

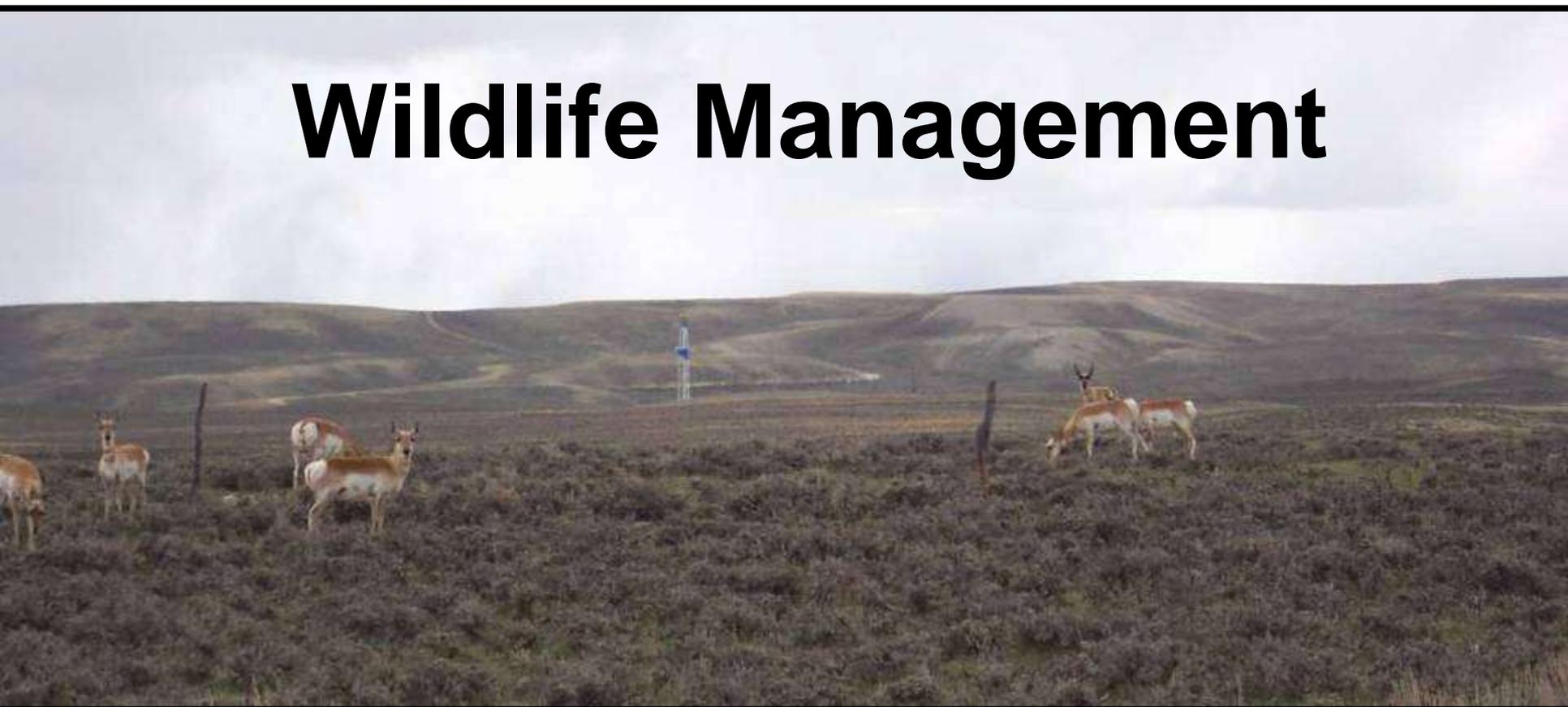


U.S. Department of the Interior
Bureau of Land Management



Updated: January 2013

Wildlife Management



Best Management Practices for Fluid Minerals

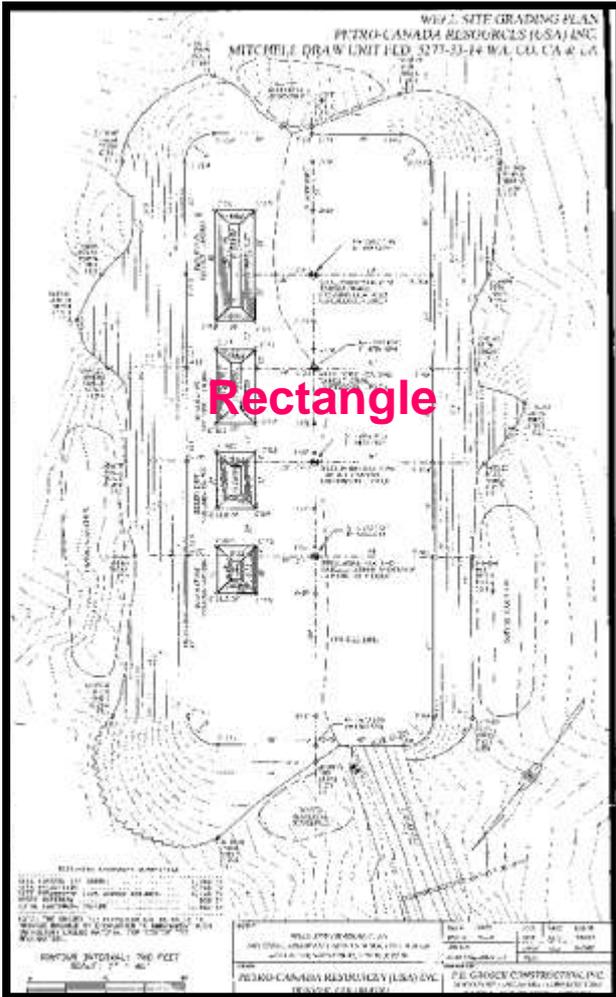
BMPs Minimize Wildlife Mortality and Habitat Fragmentation

Typical BMPs May Include:

- Reducing the Initial and Interim Size of Roads and Well Pads.
