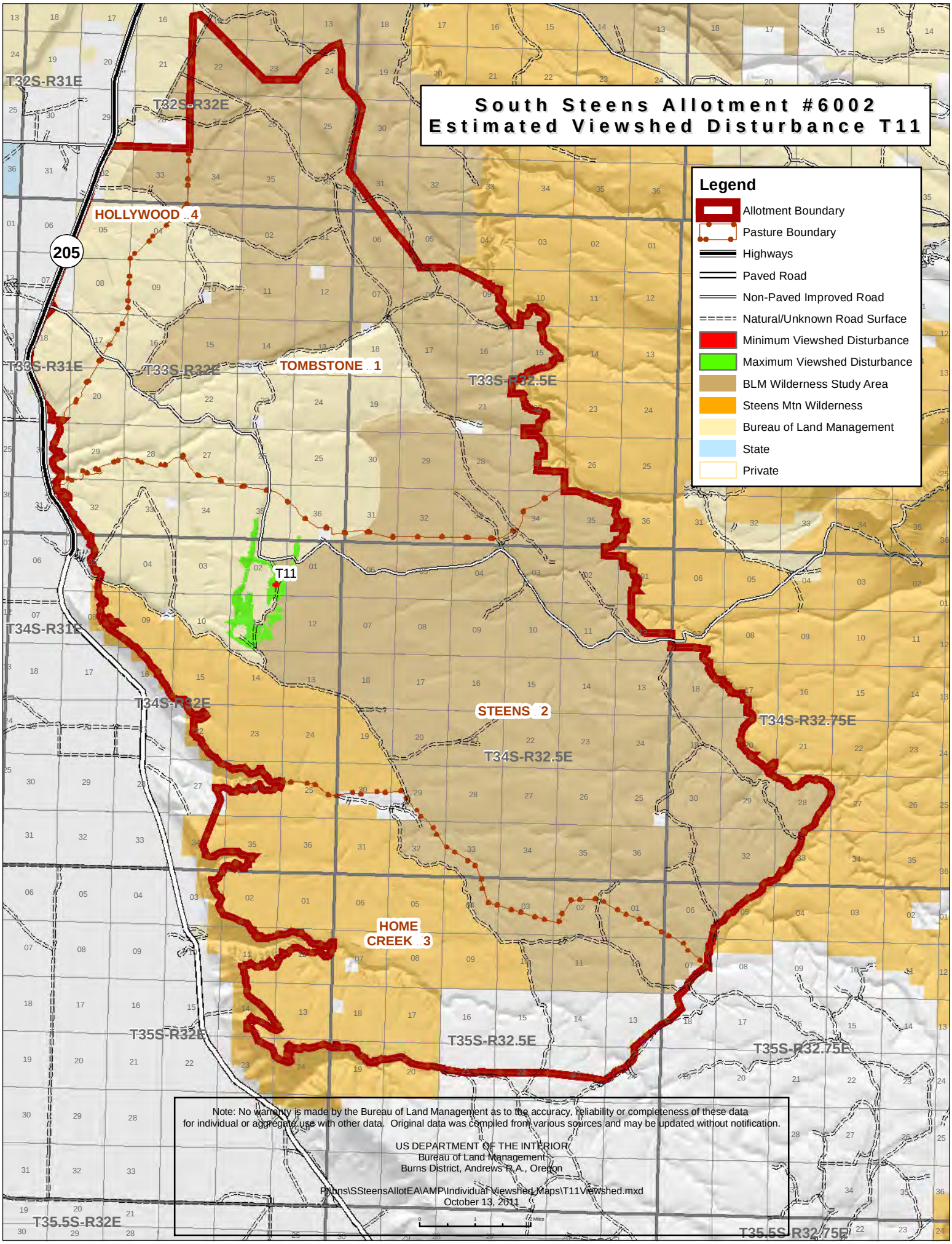
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Estimated Viewshed Disturbance T11
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Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
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T33S-R32E
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T11
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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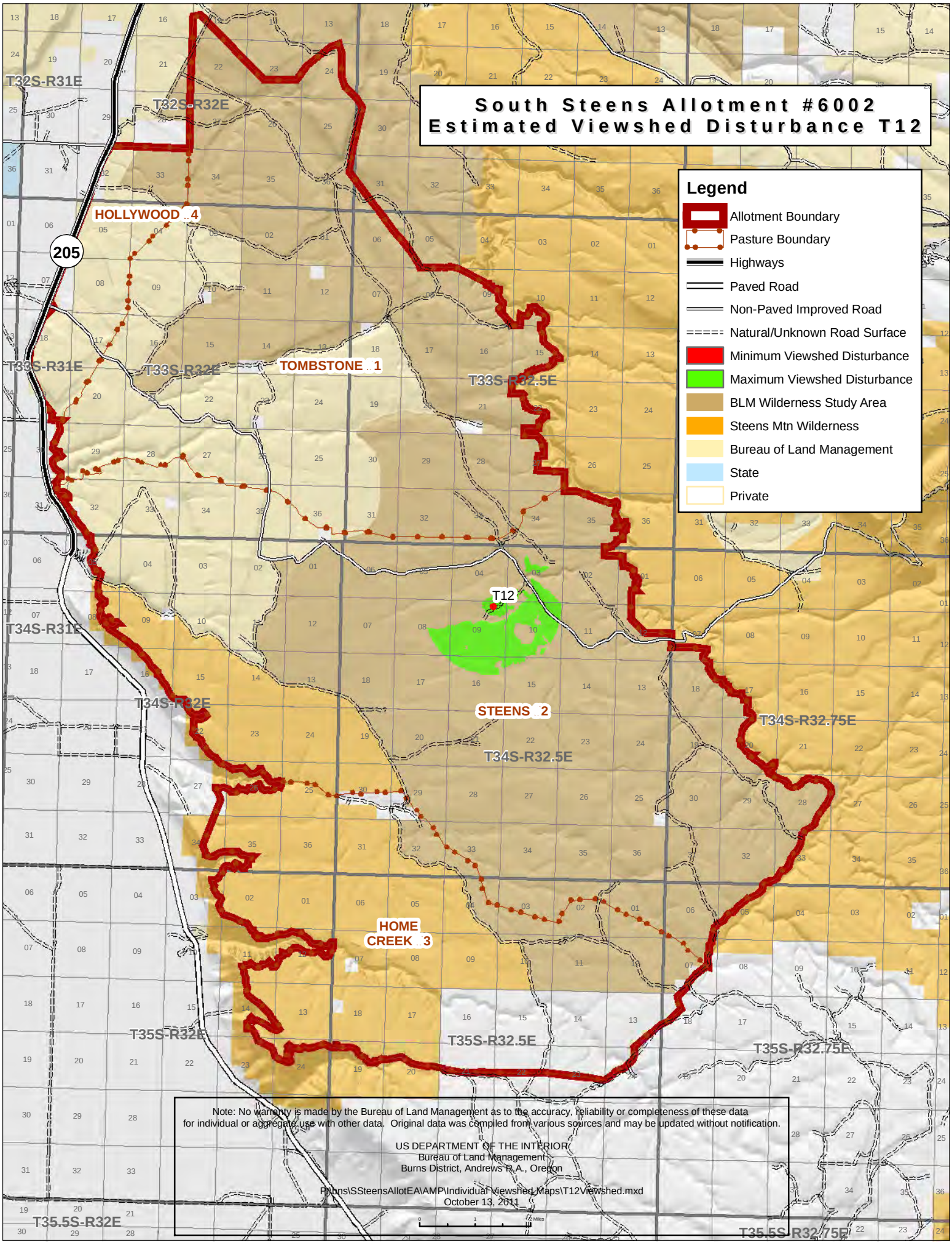
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Estimated Viewshed Disturbance T12
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Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
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T32S-R32E
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STEENS ..2
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T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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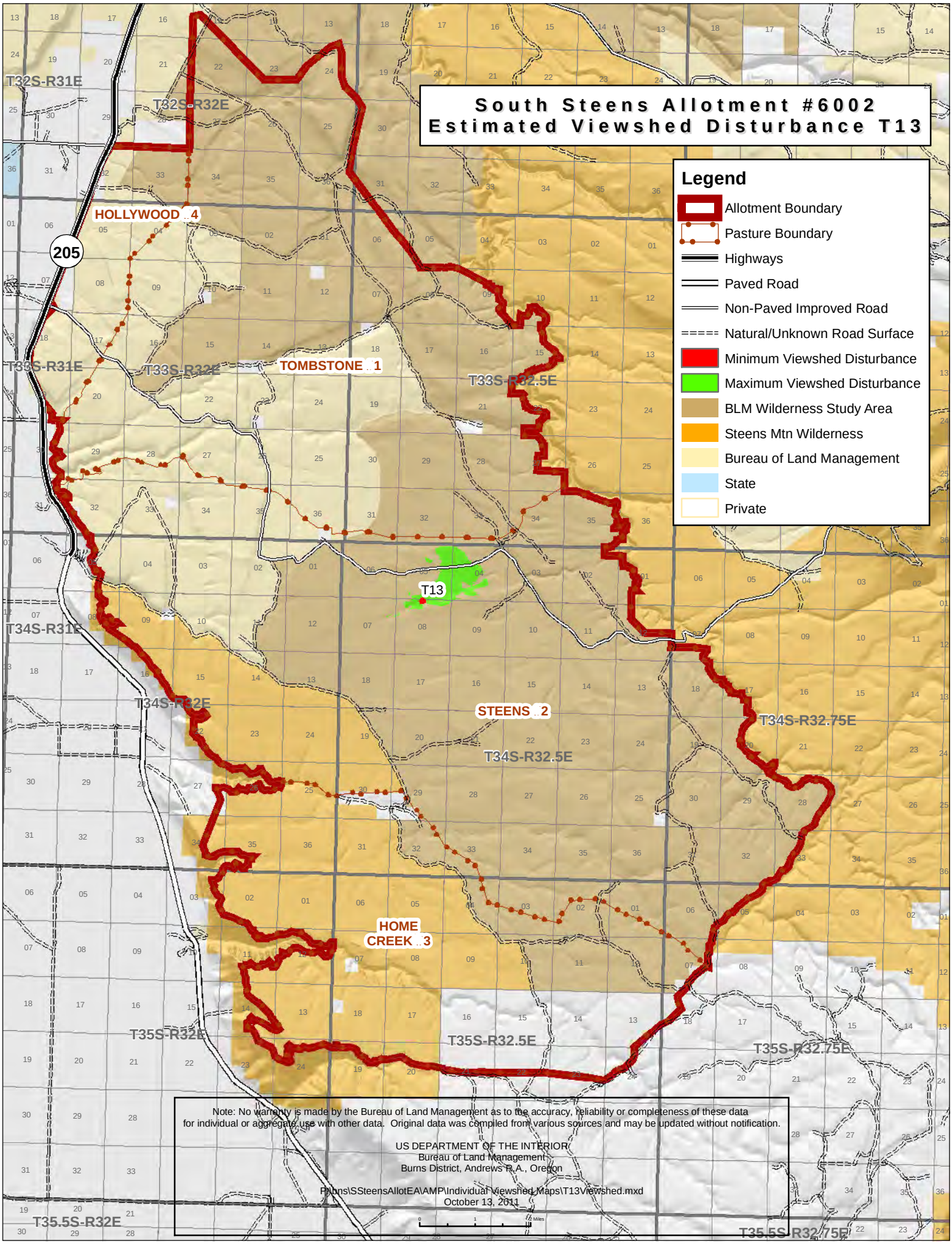
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Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
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T34S-R32E
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T34S-R32.75E
HOME CREEK ..3
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T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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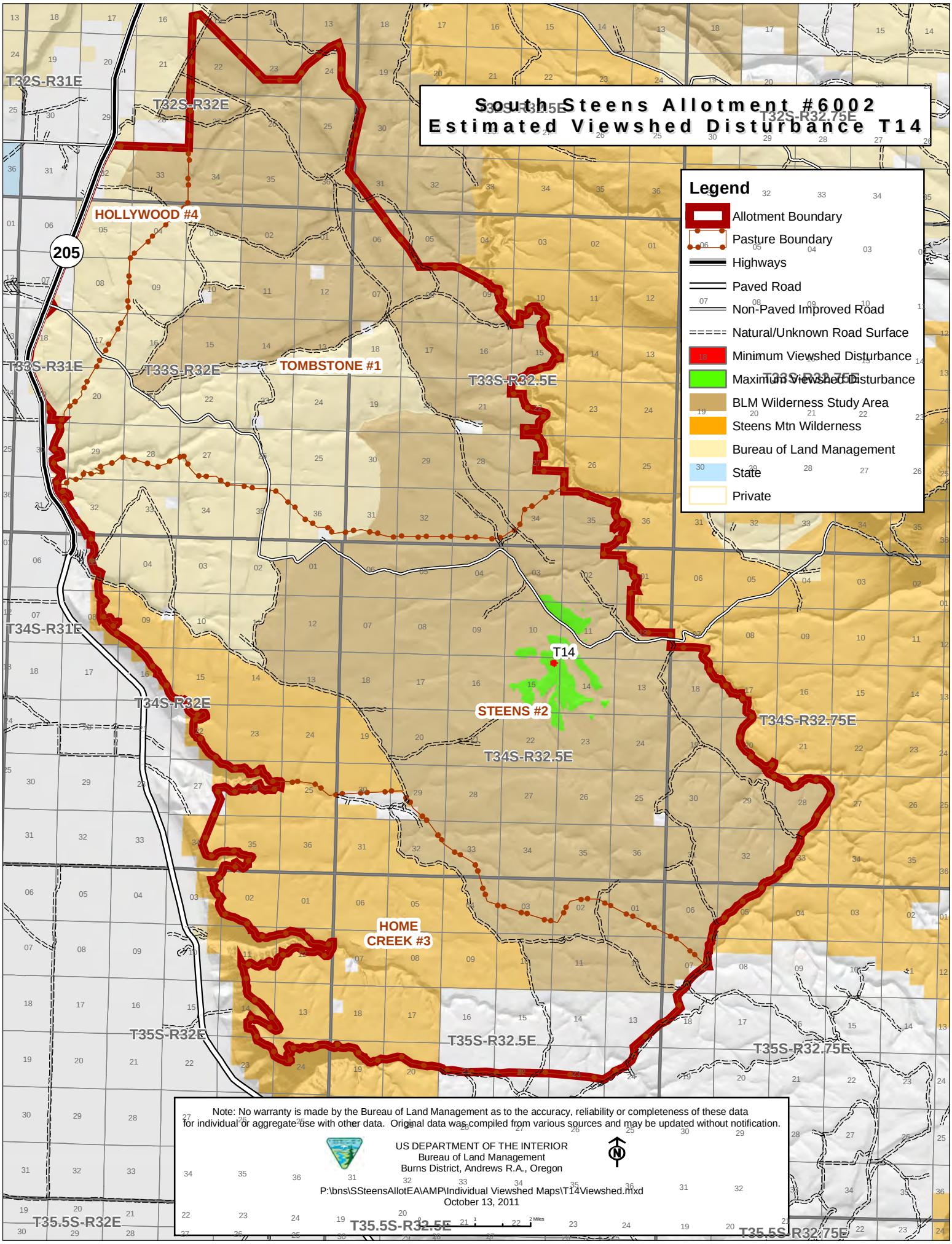
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Estimated Viewshed Disturbance T14
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Pasture Boundary
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Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
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T32S-R32E
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T33S-R32.75E
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T14
STEENS #2
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T34S-R32.75E
HOME CREEK #3
