United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Medford District Office
3040 Biddle Road
Medford, Oregon 97504
email address: Medford_Mail@blm.gov

IN REPLY REFER TO:

1792(ORM060)

OCT 26 2009

Dear Interested Public:

The enclosed *Environmental Assessment* (EA) for the Little Hyatt Dam project is available for public review. The public review period, advertised on the Medford Bureau of Land Management (BLM) Website, ends on November 30, 2009. The website address is *http://www.blm.gov/or/districts/medford.*

The future of Little Hyatt Dam has generated much interest and discussion. From BLM's initial desire to remove the dam for both safety and liability reasons, many of you have asked us to look at other options, preferring to retain the dam. I have heard the following observations from you on this issue.

You value the aesthetic and spiritual ambience of the mountain lake setting. There is special appreciation for the structural appearance of the dam, the cascading water over the dam, and the peace and quiet of the area. Many of you recall pleasant memories of more youthful visits to the lake. You also value its rather undeveloped recreational aspect to fish, boat and camp in the area, and generally having the "place to yourself". For those who live in the area, you appreciate this amenity and the value it brings to the Green Springs mountain community. You have noted the biological value of a small mountain lake and its surrounding wetlands, and the fact that the surrounding larger lakes are much more developed. Based on both personal opinions and the available technical information on the condition and possible collapse of the dam, many of you remain skeptical that there is any real danger to life and property, believing the old dam will simply leak a slow death, and noting the sparse development downstream that is unlikely to be affected in the event that a collapse does occur.

More importantly, you advocated for an opportunity to help save the dam. Working with the BLM and local congressional representatives, a group of dedicated residents helped explore a number of avenues for funding to repair the dam. A proposal to use the value of surrounding public land to offset the cost of repairing the dam was presented for consideration and was fully developed in this EA.

As with all alternatives to address a problem, there are pros and cons that must be carefully weighed into a final decision. It is my hope that we have adequately explored a range of ideas and have adequately and fairly described the differences between alternatives. It is also customary that the BLM identify a Proposed Action. This (Proposed Action) is a term--described

in the implementation regulations for environmental analysis--that may confuse people into believing a decision has already been made. That, however, is not the case. The Proposed Action is a starting point the BLM uses in its environmental analysis process from which to build options. No decision has been made, but the Proposed Action does alert the public to the management direction the BLM is leaning. I will make a final decision on this project only after carefully considering your comments. The record of my decision will reflect the rationale of that final decision and how I considered public comments in making that decision.

I welcome your comments on the content of the EA. I am particularly interested in comments that address one or more of the following: (1) new information that would affect the analysis, (2) information or evidence of flawed or incomplete analysis; and (3) alternatives to the Proposed Action that would respond to purpose and need. Specific comments are the most useful. **Comments are due by 4:30 PM, November 30, 2009.**

Before including your address, telephone number, email address, or other personal identifying information in your comment, be advised that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

All comments should be made in writing and mailed or delivered to John Gerritsma, Ashland Resource Area, 3040 Biddle Road, Medford, OR 97504. Further information on this proposed project is available at the Medford District Office, 3040 Biddle Road, Medford, Oregon 97504 or by calling the Ashland Resource Area Planning Department. Contact John Gerritsma at (541) 618-2438.

Sincerely,

John Gerritsma
Field Manager
Ashland Resource Area

Enclosure

ENVIRONMENTAL ASSESSMENT

For

LITTLE HYATT DAM
(Long-Term Management)

United States
Department of the Interior
Bureau of Land Management
Medford District

Jackson County, Oregon

ENVIRONMENTAL ASSESSMENT (EA)

for

LITTLE HYATT DAM
(Long-Term Management)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

JACKSON COUNTY OREGON
EA COVER SHEET

RESOURCE AREA: Ashland

ACTION/TITLE: Little Hyatt Dam (Long-Term Management

EA NUMBER: (DOI-BLM-OR-M060-2010-0001-EA)

LOCATION: T. 39 S., R. 3 E., in Section 20, W.M., Jackson County Oregon (see Map)

List of Preparers	Title	Responsibility
Miriam Liberatore	District Engineer	Engineering
Michael Derrig	Hydrologist	Hydrology, Soils & Watershed
Brad Tong	Botanist	Special Status Plants, Botany
Steve Godwin	Wildlife Biologist	T&E Animals, Wildlife
Jennifer Smith	Fisheries Biologist	Fisheries, Riparian
Ann Ramage	Cultural Resources	Cultural Resources
Edward Reilly	Environmental Coordinator	NEPA Compliance

ENVIRONMENTAL ASSESSMENT (EA)

for

LITTLE HYATT DAM (Long-Term Management)

A. INTRODUCTION & BACKGROUND

This Environmental Assessment (EA) documents the environmental analysis conducted to estimate the site-specific effects on the human environment that may result from the implementation of BLM's proposed action. This document complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's manual guidance on the National Environmental Policy Act of 1969 (516 DM 1-7).

In 1923, Little Hyatt Dam was constructed on Keene Creek in Jackson County, Oregon for the Talent Irrigation District (TID). At that time, water was diverted for irrigation to the Rogue Basin. In the 1950's, the Bureau of Reclamation built Keene Creek Reservoir and the Green Springs Hydroelectric Plant downstream from Little Hyatt. With the completion of these projects, TID stopped using Little Hyatt Reservoir for irrigation purposes.

Since the 1950s, the reservoir has been used for recreation. In 1992, Talent Irrigation District contacted BLM, stating they (TID) wished to relieve themselves of the liability of the dam by breaching it. In order to continue to provide the recreational opportunities provided by the Little Hyatt Reservoir, BLM assumed title to the dam from the TID in 1993, and is currently responsible for its maintenance and safe operation. The BLM does not, however hold title or easement on approximately two-thirds of the land flooded by the current reservoir, nor does it hold a valid right to store or impound water at the site.

When BLM acquired the dam, the Bureau of Reclamation noted that the dam was "in need of repairs". In 1996, BLM inspected the dam, determining that indeed, "the structure appear(ed) to be in poor condition." BLM's report also noted that the condition of the dam presents a potential hazard to downstream land uses including the Pacific Crest Trail foot bridge crossing (200 feet downstream), camping, and other uses. The concrete dam measures 125 feet along its crest, 18 feet high, 2 feet thick, with a 75 feet wide spillway. The concrete has eroded, exposing vertical and horizontal rebar (the support structure inside the concrete). The concrete at the toe of the dam has been undermined. The dam gates are inoperable.

In 1997, the Oregon Water Resources Department, the Bureau of Reclamation, and TID inspected Little Hyatt Dam; their report also documents the dam's poor condition. For example, they observed several hundred gallons of water per minute flowing between the foundation and the concrete interface. Because the downstream valley is wide and generally uninhabited, there did not appear to be a significant threat downstream to life or property. Based on the dam's height, impoundment volume, and the downstream development, a hazard rating of "low" was assigned to the dam. Regardless of the rating, a sudden release of water resulting from a dam failure poses some risk to public recreating downstream as well as facilities (trail and road), and private property and structures. In addition, a sudden discharge of water has the potential to affect the Keene Creek Reservoir and the hydroelectric generating facility downstream.

In April of 1998, BLM proposed removal of the dam based on the dam's poor condition. However, information gathered at subsequent public meetings indicated strong support for retaining the dam and preserving its related recreational and cultural values. In response to this, BLM issued an Environmental Assessment in 2003 to repair or rebuild the dam. BLM has made repeated attempts to secure funding to repair the dam but has been unable to acquire the needed funds.

In the summer of 2006, another dam safety inspection was performed. The results of this inspection show the dam suffering from continued deterioration and the threat of failure to be elevated to critical. The inspection report states that "the majority of the spalled pockets are 10-12 inches deep with exposed #7 rebar. The largest spalled pocket measured 5 feet wide by 3 feet high by 21 inches deep."

The Medford District BLM received a memo from the Associate State Director requesting that the Medford District take immediate action to breach the dam. Public outreach was again made with interested neighbors near the dam to discuss the situation. Since June, 2007 extensive dialog with the local community concerning the fate of the dam has taken place. Several newspaper articles have been published, meetings with neighbors have been held, numerous e-mail discussions and phone conversations have taken place with adjacent neighbors and other interested parties to discuss the safety concerns and need for removal of the dam. The community group that formed to save the dam developed an alternative involving the sale of public lands. The alternative is evaluated in detail in this document.

In early September, 2007, a monitoring review determined there was an increase in water release through cracks in the dam's right abutment area. This is the area documented in engineering studies to be the likely location of a sudden failure. As a result of this change, an emergency draw down of impounded water took place to relieve pressure on the dam and reduce the risk of dam failure. The lake level was drawn down to approximately eight feet below the crest of the dam and maintained at that lower level through January, 2008, during which time stabilization efforts were made to the right abutment. The stabilization effort consisted of reinforcing the right abutment with a new concrete footing. It is important to note that this was not a repair of the dam but stabilization made to a supporting structure at the edge of the dam.

B. WHAT IS BLM PROPOSING & WHY?

The **Purpose and Need** for the Little Hyatt Dam Public Safety Project is to alleviate both the safety concerns resulting from a possible break/collapse of the aging dam structure and to reduce the long term maintenance liability for the BLM in a more financially practical manner than the current standing decision to repair the dam at a cost of $1,000,000 (which BLM has been repeatedly unable to obtain).

The impounded water behind the dam forms a lake of approximately 11 acres and fifty-nine acre feet of water. The quantity of water that would be released under a collapse scenario is equivalent to a football field of water almost 50 feet tall! Such a release has tremendous potential to damage property, injure or kill people. In addition, a large amount of sediment delivered to Keene Creek Reservoir downstream is likely to cause substantial damage to power generation and irrigation delivery systems. While the overall risk of substantial damage, injury or death has been determined to be "low" (which still recognizes there is a risk), there remains the potential to cause substantial harm and/or loss that can be prevented by ameliorating the safety concerns at the dam site.

Nationally, the BLM is addressing its runaway backlog of maintenance on its various facilities, including structures like Little Hyatt Dam, by removing structures (and removing the ongoing maintenance needs) when the opportunity presents itself. The BLM's budget for maintenance is decreasing annually, and structures, like Little Hyatt Dam, are much lower in priority than other facilities that are more closely tied to BLM's mission (infrastructure such as roads and bridges or facilities for wild horses and burros).

To meet the **Purpose and Need**, the BLM is proposing to partially remove Little Hyatt Dam.

Current direction for management of the dam was provided in an environmental assessment and Decision Notice in 2003. The Decision made in 2003 was to repair the dam. However, funds for that repair have been unavailable negating the viability of the decision to repair the dam with BLM funds. An engineering firm (OTAK) performed an inspection in 2007 and estimated the repair costs to be between $750,000 and $1,000,000 dollars. All the while, the structure continues to deteriorate. A stabilization effort in 2007 addressed the most critical weakness of the dam (right abutment) but was not intended to

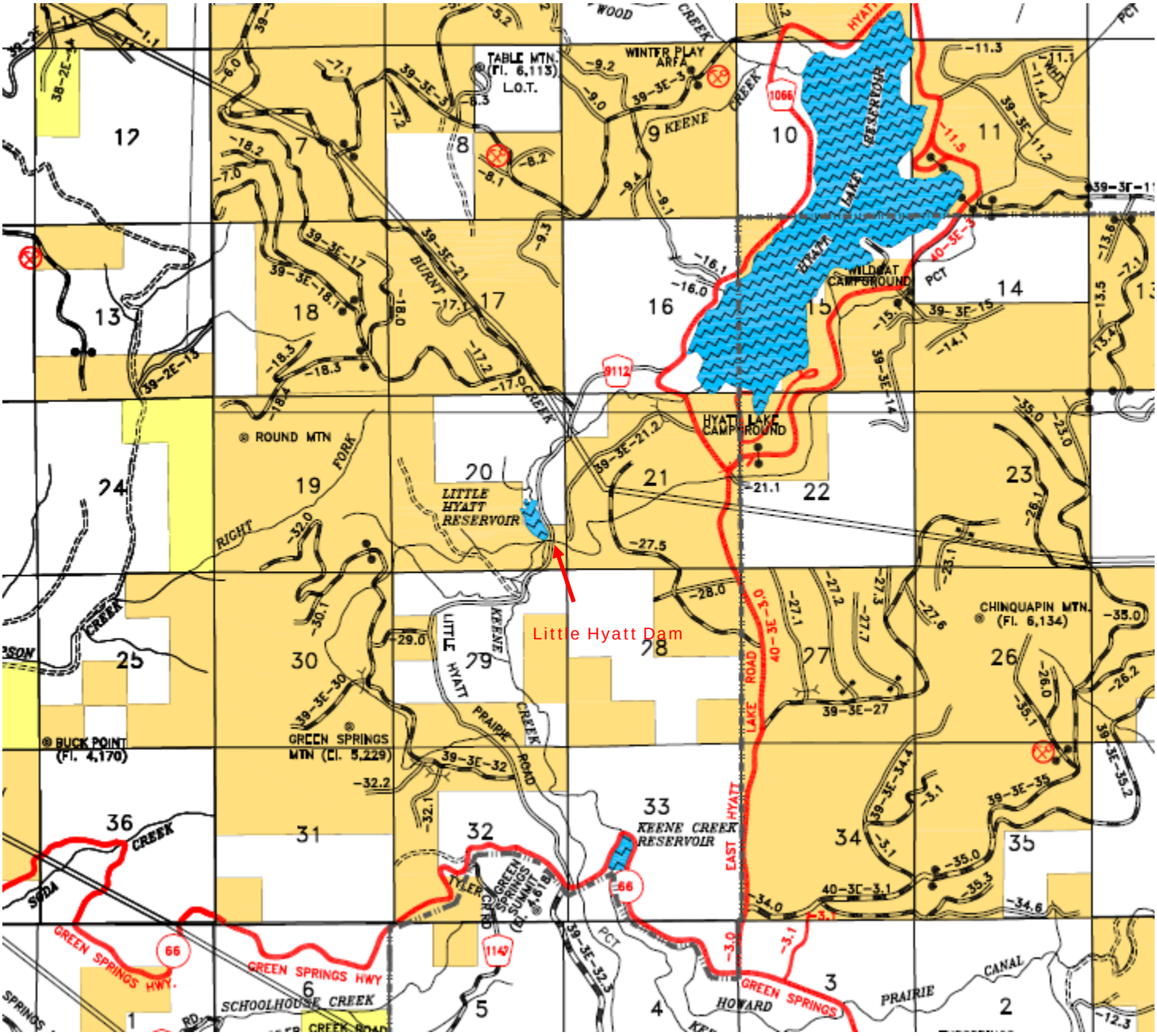
address the deterioration in the dam face which continues to deteriorate. Based on recent inspections, the risk for collapse of the dam remains. Therefore, there is a need to have the safety hazard ameliorated before a collapse occurs. Because there is stored sediment behind the dam, there is also concern for releasing this sediment as a result of a structural failure. A large release of sediment could potentially cause damage or impede normal operations of downstream hydroelectric and irrigation facilities. There is also a concern for sediment impacts on water quality and downstream aquatic habitats.