- Corridoring Buried Pipes and Power next to the Road.
- Drilling Multiple Wells from a Single Well Pad.
- Eliminating Mortality Hazards to Wildlife.
- Reducing Noise and Traffic.
- Centralizing Production Facilities Off Site.
- Remote Production Monitoring.



Pad Design to Minimize Disturbance

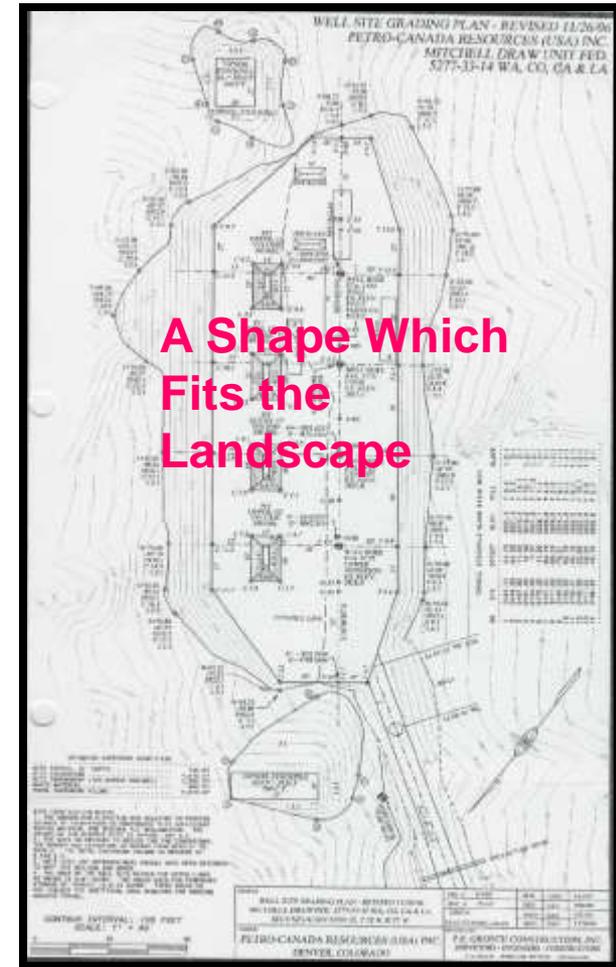


Area: 1.3 acres
Total Dirt Moved:
10,520 cy yd

Pads do not
have to be
rectangular.