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T35S-R32.5E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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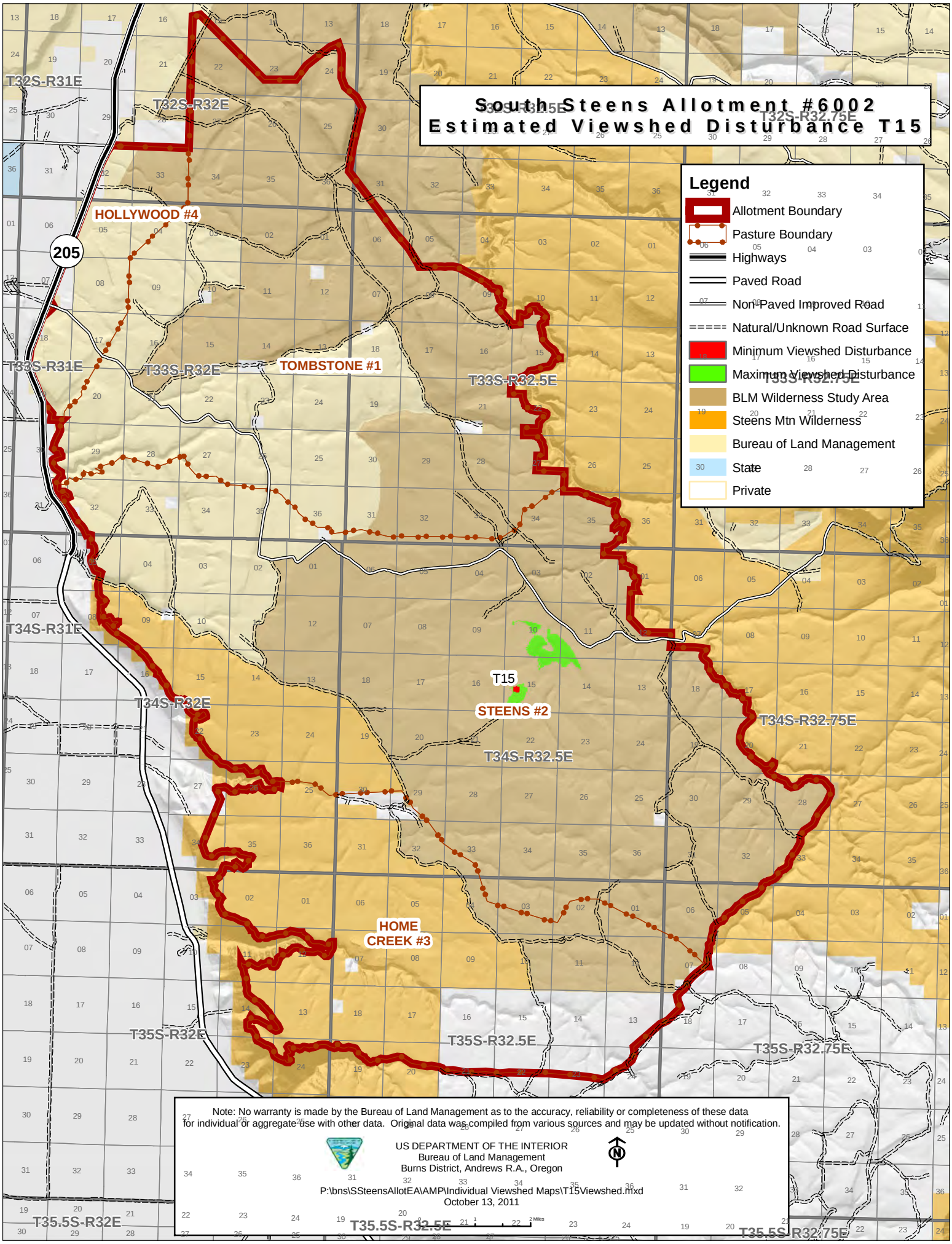
2 Miles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Pasture Boundary
Highways
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Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
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T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD #4
205
T33S-R31E
T33S-R32E
TOMBSTONE #1
T33S-R32.5E
T33S-R32.75E
T34S-R31E
T34S-R32E
T15
STEENS #2
T34S-R32.5E
T34S-R32.75E
HOME CREEK #3
T35S-R32E
T35S-R32.5E
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US DEPARTMENT OF THE INTERIOR
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Burns District, Andrews R.A., Oregon
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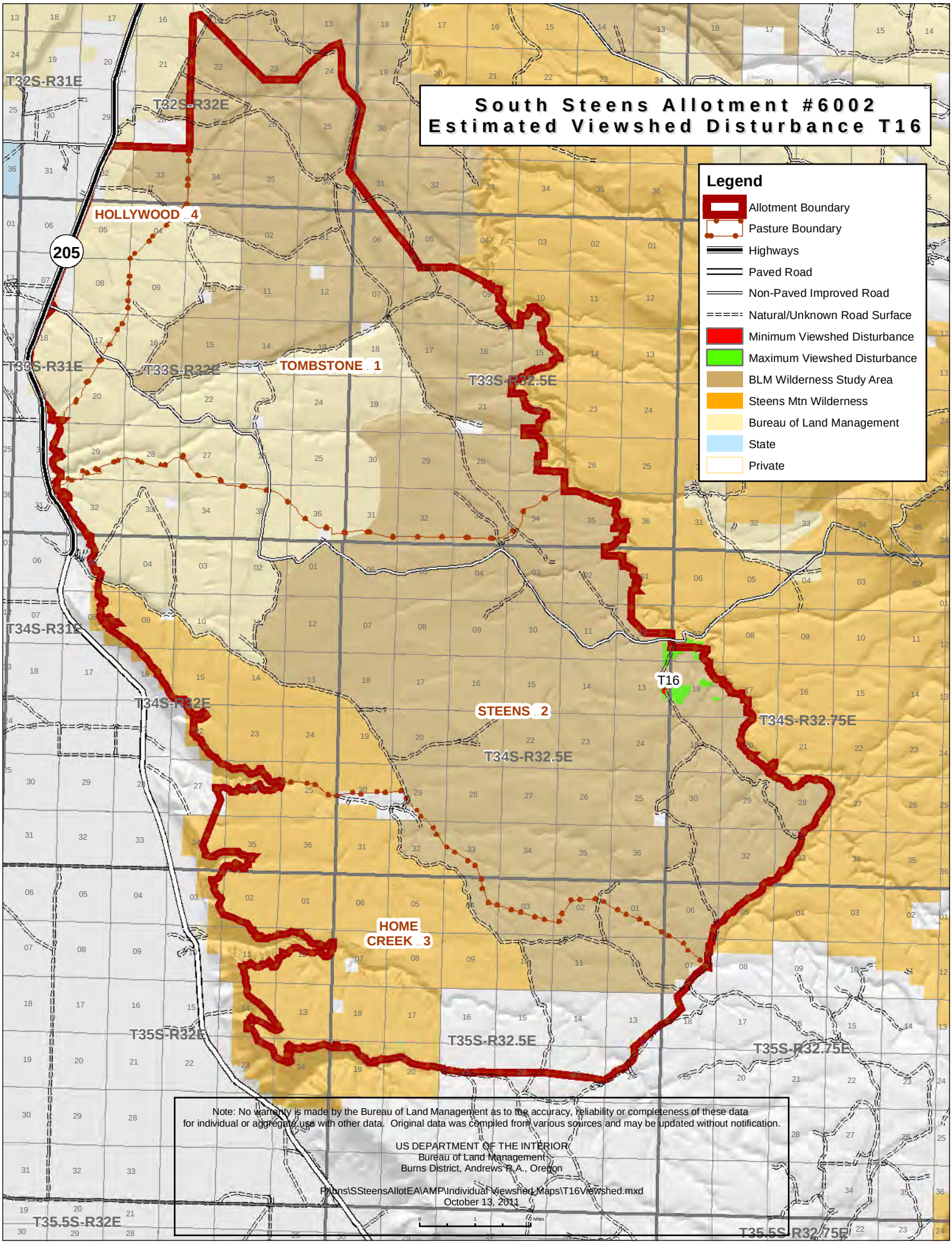
2 Miles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Estimated Viewshed Disturbance T16
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Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
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TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
T16
HOME CREEK ..3
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T35S-R32.5E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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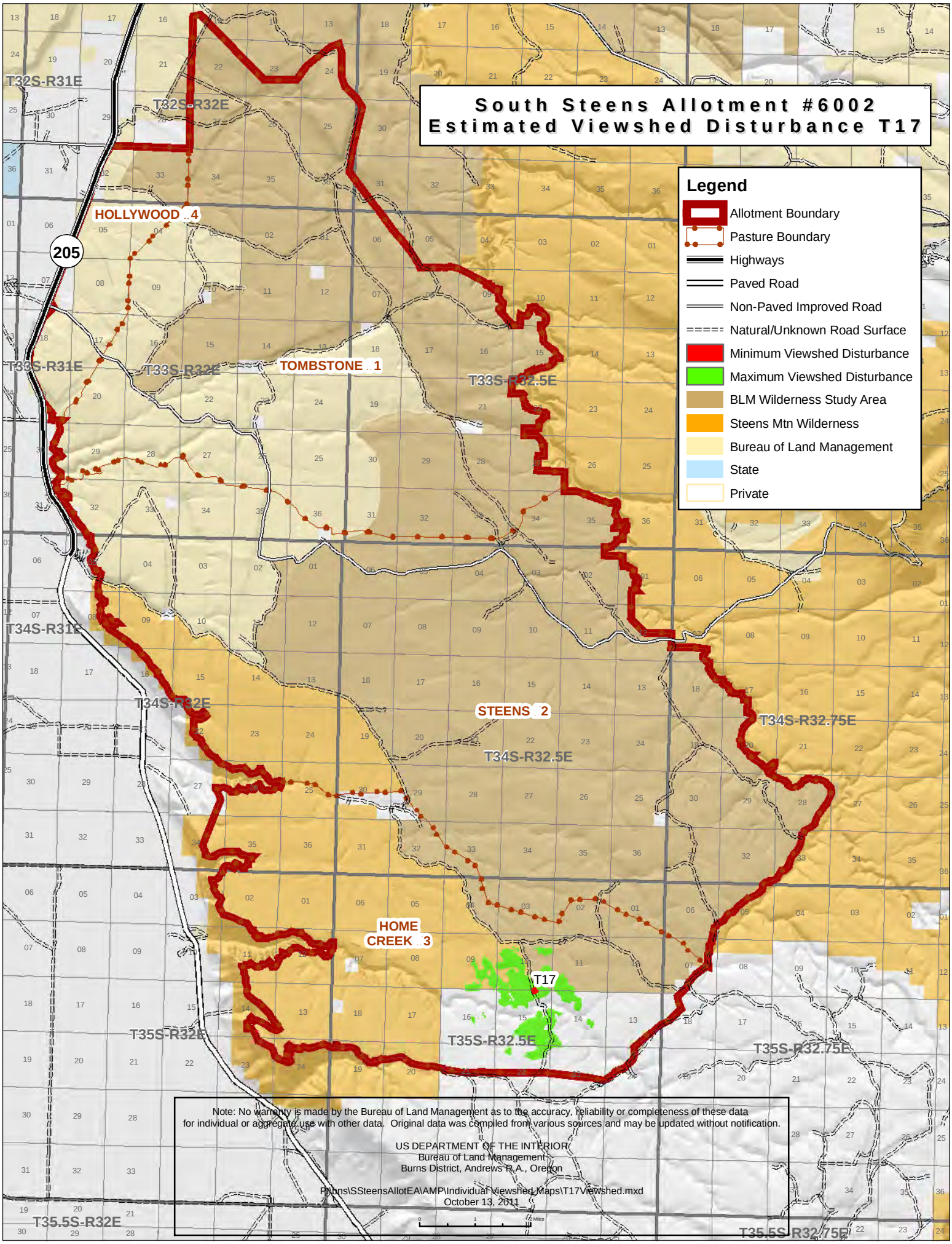
October 13, 2011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Estimated Viewshed Disturbance T17
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Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
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HOLLYWOOD 4
205
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T33S-R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.5E
T34S-R32.75E
HOME CREEK 3
T17
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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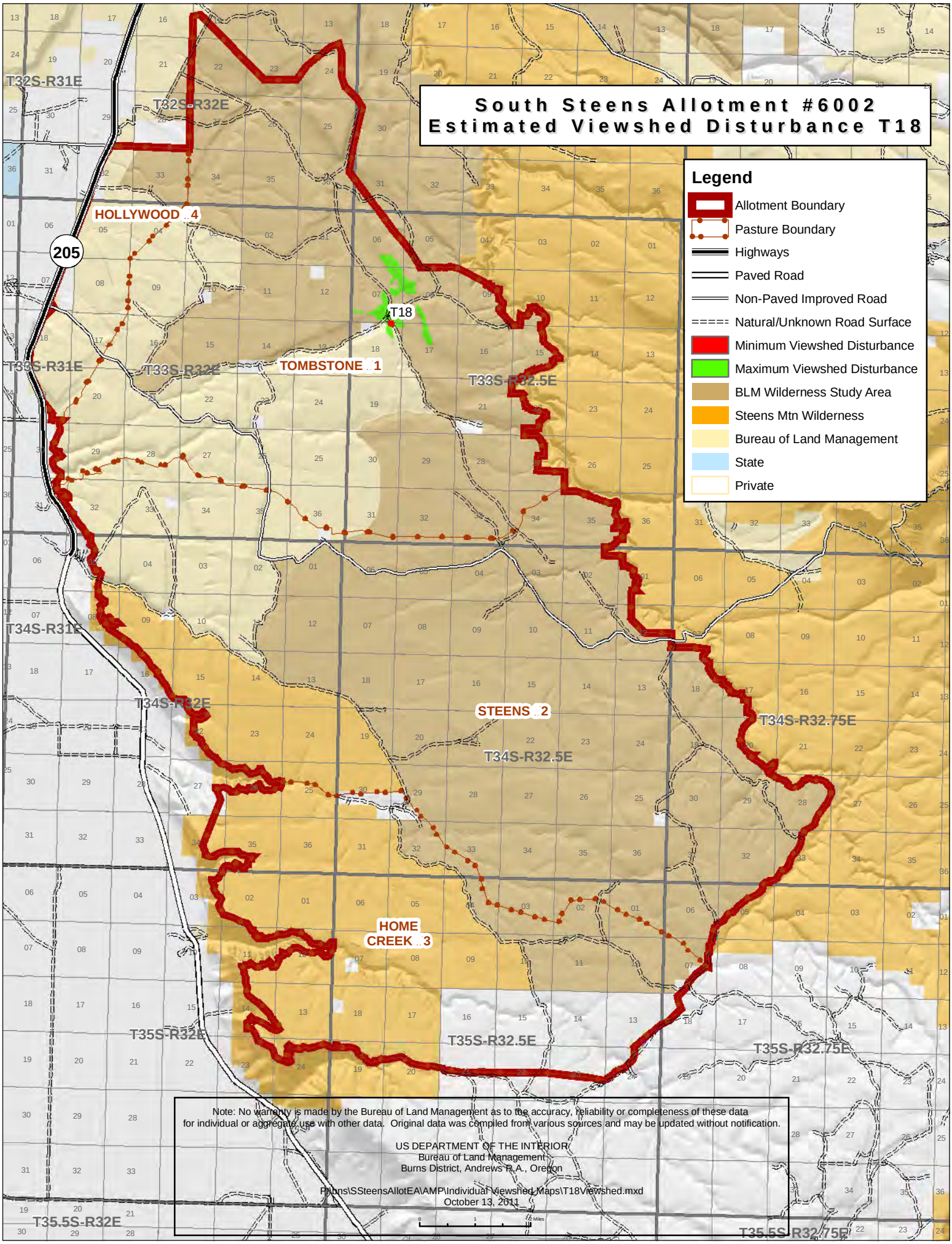