C. CONFORMANCE WITH MANAGEMENT DIRECTION, STATUTES & REGULATIONS

This proposal is in conformance with the Medford District's 1995 Record of Decision and Resource Management Plan, implementing actions consistent with Management Objectives and Direction of the 1995 RMP (USDI 1995, p. 88-91). This proposal is also in compliance with the direction given for the management of public lands in the Medford District by the Oregon and California Lands Act of 1937 (O&C Act), Federal Land Policy and Management Act of 1976 (FLPMA), the Endangered Species Act (ESA) of 1973, the Clean Water Act of 1987, Safe Drinking Water Act of 1974 (as amended 1986 and 1996), Clean Air Act, and the Archaeological Resources Protection Act of 1979.

D. WHERE IS THE PROJECT LOCATED?

Map 1: Project Area - Township 39 South Range 3 East



E. DECISIONS TO BE MADE & DECISION FACTORS

This Environmental Assessment will provide the information needed for the authorized officer, the Ashland Resource Area Field Manager, to render a decision regarding the selection of a course of action to be implemented for the Little Hyatt Dam Public Safety project. The Ashland Resource Area Field Manager must decide whether to implement the proposed action, an alternative to the proposed action or the no-action alternative. In choosing whether or not to move forward with the proposed action, the Field Manager will consider whether the proposed action is compliant with applicable Federal and State laws and consistent with management direction for BLM-administered lands (43 CFR 2804.25 (d)(1) and 43 CFR 2804.26 (1).

The decision will also include a determination whether or not the impacts of the proposed action are significant to the human environment. If the impacts are determined to be within those impacts analyzed in the *Medford District Proposed Resource Management Plan Environmental Impact Statement* (EIS) (USDI 1994) and the *Final SEIS On Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan)* (USDA/USDI 1994), or otherwise determined to be insignificant, a Finding of No Significant Impact (FONSI) can be issued and a decision implemented. If this EA determines that the significance of impacts are unknown or greater than those previously analyzed and disclosed, then a project specific EIS must be prepared.

F. ALTERNATIVES ANALYZED BUT ELIMINATED FROM DETAILED STUDY

Replace/Reconstruct the Dam - The current cost estimate for replacement of the dam is at $1,000,000 plus. Repeated attempts to secure funding for repair have failed. The BLM budgets are in a stagnant/downward trend, thus there is no reasonably foreseeable future time at which this amount of money would become available. This alternative is economically infeasible and will be eliminated from detailed study. An EA was completed in 2003 that directly addressed the repair of the dam. The effects analysis written in 2003 is still valid.

Close area downstream of dam – This option would attempt to close all areas within the flood zone from Keene Creek Reservoir to Little Hyatt Dam to public entry and regulate use on private lands by owners. The county road would be closed from adjacent to the dam to 500 feet downstream, past the existing crossing. No boating or swimming would be permitted on Little Hyatt Lake. The Pacific Crest Trail would have to be rerouted to the north. Extensive signage and some fencing would need to be installed to maintain adequate warning. It is unlikely that posting signs would be sufficient to prevent people from recreating near the dam or within the potential flood zone. It is unknown how to achieve compliance for private lands. This option is deemed infeasible and therefore is not a viable course of action.

Install Permanent Siphon Structure - This option would lower the pool to the top of the sediments, virtually eliminating the reservoir. The dam would remain and would act to retain sediments. This is not a permanent solution, as it does not account for passing flood flows, and the fact that the siphons will stop each time the water surface is lowered to the inlet elevation. The siphons would have to be monitored and restarted each time water begins to accumulate above the level of the siphon inlet. While useful for eliminating the safety hazard quickly (and without external power sources) by dewatering the site to allow a permanent solution to be implemented, this alternative is not a viable solution for the long-term. Thus, permanently installing a siphoning structure is not a feasible alternative. As BLM has discovered during the monitoring period following the stabilization of the right abutment, accessibility in winter is difficult (effectively non-existent at times) and costly.

Partial Notching of the Dam – This option would cut a notch several feet in width from the top to bottom of the existing structure. This would allow the free flow of water year round through the dam. It would also allow uncontrolled discharge of sediment. The remaining concrete dam structure would still

be in place but in a very weakened form as all structural integrity would be lost. It would be a safety hazard as it would crumble over time. This alternative would do nothing to alleviate the potential for uncontrolled sediment and would create another safety hazard in the remaining dam structure. While this alternative is feasible from a technical point of view, there would be additional long term safety liability at the dam site.

Other Community Generated Alternatives - After the stabilization (not a "repair") of the right abutment, the BLM and the community worked together in attempts to find collaborative solutions to saving the dam. The following ideas will not be explored as alternatives in detail.

- Transferring ownership to other government or Not for Profit Entities--The community sought to have the dam transferred to the Oregon State Parks or a Nongovernment Organization (NGO) without success. No other non-private entity was found to take over the dam and lake.
- Community Fund Raising--The community was able to raise about $150,000 dollars toward the repair of the dam, which was far short of the estimated repair costs. The community also worked with local political representatives to find solutions for funding, but were unable to find viable options.

G. ALTERNATIVES ANALYZED IN DETAIL

There are five alternatives analyzed in detail, including the Proposed Action. Costs associated with these alternatives are displayed in the Cost Comparison Table at the end of this section. Funding for each of the alternatives is dependent on annual allocation and selection of projects, but would be immediately secured if there is an emergency situation. It is assumed that due to the potential safety threat of the dam, that funding for the selected alternative will become available within three years of a Decision Notice.

Alternative 1 - No Action Alternative

Under Alternative 1, the dam would remain in place without additional repair or stabilization. It would likely fail in the future, either with a major breach and a corresponding large flow of water and sediment or with slow leaks that enlarge over time. In both situations, the reservoir would drain and the lake would be gone. The following actions would continue under this alternative:

1. The siphon system will remain in place and will be maintained in functioning condition to allow BLM to draw down the lake for inspections or emergency situations.
2. The siphon system is tested annually.
3. Regular monitoring of the dam (per Monitoring Plan required by Oregon Water Resources Board).
4. An Emergency Plan has been developed and an annual drill is held to test implementation of the plan.

Alternative 2 – Community Repair Proposal

This alternative was developed by an interested public representing a community group wishing to save the dam, but responding also to the high cost associated with repairing the dam, and the lack of funding available through BLM appropriated funds.

The crux of this alternative is to utilize the surrounding public (BLM) land value in exchange for the repair of the dam. In order to do so, land surrounding the dam must be made available for sale, with the value of the land "exchanged" for the cost of repairing the dam. In the area of the dam, the minimum contiguous land required by Jackson County planning regulations to issue a home site approval is 160 acres. There are adjoining private lands currently for sale as well, and other opportunities to obtain private parcels may also be available. While the goal is to achieve a 160-acre minimum home site parcel, and the goal could be achieved with a combination of federal and private lands, an alternative that includes only federal land of a known quantity is much more simple and implementable. Therefore, this alternative provides the full 160 acre minimum home site from federal ownership only. This proposal is for BLM to sell 160 acres of land, including the land on which the dam sits, the dam itself and BLM's portion of the lake via federal land disposal processes with an open, competitive bid.

The responsibility for repair of the dam will be with the new owner. Liability associated with the dam will be with the new land owner. The development of the repair strategy rests with the successful new owner of the dam, but technical reports done previously for BLM (1998 OTAK Engineering Report) are available for guidance. Once the property has been converted from federal to private ownership, BLM will no longer be responsible for the dam and subsequently will not be responsible for overseeing the implementation of the dam repair or execution of any deed requirements and restrictions. That role is expected to be undertaken by community members who have been interested in saving the Little Hyatt Dam.

It is assumed that the repair of the dam, if privately owned, is substantially (33%) less than if government owned (due to federal contracting and construction regulations). The dam, lake, and property would be sold "as is" (to relieve the government of future liability). The sale would be under a competitive bid process open to any qualified bidder.

The following conditions are part of this proposal:

1. BLM will provide technical assistance for the homeowner to secure the permit for the right to store water in the lake. Currently, there is no valid permit to store water behind Little Hyatt Dam. Additionally, the lake is partially on private land. There is no formal agreement between BLM and the private land owner to allow storage of water on private land, nor to use private land for recreation purposes.
2. BLM will make available any applicable, previous engineering studies on the dam to prospective new owners. Buyer is responsible for contracting and completing the repair work.
3. Buyer will pay all costs to repair the dam. Subsequent repair of the dam will be a condition in the deed of sale.
4. Buyer is to be deeded 2,000 feet from the high water mark (top of the dam) of all BLM land surrounding the dam, in addition to land underlying the Little Hyatt Dam lake occurring on federal land (approximately 5 acres) (all included as part of the 160 acres).
5. Buyer is responsible for obtaining any necessary agreements from private land owner on whose land approximately ½ of the lake resides. Buyer can negotiate with private land owner for purchase of the land (which is currently for sale). Buyer is responsible for any other actions that involve the sale of adjacent private lands.
6. BLM will pay the costs of the land sale including the appraisal, but not the costs typically borne by the purchaser.
7. A recreation easement for public access between the existing county road and the lake along the entire west side of the lake (along the road from the dam to the adjoining private land), and for public use (both surface and subsurface) of that area covered by the water of Little Hyatt Lake.
8. Buyer agrees to place a conservation easement on the property surrounding the lake such that no additional home sites are allowed, no further development other than one home site is allowed, and removal of trees is not allowed (with the exception of thinning for forest health).
9. Buyer agrees to a permanent easement to the BLM or the Pacific Crest Trail Association for that portion of the trail that would be involved in the sale of BLM land with the intention of maintaining public use of that portion of the Pacific Crest Trail.
10. A deed restriction for the 160 acres would include the prohibition of cattle grazing and limit the owners to one dog to reduce the disturbance to wildlife. No further subdivision would be allowed.

In 1998, BLM contracted a private engineering firm to complete a thorough study of the dam and the reservoir. The technical report and analysis, *Preliminary Report Engineering Study Little Hyatt Dam* (Otak 1998) is incorporated by reference to this EA. The study described a suggested methodology for repairing the dam. A summary of that proposal is:

- Obtain an easement or acquire adjacent private land.
- The reservoir would be dewatered during construction phase.
- The entire surface of the dam (both sides) would be sandblasted, cleaned, and the deteriorated surface areas would be patched.
- All debris and excavated material would be disposed of at a site within three (3) miles of the project on BLM land in T39S, R3E, Section 22.
- A concrete liner would be placed over the entire downstream face, and a composite geo-membrane would be placed over the entire upstream face.
- Obtain a water right for impoundment.

While other methods for repair may now be available or may now be feasible, the basic approach as described above is expected to remain similar. The effects of Alternative 2 (see Section H) are estimated based on the above approach to repair.

Estimated timeline for this alternative is:

Year 1—Begin NEPA (likely an EIS) to authorize sale of lands (160 acres). This includes an amendment

to the BLM Resource Management Plan (RMP) to sell the land as the parcels involved are not currently identified for disposal. Need for EIS is based on (1) size of acreage to be sold out of public ownership and anticipated controversy, and (2) designation of most of 160 acres as O&C lands, for which there is a legal requirement that there will be no net loss to the BLM's statewide O&C land base.
Year 3—Complete NEPA and begin the preparation for land sale.
Year 5—Offer land sale.
Year 7—Dam repairs can begin (after obtaining necessary design and permits).

Alternative 3 – Buttress the Dam with Rock

This alternative would reinforce the existing dam with a large quantity of boulders. Reinforcing would alleviate the concern for a catastrophic failure and extend the useful structural life of the dam an unknown period of time into the future but would not prolong its water tightness. The dam would still leak at the about same rate as it would under No Action, and would develop additional leaks that could not be sealed. Buttressing would not prevent future leaking and eventual draining down of the lake level. In the long term, the lake would recede as the leaking outflow becomes greater or equal to the inflow.

Buttressing would require approximately 6,000 cubic yards of large rocks obtained in a rock quarry to be transported approximately 8 miles to the Little Hyatt Dam site. These large rocks would be placed on both sides of the existing dam to reinforce the structure and provide enough mass to alleviate the concern for a catastrophic failure. The rock would provide reinforcement but not an impermeable barrier to water.

In order to place the rock boulders, a temporary access road approximately 100-200 feet in length would need to be built below the dam and starting at the existing road. An existing foot bridge providing access to the Pacific Crest Trail could need to be removed temporarily. Foot traffic on the Pacific Crest Trail would need to be rerouted several hundred feet downstream to avoid the work site. Several trees directly below the dam site would need to be felled and removed to allow access. After work is complete the bridge would be replaced, the trail sited back in the original location, and the temporary road obliterated.

The haul route between the quarry and the dam site would be subject to hauling restrictions limiting both load weight and wet weather hauling.

Estimated timeline for this alternative is:

Year 1—Complete NEPA and Decision Notice.
Year 3—Obtain allocated budget and prepare contract.
Year 4—Offer contract and complete buttress work.
Year 5—Complete restoration work.

Alternative 4 – Partially Remove the Dam (Proposed Action)

This alternative removes the liability and safety hazard while minimizing the costs related to sediments in the lake and minimizing the impact of losing of wetland. A partial removal of the dam retains a structure that is not a threat to collapse while functioning as a check-dam to hold back sediments and provide some water levels for wetland development adjacent to the remaining dam structure. A local engineering firm (Ciota Engineering of Ashland, Oregon) contracted by BLM determined the alternative to be feasible. The face of the dam will be reduced to about six feet from the base at the center of the dam, while an approximate three foot high face remains toward the nearest 1/3 of each of the abutments. The result is a pond/wetland of about three acres with water depths near the remaining dam structure of a maximum of four feet. The top (gate structure) of the right abutment will be removed, as will the canal structure behind it. The base of the right and all of the left abutments will remain standing.

Dam debris will be removed from the site. As in both Alternatives 3 and 5, downstream access to the dam would be required. A temporary access road approximately 100-200 feet in length would be built

below the dam, beginning at the existing road. All existing vegetation would be protected to the extent possible and disturbed ground will be revegetated and monitored for invasion of noxious weeds, which would be removed and/or treated appropriately.

Year 1—Complete NEPA and Decision Notice.
Year 3—Obtain allocated budget and prepare contract.
Year 4—Offer contract and complete partial removal.
Year 5—Complete restoration work.

Alternative 5 - Remove the Dam

This alternative would dismantle the dam and remove the structural support material in a controlled manner thus alleviating the potential for catastrophic collapse. The concrete and rebar structure would be cut in pieces or demolished using heavy equipment and/or blasting. The rubble from demolition along with excess lake bottom sediment would be disposed of in an abandoned rock quarry site. Efforts would be made to dispose of the material in the fall of the funding year. If weather or funds limit the operations, material may be stockpiled on site for up to two years before it could be removed to the permanent disposal site.

Stabilizing the sediment and controlling downstream turbidity would be key considerations in the full removal of the dam. Project Design Features (PDFs) listed below detail measures to reduce sediment dispersal. Downstream of the dam removal site, sediment collecting devices would be installed in the creek channel prior to the demolition phase, and would remain in place throughout the demolition and sediment stabilization work. Other sediment control measures would consist of using a soil stabilization polymer to help consolidate the sediment. This would aggregate the sediment into large pieces that can be trapped by filters. This alternative would restore the stream channel and re-vegetate the exposed lakebed and stream channel with native trees, shrubs and grasses. Follow up monitoring, replanting and weed control measures would take place if needed. Stabilization measures would include grading, shaping, and possibly the installation of riprap.