Result →

- Less disturbance
- Less habitat loss
- Less reclamation
- Less cost to build



Area: 1.0 acres
Total Dirt Moved:
5,010 cy yd

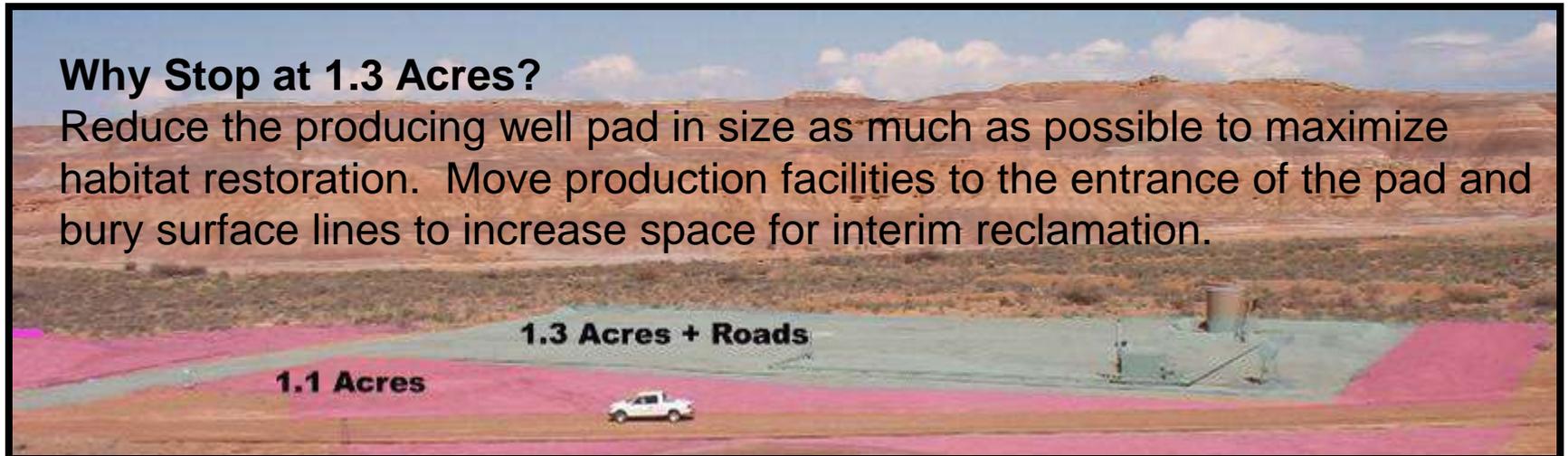
Interim Reclamation

Short-term reclamation that occurs as the well is beginning initial production of oil and/or gas. Includes partially reshaping and revegetating roads, and well pads to reduce the amount of bare ground created during construction and drilling activity.

To minimize habitat loss and fragmentation, re-establish as much habitat as possible by maximizing the area reclaimed during well production operations. In many cases, this “interim” reclamation can cover nearly the entire site, including the road and right up to the facilities.

Why Stop at 1.3 Acres?

Reduce the producing well pad in size as much as possible to maximize habitat restoration. Move production facilities to the entrance of the pad and bury surface lines to increase space for interim reclamation.



Gray = Unreclaimed

Pink = Recontoured and seeded

Interim Reclamation - A Paradigm Shift

It is okay to set up well workover operations on, or park on, the restored wellsite or roadside interim vegetation.