October 13, 2011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Estimated Viewshed Disturbance T18
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Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
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T34S-R32.75E
HOME CREEK ..3
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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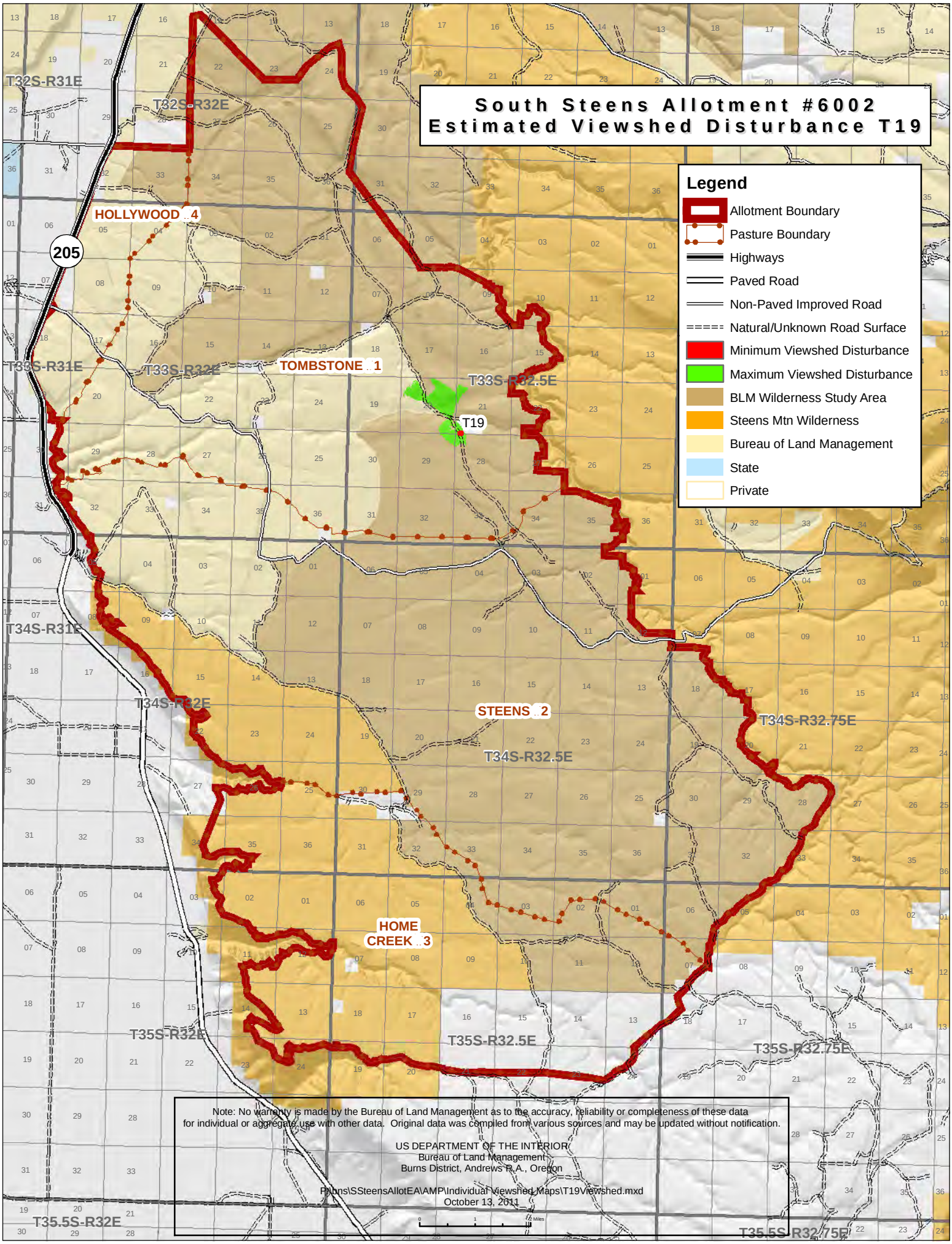
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance T19
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T19
HOLLYWOOD ..4
TOMBSTONE ..1
STEENS ..2
HOME CREEK ..3
205
T32S-R31E
T32S-R32E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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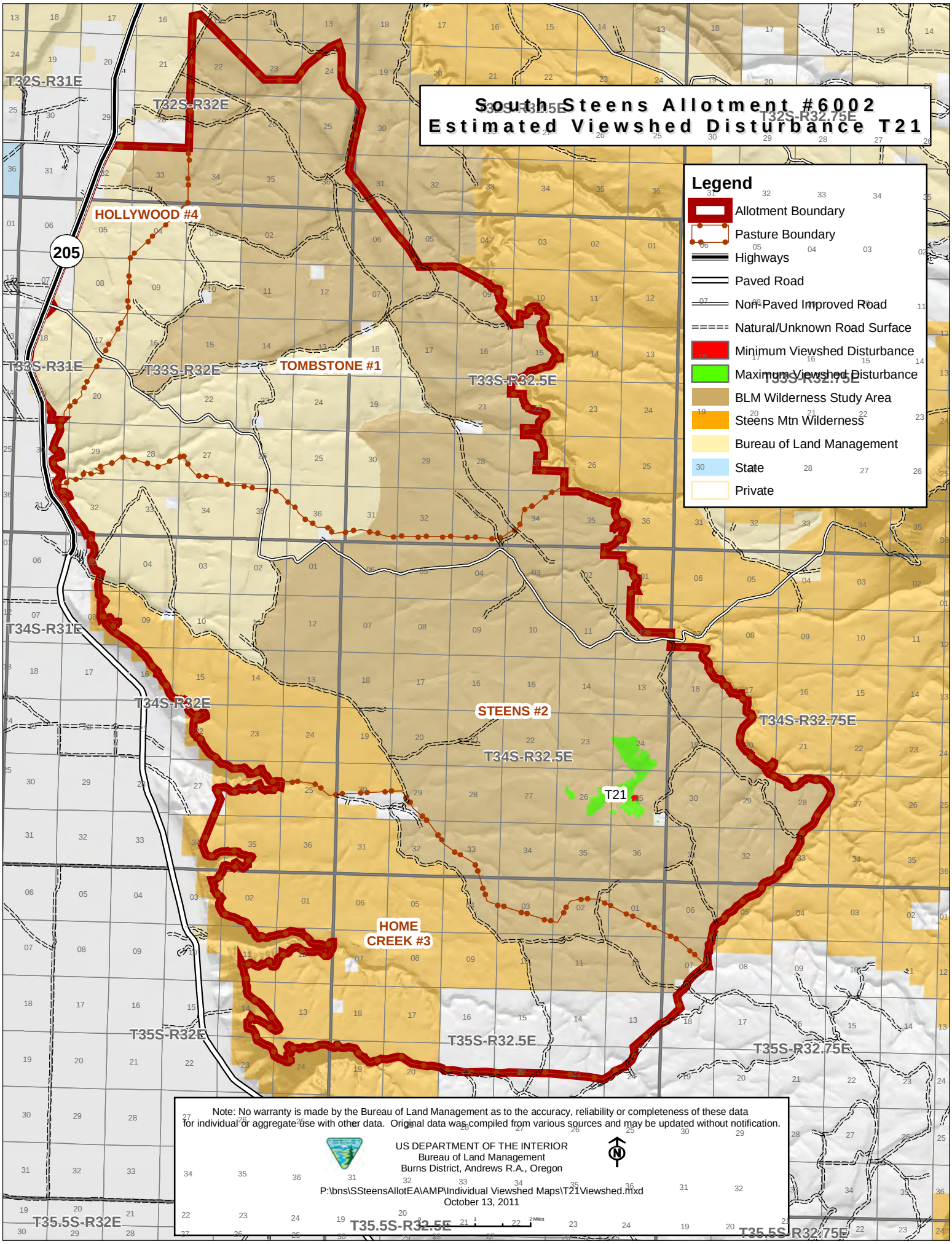
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance T21
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
T21
205
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
T33S-R31E
T33S-R32E
T33S-R32.5E
T33S-R32.75E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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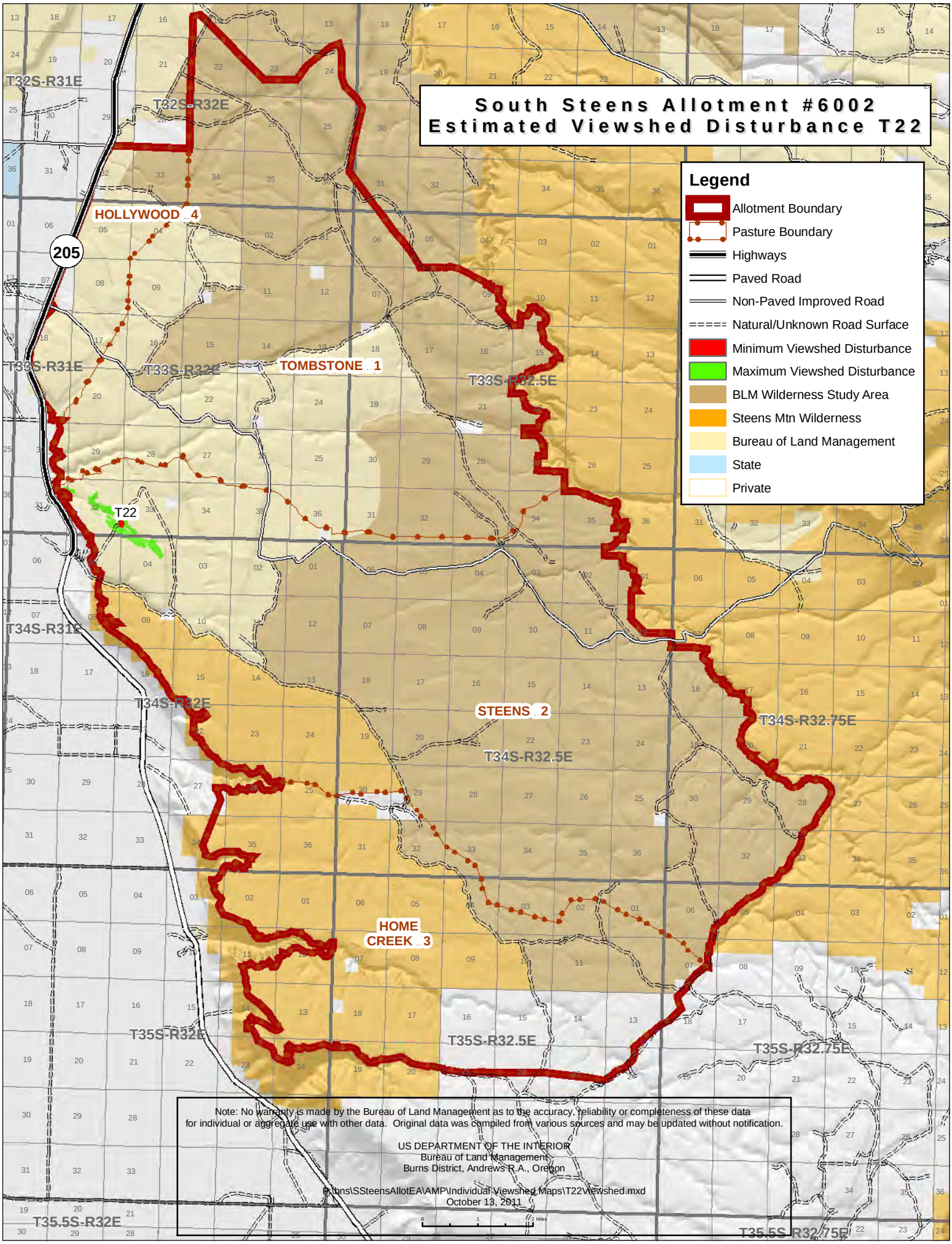
October 13, 2011
2 Miles


South Steens Allotment #6002
Estimated Viewshed Disturbance T22
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T22
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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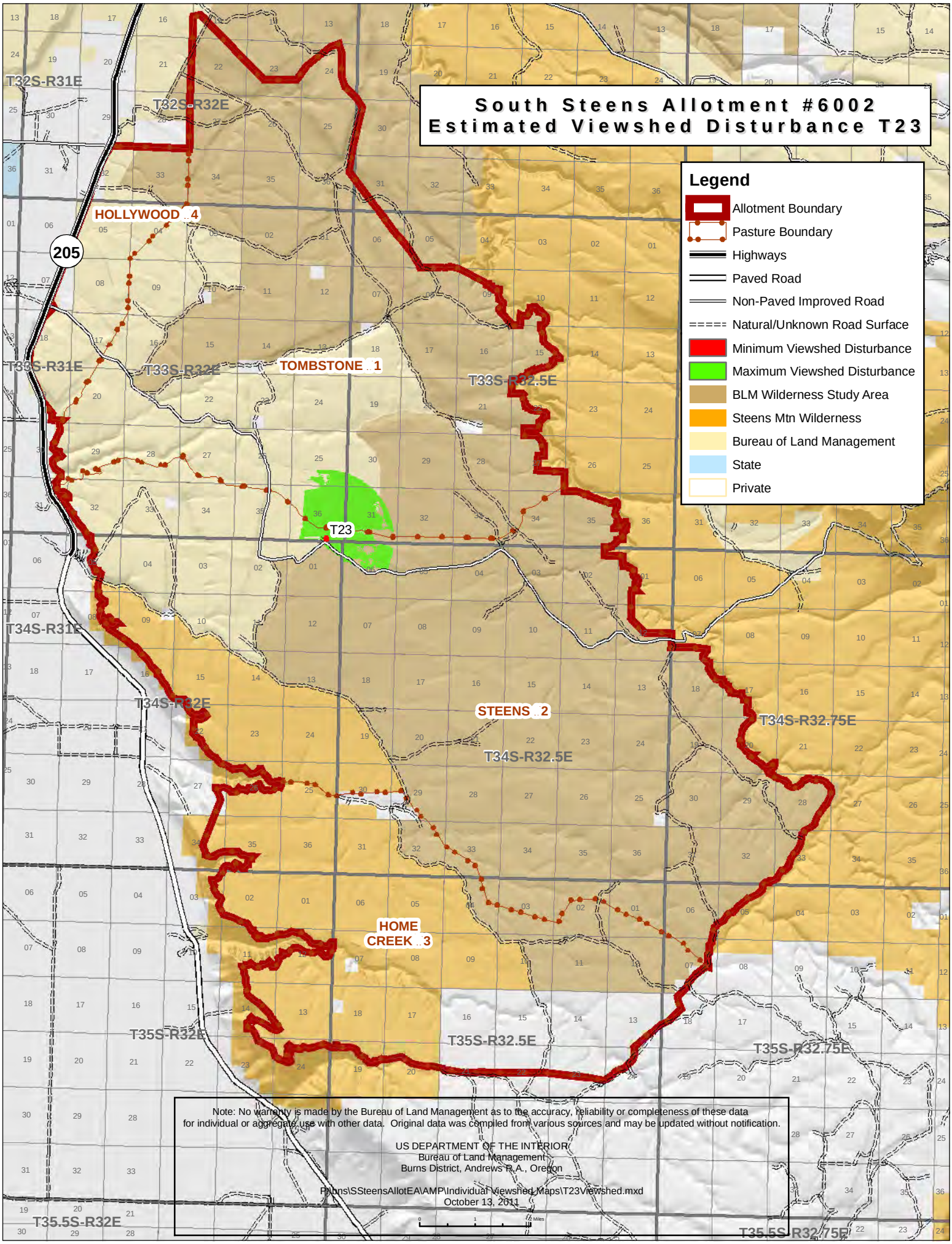
South Steens Allotment #6002
Estimated Viewshed Disturbance T23
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T23
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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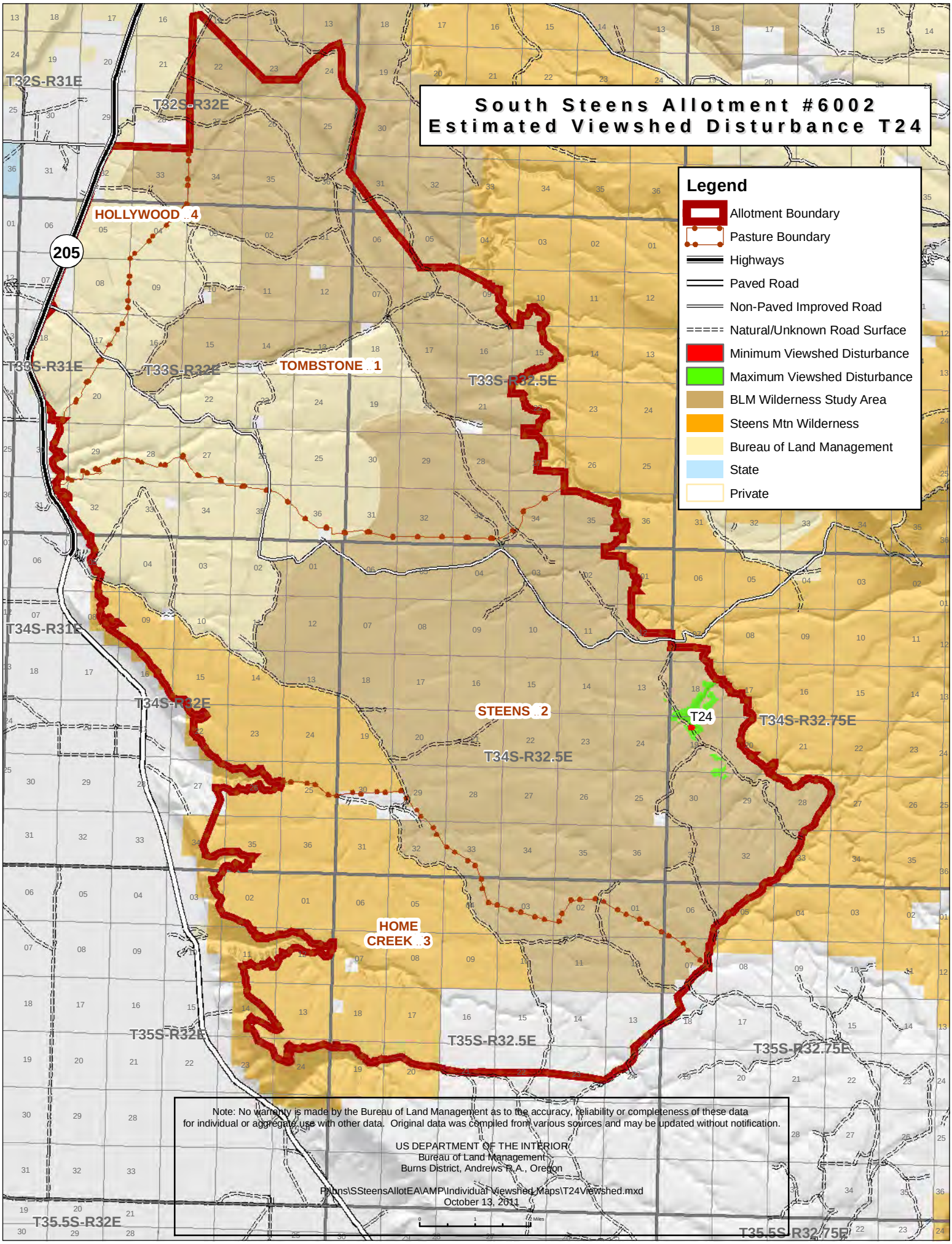
October 13, 2011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Estimated Viewshed Disturbance T24
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T24
T34S-R32.75E
T34S-R32.5E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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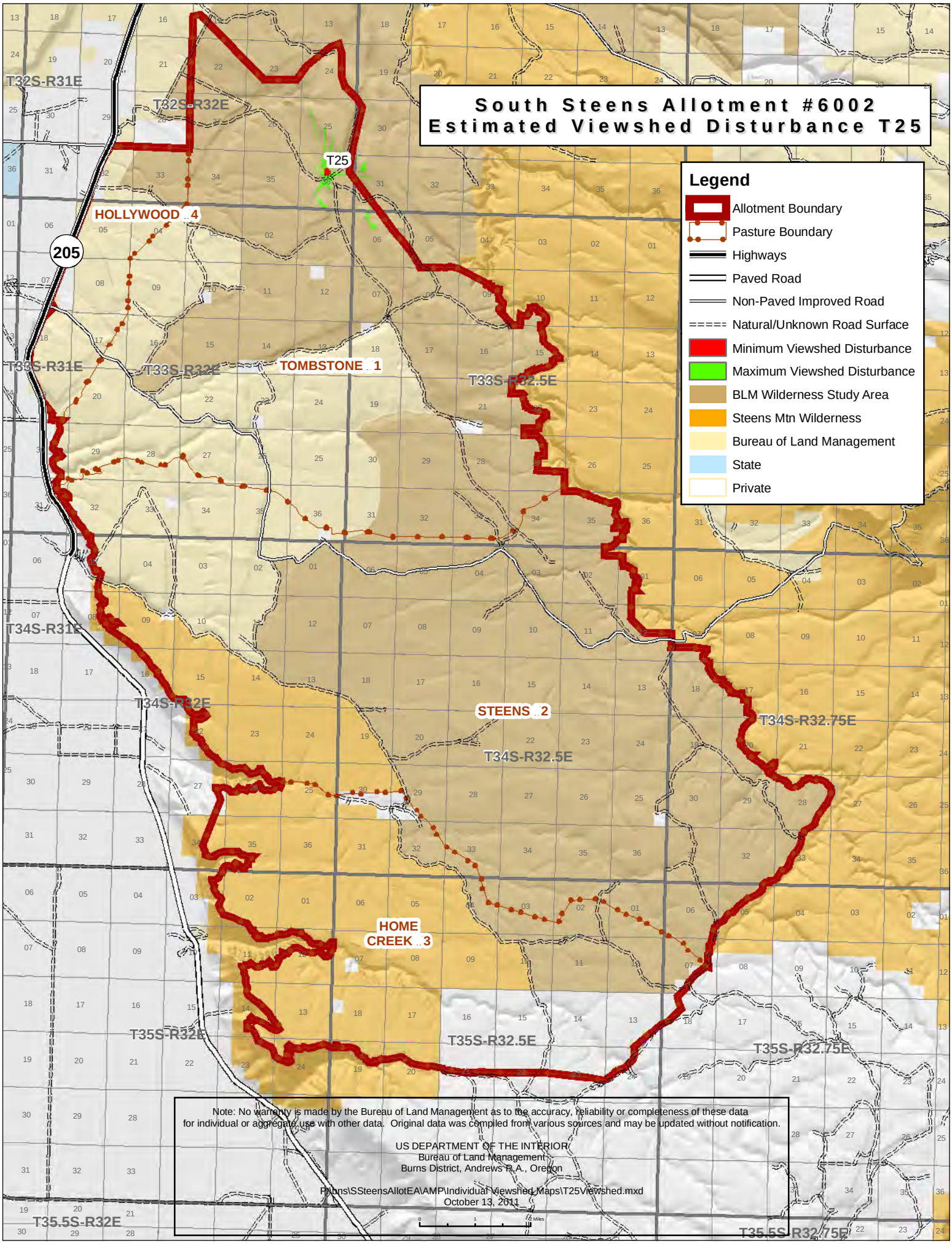
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance T25