As in the buttressing alternative, downstream access to the dam would be required. A temporary access road approximately 100-200 feet in length would be built below the dam, beginning at the existing road. The foot bridge providing access to the Pacific Crest Trail would be removed temporarily. Foot traffic on the Pacific Crest Trail would be rerouted several hundred feet downstream to avoid the work site. Several trees directly below the dam site would be felled and removed to allow access. One dead tree in the lake just above the dam near the left abutment would need to be removed for safety considerations. Trees removed would be retained on site for use in restoration work in the stream channel. After dam removal and clean up the foot bridge would be replaced and the trail sited back in the original location.

Year 1—Complete NEPA and Decision Notice.
Year 3—Obtain allocated budget and prepare contract.
Year 4—Offer contract and complete removal.
Year 5—Complete restoration work.

Project Design Features

PDFs for Action Alternatives That Retain Dam Structure

- Implement all measures required under permits for the control of turbidity and sedimentation.
- Flows in Keene Creek downstream of the work area would not be allowed to drop lower than 1 cubic feet per second at any time unless reservoir inflows were less than that amount.
- Keene Creek flow would be diverted via a temporary pipeline around the project area for the extent of the project. Flow would be captured via a temporary diversion at a point upstream of the work area

and piped to a location downstream of the project area. At the point where flow is returned to the Keene Creek channel, the pipeline would release flow directly down a straight section of channel, at grade, with temporary placement of energy-dissipating riprap immediately under and downstream of the pipeline outfall. To contain construction generated turbidity and sediment a temporary cofferdam would be installed downstream in the channel. Turbid water originating from the construction site and contained behind the cofferdam would be pumped and treated or allowed to infiltrate into the soil in an approved location.

- Screened pumps, siphons, and intakes would be used to prevent the release of reservoir fish downstream into Keene Creek.
- The pipeline would remain in place during refilling of the reservoir, continuing to divert enough water around the reservoir to prevent Keene Creek from being dewatered downstream of the reservoir.
- Pipeline, temporary diversions, temporary riprap, etc. would be removed from Keene Creek and associated Riparian Reserves as the project is completed.
- The exposed reservoir bed and adjacent shore areas would be signed as closed to vehicles while the reservoir is dewatered to discourage disturbance.
- The work area including the reservoir would be closed to livestock grazing until the project is completed.
- Seeding and planting of vegetation and installing appropriate erosion control measures would be used as needed to stabilize and restore areas where ground disturbance has occurred within riparian reserves. This would include installing temporary best management practices (BMP's) that would contain off-site movement of sediment during construction activities, particularly during precipitation events. Such measures would include straw wattles, silt fences, or other perimeter BMP's and ground cover such as mulch, straw, tarps.
- All waste materials would be disposed of at an appropriate location off site.

PDFs for Partial or Full Removal Alternatives

- Implement all measures required under permits for the control of turbidity and sedimentation.
- Flows in Keene Creek downstream of the work area would not be allowed to drop lower than 1 cubic feet per second at any time unless reservoir inflows were less than that amount.
- Keene Creek flow would be diverted via a temporary pipeline or above ground constructed channel around the project area for the extent of the project. Flow would be captured via a temporary diversion at a point upstream of the work area and piped to a location downstream of the project area. At the point where flow is returned to the Keene Creek channel, the pipeline would release flow directly down a straight section of channel, at grade, with temporary placement of energy-dissipating riprap immediately under and downstream of the pipeline outfall. To contain construction generated turbidity and sediment a temporary cofferdam would be installed downstream in the channel. Turbid water originating from the construction site and contained behind the cofferdam would be pumped and treated or allowed to infiltrate into the soil in an approved location.
- Screened pumps, siphons, and intakes would be used to prevent the release of reservoir fish downstream into Keene Creek.
- Pipeline, temporary diversions, temporary riprap, etc. would be removed from Keene Creek and associated Riparian Reserves as the project is completed.
- The exposed reservoir bed and adjacent shore areas would be fenced to discourage vehicle and livestock disturbance during recovery of the site.
- Seeding and planting of vegetation and installing appropriate erosion control measures would be used as needed to restore the former lake bed and areas where ground disturbance has occurred within riparian reserves. This would include installing temporary best management practices (BMP's) that would contain off-site movement of sediment during construction activities, particularly during precipitation events. Such measures would include straw wattles, silt fences, or other perimeter BMP's and ground cover such as mulch, straw, tarps.

- All sediment, concrete and other materials disturbed at the dam and within the reservoir would be disposed of at an appropriate location off-site.

PDFs for all action alternatives (2-5)

<u>To minimize the spread of noxious weeds</u>

- Mechanical equipment (e.g. backhoes, loaders, etc.) would be power washed and cleaned of all soil and vegetative material before entering the project area, including quarry sites. The Contractor is responsible for this work.
- Seeding and planting of native plants and/or seeding with an approved seed mix on highly disturbed soil (e.g., landings, new road cut and fill slopes, etc.) and newly exposed sediment will occur. The BLM is responsible for this work but it is dependent on available funding and workforce.
- Noxious weeds will be inventoried and treated by BLM. Inventories will occur the first three years after project completion and then periodically thereafter. Treatments will be scheduled by priority and will occur based on the potential of the weed population to cause economic or environmental harm or harm to human health. These subsequent weed inventories and treatments would occur depending on available funding and workforce.
- All quarries used will be surveyed for noxious weeds. All noxious weeds will be eradicated before quarry development or use of material. The BLM is responsible for this work but it is dependent on available funding and workforce.

<u>To reduce sediment transport</u>

Sediment control devices would be installed for both alternatives. These devices might include, but would not necessarily be limited to, the following:

- Diversion channel located between the road and the stream. The purpose of this would be to allow sediment collection outside the natural stream channel. The diversion would be constructed of straw bales, plastic sheeting, and jute sediment collection mats. Two gates would permit switching the flow between the natural channel and the diversion to allow the sediment collection mats to be changed in the absence of flowing water.
- Temporary check dams. Rock, wood, or natural fiber (straw, wood chips, or similar material) check dams may be placed in the channel in the former lakebed. The purpose of these would be to slow the flow velocity through the newly exposed lake sediments. These dams are expected to be up to one foot high.
- Jute mesh mats. Mats of natural jute fiber mesh would be placed on the exposed lake sediments to discourage erosion of the soil surface and encourage the establishment of vegetation. New material and/or recycled mats from the sediment collection devices would be used.
- Straw mulch. Loose straw might be hand-applied to areas of exposed soil to aid in stabilizing the sediments. Certified weed-free straw would be used.

<u>To reduce effects to northern spotted owls</u>

- Activities (such as tree felling, construction, hauling on roads not generally used by the public, muffled blasting) that produce loud noises above ambient levels will not occur within specified distances of any documented or projected owl site between March 1 and June 30 (or until two weeks after the fledging period) – unless protocol surveys have determined the activity center to be not occupied, non-nesting, or failed in their nesting attempt. The distances may be shortened if significant topographical breaks or blast blankets (or other devices) muffle sound traveling between the work location and nest sites.

- The BLM has the option to extend the restricted season until September 30 during the year of activity, based on site-specific knowledge (such as a late or recycle nesting attempt) if project would cause a nesting spotted owl to flush. (See disturbance distance).

- Burning will not take place within 0.25 miles of spotted owl sites (documented or projected) between 1 March and 30 June (or until two weeks after the fledging period) unless substantial smoke will not drift into the nest stand.

- Mandatory Restriction Distances to Avoid Disturbance to Spotted Owl Sites

• Activity	• Buffer Distance Around Owl Site
• Heavy Equipment (including non-blasting quarry operations)	• 105 feet
• Chain saws	• 195 feet
• Impact pile driver, jackhammer, rock drill	• 195 feet
• Small helicopter or plane	• 360 feet*
• Type 1 or Type 2 helicopter	• 0.25 mile*
• Blasting; 2 lbs of explosive or less	• 360 feet
• Blasting; more than 2 lbs of explosives	• 1 mile

*If below 1,500 feet above ground level

- Above-ambient noises further than these distances from spotted owls are expected to have ether negligible effects or no effect to spotted owls. The types of reactions that spotted owls could have to noise that the Service considers to have a negligible impact, include flapping of wings, the turning of a head towards the noise, hiding, assuming a defensive stance, etc. (USFWS 2003).

Comparison of Estimated Costs to Implement Alternatives for Little Hyatt Dam

	No Action	Community Alternative Repair		Buttress	Partial Remove	Full Remove
	BLM	BLM	Private	BLM	BLM	BLM
Sediment Test[1]			$10,000	$10,000	$10,000	$10,000
Lower Water Level and Maintain Stream Flow Downstream			$121,305	$121,305	$121,305	$121,305
Maintain Siphon System	$15,000/yr[2]					
Construction/Destruction[3]			$571,963	$457,266	$166,695	$313,109
Site Restoration	$62,000[5]			$62,000[5]	$44,000	$62,000
Land Sale Costs		$75,000	$25,000			
Total Costs	$15,000/yr	$75,000	$728,268	$650,571	$342,000	$506,414

[1]Required for any in-stream work. Common to all action alternatives.
[2]Required for the life of the dam if no action is taken to repair the dam. Annual drawdown and inspection is about a 10 day process. This cost would continue for all action alternatives until the action is complete.
[3]All costs for construction or demolition are based on 2009 estimates. Does not include administrative costs or contingency costs.
[4]This cost is based on the current government estimate of $905,557 for construction costs with a 33% reduction "saved" if a contract does not involve federal funds and bureaucracy. Also, the cost of the loss of value to the public for 160 acres of public land is not included as a "cost".
[5]Cost for future restoration. Would not occur until dam failure. Current cost not adjusted for inflation.

H. ENVIRONMENTAL CONSEQUENCES

Soil, Fish and Water Resources

Little Hyatt Reservoir is located on Keene Creek, a major tributary of the Jenny Creek Watershed in the Upper Klamath Subbasin and is one of a chain of reservoirs in the Keene Creek Subwatershed. Hyatt Reservoir Dam impounds flow from 7,373 acres of upper Keene Creek. Keene Creek Reservoir lies approximately 2.5 miles downstream of Little Hyatt Reservoir. From Keene Creek Reservoir, water is transported to the Bear Creek Watershed (a tributary of the Rogue River) through tunnels and a pipeline down to Green Springs Power Plant, then on to Emigrant Creek for storage in Emigrant Reservoir and dispersal through the Talent Irrigation District canal system. The transbasin conveyance of water from Keene Creek Reservoir to Emigrant Creek normally captures 100 percent of the flow of Keene Creek. Input to the downstream Jenny Creek system via Keene Creek only occurs during flood events or instances where the transport system into Emigrant is shut down.

Flow into the Little Hyatt Reservoir is controlled by Bureau of Reclamation and TID-regulated releases from Hyatt Dam, which typically occur between April and September, but sometimes begin as early as February. Additional flow comes from Burnt Creek to the north and two adjacent smaller drainages which enter Keene Creek and Little Hyatt Reservoir from the west. Normal releases from Hyatt Dam are 20 to 30 cubic feet/second (cfs).

Water levels in Keene Creek downstream of the Little Hyatt Dam fluctuate throughout the year, as the Bureau of Reclamation and Talent Irrigation District control the flow of Keene Creek for delivery of irrigation water to the Rogue Valley, and for the production of hydroelectric power. This typically results in high base flows during the summer irrigation season and low flows in winter as Hyatt Reservoir is filled This reversed hydrograph impacts the stream system and aquatic organisms by maintaining higher base flows in the summer and attenuating winter peak flows. Keene Creek between Hyatt and Keene Creek Reservoirs is no longer connected to its floodplain. Floodplains provide myriad benefits to a stream system including flood dissipation, sediment capture, nutrient inputs, and slow-water habitats fish and other aquatic organisms use during high flow events.

Keene Creek below Little Hyatt Dam is on the Oregon Department of Environmental Quality 303d list for summer temperature, with severe stream temperature problems. Little Hyatt Reservoir is estimated to contribute 1.5 degrees Fahrenheit stream heating that would not otherwise occur if Keene Creek was in its historic channel through the reservoir area and if riparian vegetation was similar to adjacent sections of Keene Creek. Stream temperature data collected in Keene Creek at sites above and below (1,600 feet apart) Little Hyatt Reservoir during the summer of 1998 indicated that July and August daily maximum stream temperatures increased an average of 2 degrees Fahrenheit as Keene Creek passed through the reservoir. This computes to a 6.6 degrees Fahrenheit/mile rate of increase. In comparison, a stream temperature increase of 2.7 degrees Fahrenheit was observed in the 9,000 feet section of Keene Creek from Little Hyatt Reservoir up to Hyatt Dam, a 1.6 degrees Fahrenheit/mile rate of increase.

The BLM in cooperation with the Forest Service, DEQ, and the Environmental Protection Agency is implementing the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (USDA and USDI 1999). Under the Protocol, the BLM will protect and maintain water quality where standards are met or surpassed, and restore water quality limited waterbodies within their jurisdiction to conditions that meet or surpass standards for designated beneficial uses. The BLM will also adhere to the State Antidegradation Policy (OAR 2005; 340-041-0004) under any proposed actions. The DEQ has not determined the Total Maximum Daily Load (TMDL) for the Jenny Creek Watershed (including Keene Creek). The BLM submitted a water quality restoration plan (WQRP) for BLM-administered lands in the Jenny Creek Watershed to DEQ in May 2008. Recovery goals focus on protecting areas where water quality meets standards and avoiding future impairments of these areas, and restoring areas that do not currently meet water quality standards. Necessary federal and state permits would be obtained for any proposed instream work.

In 1997, accumulated sediment behind the reservoir was sampled (OTAK 1997) and analyzed (AGRA 1997). Four (4) samples were analyzed to detect semivolatile organic compounds (SVOCs), priority pollutant metals, chlorinated herbicides, pesticides (polychlorinated biphenyls (PCBs)), nitrogen as ammonia, nitrogen as nitrite, nitrate, and total phosphorus. Concentrations of metals detected in sediments appear similar to background concentrations of metals in Oregon soils. No SVOCs, chlorinated herbicides, pesticides or PCBs were detected. Nitrogen as ammonia and phosphorus concentrations are high relative to what would be expected for these constituents in surface soils, but may not be unusual for organic sediments. Ammonia concentrations exceeding nitrate concentrations would be expected in an anaerobic, highly organic environment, typical of lake-bottom sediments.

Available information indicates that Little Hyatt Reservoir has been maintained at full pool since the time it was constructed over 80 years ago. During that time, fine sediment estimated to range from several feet to several yards deep has accumulated within the reservoir. As the water level within the reservoir drops during any drawdown operations, Keene Creek is expected to erode through these sediments as flow is reestablished through the previously submerged valley bottom. The reservoir is expected to become turbid with suspended sediments prior to the start of proposed activities. Drawdown of the reservoir is may to elevate turbidity levels in Keene Creek above State water quality standards, even with treatment mechanisms in place. As an emergency activity, the standard may be waived for 45 days by the Oregon Department of Environmental Quality. Such waivers are available for emergency actions only. As such, the proposals under consideration here must meet water quality standards. As a consequence of sediment capture by the dam, the stretch of Keene Creek between Little Hyatt and Keene Creek reservoirs is sediment starved, likely allowing the stream channel to widen compared to pre-dam conditions. Given the uncertainty of how much may be added, the potential effect to this section of creek is unknown.