Limit activities to only the area that is necessary. To avoid fires, consider mowing the vegetation where you will park. Repair the damage and revegetate when you are done.

Question: “But aren’t you are damaging the new vegetation?!?”

Answer: Yes, but it is temporary and minor damage. Keep in mind, the operator has the right to develop the lease and maintain production operations within reasonable constraints. Future well maintenance operations will use far less land surface area than do the original drilling operations.

And Consider this:

What causes less loss of habitat:

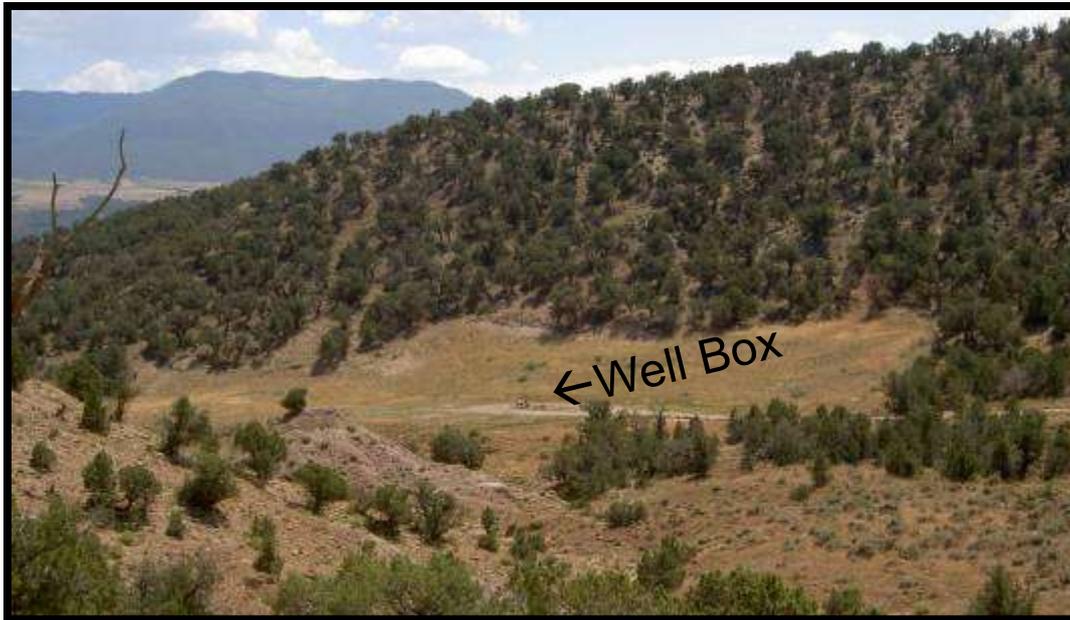
- A one or two acre well pad left barren for 40 years of oil or gas production, or
- Revegetating the entire well location, knowing that a small portion of it will sustain vehicle traffic and temporary vegetation damage during future production and maintenance operations?



Parking on the vegetation.
(It will green-up next spring.)

Interim Reclamation

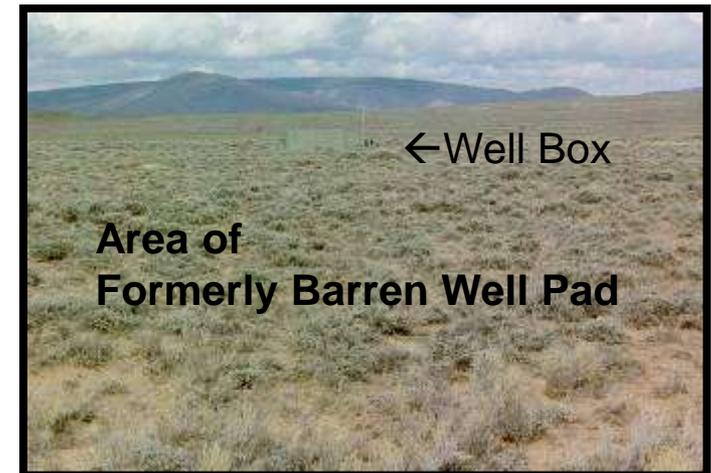
Interim reclamation should begin shortly after construction or establishing oil or gas production on the site.