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T25
HOLLYWOOD ..4
TOMBSTONE ..1
STEENS ..2
HOME CREEK ..3
205
T32S-R31E
T32S-R32E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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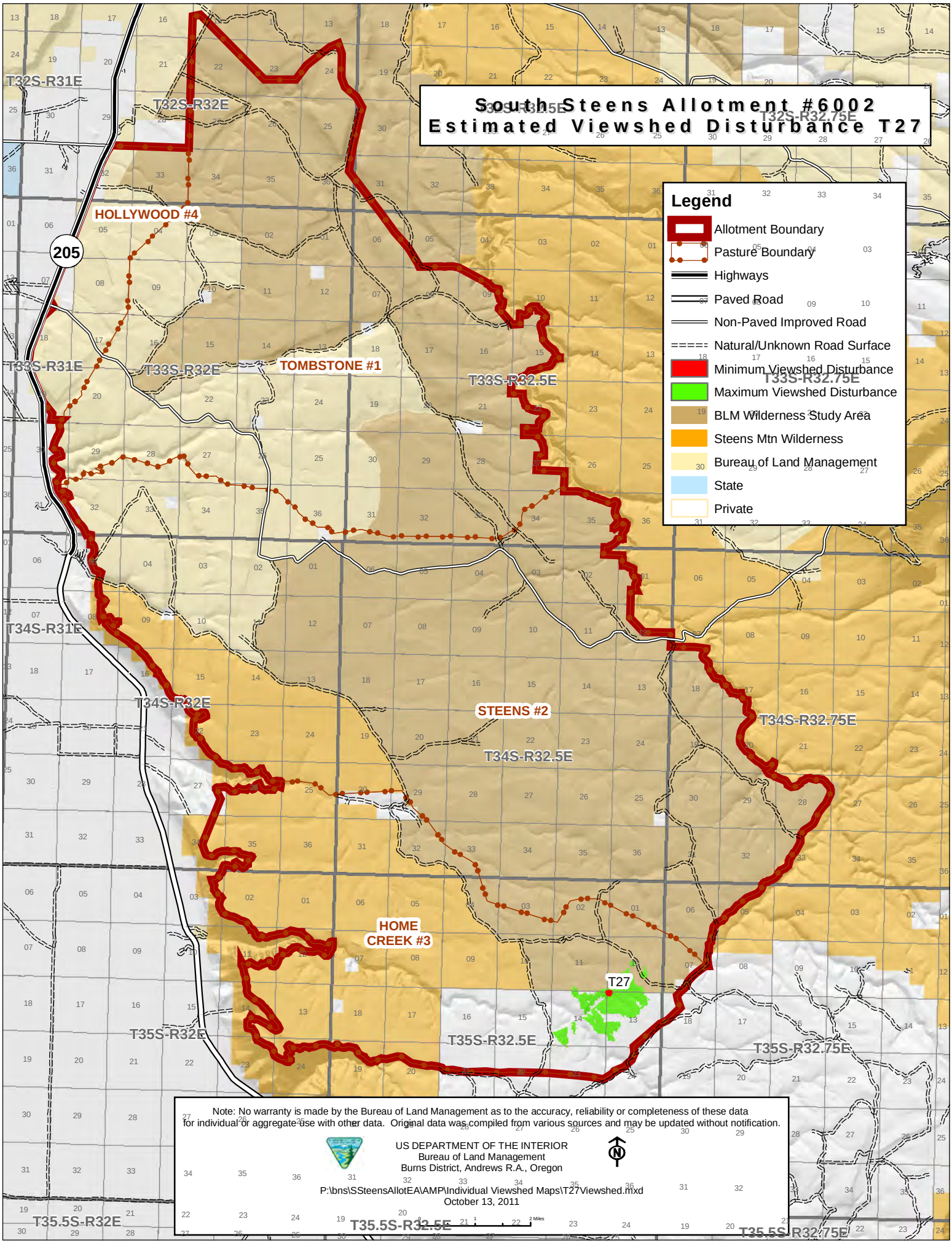
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance T27
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
HOLLYWOOD #4
TOMBSTONE #1
STEENS #2
HOME CREEK #3
T27
205
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
T33S-R31E
T33S-R32E
T33S-R32.5E
T33S-R32.75E
T34S-R31E
T34S-R32E
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T34S-R32.75E
T35S-R32E
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T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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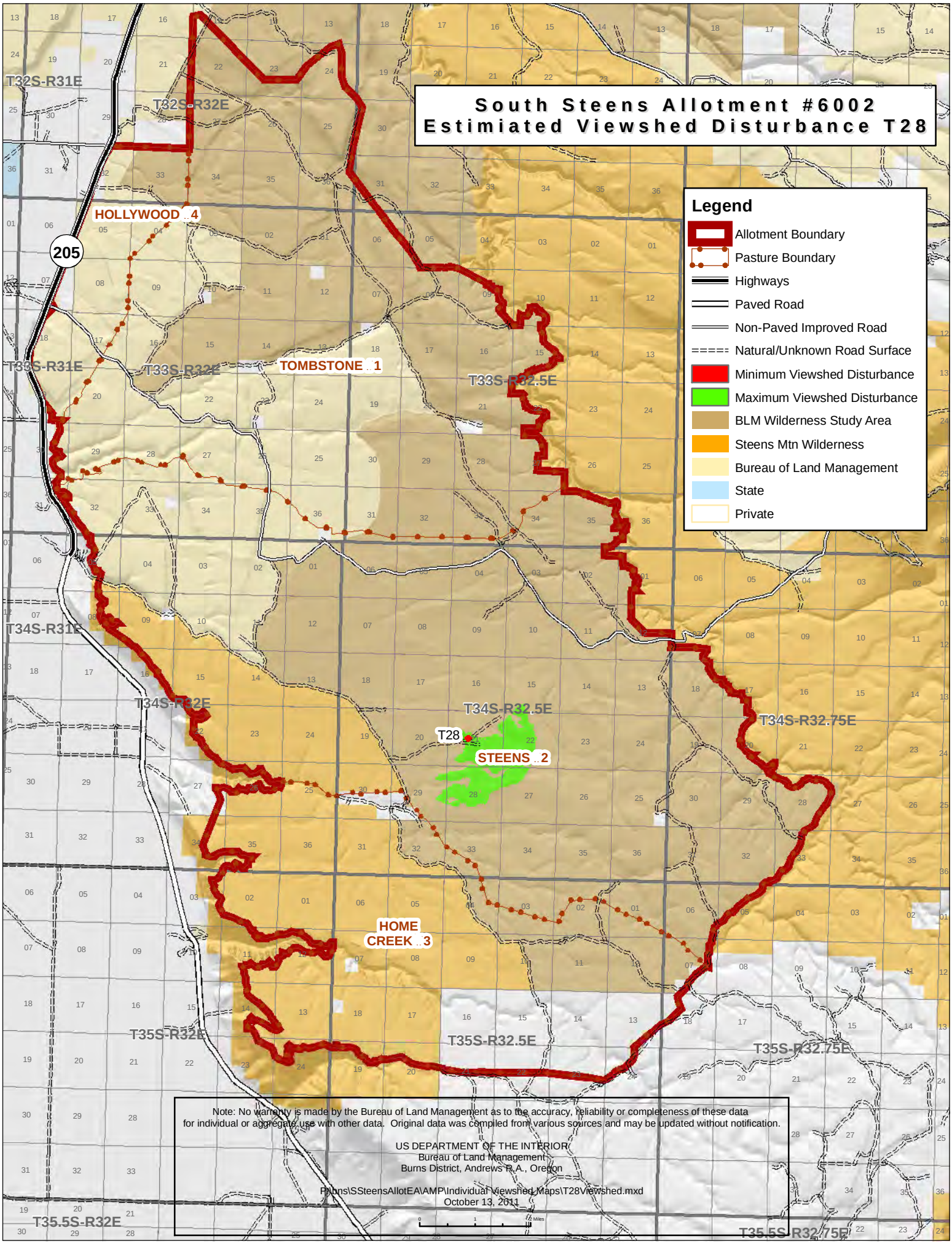
October 13, 2011
2 Miles


South Steens Allotment #6002
Estimiated Viewshed Disturbance T28
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T28
STEENS ..2
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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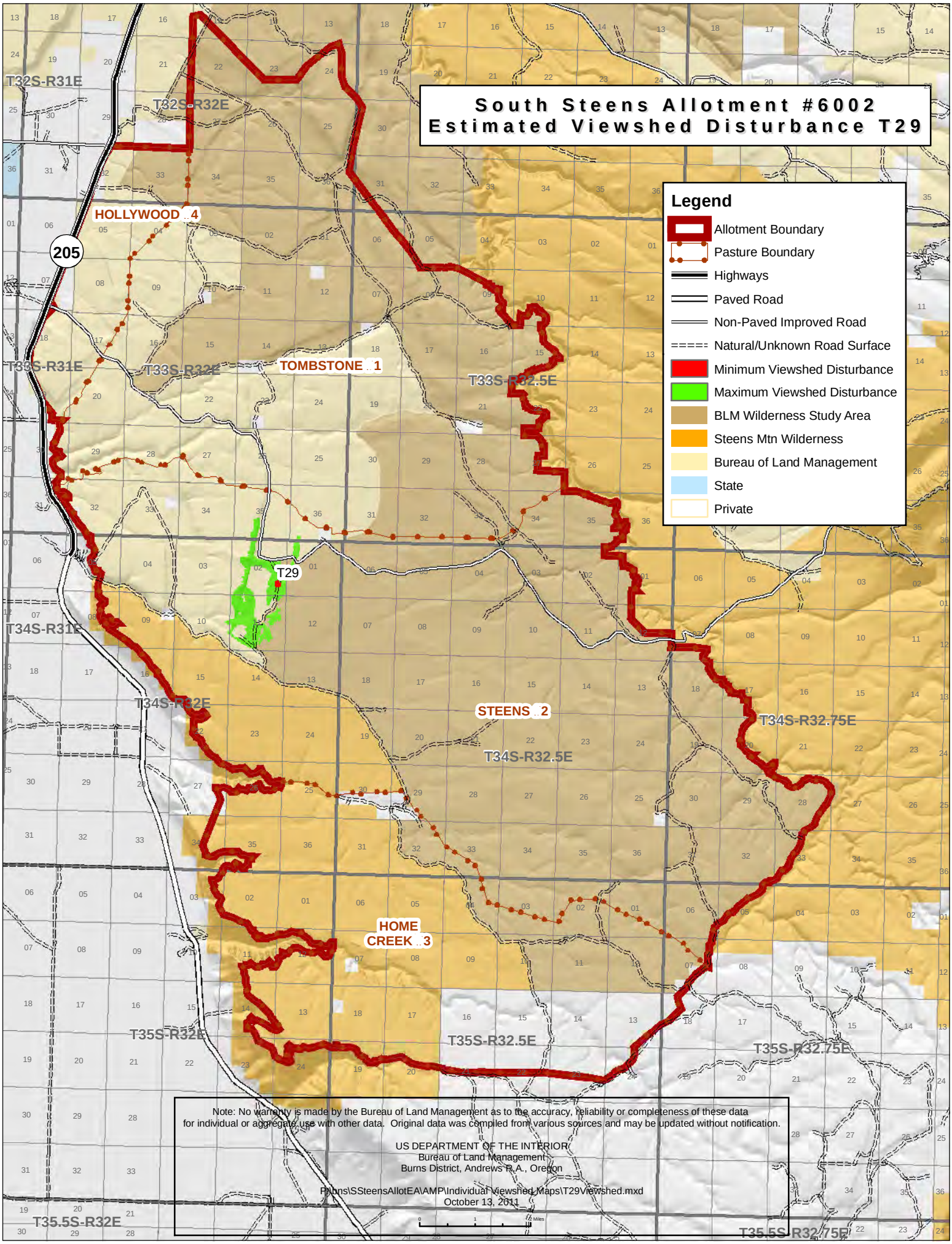
South Steens Allotment #6002
Estimated Viewshed Disturbance T29
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T29
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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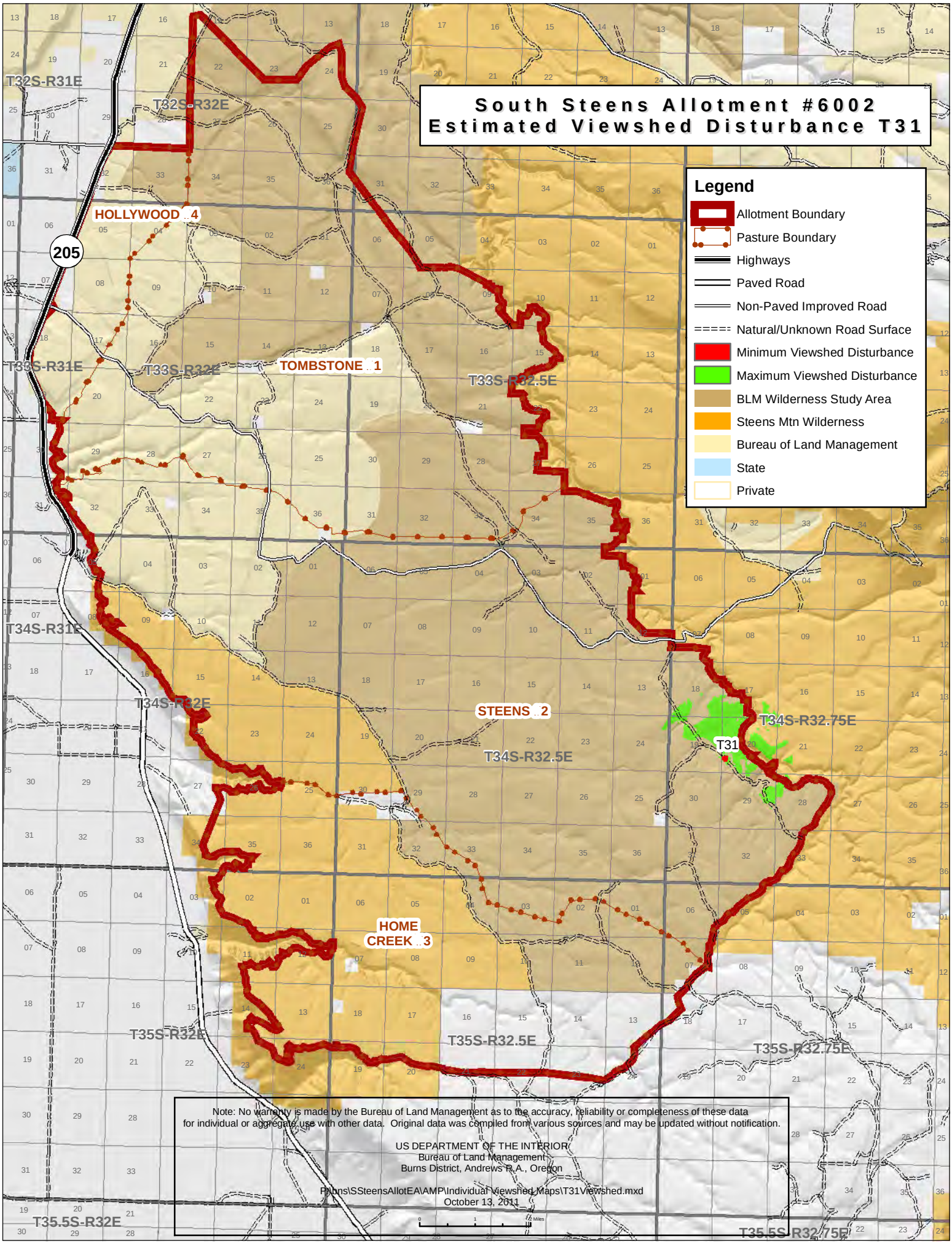
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance T31
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
T31
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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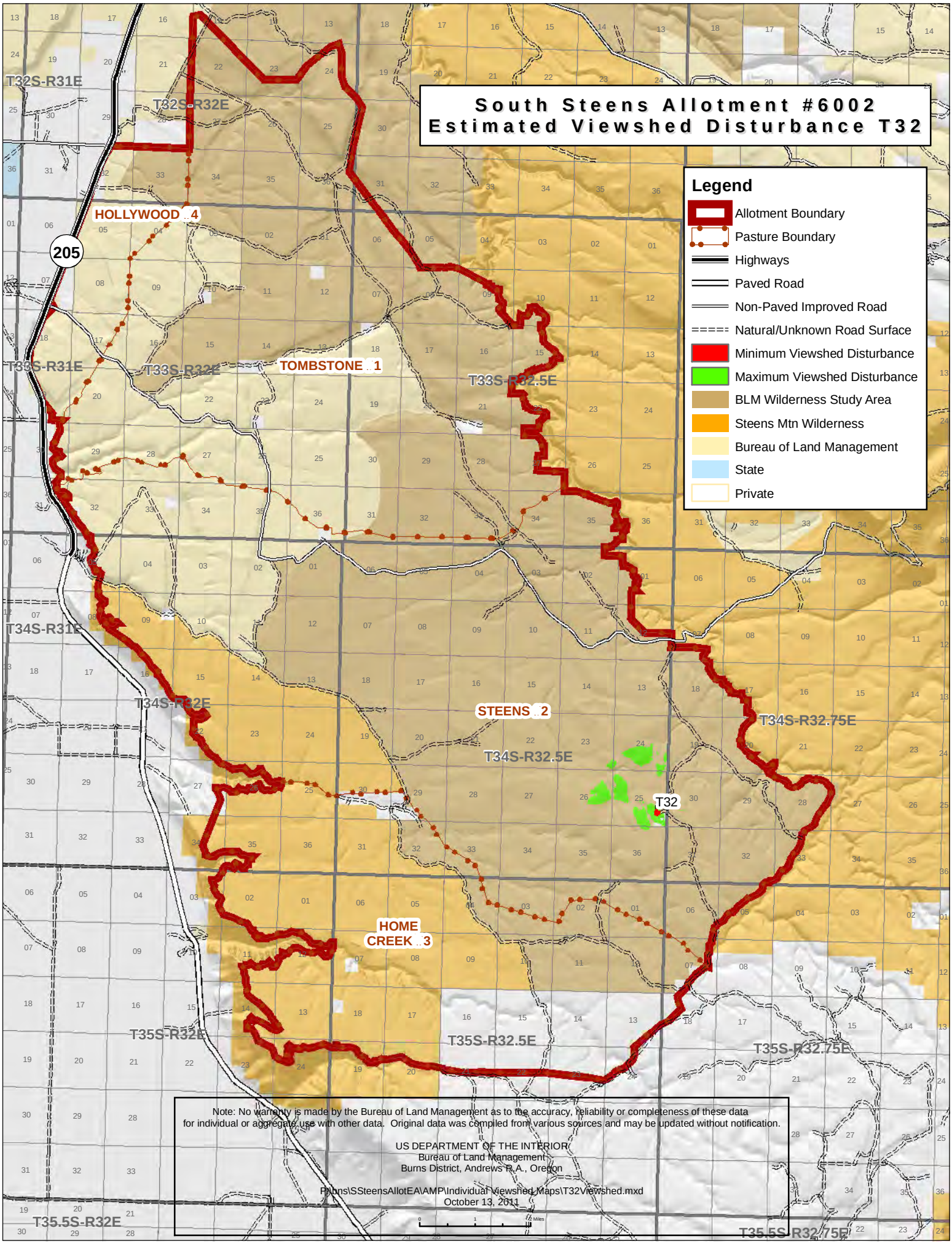
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Estimated Viewshed Disturbance T32
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
T32
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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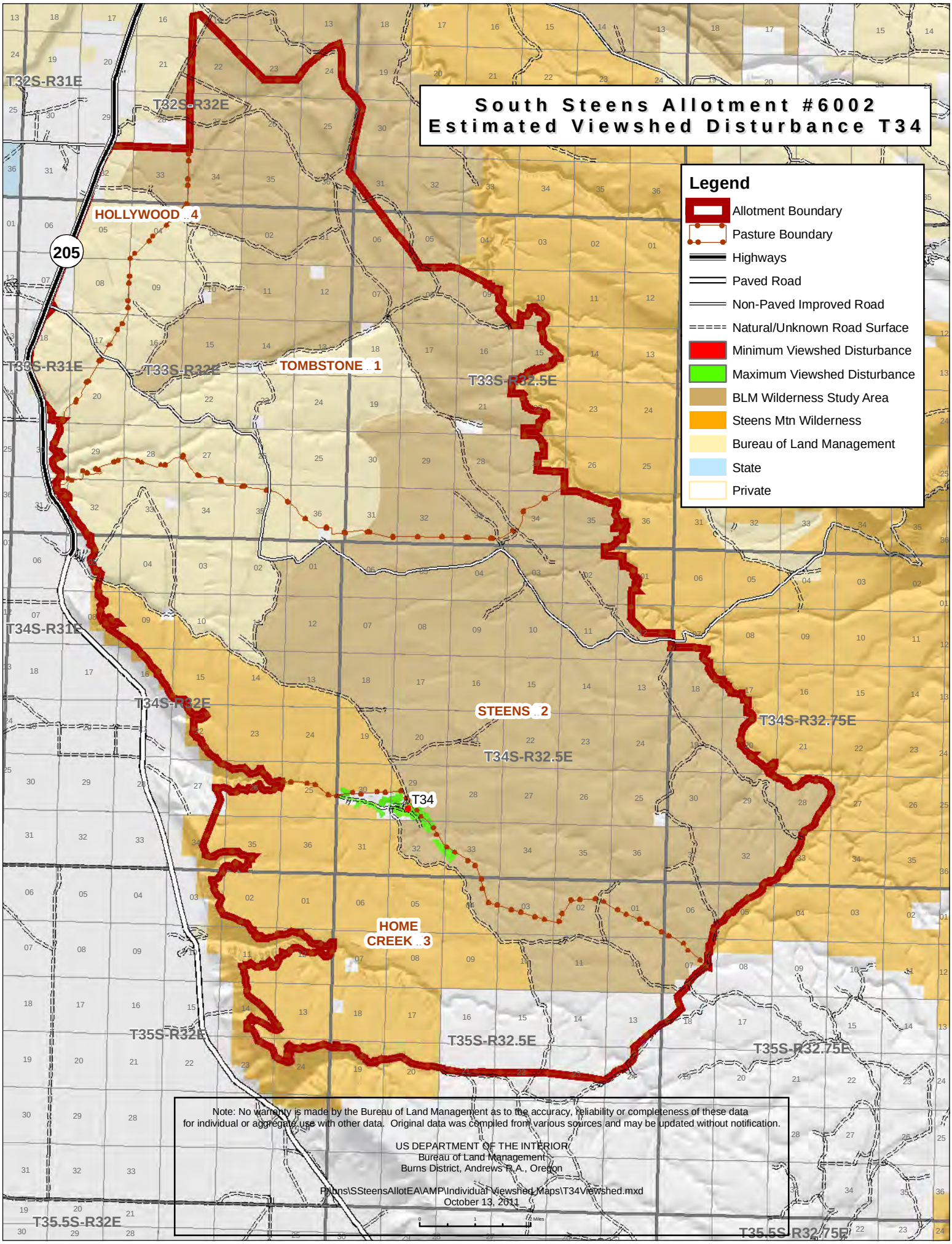