The impoundment behind the Little Hyatt Dam forms a small reservoir and wetland where a meandering stream once existed. The impact of this change on native aquatic organisms is unknown; however in general, the flow regime is highly altered, migration has been restricted, spawning habitat limited, water temperatures have increased, and non-native species have probably been favored over native species.

The dams in this reservoir chain are impassable to upstream migration of fish and many other aquatic organisms. Downstream migration is limited to occasional reservoir overflow events. Downstream migrations within the chain of reservoirs may not be critical due to the unnatural conditions that exist in this section of the Keene Creek system. However, non-native fish that are spilled over Keene Creek Reservoir could negatively affect aquatic ecosystems in lower Keene Creek and Jenny Creek. The dams restrict seasonal movement of aquatic organisms that would normally seek cooler habitats in the summer and areas of reduced flow in the winter. Dams also restrict access to spawning habitat by blocking upstream and downstream movement.

Water temperature is a limiting factor for salmonids and other cold water fishes and summer temperatures in Keene Creek exceed those that are generally accepted for salmonids. Introduced species that are more tolerant of these warmer temperatures may out compete physiologically stressed native species for food and space.

Fish stocking practices designed to enhance sport fishing in this lake chain have altered the structure of native aquatic communities by introducing both native and non-native sport fish species. The effects of introduced species in this watershed are unknown however, competition for resources, spawning habitat, and mates are all possible consequences of species introductions.

Both native and non-native fish inhabit the Little Hyatt Reservoir and Keene Creek between Hyatt and Keene Creek Reservoirs. Originally, native fish in this system included redband trout *(Oncorhynchus mykiss)*, speckled dace *(Rhinichthys osculus)*, and Klamath small-scale suckers *(Catastomus rimiculus)*. However, the genetic integrity of redband trout *(O. mykiss)* may be compromised due to the long-term stocking of rainbow trout *(O. mykiss)* in this system and the potential for interbreeding between the two

subspecies. In addition, recent (2007) sampling by BLM found only speckled dace in Keene Creek between Little Hyatt and Keene Reservoirs. Oregon Department of Fish and Wildlife (ODFW) stocks the reservoirs in this system with native and non-native game fish species. Little Hyatt Reservoir has historically been stocked with rainbow trout *(O. mykiss)*. Hyatt Reservoir is also stocked with rainbow trout *(O. mykiss)* and largemouth bass (*Micropterus salmoides*). Stocking practices in Hyatt Reservoir are important to Little Hyatt because the systems are connected and there is occasional downstream migration from Hyatt Reservoir.

Fish salvage efforts completed before the emergency draw down in fall 2007 captured 13,755 fish: 184 rainbow trout, 10,897 speckled dace (*Rhinichthys osculus*), 425 brown bullhead, and 2,307 golden shiners (DOI BLM 2007). This sampling effort continued for six days with a declining trend in fish capture per net hour and although there is no way of knowing how many fish remained after this sampling effort it is expected that the majority of fish were successfully removed. Prior to this the Little Hyatt Reservoir was sampled regularly to assess fish populations. Through information collected during gillnet studies, the following species have been confirmed in Little Hyatt Reservoir: rainbow trout (*O. mykiss*), largemouth bass (*Micropterus salmoides*), brown bullhead *(Ictalurus nebulosus*), black crappie (*Pomoxis negromaculatus*), golden shiners (*Notemigonus crysoleucus*), and brook trout (*Salvelinus fontinalus*). Brook trout used to be stocked in Hyatt Reservoir and since this practice has stopped, D. Haight, ODFW biologist believes there are few if any brook trout in the system. Small numbers of bluegill sunfish (*Lepomis macrochirus*) are expected in Little Hyatt Reservoir because they are known to exist in Hyatt Reservoir. Pumpkinseed *(Lepomis gibbosus)* and brown bullhead *(Ictalurus nebulosus*) are known to occur in Keene Creek Reservoir. Rainbow trout (*O. mykiss*), brook trout (*S. fontinalus*), and speckled dace *(R. osculus)* are thought to occur in Keene Creek, between Little Hyatt Reservoir and Keene Creek Reservoir however, recent surveys conducted by BLM found only speckled dace on BLM land within this section.

Soil, Fish, and Water Effects of Alternative 1 – No Action

Under the no action alternative, the Little Hyatt Dam would probably weather and decay over time through natural processes. In the short term, the dam would continue to trap sediment, maintain stream temperatures and would continue to restrict fish passage. Over the long term, the dam would rupture and/or collapse, the impoundment would disappear, sediment would be released, temperatures would remain the same, and limited fish passage would be restored. However, restoration of fish passage would probably not significantly improve resident fish conditions in this artificial system due to the presence of non-native fish species and other impoundments located both up and down stream.

As the dam deteriorates, sediments that have been captured by the dam would be carried downstream. If the dam were to deteriorate slowly, small pulses of sediment would be released. If a sudden failure occurs a large volume of water and sediment would be carried downstream within a short period of time. This sudden release would also result in downstream channel erosion and other impacts to the floodplain and riparian area. Depending on the time of year and how much of the sediment moves at once, eggs and juvenile fish could be negatively impacted. Approximately two miles of Keene Creek would be impacted by this sediment before Keene Creek Reservoir traps the remaining suspended sediments. Whether the dam fails gradually over time or all at once would also determine sediment impacts to Keene Creek Reservoir. A sudden flush of sediment from a sudden failure of little Hyatt Dam would likely result in a need for sediment removal from Keene Creek Reservoir. Inflows to Keene Creek Reservoir would overflow the dam structure and travel down Keene Creek into Jenny Creek, being delivered into Iron Gate Reservoir on the Klamath River.

Stream temperature conditions would remain unchanged. Because management of flows and associated reservoir levels and stream routing would not change under the No-Action Alternative, stream and riparian condition would continue to be dictated by processes unrelated to the project implementation. Little Hyatt Reservoir would continue to contribute approximately 1.5 degrees Fahrenheit to maximum stream temperatures in Keene Creek as a result of implementation of this alternative, for the short-term.

Conditions would change over the long-term as the dam structure failed. In the long term, after the eventual failure of the dam, summer stream temperatures between Little Hyatt and Keene Creek dams would gradually be reduced up to 1.5 degrees Fahrenheit as a natural channel recovers and riparian vegetation once again begins to provide shade. Implementation of this alternative is anticipated to have no short-term effect on water quality issues, as conditions would remain essentially unchanged. A resulting reduction in stream heating is expected as the channel and associated riparian vegetation become reestablished. Effects to stream temperature as a result of Little Hyatt Reservoir would not extend downstream of Keene Creek Reservoir due to the current flow management regime.

All of the dams in this chain of reservoirs are impassable to upstream migration though downstream migration occurs when the reservoirs overflow. Overflow events on Keene Creek Reservoir are infrequent but could allow non-native fish to become established downstream, competing with native fish lower down in the system. Once the dam degrades, upstream and downstream passage would be restored. While restoring fish passage has a theoretically positive effect on the system it is complicated by the ensuing redistribution of non-native species throughout Keene Creek, above Keene Creek Reservoir.

The cumulative effects of non-native fish species entering the Keene Creek and Jenny Creek systems are not completely known. Keene Creek and potentially Jenny Creek may not support these non-native species; however, they may survive to compete with native fish for resources. Once established, non-native fish would compete with native fish for food and habitat, increasing stresses on native fish. Golden shiners *(Notemigonus crysoleucas)* and brown bullhead *(Ictalurus nebulosus*) have been reported in Jenny Creek and an analysis of the redband trout in Jenny Creek indicates that some genetic mixing has occurred between stocked rainbow trout *(O. mykiss)* and redband trout *(O. mykiss)* (Currens 1992). Hybridization between hatchery rainbow trout *(O. mykiss)* and native redband trout *(O. mykiss)* is possible in this system whether the dam stands or not. Where hybridization occurs, it is expected to have negative consequences for the redband trout.

Soil, Fish, and Water Effects of Alternative 2—Community Repair

Apart from any emergency drawdown of the reservoir, water levels in Little Hyatt Reservoir remain relatively constant throughout the year and this has allowed riparian and wetland vegetation to become established in and around the reservoir, allowing the reservoir to function more like a natural lake. During implementation of this alternative, there would be short-term disturbance to the aquatic community in the reservoir. Dewatering the reservoir and piping water around the dam could result in loss of this riparian vegetation as normally inundated areas could dry out. The above-ground portion of many reeds, rushes, and sedges around the periphery of the reservoir are expected to die back/go dormant depending on the actual implementation timeframe; it is expected these species would resprout the following spring and summer. Impacts are anticipated to be similar to what would be experienced by many wetland areas in a severe drought. Downstream habitat and organisms below the work area should not be substantially impacted by piping water around the dam.

During repair activities, Keene Creek flow would be routed through a pipeline around the work area. Stream temperature impacts caused by the pipeline are anticipated to be similar to those caused by the reservoir, so no change is anticipated. In the long term, the reservoir would continue to function as it has prior to the project. No long term changes in water quality would occur.

Because management of flows, spillway elevation, and therefore associated reservoir levels and stream routing would not change as a result of completion of this project, stream and riparian condition would continue to be dictated by processes unrelated to this project. Little Hyatt Reservoir would continue to contribute approximately 1.5 degrees Fahrenheit to maximum stream temperatures in Keene Creek indefinitely as a result of implementation of this alternative. Impacts to stream temperature as a result of Little Hyatt do not extend downstream of Keene Creek Reservoir due to the current flow management regime.

Under this alternative it is assumed that the repair scenario in the engineering report (OTAK, 1998) would be used to repair and maintain Little Hyatt Reservoir. The dam would continue to restrict aquatic connectivity as a total barrier to upstream and downstream migration except when water over-tops the dam allowing for passive downstream migration. Implementation of this alternative would result in short-term disturbance to the aquatic community within and downstream of the reservoir.

Repairing the existing structure would likely be accomplished using heavy equipment accessing the dam via a temporary road on the downstream side. Instream work and groundwater flow on the downstream side of the dam could generate sediment and turbidity that would be transmitted downstream. The sediment would negatively impact the 2-mile reach of Keene Creek between Little Hyatt Dam and Keene Creek Reservoir and would have short-term negative impacts on spawning, rearing, and feeding. Turbidity would also negatively impact this reach of Keene Creek and could be transmitted through Keene Creek Reservoir, all the way down to Emigrant Lake, or Jenny Creek if water passes Keene Creek Dam. This effect would be minimized or eliminated given correct implementation of the PDF's.

Direct effects to fish include reduced opportunities to feed and potential avoidance of disturbed areas altogether during the period of elevated turbidity. Indirect effects include short term habitat modification of the downstream reaches, as any mobilized sediments would be stored here until flushing flows sort and distribute sediment. This could potentially lead to decreased production of aquatic macro-invertebrates, and hence a reduction in food supply to fish present. Adherence to Project Design Features should help to minimize these sediment related impacts.

Maintaining the dam as a sediment trap could be a long term benefit of this alternative. A benefit of retaining the existing structure would be continued separation of the non-native fish species that currently occupy Little Hyatt Reservoir from downstream habitats. The physical conditions in this system are driven by irrigation needs and power supply while biological conditions are the result of stocking practices and the downstream movement of introduced fish and other aquatic organisms. All of the dams in this chain of reservoirs are impassable to upstream migration though downstream migration occasionally occurs when the reservoirs overflow. Overflow events are infrequent but potentially significant as these fish become established and compete with native fish. Stocking practices in this chain of reservoirs concentrated on developing and maintaining a sport fishery. Some non-native species have been introduced by stocking practices and others have been introduced by accident (bait fish and un-official introductions).

Movement of non-native fish in this system will occur with or without the dams; however, less readily with the dam in place. Sensitive species of resident fish in the Keene and Jenny Creek systems are currently being impacted by the introduction of these non-native fish.

Implementation of this alternative is anticipated to have a minimal negative short-term effect on ACS objectives and water quality issues as sediment and turbidity move downstream. Because management of flows and associated reservoir levels and stream routing will not change as a result of implementation of this alternative, stream and riparian condition will continue to be dictated by processes unrelated to this project. Little Hyatt Reservoir will continue to contribute approximately 1.5° F. to maximum stream temperatures in Keene Creek as a result of implementation of this alternative. Impacts to stream temperature as a result of Little Hyatt do not extend downstream of Keene Creek Reservoir due to the current flow management regime.

An additional effect beyond those related to dam repair and associated impacts would be the eventual development of the former BLM parcel. It is anticipated that a single family structure would be constructed along with roads and other features. It is impractical to speculate on the nature and location of this disturbance, however short and long term impacts resulting from ground disturbance and altered runoff patterns are expected. These effects would be magnified if these activities were located within the current riparian reserve.

Soil, Fish, and Water Effects of Alternative 3 - Buttress

Apart from any emergency drawdown of the reservoir, water levels in Little Hyatt Reservoir remain relatively constant throughout the year and this has allowed riparian and wetland vegetation to become established in and around the reservoir, allowing the reservoir to function more like a natural lake. During implementation of this alternative, there would be short-term disturbance to the aquatic community in the reservoir. Dewatering the reservoir and piping water around the dam could result in loss of this riparian vegetation as normally inundated areas could dry out. The above-ground portion of many reeds, rushes, and sedges around the periphery of the reservoir are expected to die back/go dormant depending on the actual implementation timeframe; it is expected these species would resprout the following spring and summer. Impacts are anticipated to be similar to what would be experienced by many wetland areas in a severe drought. Downstream habitat and organisms below the work area should not be substantially impacted by piping water around the dam.

During buttressing activities, Keene Creek flow would be routed through a pipeline around the work area. Stream temperature impacts caused by the pipeline are anticipated to be similar to those caused by the reservoir, so no change is anticipated. In the long term, the reservoir would continue to function as it has prior to the project. No long term changes in water quality would occur.

Because management of flows, spillway elevation, and therefore associated reservoir levels and stream routing would not change as a result of completion of this project, stream and riparian condition would continue to be dictated by processes unrelated to this project. Little Hyatt Reservoir would continue to contribute approximately 1.5 degrees Fahrenheit to maximum stream temperatures in Keene Creek indefinitely as a result of implementation of this alternative. Impacts to stream temperature as a result of Little Hyatt do not extend downstream of Keene Creek Reservoir due to the current flow management regime.

Under this alternative, large riprap would be used to buttress the dam and maintain Little Hyatt Reservoir. The buttressed dam would continue to restrict aquatic connectivity as a total barrier to upstream and downstream migration except when water over-tops the dam allowing for passive downstream migration. Implementation of this alternative would result in short-term disturbance to the aquatic community within and downstream of the reservoir.

Adding riprap to the existing structure would be accomplished using heavy equipment accessing the dam via a temporary road on the downstream side. Instream work and groundwater flow on the downstream side of the dam could generate sediment and turbidity that would be transmitted. The sediment would negatively impact the 2-mile reach of Keene Creek between Little Hyatt Dam and Keene Creek Reservoir and would have short-term negative impacts on spawning, rearing, and feeding. Turbidity would also negatively impact this reach of Keene Creek and could be transmitted through Keene Creek Reservoir, all the way down to Emigrant Lake, or Jenny Creek if water passes Keene creek Dam. This effect would be minimized or eliminated given correct implementation of the PDF's.