October 13, 2011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Estimated Viewshed Disturbance T34
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
T34
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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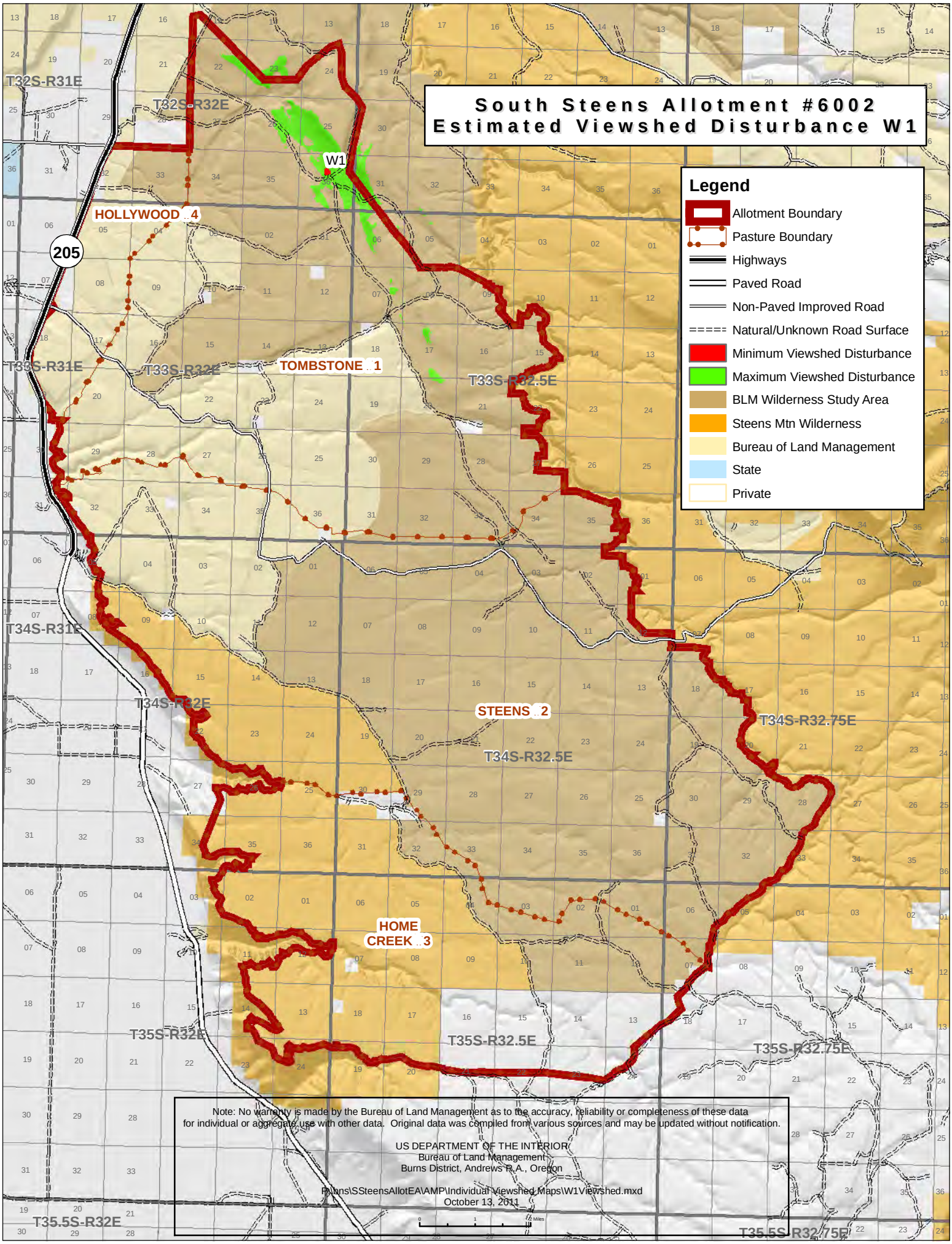
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Estimated Viewshed Disturbance W1
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
W1
HOLLYWOOD ..4
TOMBSTONE ..1
STEENS ..2
HOME CREEK ..3
205
T32S-R31E
T32S-R32E
T33S-R31E
T33S-R32E
T33S-R32.5E
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T34S-R32.5E
T34S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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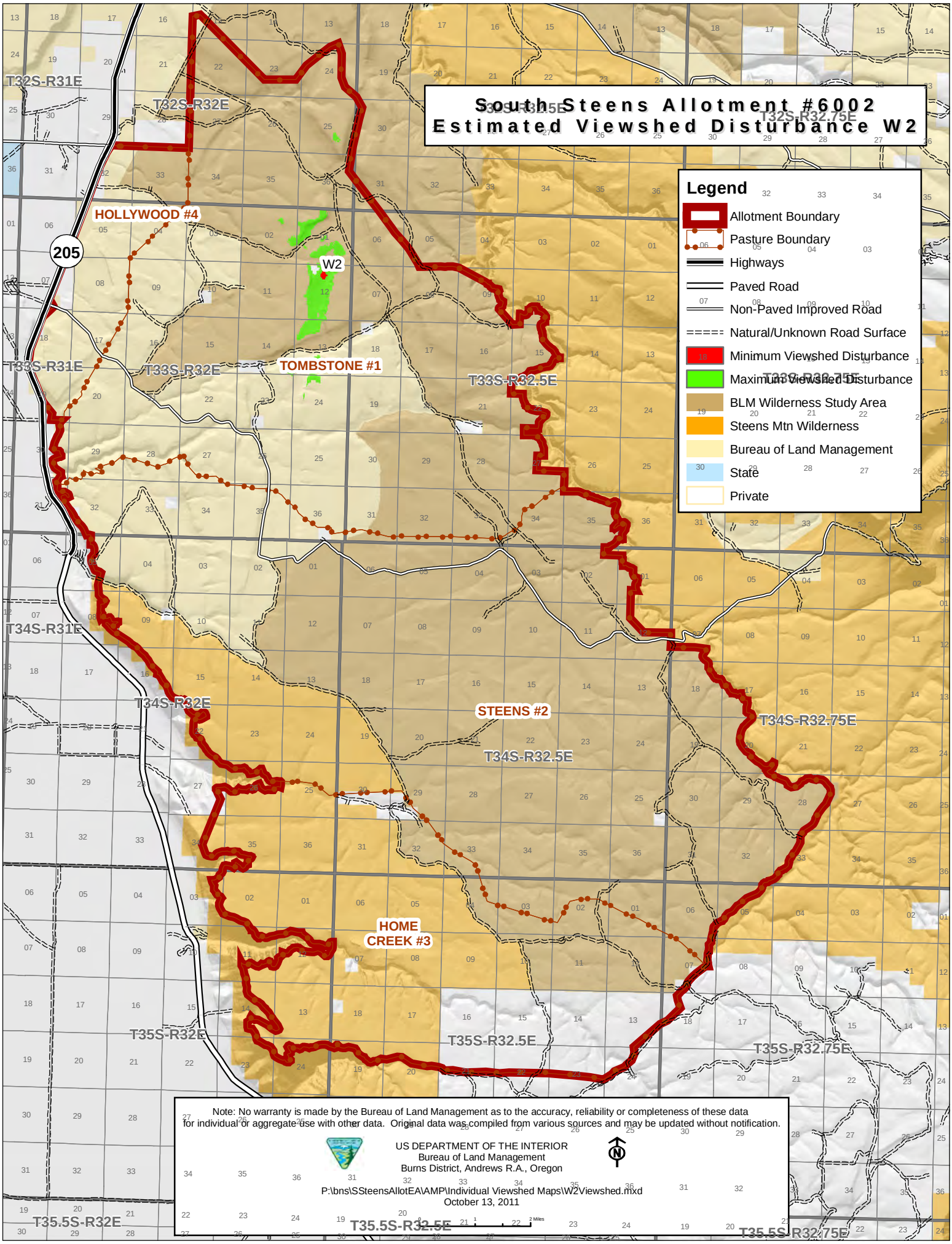
October 13, 2011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Estimated Viewshed Disturbance W2
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.75E
HOLLYWOOD #4
205
W2
T33S-R31E
T33S-R32E
TOMBSTONE #1
T33S-R32.5E
T33S-R32.75E
T34S-R31E
T34S-R32E
STEENS #2
T34S-R32.5E
T34S-R32.75E
HOME CREEK #3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.5E
T35.5S-R32.75E
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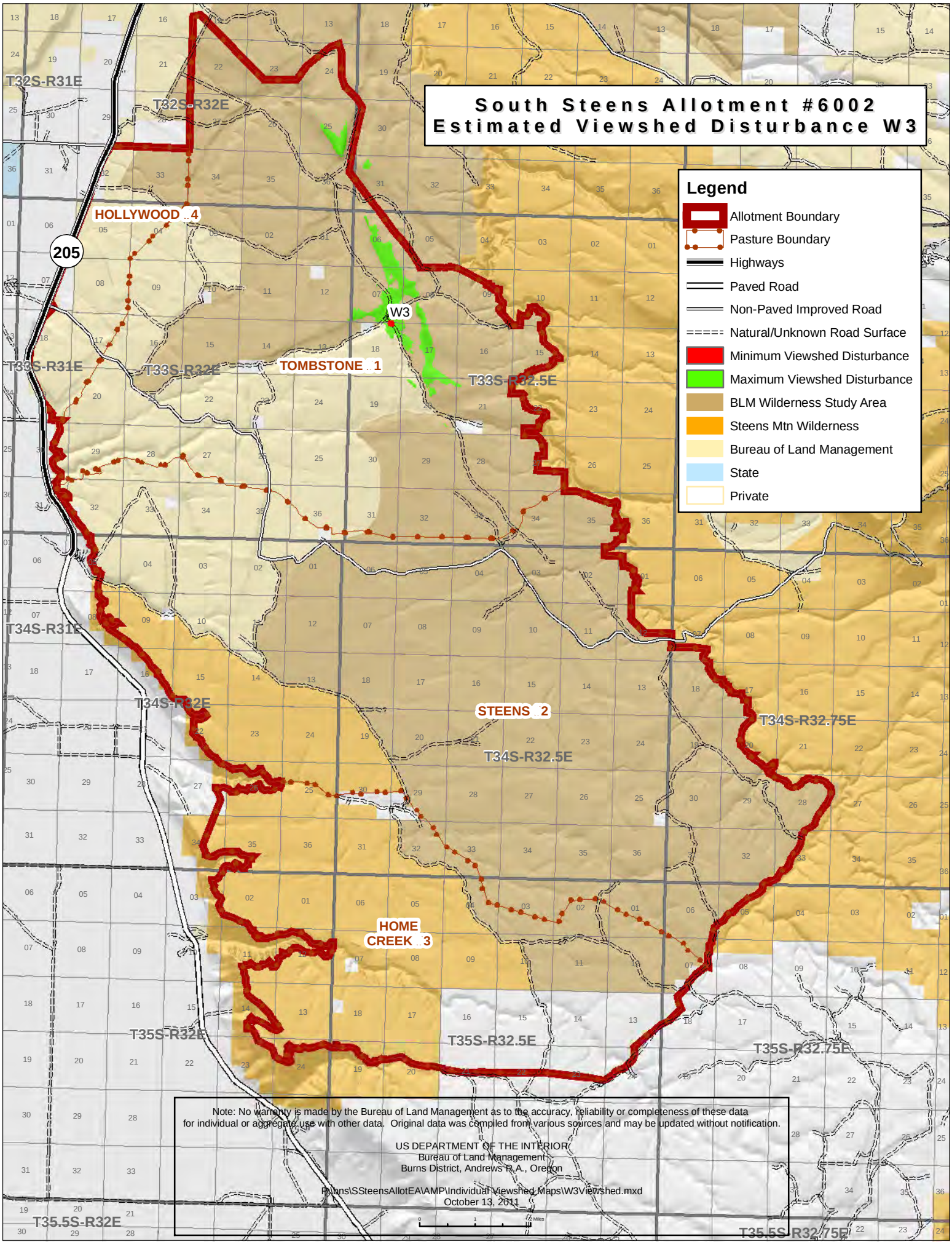
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
P:\bns\SSteensAllotEA\AMP\Individual Viewshed Maps\W2Viewshed.mxd
October 13, 2011
2 Miles


South Steens Allotment #6002
Estimated Viewshed Disturbance W3
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
W3
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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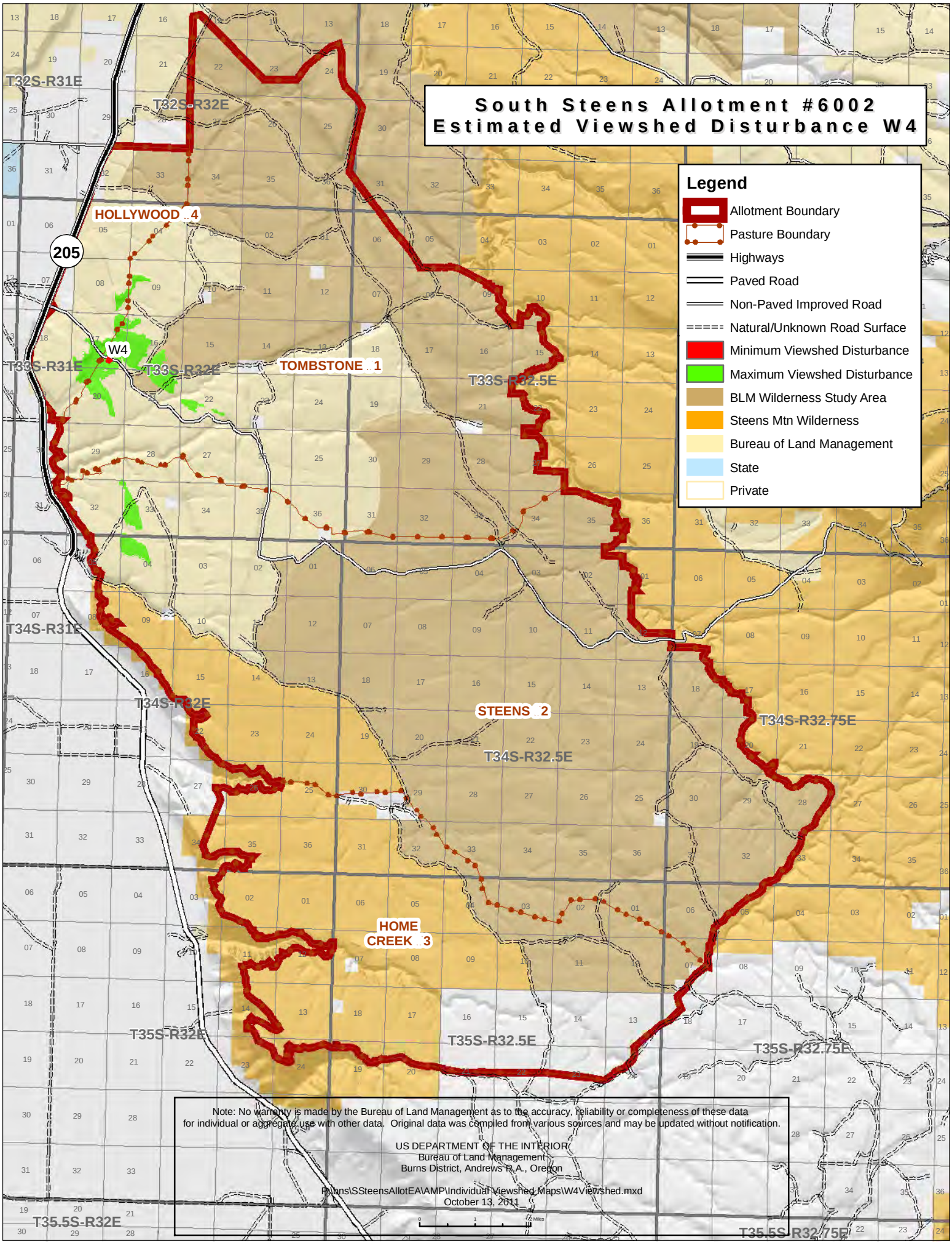
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance W4
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
W4
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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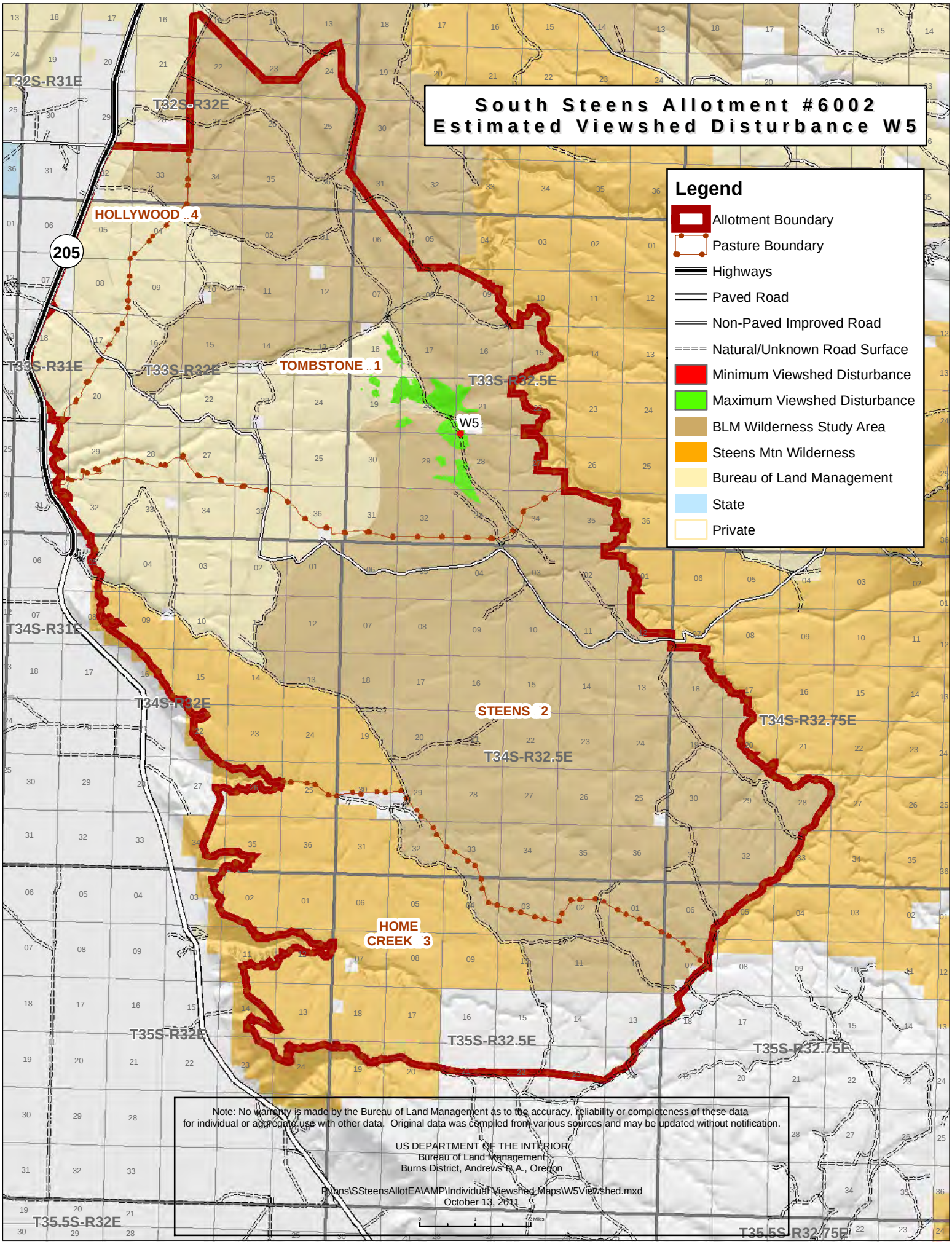
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance W5
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD 4
205
T33S-R31E
T33S-R32E
TOMBSTONE 1
T33S-R32.5E
W5
T34S-R31E
T34S-R32E
STEENS 2
T34S-R32.5E
T34S-R32.75E
HOME CREEK 3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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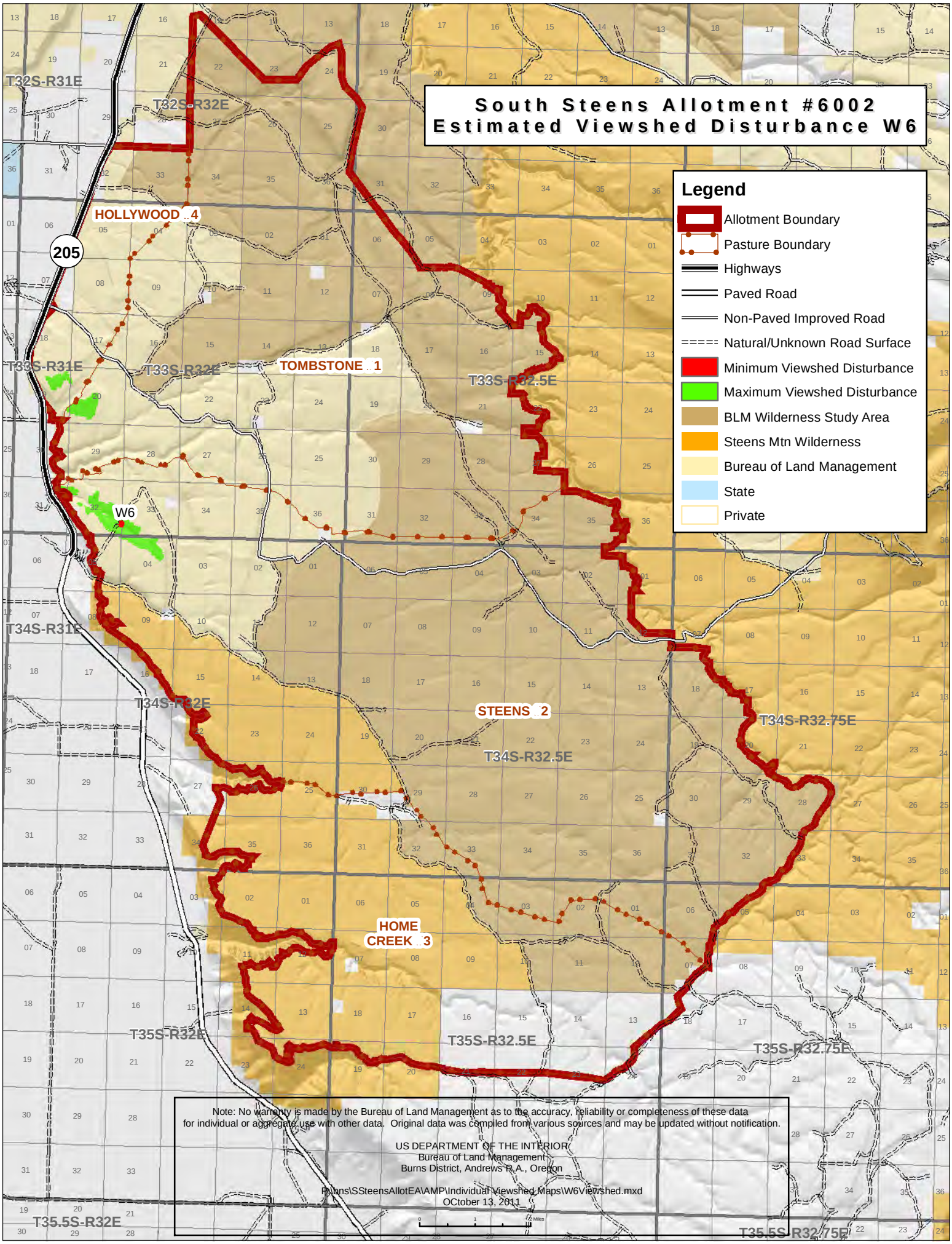
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance W6
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
W6
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T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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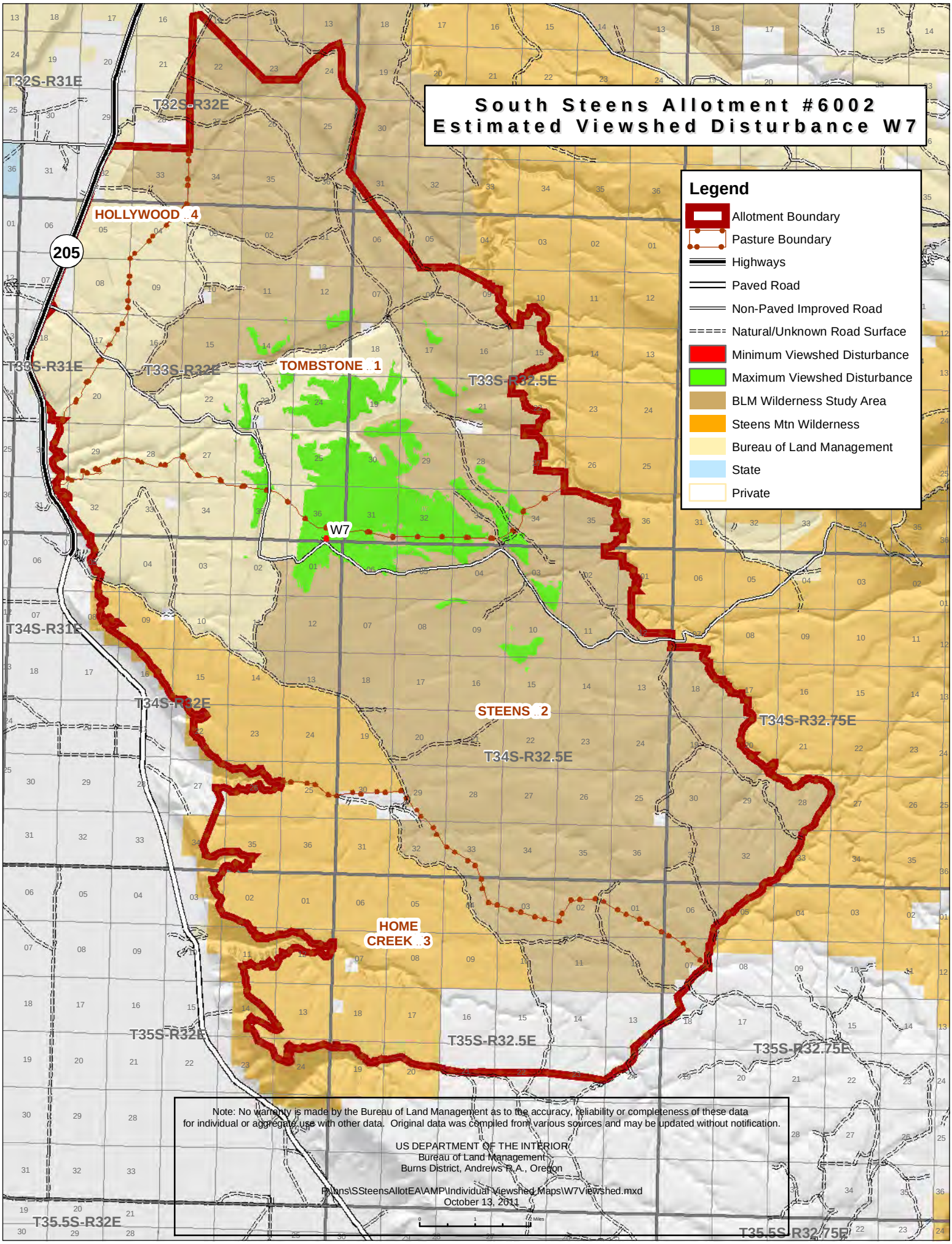
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Estimated Viewshed Disturbance W7
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
W7
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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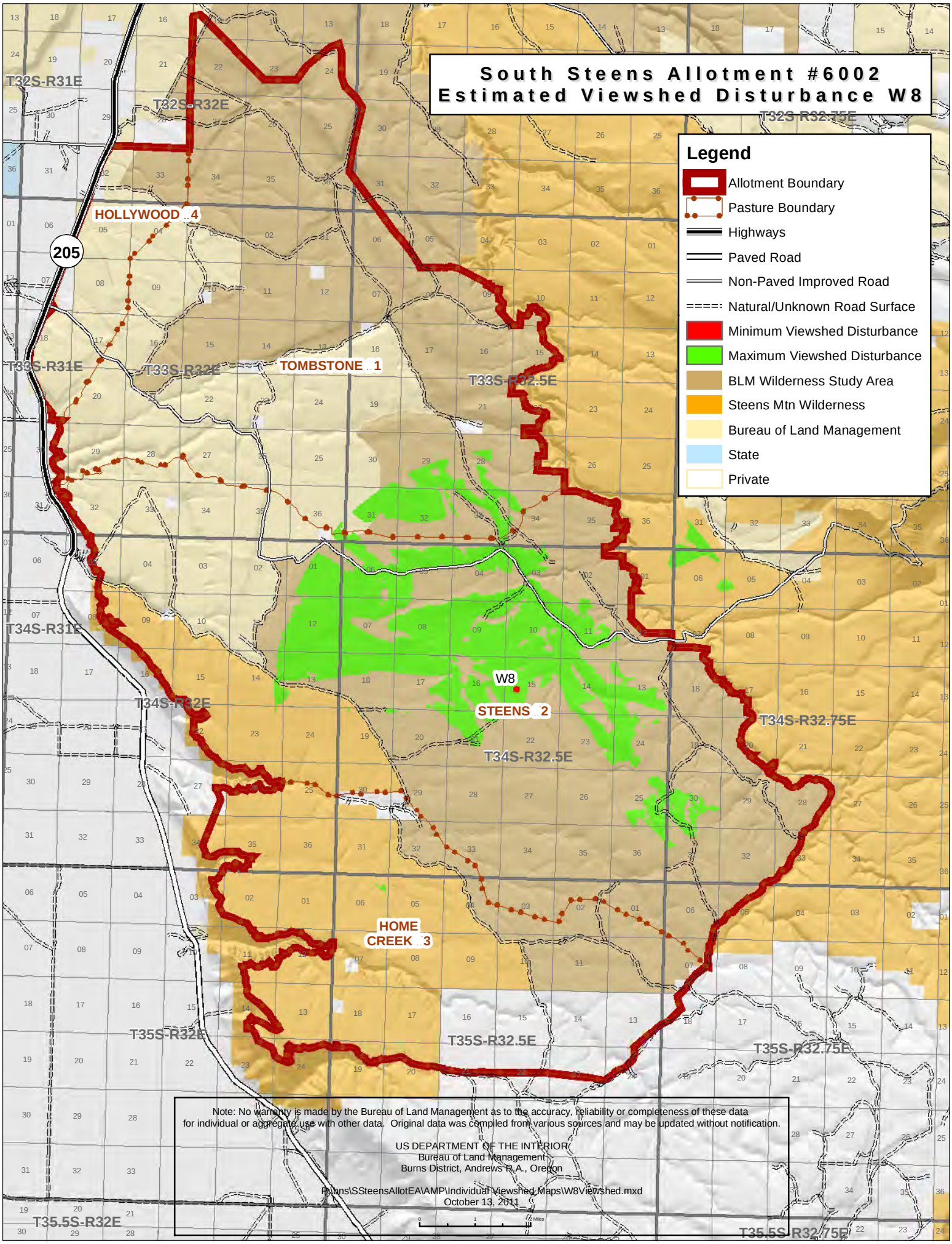
South Steens Allotment #6002
Estimated Viewshed Disturbance W8
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.75E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
W8
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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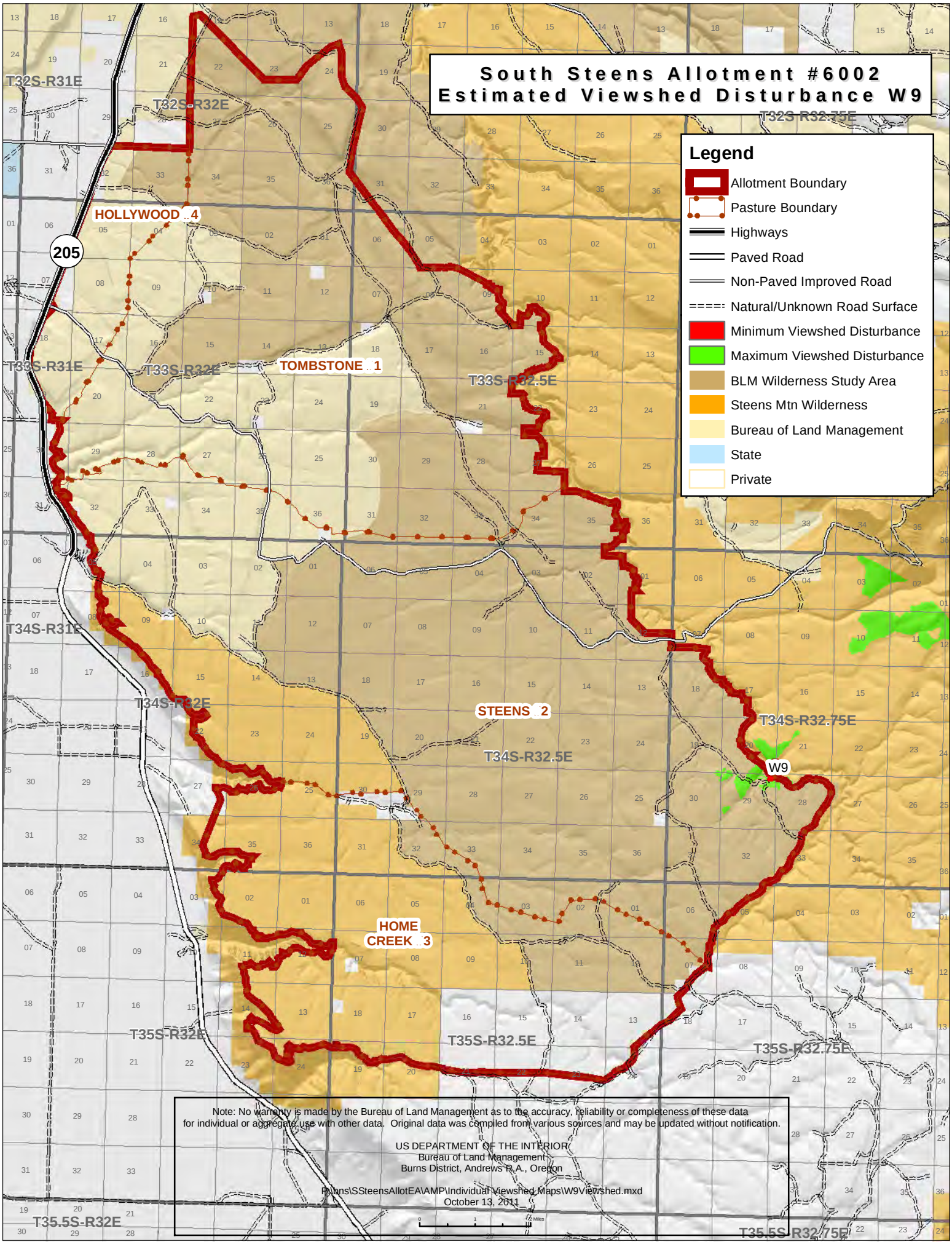
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance W9
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.75E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
W9
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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Burns District, Andrews R.A., Oregon
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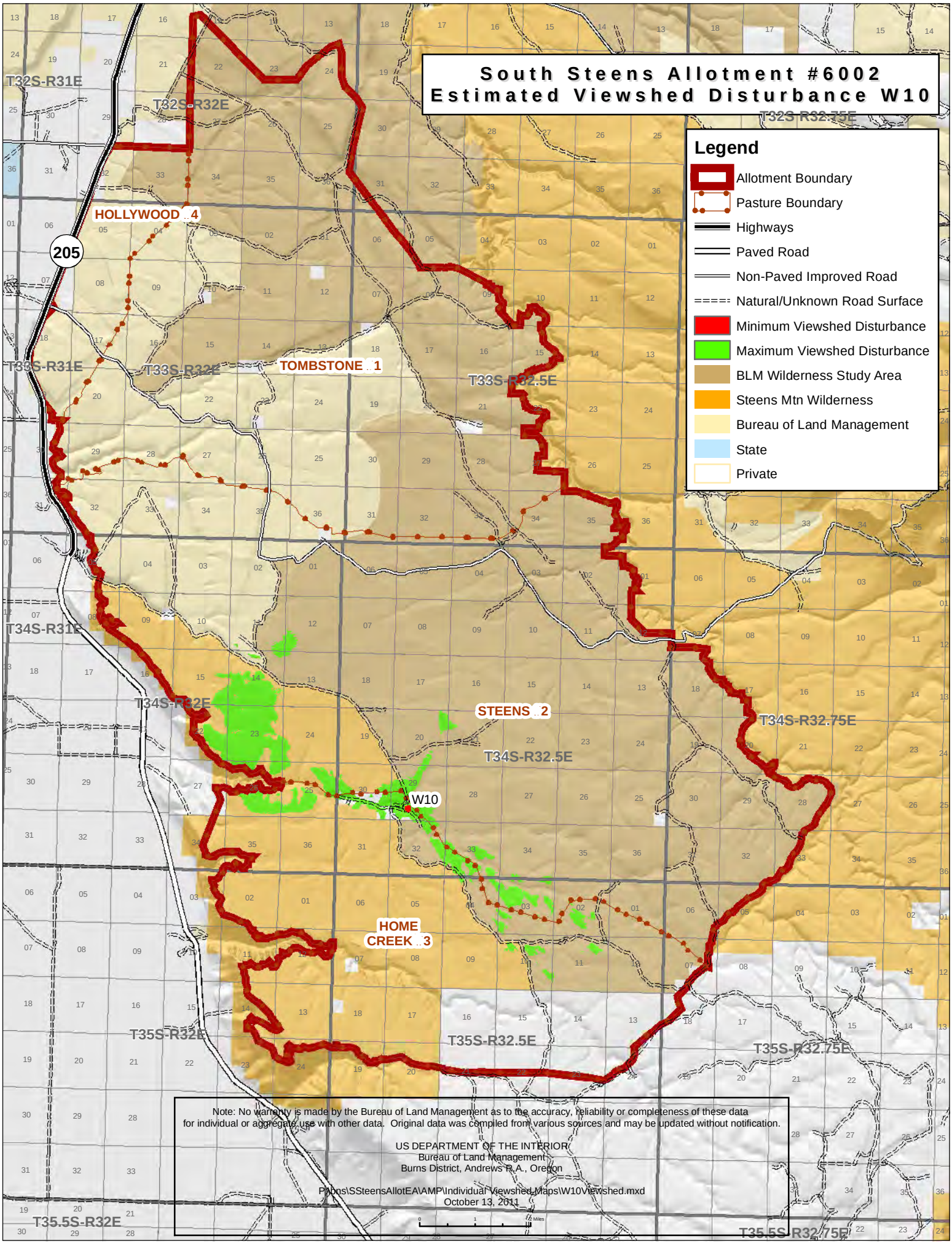
South Steens Allotment #6002
Estimated Viewshed Disturbance W10
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.75E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
W10
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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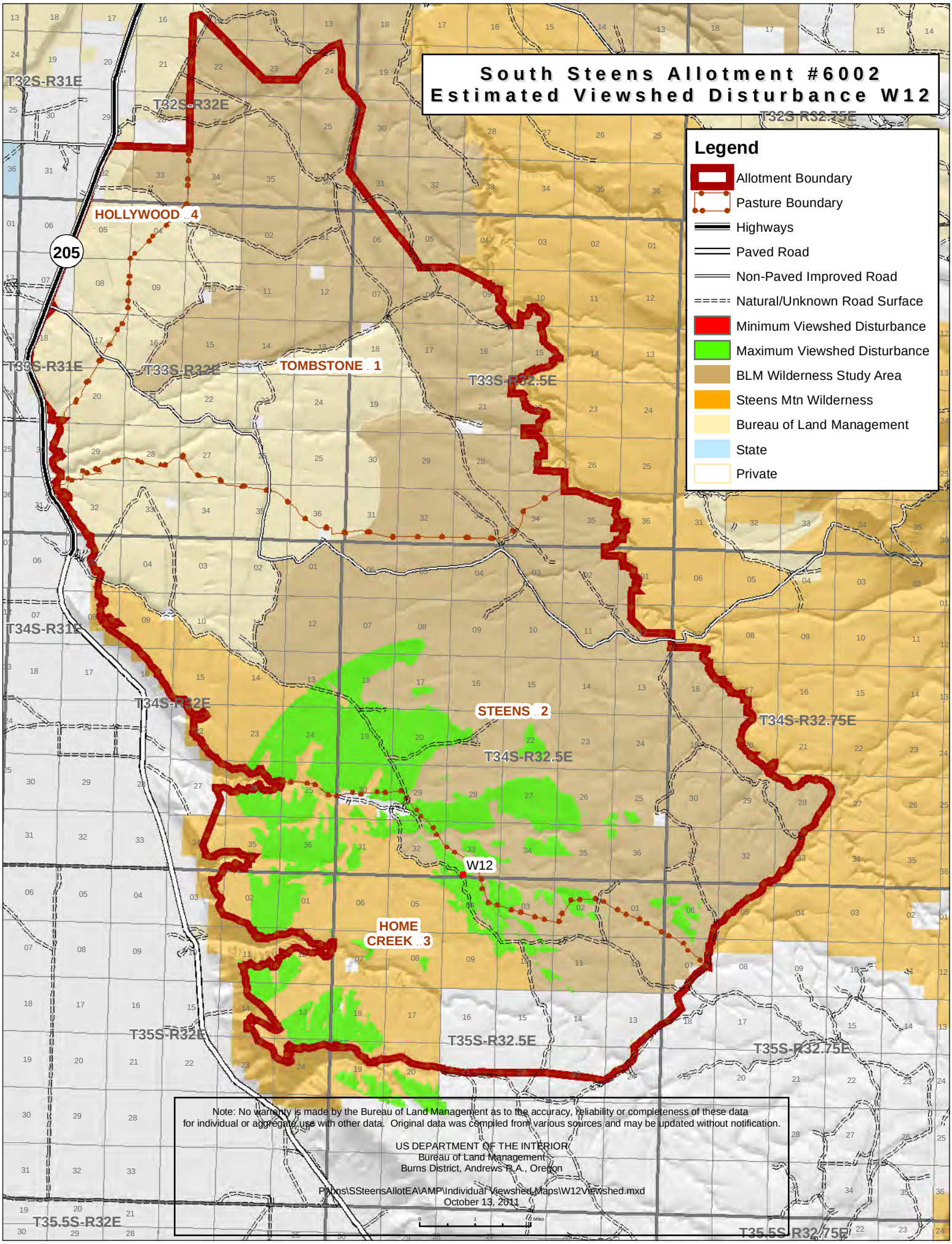
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Estimated Viewshed Disturbance W12
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.75E