Direct effects to fish include reduced opportunities to feed and potential avoidance of disturbed areas altogether during the period of elevated turbidity. Indirect effects include habitat modification of the downstream reaches, as the majority of mobilized sediments would be stored here until flushing flows sort and distribute sediment. This could potentially lead to short term decreases in aquatic macro-invertebrate production, and hence a reduction in food supply to fish present. Adherence to Project Design Features should help to minimize these sediment related impacts.

Maintaining the dam as a sediment trap could be a long term benefit of this alternative although it is not clear if the riprap will act as a fine sediment filter or if sediment will flow through the buttress material as the concrete dam deteriorates. A benefit of buttressing the existing structure would be continued separation of the non-native fish species that currently occupy Little Hyatt Reservoir from downstream habitats. The physical conditions in this system are driven by irrigation needs and power supply while

biological conditions are the result of stocking practices and the downstream movement of introduced fish and other aquatic organisms. All of the dams in this chain of reservoirs are impassable to upstream migration though downstream migration occasionally occurs when the reservoirs overflow. Overflow events are infrequent but potentially significant as these fish become established and compete with native fish. Stocking practices in this chain of reservoirs concentrated on developing and maintaining a sport fishery. Some non-native species have been introduced by stocking practices and others have been introduced by accident (bait fish and un-official introductions). As the dam degrades under the riprap, it is likely that limited passage would be restored. This will allow some movement of aquatic organisms in the system, potentially contributing to the establishment or redistribution of non-native organisms.

Implementation of this alternative is anticipated to have a minimal negative short-term effect on ACS objectives and water quality issues as sediment and turbidity move downstream. Because management of flows and associated reservoir levels and stream routing will not change as a result of implementation of this alternative, stream and riparian condition will continue to be dictated by processes unrelated to this project. Little Hyatt Reservoir will continue to contribute approximately 1.5° F. to maximum stream temperatures in Keene Creek as a result of implementation of this alternative, at least in the short-term. Impacts to stream temperature as a result of Little Hyatt do not extend downstream of Keene Creek Reservoir due to the current flow management regime.

Soil, Fish, and Water Effects of Alternative 4—Partial Removal

During removal of a portion of the dam, flow in Keene Creek would be routed around the work area through a pipeline. Once work is completed and flow is restored through a portion of the reservoir bottom, sediment would be mobilized and turbidity levels would increase as the stream creates a channel through the former lakebed. Quantities of sediment and levels of turbidity resulting from this activity are unknown, but could be substantial. State water quality standards for turbidity may be exceeded for an indeterminate period following restoration of flow to the channel. The turbidity and sedimentation would be substantially less than would occur with a catastrophic failure of the structure, although the impacts would be extended over a longer period of time. A portion of the mobilized sediment would be retained in the remaining structure; however a temporary increase in turbidity is likely as fine particles remain in suspension and pass over the dam. Erosion control and restoration activities as outlined previously would be implemented with the intent of preventing most of this sediment from being transported. As vegetation recolonizes the site, erosion and increases in turbidity would be substantially reduced. For the first few days after flow is restored through a portion of the dewatered reservoir bottom, turbid water will be present from Little Hyatt Reservoir down through the Keene Creek Reservoir at Highway 66. Because of the nature of this sediment and the relatively short amount of time for flow to cycle through Keene Creek Reservoir, little of this turbidity is expected to settle out. The increase in turbidity in Keene Creek Reservoir is dependent on numerous factors such as effectiveness of restoration activities, intensity of any precipitation events, and ultimately the amount of eroded material. If concentrations are substantial, the route of the turbid water has three possible paths depending on Bureau of Reclamation/Talent Irrigation District operations at Keene Creek Reservoir:

1. Under normal operations, the water would be piped to Green Springs Power Plant on Emigrant Creek, passing through the turbine to be released into Emigrant Creek and then down Emigrant Creek into Emigrant Reservoir. Upon entering Emigrant Creek, the turbidity would be diluted somewhat, but that effect is not expected to be great due to the relatively low natural flows in Emigrant Creek. The turbidity would be expected to be plainly visible until delivery into Emigrant Reservoir; increases in measurable turbidity in Emigrant Reservoir could be expected, but potential levels are unknown.
2. Because of sediment and turbidity levels, Bureau of Reclamation could opt to bypass the water to prevent damage to the Green Springs Power Plant facilities, and instead release flows out of Keene Creek Reservoir through pipeline into the Tyler Creek Wasteway, a tributary to Emigrant Creek. The delivery of turbid water to Emigrant Creek and Reservoir would not be expected to be substantially different than under the first scenario, above. A slightly shorter length of Emigrant Creek would be affected, but Tyler Creek and the Wasteway would be affected.

3. If flows were not fully dealt with under the two scenarios above, the turbid water would flow over the spillway at Keene Creek Reservoir, where it would travel down Keene Creek into Jenny Creek and be delivered into Iron Gate Reservoir on the Klamath River. The turbidity would be diluted somewhat by other Keene Creek tributaries and Jenny Creek; however, this would not likely exceed 50% dilution due to the otherwise low flows in these streams at that time of year.

Silt-sized and larger sediments mobilized from the former lakebed and those transported by the stream from upslope sources would accumulate behind the remaining structure over a period of years. Once the accumulated sediment reaches a maximum capacity behind the dam sediment transport would be unimpeded through the site. Much of the sediment would be deposited on the bed and banks of Keene Creek, with the remainder eventually making its way into Keene Creek Reservoir.

As soon as streamflow is restored through the work area, the stream would begin a natural recovery process. Mulching all exposed sediment and seeding with native grasses and sedges would provide some initial surface stability to the soil; seeds from wetland tree and shrub species would naturally establish along the developing channel. Using restoration funding, BLM would plant additional vegetation along the stream to supplement natural reproduction on the site, and could add woody debris to provide some in-channel structure. Exclosure fencing to discourage OHV and livestock access would be installed as soon as possible to allow initial recovery to occur unimpeded by additional soil disturbance. Turbidity and instream sedimentation levels would likely decrease rapidly following the first rainy season, and continue to decrease until the site stabilizes.

Although stream and riparian conditions in Keene Creek would still be heavily influenced by processes unrelated to this project (transfer of water between Hyatt and Keene Creek Reservoirs), partial removal of the dam and reestablishment of the creek through the former reservoir bed would result in long-term improvement to riparian vegetation, channel conditions, and water quality within the project area. As the reservoir fills with sediment and the water depth decreases, colonization with aquatic and riparian vegetation will hasten the development of what will eventually become a wetland. Wetlands are effective in trapping additional sediment and nutrients, so water quality may realize an improvement over time. The elevated increase in stream temperature contributed by Little Hyatt would be expected to remain constant.

Alternative 4 would result in short-term high levels of sediment and turbidity, relatively unchanged stream temperatures, and marginal long term improved water quality. Sediment and turbidity levels could exceed State standards during and after the actual work period depending on the effectiveness of erosion control measures and would continue at a reduced level until the stream channel becomes established and stabilizes in the former reservoir bottom behind the remaining portion of the dam. These sediment and turbidity levels would likely displace or kill most of the fish in the stream reach between the Little Hyatt and Keene Creek Reservoirs. Sediment deposition would occur along this stream reach resulting in short-term decreased production of aquatic macro-invertebrates, and hence a reduction in food supply to juvenile fish. Spawning habitat for any remaining fish species would also be reduced until flushing flows redistribute the sediment. Elevated turbidity levels between Keene Creek Reservoir and Emigrant Reservoir would reduce opportunities to feed and potential avoidance of disturbed areas altogether during the period of elevated turbidity. It is critical that this turbid water is not released into the Jenny Creek system below Keene Creek Dam where small populations of native special status species reside, although BLM has no control over releases from Keene Creek Reservoir. Temperatures would probably remain static through the Little Hyatt Reservoir area.

Partial removal of the dam would reestablish downstream fish passage as overflow would be continuous. The non-native and hatchery reared downstream migrants would negatively affect native fish in the Keene and Jenny Creek systems through competition for food and habitat, increased stress, and genetic dilution. Some non-native introductions have already been documented in Jenny Creek, including golden shiners *(Notemigonus crysoleucas)* and brown bullhead *(Ictalurus nebulosus*). An analysis of the redband trout in Jenny Creek indicates that some genetic mixing has occurred between stocked rainbow trout *(O. mykiss)*

and redband trout *(O. mykiss)* (Currens 1992). Upstream migration would still be restricted at the partial dam site.

Hybridization between hatchery rainbow trout *(O. mykiss)* and native redband trout *(O. mykiss)* is possible in this system whether the dam stands or not. Where hybridization occurs, it is expected to have negative consequences for the redband trout. Even though the system has been negatively influenced by non-native introductions, long-term improvements in species composition could be expected with improved fish passage and cessation of non-native stocking.

Soil and Water Effects of Alternative 5 – Dam Removal

During dam removal activities, flow in Keene Creek would be routed around the work area through a pipeline. Once work is completed and flow is restored through the reservoir bottom and the former dam location, sediment would be mobilized and turbidity levels would increase as the stream creates a channel through the disturbed area. Quantities of sediment and levels of turbidity resulting from this activity are unknown, but could be substantial, with potential displacement of several thousand cubic yards of sediment and turbidities substantially above background levels. An erosion control and restoration plan would be implemented with the intent of preventing most of this sediment and turbidity from being transported downstream. For the first few days after flow is restored through the reservoir bottom, turbid water will be present from Little Hyatt Reservoir down through the Keene Creek Reservoir at Highway 66. Because of the nature of this sediment and the relatively short amount of time for flow to cycle through Keene Creek Reservoir, very little of this turbidity is expected to settle out. From that point, the route of the turbid water has three possible paths depending on Bureau of Reclamation/Talent Irrigation District operations at Keene Creek Reservoir:

1. Under normal operations, the water would be piped to Green Springs Power Plant on Emigrant Creek, passing through the turbine to be released into Emigrant Creek and then down Emigrant Creek into Emigrant Reservoir. Upon entering Emigrant Creek, the turbidity would be diluted somewhat, but that effect is not expected to be great due to the relatively low natural flows in Emigrant Creek. The turbidity would be expected to be plainly visible until delivery into Emigrant Reservoir; increases in measurable turbidity in Emigrant Reservoir could be expected, but potential levels are unknown.
2. Because of sediment and turbidity levels, Bureau of Reclamation could opt to bypass the water to prevent damage to the Green Springs Power Plant facilities, and instead release flows out of Keene Creek Reservoir through pipeline into the Tyler Creek Wasteway, a tributary to Emigrant Creek. The delivery of turbid water to Emigrant Creek and Reservoir would not be expected to be substantially different than under the first scenario, above. A slightly shorter length of Emigrant Creek would be affected, but Tyler Creek and the Wasteway would be affected.
3. If flows were not fully dealt with under the two scenarios above, the turbid water would flow over the spillway at Keene Creek Reservoir, where it would travel down Keene Creek into Jenny Creek and be delivered into Iron Gate Reservoir on the Klamath River. The turbidity would be diluted somewhat by other Keene Creek tributaries and Jenny Creek; however, this would not likely exceed 50% dilution due to the otherwise low flows in these streams at that time of year.

Silt-sized and larger sediments mobilized by the work would progress downstream from Little Hyatt Reservoir over a period of years. Much of the sediment would be deposited on the bed and banks of Keene Creek, but an unknown amount will eventually make its way into Keene Creek Reservoir. Based on very rough estimates of accumulated sediment in the reservoir bottom, and using an assumption that the stream ultimately displaces sediment to form a channel 20 feet wide and two feet deep for a 1,500 foot length, this would mobilize approximately 1.4 acre feet of sediment (2,222 cubic yards). Implementation of measures under an erosion control and restoration plan would attempt to prevent most of this sediment from moving downstream, and removing the sediment before dam structure is removed. BLM would employ erosion control measures including things such as silt fences, mechanical removal of the sediment from the reservoir bottom, and treatment of turbid water to reduce the amount of sediment and turbidity moving downstream. State water quality standards for turbidity would be exceeded for an indeterminate

period of time following restoration of flow to the channel. The turbidity and sedimentation would be substantially less than would occur with a catastrophic failure of the structure, although the impacts would be extended over a much longer period of time.

As soon as streamflow is restored through the work area, the stream would begin a long natural recovery process. Mulching all exposed sediment and seeding with native grasses and sedges would provide some initial surface stability to the soil; seeds from wetland tree and shrub species would naturally establish along the developing channel. Using restoration funding, BLM would plant additional vegetation along the stream to supplement natural reproduction on the site, and could add woody debris to provide some in-channel structure. Exclosure fencing to discourage OHV and livestock access would be installed as soon as possible to allow initial recovery to occur unimpeded by additional soil disturbance. Turbidity and instream sedimentation levels would likely decrease rapidly following the first rainy season, and could continue to gradually decrease until stabilizing within approximately five years, probably at a level slightly higher than what was present prior to emergency drawdown of the reservoir. The channel would initially be inherently unstable, so stabilization of the stream system could require longer than five years.

Although stream and riparian conditions in Keene Creek would still be heavily influenced by processes unrelated to this project (transfer of water between Hyatt and Keene Creek Reservoirs), removal of the dam and reestablishment of the creek through the former reservoir bed would result in long-term improvement to riparian vegetation, channel conditions, and water quality within the project area. Although some wetlands adjacent to the reservoir would be lost due to elimination of the reservoir, the low valley gradient through the former reservoir bottom could allow new wetland areas to develop along the stream over the course of the coming decades. The elevated increase in stream temperature contributed by Little Hyatt would be expected to decrease immediately, and would continue to improve over time as streamside vegetation eventually began to provide shade to the channel.

Alternative 5 would result in short-term high levels of sediment and turbidity, long-term temperature decreases and restored fish passage. Sediment and turbidity levels could exceed State standards during and after the actual work period depending on the effectiveness of erosion control measures and would continue at a reduced level until the stream channel becomes established and stabilizes in the former reservoir bottom behind the former reservoir bottom behind the Little Hyatt Dam. These sediment and turbidity levels would likely displace or kill most of the fish in the stream reach between the Little Hyatt and Keene Creek Reservoirs. Sediment deposition would occur along this stream reach resulting in short-term decreased production of aquatic macro-invertebrates, and hence a reduction in food supply to juvenile fish. Spawning habitat for any remaining fish species would also be reduced until flushing flows redistribute the sediment. Elevated turbidity levels between Keene Creek Reservoir and Emigrant Reservoir would reduce opportunities to feed and potential avoidance of disturbed areas altogether during the period of elevated turbidity. It is critical that this turbid water is not released into the Jenny Creek system below Keene Creek Dam where small populations of native special status species reside, although BLM has no control over releases from Keene Creek Reservoir. Temperatures would probably decrease as the impoundment disappears and the stream is restored through the Little Hyatt Reservoir area, benefiting the aquatic environment.

Removal of the dam would reestablish both upstream and downstream fish passage. Non-native and hatchery fish would compete with native fish for food and habitat, increasing stresses on native fish downstream in the Keene Creek and Jenny Creek systems. Some non-native introductions have already been documented in Jenny Creek, including golden shiners *(Notemigonus crysoleucas)* and brown bullhead *(Ictalurus nebulosus*). An analysis of the redband trout in Jenny Creek indicates that some genetic mixing has occurred between stocked rainbow trout *(O. mykiss)* and redband trout *(O. mykiss)* (Currens 1992). Upstream migration would still be restricted at the partial dam site.