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205
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T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
W12
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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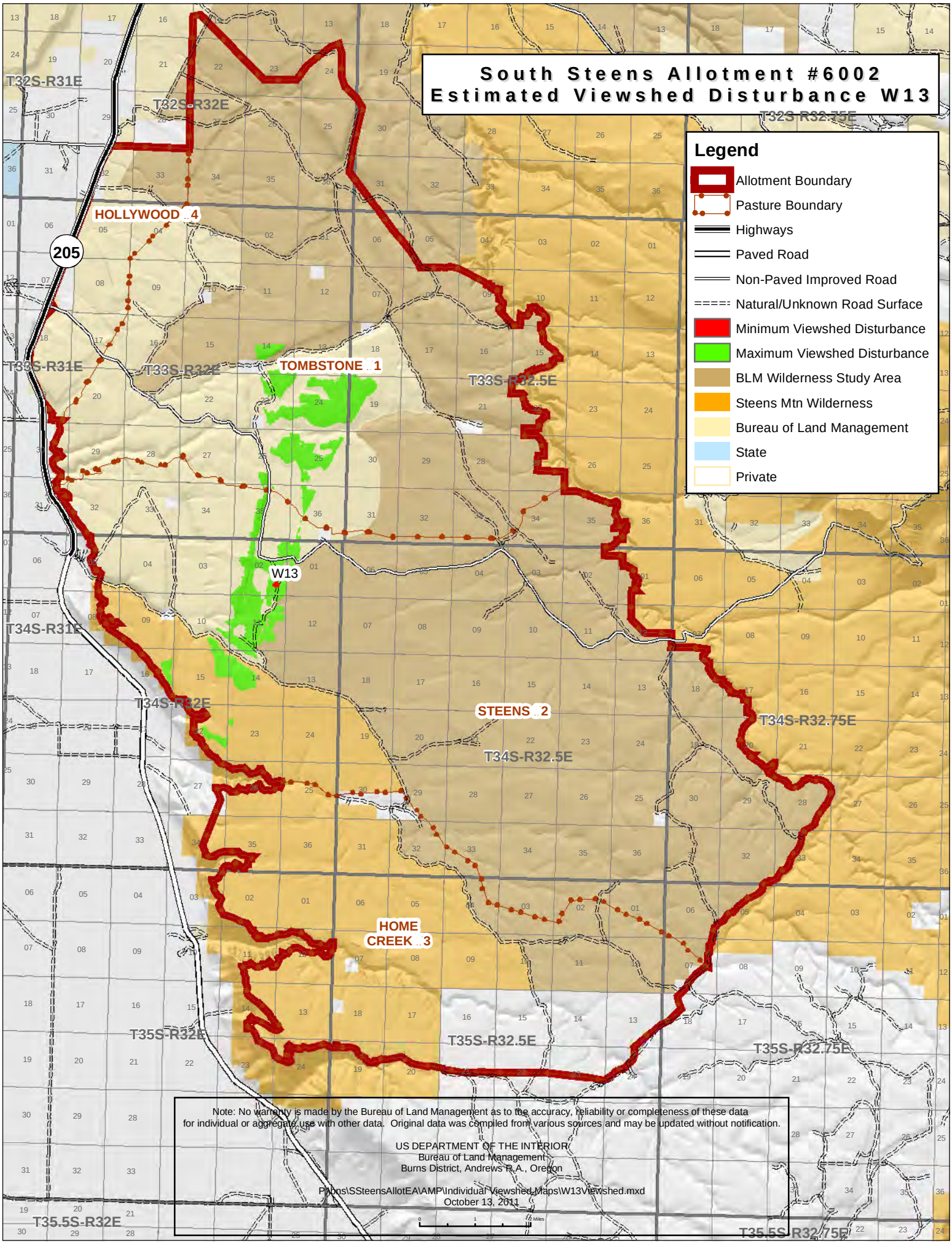
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Estimated Viewshed Disturbance W13
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.75E
HOLLYWOOD ..4
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T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
W13
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
T35.5S-R32.75E
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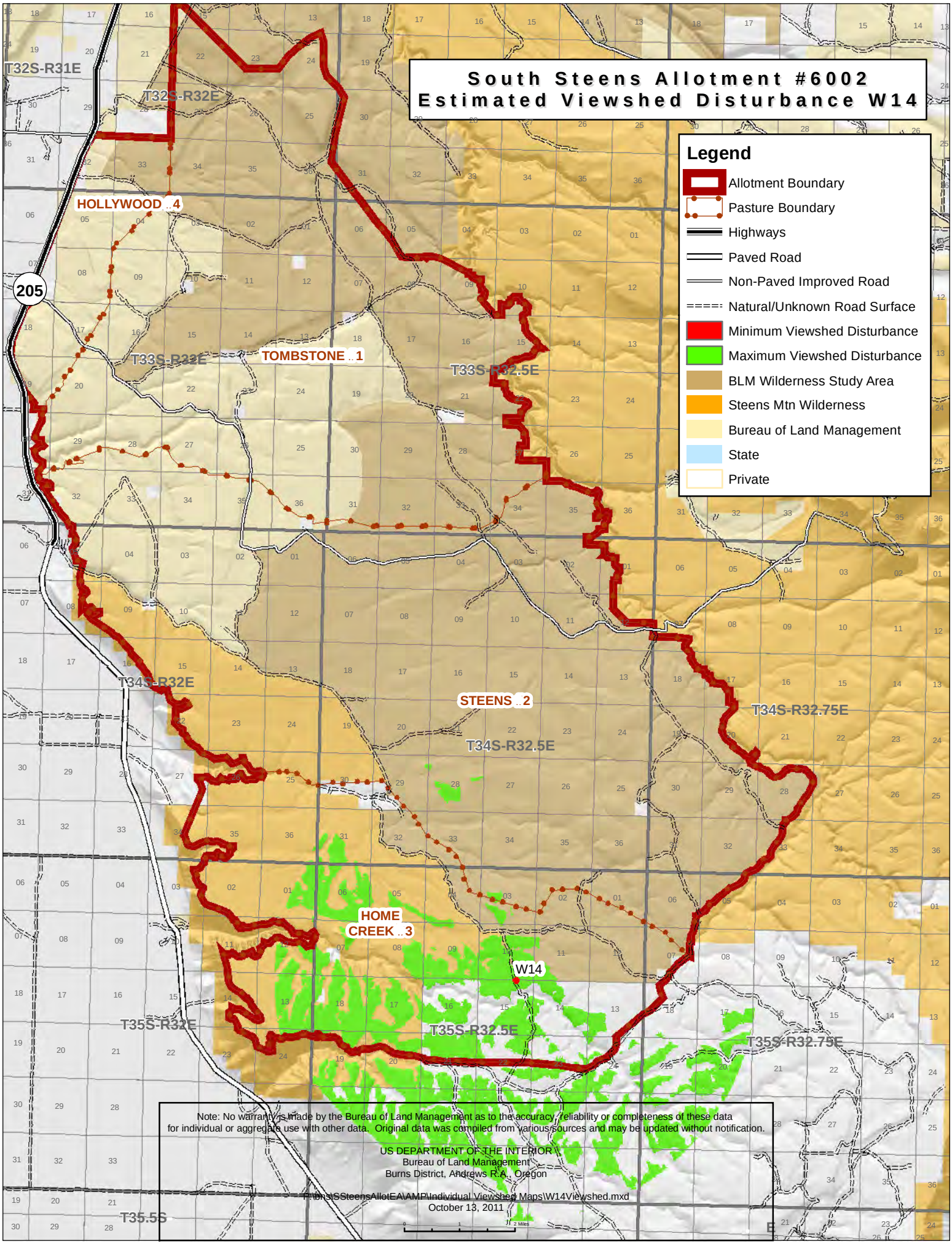
October 13, 2011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Estimated Viewshed Disturbance W14
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
HOME CREEK ..3
W14
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S
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Burns District, Andrews R.A., Oregon
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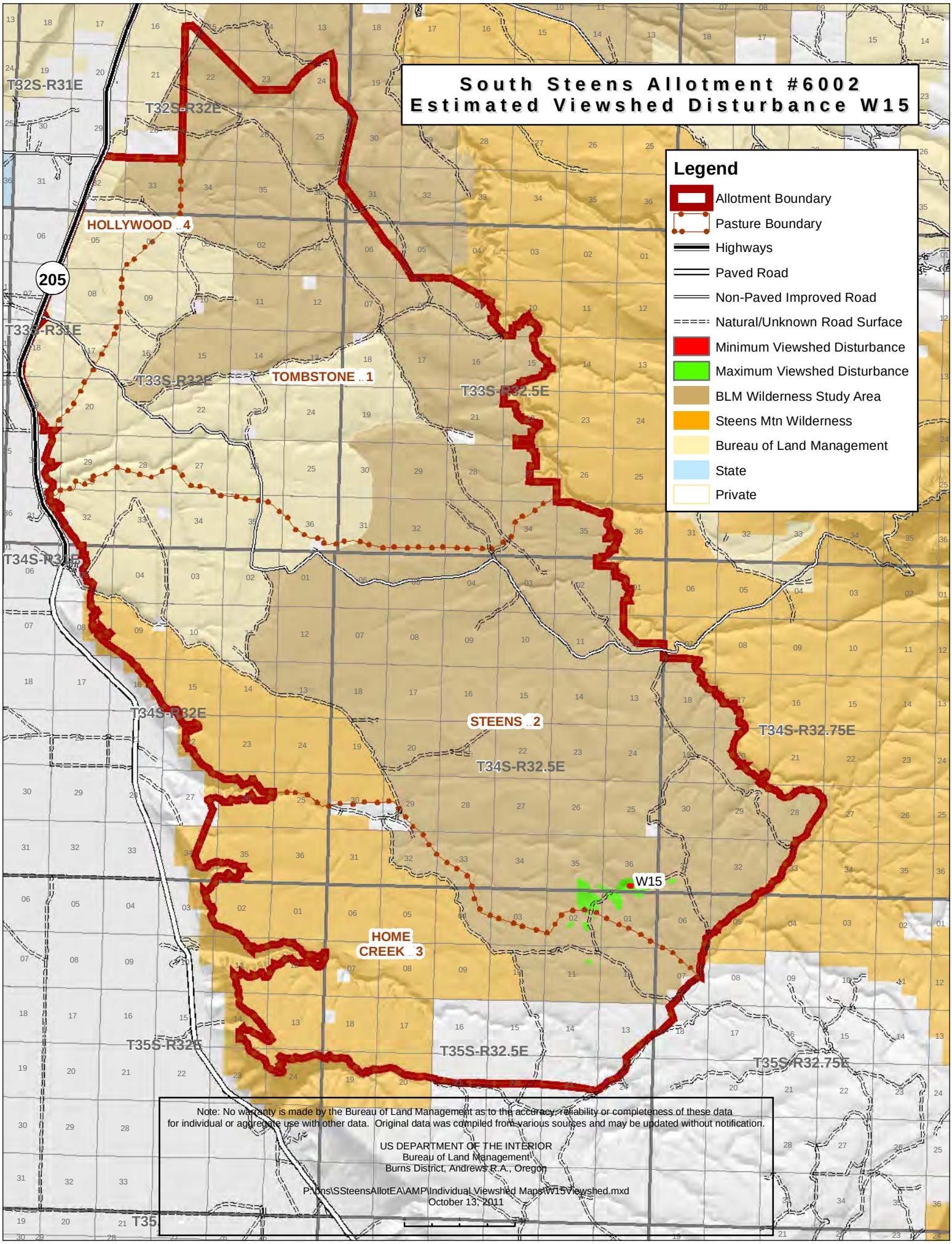
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance W15
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD ..4
205
T33S-R31E
T33S-R32E
TOMBSTONE ..1
T33S-R32.5E
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.5E
T34S-R32.75E
W15
HOME CREEK ..3
T35S-R32E
T35S-R32.5E
T35S-R32.75E
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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Andrews R.A., Oregon
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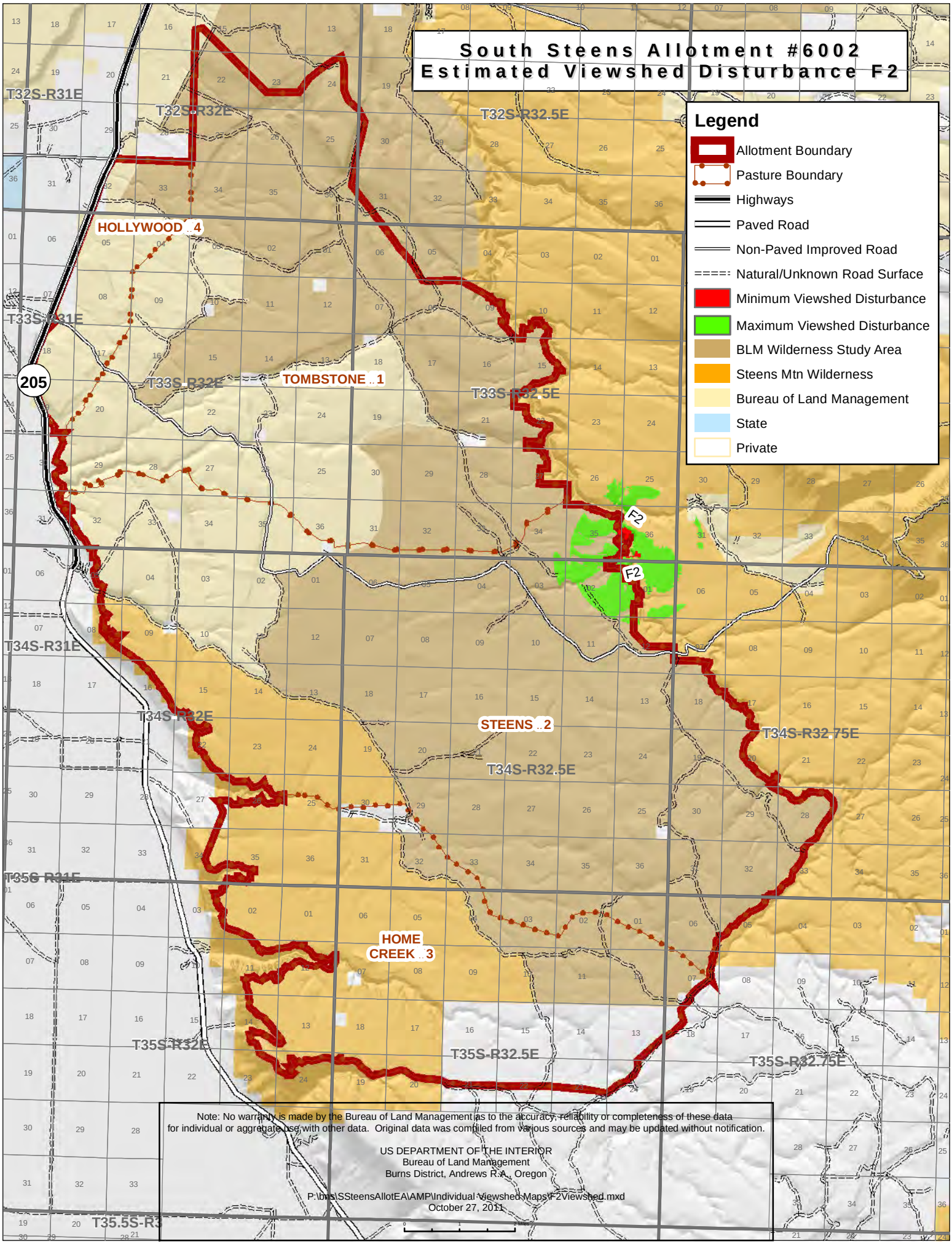
October 13, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance F2
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
HOLLYWOOD ..4
T33S-R31E
205
T33S-R32E
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T33S-R32.5E
F2
F2
T34S-R31E
T34S-R32E
STEENS ..2
T34S-R32.75E
T34S-R32.5E
T35S-R31E
HOME CREEK ..3
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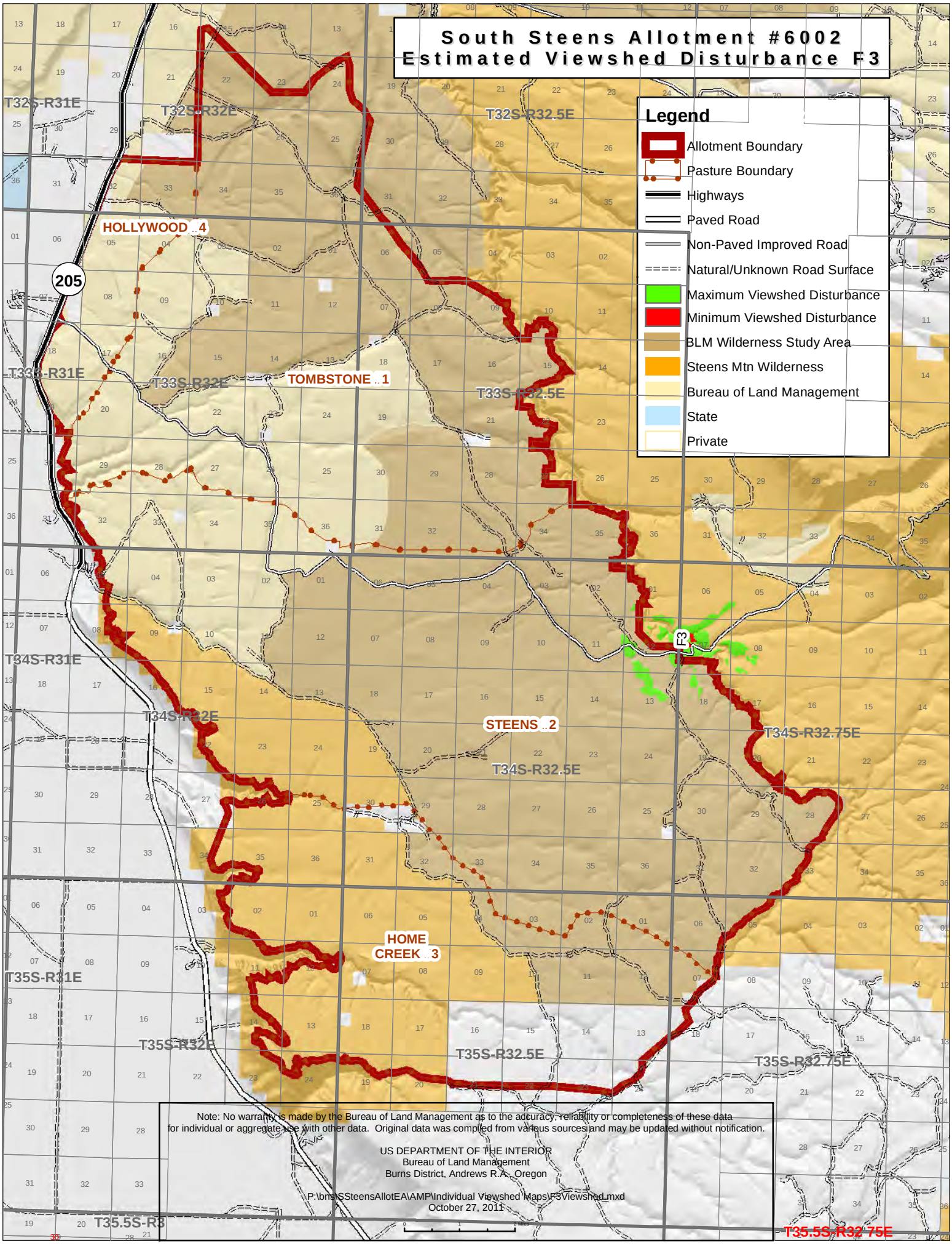