Wildlife (Terrestrial)

The larger landscape in which the project area is located provides habitat for a wide variety of wildlife species. Of note, are many species which are labeled as Special Status Species by the Bureau of Land Management. Species are recognized as "Special Status" if they are federally listed as Threatened or Endangered, proposed or a candidate for federal listing as Threatened or Endangered, if they are Northwest Forest Plan Survey and Manage Species or if they are a BLM sensitive or strategic species. BLM is mandated to follow guidelines set by the U.S Fish and Wildlife Service with regard to species listed as Threatened or Endangered. BLM Oregon State Office policy is to protect, manage, and conserve these species and their habitat such that any Bureau action will not contribute to the need to list any of these species (USDI BLM 2003).

Threatened and Endangered Species

Northern Spotted Owl *(Strix occidentalis)*	FT

FT – Federal Threatened

Northern Spotted Owl *(Strix occidentalis caurina)*
The Northern Spotted Owl is federally listed as a threatened species. The Northern Spotted Owl site nearest the project area is more than 1 mile away.

Northwest Forest Plan Survey and Manage Species

Species	**Status**
Great gray owl (*Strix nebulosa)*	S&M
Chase sideband snail (*Monadenia chaceana)*	S&M
Evening fieldslug *(Deroceras hesperium)*	S&M
Crater Lake tightcoil (*Pristiloma arcticum crateris*)	S&M

S&M - Northwest Forest Plan Survey and Manage

The only known locations of Survey and Manage Wildlife Species within 1 mile of the project location are 2 Great gray owl nest sites.

Other Special Status Species

Species	**Status**
Northwestern pond turtle (*Actinemys marmorata marmorata)*	BS
Foothill Yellow-legged frog (*Rana boylii*)	BSO
Oregon Spotted frog (*Rana pretiosa*)	BS
Mardon Skipper (*Polites Mardon*)	BS

BSO - Bureau Sensitive Oregon
BS – Bureau Sensitive

The only special status species in the immediate vicinity of the project location is the Mardon Skipper butterfly. Populations of Mardon Skippers are known to exist both above and below the existing reservoir. Northwestern pond turtles are likely to use the reservoir at times. Oregon Spotted frogs are known to occur at Parsnip Lakes, approximately 5 miles downstream from Little Hyatt Reservoir. While historic records indicate the presence of Oregon Spotted frogs at Little Hyatt Reservoir, surveys in recent decades have not detected this species. Habitat currently present at the site is not considered to be suitable for Oregon Spotted frogs.

Bald and Golden Eagle Protection Act Species

Bald Eagle *(Haliaeetus leucocephalus)*
The Bald Eagle was, until recently, listed as a Threatened species under the Endangered Species Act. It has been removed from this list, but retains protection afforded it under the Bald and Golden Eagle Protection Act. Bald Eagles are present in the area. The nearest active nest is 2.3 miles away on the east side of Hyatt Reservoir. There are no known bald eagle nests in the project area. Bald Eagles have not been documented foraging at Little Hyatt Reservoir. No impacts would occur to this species under any of the proposed alternatives.

Golden Eagle (*Aquila chrysaetos*)
Golden Eagles are protected under the Bald and Golden Eagle Protection Act. Golden Eagles are present in the larger landscape surrounding the project area. The nearest known historic Golden Eagle nest to the project area is more than 2 miles away. No impacts would occur to this species under any of the proposed alternatives.

Wildlife Effects Common to Alternatives 3-5

Threatened and Endangered Species

Northern Spotted Owl
Suitable nesting, roosting, foraging, and dispersal habitat for Northern Spotted Owls exists within <200 feet of the Little Hyatt Reservoir dam. While no suitable nesting, roosting, or foraging habitat would be altered by any of these proposed alternatives, some of the activities (e.g. blasting) under proposed alternatives could cause impacts through disturbance to breeding owls during the critical breeding season (March 1-June 30). Implementation of Project Design Features (PDFs) would remove this disturbance threat.

Northwest Forest Plan Survey and Manage Species

Terrestrial Molluscs
Impacts of this project to terrestrial molluscs will be minimal. Most survey and manage terrestrial mollusc species are dependent on forest canopy to provide a microclimate suitable for their life cycle requirements. As there is no proposal to alter forested habitats under any of the proposed alternatives, there will be no impacts to these species.

Great Gray Owl
Two known Great Gray Owl reproductive sites occur within 1 mile of the project location. No habitat suitable for use by Great Gray Owls would be altered under these alternatives. PDFs implemented to reduce disturbance to Northern Spotted Owls would also eliminate possible disturbance of Great Gray Owls during their reproductive period.

Additional Special Status Species

Northwestern Pond Turtle
Northwestern Pond Turtle activity is very limited at Little Hyatt Reservoir. Although basic habitat exists, breeding is unlikely to succeed on a regular basis due to impacts to terrestrial nesting sites from vehicular traffic, pedestrian traffic, boating on the lake and dispersed camping.

Other Wildlife Species
Little Hyatt Reservoir serves as a water source for many wildlife species. It also serves as a foraging location for waterfowl. Impacts to most species would be through disturbance due to increased human and mechanical activity in the area. Abundant water sources and waterfowl foraging habitats exist in the landscape near Little Hyatt Reservoir, most notably nearby Hyatt Reservoir. The majority of wildlife

species can easily find these alternate resource locations. These impacts would not be significant.

Wildlife Effects of Alternative 1--No Action

No significant impacts to wildlife species are anticipated under the No Action alternative. Habitats would continue in their present state, until the forces of vegetative succession or stochastic events (e.g. failure of the Little Hyatt Reservoir dam) caused their alteration. Catastrophic dam failure would harm some less mobile wildlife species (e.g. snakes, terrestrial molluscs, insects, etc...) in the path of the water outflow. Drainage of the dam through gradual or catastrophic failure would result in conversion of the current lake pool area to upland and riparian habitats. Species dependent on the lake pool would be displaced, while species associated with upland and riparian habitats would increase.

Wildlife Effects of Alternative 2--Community Repair

Impacts to wildlife species under Alternative 2 are difficult to quantify due to the many variables involved in this alternative. Construction of a house and all the physical changes involved in that process are likely to remove habitat currently used by one or another group of wildlife species. Much of the 160 acres surrounding Little Hyatt Reservoir is Northern Spotted Owl habitat suitable for nesting, roosting, or foraging. Portions of meadows in this vicinity provide habitat for the Mardon Skipper butterfly. Construction of a house on this 160 acre parcel is likely to remove several acres of habitat for Northern Spotted Owls, Mardon Skippers, or other special status species. These impacts are not likely to be significant as similar habitat exists for these species on the surrounding landscape. Maintenance of the dam will preserve the habitat provided by the lake for waterfowl and other aquatic species.

Wildlife Effects of Alternative 3-- Buttress With Rock

Impacts to wildlife species under alternative 3 would be negligible. The quantity and spatial arrangement of habitats available to wildlife species would not be significantly altered under this alternative. The placement of large rocks is unlikely to harm any special status species. The removal of several trees immediately below the dam site, the construction and later obliteration of a temporary road, and the removal and replacement of the Pacific Crest Trail bridge is unlikely to significantly impact wildlife species or their habitats. The long term effect of this alternative would be the gradual drainage of the lake with subsequent conversion of the current lake pool area to upland and riparian habitats. Species dependent on the lake pool would be displaced, while species associated with upland and riparian habitats would increase.

Wildlife Effects of Alternative 4—Partial Removal

Partial removal of the dam and resultant partial drainage of the reservoir would cause permanent alteration to habitats currently inundated by the reservoir and to habitats immediately adjacent to the existing reservoir. Foraging opportunities for osprey, bald eagles, and other fish eating species would be reduced in area. This would not be a significant change, as Hyatt Reservoir also provides foraging opportunities of this type and is only 1 mile distant. Some wetlands at the upper end of Little Hyatt Reservoir would be converted to upland vegetation, while some areas now inundated by the reservoir would become functioning riparian areas and upland meadows.

Suitable nesting, roosting, foraging, and dispersal habitat for Northern Spotted Owls exists within <200 feet of the Little Hyatt Reservoir dam. No suitable nesting, roosting, or foraging habitat would be altered by this proposed alternative. Some of the activities (e.g. blasting, heavy equipment operation) associated with this alternative could cause impacts through disturbance to breeding owls during the critical breeding season (March1st-June 30). With seasonal restriction designated in the PDFs there would be no disturbance impacts.

Suitable nesting habitat for Great Gray Owls exists in proximity to the project location. Restoration of

the reservoir to a meadow/upland vegetative composition may enhance foraging opportunities for the Great Gray Owl.

The more mobile species which currently utilize the wetlands at the upper end of the existing reservoir would easily find comparable habitat surrounding the reduced pool or Little Hyatt Reservoir or at other nearby wetland sites. Some less mobile species may be unable to relocate and cease to be present at the site. The new riparian zone would provide valuable habitat suitable for several terrestrial mollusc species, including some special status species. This riparian habitat would also be suitable for the Oregon spotted frog, a Bureau sensitive, and Federal candidate species and an historical resident of this location. As upland habitats returned to the area now occupied by the reservoir, more habitat suitable for the Mardon Skipper could be created through proper selection and seeding of nectaring and larval host vegetation. Impacts to the Mardon Skipper during the process of dam removal and restoration are minimized through avoidance of vehicular traffic in the meadow areas known to support Mardon Skipper. Foot traffic through these meadows should also be kept to a minimum. Where access is required, the placement of temporary roads and/ or footpaths should be coordinated with a wildlife biologist familiar with these butterfly sites.

Wildlife Effects of Alternative 5—Dam Removal

Removal of the dam and drainage of the reservoir would cause permanent alteration to habitats immediately adjacent to the existing reservoir. Foraging opportunities for osprey, bald eagles, and other fish eating species would see a reduction in area. This would not be a significant change, as Hyatt Reservoir also provides foraging opportunities of this type and is only 1 mile distant. Some wetlands at the upper end of Little Hyatt Reservoir would be converted to upland vegetation, while some areas now inundated by the reservoir would become functioning riparian areas and upland meadows.

Suitable nesting, roosting, foraging, and dispersal habitat for Northern Spotted Owls exists within <200 feet of the Little Hyatt Reservoir dam. No suitable nesting, roosting, or foraging habitat would be altered by this proposed alternative. Some of the activities (e.g. blasting, heavy equipment operation) associated with this alternative could cause impacts through disturbance to breeding owls during the critical breeding season (March1st-June 30). With seasonal restriction designated in the PDFs there would be no disturbance impacts.

Suitable nesting habitat for Great Gray Owls exists in proximity to the project location. Restoration of the reservoir to a meadow/upland vegetative composition may enhance foraging opportunities for the Great Gray Owl.

The more mobile species which currently utilize the wetlands at the upper end of the existing reservoir would easily find comparable habitat at Hyatt Reservoir or other nearby wetland sites. Some less mobile species may be unable to relocate and cease to be present at the site. The new riparian zone would provide valuable habitat suitable for several terrestrial mollusc species, including some special status species. This riparian habitat would also be suitable for the Oregon spotted frog, a Bureau sensitive, and Federal candidate species and an historical resident of this location. As upland habitats returned to the area now occupied by the reservoir, more habitat suitable for the Mardon Skipper could be created through proper selection and seeding of nectaring and larval host vegetation. Impacts to the Mardon Skipper during the process of dam removal and restoration are minimized through avoidance of vehicular traffic in the meadow areas known to support Mardon Skipper populations as stipulated in PDFs. Foot traffic through these meadows should also be kept to a minimum. Where access is required, the placement of temporary roads and/ or footpaths would be coordinated with a wildlife biologist familiar with these butterfly sites.

Botany

Special Status Botanical Species

Bureau Special Status Plants, Lichens, and Fungi (SSP) include species that are listed as threatened or endangered under the Endangered Species Act (ESA), Federal candidates for listing, State listed, de-listed Federal, and Bureau designated Sensitive species. For these species, the BLM implements recovery plans, conservation strategies, and approved project design criteria of biological opinions, and ensures that actions authorized, funded, or carried out by the BLM promotes their conservation and reduces the likelihood and need for their future listing under the ESA.

In July 2007, the requirements for the Survey and Manage Mitigation Measure Standards and Guidelines were removed from the Resource Management Plans of the nine BLM Districts (including Medford's) in the Northwest Forest Plan area. Conservation of rare and little known species is provided for by the BLM's, and other Agencies' Special Status Species Programs, elements of the Northwest Forest Plan, .the underlying land and resource management plans, and relevant agency programs and policies.

On July 25, 2007, the Oregon State Office Instruction Memorandum No. OR-2007-072 updated the State Director's Special Status Species List to incorporate the July 2007 ROD and to include species additions and deletions from the application of the most recent scientific data. This list was finalized with the February 6, 2008 Instruction Memorandum No. OR-2008-038.

The Little Hyatt Lake Dam Project is not in the range of any plant species that is listed, proposed to be listed, or is a candidate for listing under the ESA. Range maps were updated with the US Fish & Wildlife's Letter of Concurrence for the BLM's Biological Assessment for Fiscal Year 2009-2013 Programmatic Activities on September 25, 2008. No occurrences of listed, proposed, or candidate plants have been found within the project area. Any sites of listed, proposed, or candidate plants found outside their defined range would have been reported.

Surveys for all species, except fungi, on the Medford SSP list (current at the time of survey) were conducted in 2003 and 2007. Surveys were conducted using the intuitive controlled survey method (see definitions). No populations of SSP were found in the project area.

Of the 20 species of fungi that are on the Medford District Sensitive Species list, 19 are former Survey and Manage species whose status determined that pre-disturbance surveys were impractical and not required; one species is a hypogeous (underground) fungus, as are other of the previously referenced fungi, where pre-disturbance surveys would be impractical. Oregon State Office Information Bulletin No. OR-2004-145 reaffirmed this, stating that Bureau policy (Manual Section 6840) would be met by known site protection and large-scale inventory work (strategic surveys) through fiscal year 2004. Very little of the project area is suitable habitat for Medford District Special Status fungi (without considering the 160 acres included in Alternative 2).

Noxious Weeds and Introduced Plants

Noxious weeds are generally nonnative plants that cause or are likely to cause economic or environmental harm or harm to human health. Introduced plants are species that are nonnative to the ecosystem under consideration. Introduced plants may adversely affect the proper functioning condition of the ecosystem.

Two noxious weeds (*Cirsium vulgare* and *Hypericum perforatum*) were found in the project area, however, an additional four species are known in the vicinity. The weed sites are mostly associated with roads, disturbed areas, and off-highway vehicle traffic. All six species of noxious weeds are on the Oregon Department of Agriculture List B. "B" designated weeds are weeds of economic importance which are regionally abundant but may have limited distribution in some counties. One species is also on the Oregon Department of Agriculture List T. "T" designated weeds are priority target species on which

the Oregon Department of Agriculture will develop and implement a statewide management plan. The following table lists the noxious weeds and introduced plants in the vicinity of the project area.

Noxious weeds and Introduced plants in the vicinity of the Project Area.