October 27, 2011

South Steens Allotment #6002
Estimated Viewshed Disturbance F3



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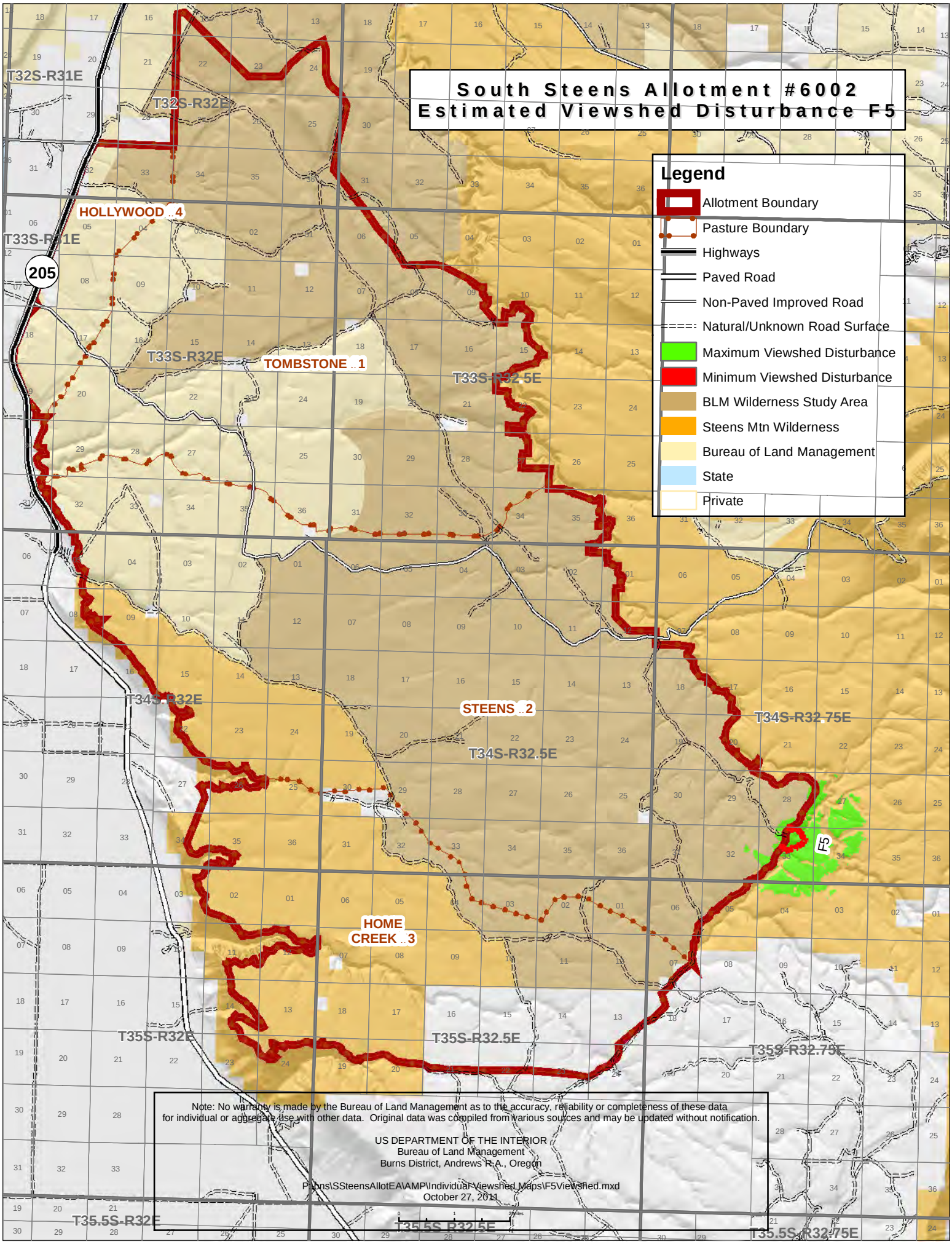
October 27, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance F5
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Maximum Viewshed Disturbance
Minimum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
HOLLYWOOD 4
T33S-R31E
205
T33S-R32E
TOMBSTONE 1
T33S-R32.5E
T34S-R32E
STEENS 2
T34S-R32.75E
T34S-R32.5E
F5
HOME CREEK 3
T35S-R32E
T35S-R32.5E
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T35.5S-R32E
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T35.5S-R32.75E
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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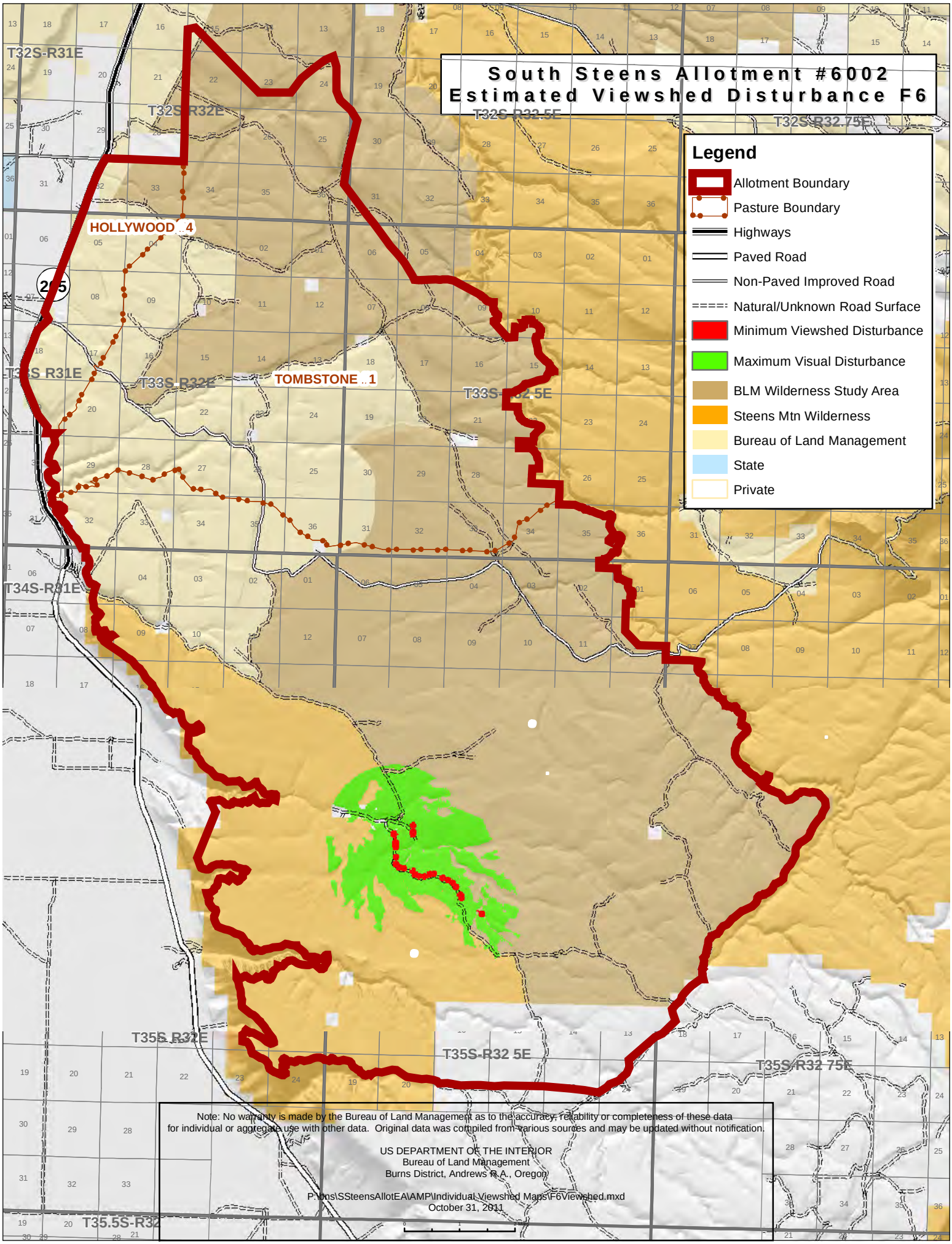
October 27, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance F6
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Visual Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.5E
T32S-R32.75E
HOLLYWOOD ..4
TOMBSTONE ..1
T33S-R32E
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T35S-R32 5E
T35S-R32 75E
T35.5S-R32
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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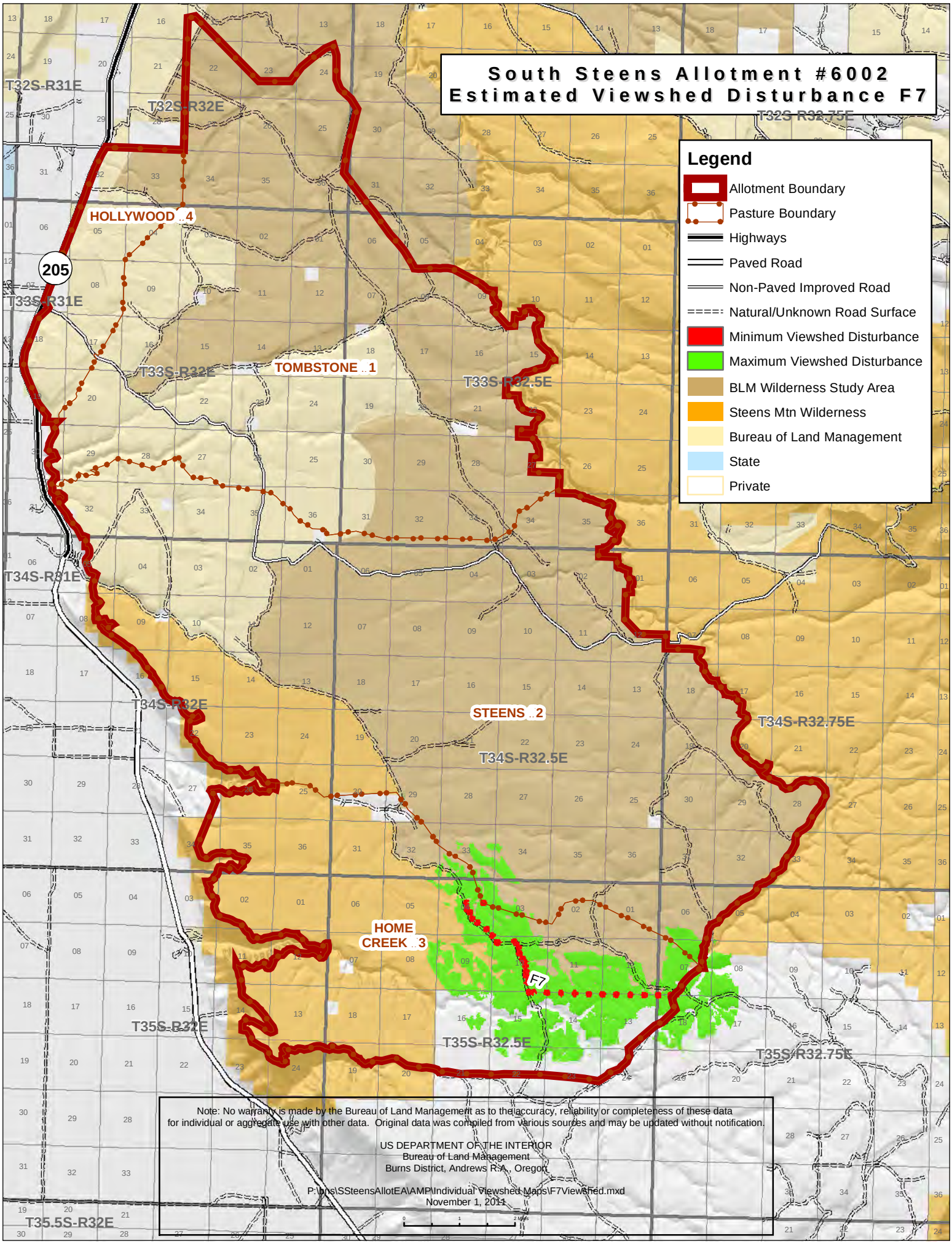
October 31, 2011


South Steens Allotment #6002
Estimated Viewshed Disturbance F7
Legend
Allotment Boundary
Pasture Boundary
Highways
Paved Road
Non-Paved Improved Road
Natural/Unknown Road Surface
Minimum Viewshed Disturbance
Maximum Viewshed Disturbance
BLM Wilderness Study Area
Steens Mtn Wilderness
Bureau of Land Management
State
Private
T32S-R31E
T32S-R32E
T32S-R32.75E
T33S-R31E
T33S-R32E
T33S-R32.5E
T34S-R31E
T34S-R32E
T34S-R32.5E
T34S-R32.75E
T35S-R32E
T35S-R32.5E
T35S-R32.75E
T35.5S-R32E
HOLLYWOOD ..4
TOMBSTONE ..1
STEENS ..2
HOME CREEK ..3
F7
205
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Bureau of Land Management
Burns District, Andrews R.A., Oregon
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November 1, 2011