Scientific Name	Common Name	ODA List*
Alopecurus pratensis	meadow foxtail	
Bromus tectorum	cheatgrass	
Centaurea solstitialis	yellow star-thistle	**B**
Centaurea stoebe ssp. *micranthos*	spotted knapweed	**B, T**
Cirsium arvense	Canada thistle	**B**
Cirsium vulgare	bull thistle	**B**
Dactylis glomerat	orchardgrass	
Dipsacus fullonum	Fuller's teasel	
Hypericum perforatum	St. Johnswort	**B**
Linaria dalmatica	Dalmatian toadflax	**B**
Nepeta cataria	catnip	
Phleum pretense	timothy	
Poa bulbosa	bulbous bluegrass	
Poa pratensis	Kentucky bluegrass	
Rumex crispus	curly dock	
Tragopogon dubius	yellow salsify	
Verbascum thapsus	common mullein	

Environmental Consequences Botany, Noxious Weeds And Introduced Plants

Botany Effects Common to All Alternatives

Effects common to alternatives 1, 3, 4, 5

There are no effects to Medford SSP. No sensitive plants or lichens were found. For the 20 species of Sensitive fungi, there are no effects from any alternative. The project area does not provide suitable habitat for these fungi species. Generally, suitable habitat for these fungi is closed-canopy, pole-size to large diameter conifer forest.

If access to private land for restoration work is not acquired then newly exposed ground is expected to allow establishment of noxious weeds and introduced plants and provide a weed refuge and weed seed source that would promote spread.

Lowering of the lake level via dam failure or dam removal would result in the loss of a small amount of man-made wetland plant habitat. Natural wetland plant habitat would attempt to recover along the streambed altered by the accumulated lake sediment

Effects common to alternatives 3, 4, 5

Project design features are incorporated into the proposed action to minimize spread of noxious weeds and invasive alien plant species. However, not all weed seed transported by humans can be excluded from the project area. Weed seed may travel to the project area from adjacent or nearby weed populations, additionally, long distance weed seed transport can be accomplished by wind, water, animals, and humans. Thus, with suitable weed habitat increasing as a consequence of the proposed action, total exclusion of new weed establishments is unattainable. Particularly vulnerable areas are new roads and newly exposed sediment.

By project design, noxious weeds will be inventoried and treated by BLM. Inventories will occur the first three years after completion of road construction and dewatering, and then periodically thereafter. Treatments will be scheduled by priority and will occur based on the potential of the weed population to cause economic or environmental harm or harm to human health. Weed treatment would almost certainly occur as the project exposes disturbed and/or unvegetated land in a lightly weeded environment; this project would rank as a high potential to cause environmental harm. With noxious weed inventory and treatment, we expect weed establishments, as a result of this project, to remain a low potential to cause harm.

Disturbed ground and newly exposed sediment would be seeded and planted with native plants. The seed source for the native plants is from the immediate vicinity and seed collected from the appropriate ecoregion. Seeding and planting would be a multi-year effort.

Mitigation measures for alternatives 3, 4, 5

A mitigation measure is an action that can be planned or taken to alleviate (mitigate) an adverse environmental impact. Mitigation measures may not be practicable or affordable. Final mitigation measures adopted will be documented in the final decision for this project.

Concerns about excessive sediment and the ability to rapidly re-vegetate the site may be addressed by the following mitigation measure:

To affect a more complete site restoration, all sediment greater than two inches deep will be removed and disposed of at an approved off-site location. Removing the sediment will increase the survival of planted and natural seedlings, lessen frost heave of planted and natural seedlings, restore the geomorphology, and restore the soil to its native characteristics.

Without the removal of the sediment, we would expect re-vegetation (planted, seeded, and natural) to be less successful. The influence of severe freezing and thawing, rates of drying, and surface cracking of the sediment (silt) would be more prominent than that expected in the native loams and clay. Restoration costs would be moderately higher and work would extend longer (one to five years) than if sediments were removed.

Re-vegetation is also a weed exclusion technique, among other methods. Planting and seeding native species occupies the site and excludes noxious weeds. Without the removal of the sediment, we expect poorer native plant seedling survival and hence greater weed establishment. Noxious weed control would rely on additional weed treatment techniques such as manual and herbicide application. Establishments of invasive introduced plants would go untreated.

To prevent damage and mortality to seeded and planted native plants, grazing in this area (Keene Creek Allotment) would not be allowed until these plants become established (approximately ten years from de-watering).

Alternative 1 – No Action

The dam is operated at full pool. With the dam still operational, noxious weed inventory and treatment in this area would occur on normal Resource Area schedules and priorities.

With the eventual catastrophic failure of the dam or its slow deterioration, newly exposed ground on BLM and private land would become available for noxious weed and introduced plant establishment. It is assumed that the dam will fail such that the water will drain either slowly or catastrophically and that much of the sediment will remain on-site. Noxious weed treatment and native plant community restoration would occur depending on available funding and workforce. Cost of restoration and weed treatment is estimated to be the same as Alternative 5 but over a time period of indeterminate length.

Alternative 2 – Community Repair
The dam is operational but in private ownership. Public use would continue on the east side of the lake. Noxious weed inventory and treatment for the 160 acres would not occur.

With the building of a home and access roads, other private uses, and the typical consideration of invasive plants on private land, noxious weeds and introduced plant species would increase.

Effects to Special Status Plants, Lichens, and Fungi on the proposed 160 acres are currently unknown. The disposal of public land would require a survey of botanical resources for the 160 acres prior to the RMP and NEPA analysis. Sensitive fungi would not be considered beyond that described in Oregon State Office Information Bulletin No. OR-2004-145.

Alternative 3-Buttress the Dam with Rock
Effects are expected to be similar to Alternative 1 except that a catastrophic failure of the dam is not anticipated and therefore a slow lowering of the water level would expose bare ground (sediment) incrementally. It is assumed that the dam will fail such that the water will eventually drain and the sediment will remain behind the dam. Newly exposed ground would become unpredictably available for noxious weed and introduced plant establishment over several years. Noxious weed inventory and treatment would occur depending on available funding and workforce.

Restoration and weed treatment on lake bottom sediments that are unpredictably exposed would occur but with expected delays. As the dam deteriorates and sediments are exposed, locally collected grass, forb, and shrub seed would need to be grown before being available for outplanting. Grass seed for direct sowing, from the appropriate ecoregion, would likely be immediately available. Cost of restoration and weed treatment is estimated to be the same as Alternative 5 but over a time period of indeterminate length.

Alternative 4 – Partial Remove
A small man-made wetland would be retained. Wetland plants currently established on-site would be allowed to naturalize throughout this wetland.

Other effects are similar to Alternative 5 but at a lesser scale. The cost of restoration and weed treatment is estimated to be 70% of Alternative 5 costs.

Alternative 5-Full Remove
This alternative exposes the most sediment at one time but this also provides for a precise restoration plan. The newly exposed ground (sediment) will provide habitat conditions that favor noxious weeds and introduced plants. Medford BLM currently has seed of grasses, sedges, and rushes from the appropriate ecoregion for use in the project area. Also, seed of native forbs and shrubs was collected in 2007 from the immediate vicinity; the species collected are ones shown to be directly used by, or are a component of the habitat used by, the Mardon Skipper butterfly. Planting this material plus sowing native grass seed will initiate the native plant community restoration and also serve to exclude noxious weeds and introduced plants. The seed is source appropriate and includes species suitable for riparian and upland habitats.

Without the removal of sediment, native riparian vegetation would be difficult to re-establish. Noxious weeds, introduced plants, erosion of streamside soil (sediment), re-routing of the streambed with changes in flows, would all affect native riparian plant re-vegetation. The cost of restoration and weed treatment is estimated to be $62000 over several years.

Cultural Resources

Cultural Effects to All Alternatives

Little Hyatt dam is a historic dam constructed around 1923 for the Talent Irrigation District. It was recorded as part of the 1990 Jackson County Cultural and Historical Resource Survey. The no action alternative will likely result in the loss of the dam slowly over time as it continues to erode. The dam will either fail completely and the concrete will be reduced to rubble or small holes will open in the dam and it will leak more and more until it will not hold water. Gradually the structure will disintegrate.

The action alternatives all remove or alter the structure as it currently exists, thus the historical features will be lost and without documentation the details of the structural characteristics and the basic dam design will be lost. The BLM has consulted with the State Historic Preservation Office (SHPO) on the effects of this project and the removal of the dam and recorded the site. Therefore, the loss of the dam has been mitigated by recording the site with detailed photos and written descriptions and there is no significant effect to cultural resources.

This project would not result in restricting access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners or adversely affect the physical integrity of such sacred sites. No sites have been identified in the project area (Executive Order 13007 (Indian Sacred Sites)). This project would have no effect on Indian Trust Resources as none exist in the project area.

Social--Recreation and Visual Resources

Little Hyatt Dam is located within the Special Recreation Management Area (SRMA) for the Pacific Crest Trail. Management direction for SRMAs is to manage them “to realize their potential to provide appropriate/prescribed recreational experience opportunities while protecting sensitive resources, increasing public awareness, reducing conflicts, and diversifying the regional economy” (RMP, p 63).

Because the dam is within a quarter mile of the Pacific Crest Trail, the area is currently mapped as a Visual Resource Management (VRM) class 2, where low levels of change to the characteristic landscape may be seen, but should not attract the attention of the casual observer.

Little Hyatt Lake is a small, remote reservoir with a natural-lake feel. Keene Creek, which feeds the lake from the north, winds its way through an open meadow in and amongst stands of ponderosa pine. The creek gradually widens into a marsh, marking the northern end of the lake. Mesic and wetland plants characterize this part of the lake where a variety of songbird, waterfowl, and mammal are common. Stands of large Douglas fir and ponderosa pine define the east and west shorelines of the lake. These trees are aligned along converging ridgelines which funnel together at the south end of the lake where the dam is located. The dam is built into the base of a narrow notch in a linear wall of basalt that traverses this ridgeline.

The dam structure has endured a significant amount of erosion and weathering. Pitting and staining in the moss-covered concrete face of the downstream side of the dam has actually helped the structure blend with the texture and tones of the adjacent rock in the natural landscape. A notch in a concrete diversion channel below the dam releases enough water to create a waterfall down a rock face into Keene Creek Riparian vegetation along the stream helps to screen the dam from the road and from views along the Pacific Crest National Scenic Trail (PCT) , which crosses Keene Creek at a wood footbridge below the dam. At high water levels, the dam itself acts like a weir, sending a curtain of water over the top of the dam to the rocky basalt bedrock below. Along with the waterfall in the canal notch, this provides a more natural feeling to the concrete structure when approaching the dam from along the road and the PCT and has become part of the sense of place of this area.

When viewed from the lakeshore, the dam abutments and discharge gates are the most visible part of the structure. These abutments, and the visible portion of the arched dam, blend relatively well with the texture and color of the adjacent basalt rock formations. This is largely due to grasses and shrubs growing in and adjacent to the concrete forms and discoloration of the concrete from weathering. A large, picturesque Douglas-fir snag immediately adjacent to the east abutment also helps to minimize draw the eye away from the geometric appearance of the dam.

Old Hyatt Lake Reservoir Road [County Road 9112] borders along the eastern edge of the lake. A corral and a pole fence on private land at the north end of the lake contribute to the more remote, rustic setting. Off-road vehicle use in the meadow (which is private land) along the north lakeshore are evident, however, and distract from the overall scenic quality.

Built in 1923, the dam and lake have been a part of the landscape in this area for most of the last century. No longer used for irrigation, the lake setting has existed primarily as a scenic recreation destination for hiking, picnicking, fishing, canoeing, and just relaxing. Those who frequent the lake regard it as special, with a unique sense of place. Although man-made, the lake and dam are reminiscent of more natural features, and as such, have become part of the valued, characteristic landscape of the area. Deviations from the characteristic landscape are subordinate to the overall valued sense of place, hence, the area continues to meet the visual quality objectives of the VRM Class II allocation.

Fishing opportunities have been reduced significantly when most fish were removed from the lake during the 2007 emergency drawdown of the lake. It has not been restocked, though some remnant fish remain. Use of the area is best characterized as occasional and therefore offers peace and quiet to those who visit the lake.

Social Effects of Alternative 1 - No Action

Under this alternative, no activity to reinforce the dam or remove the dam would take place. It is expected that the dam will either fail slowly and the water level would drain down gradually or a major breach would occur with a large amount of water escaping in one event. If dam failure occurred via a slow leak, this would result in a gradual changing of the landscape elements currently contributing to the landscape character. The wetland/marsh areas along the northern edge of the lake would begin to migrate toward the dam as more of the lake bed dries. The cascading waterfall effect of the dam face and side canal would eventually disappear as water levels dropped. With lower water levels, the dam would become more visible and the overall lakeshore would recede showing bare ground along the lake edge. The impounded water creating the lake and the cascading waterfall features would be gone.

If a sudden breach were to occur, the lake, shoreline, wetlands and cascading waterfall would be gone in moments. The stream below the dam would be scoured and strewn with debris. The stream channel would be enlarged and many shrubs and trees would be undermined and carried downstream. The foot bridge for the Pacific Crest trail would be destroyed. Portions of the dam would likely remain in place with concrete pieces scattered downstream. Sediment would be left in the lake bottom. Sediment would be flushed out during peak flow events.

As the water level recedes due to a failing dam, the visitor may be drawn to the dam structure and subsequent wetland that develops behind the dam, but unless the dam collapses catastrophically, the view will not dominate or detract substantially from the landscape. Therefore, the visual change caused by either a gradual collapse of the dam does not significantly alter the visual expectation for the site. A catastrophic collapse would greatly alter the visual characteristic of the landscape and until the dam debris is removed and the site is restored, it will not meet the visual expectation associated with VRM Class 2.

In either case of dam collapse, the lake would eventually be gone and the loss of lake recreation would be gone as well. Recreation character would change from a lake destination to one of lighter dispersed recreation. The loss of recreation at Little Hyatt would not be significant as the Hyatt Lake reservoir is

about one mile away and Howard Prairie is about eight miles away. Both Lakes offer very similar recreation opportunities. Emigrant Lake also offers similar opportunities and is located about 30 minutes away. Dispersed recreation can take place such as hunting, creek fishing, hiking and camping.

Social Effects of Alternative 2 – Community Repair

The visual character of the area will essentially remain unchanged after repair of the dam is complete and the construction site has healed, though depending on the design of the dam, the level of quaintness may be substantially reduced. Nonetheless, the small mountain lake setting will be preserved and the VRM Class 2 objectives will be met.

There will be some changes in recreation opportunities as a private home site is established. A portion of lake shore will still be available for the public but the private land on the opposite shore may not be available for public recreation. Hikers on the Pacific Crest Trail will have more limited options for camping when the land becomes privately held. Some of the solitude visitors can experience visiting the lake may be lost when a home site is established with its corresponding noises of heating and air conditioning units, lawn mowers, weed trimmers and other objects associated with caretaking of rural property.

Social Effects of Alternative 3- Buttress Option

Under this alternative the dam would be reinforced to prevent catastrophic collapse but would eventually drain slowly as the leaks expand. Drainage of the lake would be required for buttressing. During buttressing work, the lakeshore and lakebed would be dry. The historic lake character and associated recreation would not be available during the time the lake is drained. After buttressing is complete, the lake would again refill and provide year around recreation. It is unknown how long the lake would remain filled with the buttressing alternative. The lake will eventually drain as the existing leaks in the dam expand. The buttressing will not prevent water from leaking out of the dam. After the lake drains, the recreation opportunities associated with the lake would cease.

The use of native rock to strengthen the dam would help to blend the structure into the landscape. Native rock armor on the downstream side would change the visual appearance. The dam face will be obscured and may blend in a bit more when viewed from a distance. The aged appearance of the current dam would be gone and the newness of the rock boulders would be apparent. Over time some moss and darkening of the boulders would take place. Therefore, the visual change caused by adding large amounts of rock that brings a “new” form and line (large, sloping rock field) to the area removes the quaintness associated with the dam and alters the pastoral setting associated with the picturesque dam, and would not meet the visual objective associated with VRM class 2.

When the dam starts leaking significantly and the water level is reduced, the wetland/marsh areas along the northern edge of the lake would begin to dry. The grass and other vegetation would change from a flood plain type to a dry land type. The cascading waterfall effect of the dam face and side canal would eventually disappear as water levels dropped. With lowering water levels, the dam would be more visible and the overall lakeshore would begin to exhibit the characteristics typical of most reservoirs with bare ground along the edges. The amount of bare ground at pool edge would increase over time as the leaks outpace the inflow. The lake may take on a seasonal quality of higher pool depth in the winter when in flow is increased and drop significantly in summer when evaporation is high and inflow rate is reduced. Recreation character would change from a lake destination to one of lighter dispersed recreation. Lake type recreation would be served by Hyatt Lake or other nearby lakes. Thus, the effect to recreation is minor.

Social Effects of Alternative 4 – Partial Removal

Because most of the structure is removed (leaving the base 6 feet or so along the face of the dam, the

visual character of the old dam and the lake associated recreation opportunities described previously would mostly be lost. What is retained, however, is a rudimentary structure with some of the line and form that is currently present with a correspondingly appropriate view of a pond/large wetland of approximately three acres. This view is at eye-level from the Pacific Crest Trail bridge with the viewer seeing the wetland and background landscape of hills and forest. So while the scene has been altered from a small mountain lake and picturesque dam to a small pond and wetland, the visual lines, form, and color do not detract from the surrounding scene and meet the visual objectives for VRM class 2. The reduction of the current pastoral view to a smaller, but serene pond/wetland without the current aesthetic view of the dam structure is consistent with the management direction and therefore has no significant effect on visual resources.

The campsites adjacent to the lake (used mostly by Pacific Crest Trail hikers) would be changed from lake side to stream side/pond/riparian, but would still provide a water-based recreational and visual value. The water-based fishing, swimming and floating opportunities provided by the reservoir would be gone. The loss of recreation at Little Hyatt would not be significant as the Hyatt Lake reservoir is about one mile away and Howard Prairie is about eight miles away. Because both lakes offer very similar recreation opportunities, dispersed recreation such as hunting, creek fishing, hiking and camping will continue to take place and be affected very little. Emigrant Lake also offers similar opportunities and is located about 30 minutes away.

Social Effects of Alternative 5 – Remove Dam

Under this alternative the lake would be drained in a controlled way, the dam would be breached and the rubble would be removed to a disposal site. The visual character of the old dam and the lake associated recreation opportunities described previously would be lost. The campsites adjacent to the lake used by Pacific Crest Trail hikers would be changed from lake side to stream side. The fishing, swimming and floating opportunities provided by the reservoir would be gone. The loss of recreation at Little Hyatt would not be significant as the Hyatt Lake reservoir is about one mile away and Howard Prairie is about eight miles away. Both Lakes offer very similar recreation opportunities. Emigrant Lake also offers similar opportunities and is located about 30 minutes away. Dispersed recreation can take place such as hunting, creek fishing, hiking and camping.

The lake bed would be gone and replaced by a stream channel. Restoration work will take place to restore the stream channel and planting and other restoration measures will help to restore the character of a stream with streamside vegetation. The upland areas will be planted with trees and native grasses. In time the general character of the area will return to a condition suitable for dispersed recreation.

For the short term there will be large amounts of rubble and remnants of the dam at the dam and lake site. The area will take on the character of a construction zone with heavy equipment operating for a period of 2-3 months. The scenic qualities of the immediate area would be affected for the time period required to complete the clean up and restoration process. After the cleanup is complete, the stream channel and native vegetation would be restored and dispersed recreation would again take place. People who formerly used Little Hyatt Lake for floating and fishing would have opportunities for similar lake recreation at Hyatt Lake or other nearby lakes.

While the change of the current pastoral view to a stream environment is a visual change, the resulting line, form and color associated with the stream is consistent with the lines, form, texture, and color of adjacent sights and is therefore consistent with the visual expectations for VRM Class 2 and therefore has no effect on visual resources.

Economics

Economics Effects of All Alternatives

The previous table (in section G) compared the costs of implementing each of the five alternatives. For comparison, the cost of the decision currently in place to repair the dam (2003 Environmental Assessment and Decision Notice) is approximately $1,000,000. Since costs are estimated, the numbers should be used in a relative sense rather than absolutes.

The least cost is Alternative 1 (No Action). The approximate $15,000 annual cost will continue on an annual basis until the safety threat has been ameliorated. The annual expense represents mostly labor costs for bi-weekly monitoring, annual inspections, and annual drawdown of the lake for the inspection. It is likely, however, that another emergency situation will occur as the dam deteriorates and based on the 2007 experience, that cost can easily go over $150,000.

While the direct cost of Alternative 2 to the BLM is minimal (about $75,000 to process the land sale), there is an indirect loss of 160 acres of public land, including the future sale of timber on the O&C lands. There is a slight benefit to Jackson County, however, as property taxes will be generated. The prospective buyer of the 160 acres will be required to repair the dam at an estimated cost of $700,000 plus the costs of permits and the buyer's share of the land sale.

The estimated costs (about $650,000) of Alternative 3 (Buttress) are based on BLM's estimates for the work plus the cost of some site restoration. It is unlikely any future unforeseen costs will be required as the buttress will remain in place regardless of the level of water behind the dam.

The partial removal of the dam (about $342,000) is 54%of the cost of buttressing the dam, and about 68% of the cost of removing (about $506,000) the dam.

Long-term Maintenance Liability (Public Health and Safety)

Liability is defined as both potential personal injury/death (Public Health and Safety) and long-term maintenance (Liability) responsibilities. Nationwide, the BLM it increasing its backlog of maintenance on existing structures and facilities. Based on both the Medford District's requests for backlog maintenance funds and the allocation of funds for backlog maintenance, it is apparent that, unless there is an emergency situation, funds to maintain Little Hyatt Dam will not be available. Its maintenance needs will be routinely added to the national backlog. Potential monetary liability associated with injury, death, or loss of property, if any, would be associated with a catastrophic collapse of the dam.

Liability Effects of Alternative 1

The BLM is currently monitoring the dam bi-weekly and inspecting it annually. There is a siphon system in place to draw down the lake should the need arise (emergency or inspection). These costs will be borne by BLM annually until the dam no longer has the potential for catastrophic collapse. In absence of removing the structure, BLM will likely have to continue with stabilization efforts like the 2007 effort to stabilize the right abutment. These expenses are quite costly (estimated cost for 2007 is $150,000). The No Action Alternative results in continued accrual of repair/maintenance needs of the dam. Such accrual eventually will be the major cause of dam failure or emergency repair/removal. Therefore, there will likely be substantial monetary liability for some time into the future. Unfunded maintenance will be added to the cumulative BLM maintenance backlog.

The no action alternative has the potential to significantly affect public health and safety. If the dam were to suddenly fail, a large torrent of water (the equivalent of one football field sixty feet tall) would wash down the canyon and potentially kill or injure anyone within the range of the oncoming discharge of

water. Damage to power generation associated with Keene Creek reservoir downstream is likely from the vast amount of sediments washing down from the dam. Because homes are on higher ground downstream from the dam, it is likely no domiciles will be affected. The footbridge for the Pacific Crest Trail and the county road below the dam will be destroyed, and the bridge on Highway 66 across Keene Creek may suffer damage. These are the potential property losses associated with this alternative. As long as the dam is standing in its current condition, the potential for injury, death, or loss of property remains.

Liability Effects of Alternative 2

The Community Alternative relieves the BLM's liability in approximately 5 years when the land sale is completed and the liability is transferred to the new private owner. However, there are numerous potential events that will cause BLM to retain the liability associated with the dam for much longer than 5 years. While the risk of the following events happening is undetermined, the longer the dam remains in its current condition, the sooner the day (if it occurs) the dam catastrophically collapses.

- Land sales are complex, time-consuming events subject to funding. Protests, appeals, or litigation surrounding the proposal to sell 160 acres of public lands will delay the sale and liability transfer process.
- Prior to the time the land sale is finalized (5 years), the accrued non-maintenance may result in a dam collapse, catastrophic or otherwise (same situation as Alternative 1).
- Factors such as bankruptcy, death, divorce, foreclosure, litigation on behalf of the potential buyer will interfere with execution of land and may extend the time before (if ever) liability is transferred away from BLM.
- The value of land and the cost of goods and services are highly variable from year to year and the land value may not support the cost of repairing the dam, thus delaying the transfer of ownership.
- There is a risk that despite the BLM's best intentions in stating the terms of the land sale, the buyer or potentially new owner will renege on their responsibilities toward final execution of the land sale and subsequent repair of the dam.
- If the costs and or liability concerns for potential buyers becomes too great and no bids result for the dam and adjacent property, the BLM will continue to have the long-term liability issue beyond five years as another alternative is selected and implemented.

Liability Effects of Alternative 3

Buttressing the dam (Alternative 3) relieves the long-term maintenance liability because the dam structure will be reinforced. There is no anticipated maintenance of the buttress.

Until the funding is secured (estimated within three years), the liability for the BLM remains the same as Alternative 1.

Liability Effects of Alternative 4

Partially removing the dam (Alternative 4) relieves the long-term maintenance of the facility because the dam no longer exists to the extent that maintenance is required. Eventually, however, as the remaining structure crumbles, there may need to be a final removal of material for safety concerns.

Until the funding is secured (estimated within three years), the liability for the BLM remains the same as Alternative 1.

Liability Effects of Alternative 5

Removing the dam (Alternative 5) relieves the long-term maintenance because the dam no longer exists. Until the funding is secured (estimated within three years), the liability for the BLM remains the same as Alternative 1.

Environmental Justice

This project was reviewed for the potential for disproportionately high or adverse effects on minority or low income populations. No adverse impacts to minority or low income populations would occur (*Executive Order 12898 (Environmental Justice).*

Comparison of Alternatives

	No Action	Community Repair	Buttress	Partial Remove	Full Remove
Public Safety	Risk of catastrophic failure remains until dam collapses	Risk is minimal (always some risk with standing dam)	Risk is minimal	No risk	No risk
Long-term Maintenance Liability	Continues long-term liability until dam deteriorates	None, because BLM no longer owns the property and would have no liability	Very minimal	Very minimal, but years out may have to remove remnant structure	None
Water Quality	Substantial but short-term if catastrophic failure occurs	Short-term disturbance during water drawdown	Short-term disturbance during water drawdown	Short-term disturbance during water drawdown	Could be substantial if major water flow event occurs before sediment is removed from channel behind dam
Water Temperature (related to 303d listing)	Dam adds 1.5 degrees to water temp downstream until dam deteriorates	Dam adds 1.5 degrees to water temp downstream	Dam adds 1.5 degrees to water temp downstream until natural deterioration of dam	Decreases water temp by 1 to 1.5 degrees downstream	Decreases water temp by 1.5 degrees downstream
Fish	Keeps most nonnative fish from entering Jenny and Keene Creeks until dam deteriorates	Keeps most nonnative fish from entering Jenny and Keene Creeks	Keeps most nonnative fish from entering Jenny and Keene Creeks	Removes intermediate blockage to nonnative fish (not 100% effective currently) from stream system	Removes intermediate blockage to nonnative fish (not 100% effective currently) from stream system
Wildlife (T&E)	No impacts	Disturbance during construction minimal due to timing of work restrictions	Disturbance during construction minimal due to timing of work restrictions	Disturbance during construction minimal due to timing of work restrictions	Disturbance during construction minimal due to timing of work restrictions
Wildlife	Favors lake/riparian species until dam deteriorates	Favors lake/riparian species	Favors lake/riparian species	Favors wetland and riparian species	Favors stream related species
Recreation	Maintains camping and lake related recreation until dam deteriorates	Limits use of lakeshore to edge along county road; use of lake, itself continues	Maintains camping and lake related recreation until dam deteriorates	Lake related recreation mostly eliminated, wetland and stream related recreation available	Virtually removes the current lake recreational uses, though camping related to Pacific Crest Trail would still occur
Aesthetic Quality	Disrupts ambience of the picturesque dam due to strong visual distraction of siphon system	Maintains ambience of the picturesque dam and relationship of water to forest scene	Substantially reduces the quaintness of the dam, but lake still in place until dam deteriorates	Lake and open water character replaced with large scale wetland	Lake and dam ambience is replaced with a stream
Cost to Taxpayer	$15,000/yr until dam deteriorates, unless claims occur from catastrophic failure. Claims could be substantial	$75,000 but also loss of 160 acres of public land into private ownership	$360,000	$435,000	$835,000

Each alternative is compared as being fully implemented.

I. PUBLIC PARTICIPATION

Extensive scoping has occurred for this project. This project has had years of discussion starting in 1998. Letters were sent out to neighbors announcing BLM's intent to publish an EA. At that time a number of discussions took place with interested neighbors to understand local concerns. In 2003 an Environmental Assessment was published and a Decision to repair the dam was made. Since then, repeated attempts to procure funds to repair the dam have been made and failed. More recently between 2007 and today, as the concern for the safety of the dam has increased, numerous neighborhood and individual meetings have taken place with BLM and interested neighbors. Several newspaper articles have been published in the local newspaper, numerous e-mails have been exchanged with neighbors, and agency to agency discussions have taken place. In 2007 and 2008 local elected officials facilitated discussions between BLM and community interests trying to identify alternatives that would meet both agency and community needs.

This EA was distributed to adjacent landowners and to the following agencies, organizations, companies, and tribes:

Organizations and Agencies

Association Of O&C Counties
Audubon Society
BOR Bend Field Office
BOR Lower Columbia Area Office
Department of Environmental Quality
Department of State Forestry
Hannon Library Southern Oregon University
Friends of the Greensprings
Indian Hill LLC
Jackson. County Soil & Water Conservation District
Jackson Co. Commissioners and Courthouse
Jackson Co. Stockman's Association
Klamath Siskiyou Wildlands Center
Little Butte Watershed Council
Medford Irrigation District
Medford Water Commission
Meriwether Southern Oregon
Murphy Creek Timber Company
Northwest Environmental Defense Center
Oregon Department Environmental Quality
Oregon Department of Fish and Wildlife
Oregon Wild - Western Field Office
Pacific Legal Foundation
Rogue River-Siskiyou National Forest
Rogue River Valley Irrigation
Siskiyou Project
SOTIA
Superior Lumber Company
Talent Irrigation District
The National Center for Conservation Science and Policy

Federally Recognized Tribes

Cow Creek Band of Umpqua Tribe of Indians
Confederated Tribes of Grand Ronde
Confederated Tribes of Siletz Indians of Oregon
Klamath Tribe
Quartz Valley Indian Reservation (Shasta Tribe)
Shasta Nation

Other Tribes

Confederated Tribes of the Rogue-table Rock and Associated Tribes
Shasta Indian Nation

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