If the disturbed areas are covered with topsoil and seeded with appropriate amounts and varieties of native species, over time, local natives will typically reestablish themselves on the site, helping to restore proper species composition and structure.

Steps:

1. Fully recontour unneeded areas to the original contour or a contour that blends with the surrounding topography;
2. Respread topsoil over entire pad;
3. Revegetate to reestablish habitat.



Interim Reclamation – Good and Bad Examples

Seed with the proper species, varieties, and amounts of seed.

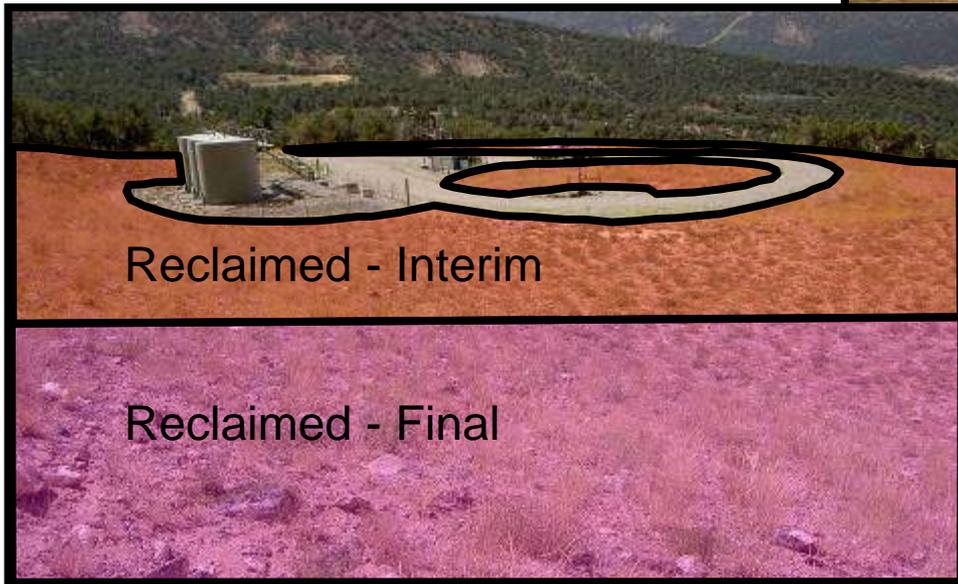
The use of native species is preferred. Consider adding shrubs and forbs to the seed mixture, where appropriate, to reestablish habitat.

Good...

- + Vegetation reestablishing on pad close to facilities.
- + Concentrate facilities near the entrance road to maximize area for interim & final reclamation.



Unvegetated Bare Ground



Reclaimed - Interim

Reclaimed - Final

- ↑ Not so Good...
 - Bare ground out to the rig anchors.
 - Long-term loss of habitat and forage.
 - Maintenance problems including mud & weeds.

Interim Reclamation of Roads



The Standard Road:

Ditches erode each time it rains. Annual maintenance including blading and weed control is required.



With Interim Reclamation:

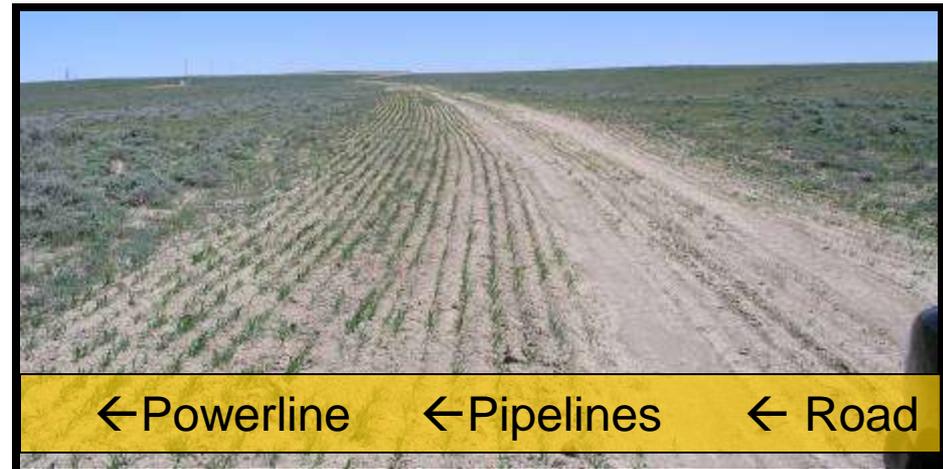
Oversize borrow ditches covered with topsoil and seeded. Consider seeding the road surface for low use roads. Forage and habitat is partially restored. (Along high speed or high traffic roads, avoid planting species that may attract wildlife.)

Interim Reclamation of Roads

Respread Topsoil On All Road Cut and Fill Slopes and Revegetate to Ensure Slope Stability, Erosion Control, Restoration of Forage & Habitat, Maintenance of Visual Resources, and Topsoil Viability.



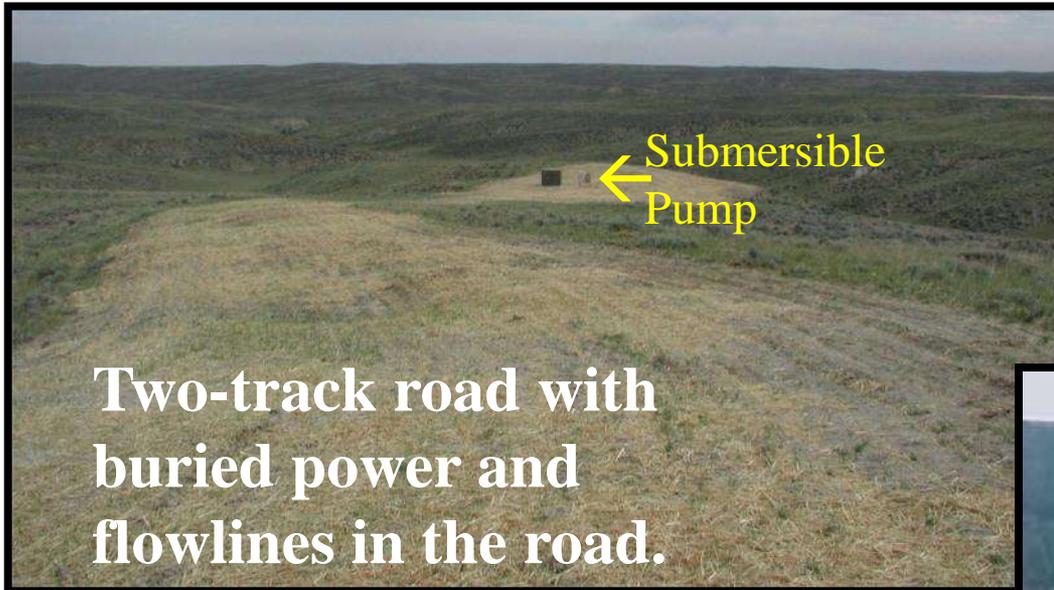
Respread Topsoil to the Road Surface
Roughen the Soil to Trap Seed & Water.



Minimize Roads

In the BLM 9113 Manual, it states:

Bureau roads must be designed to an appropriate standard no higher than necessary to accommodate their intended functions...



In some cases, short, low volume, two-track spur roads to the wellhead may be the suitable choice and create the least fragmentation of habitat.



Consider:

Average daily traffic (ADT)
load, vehicle size, soil type, topography,
weather, season of use, safety, etc...

Mat Pads

To Reduce Reclamation Costs & Speed Recovery

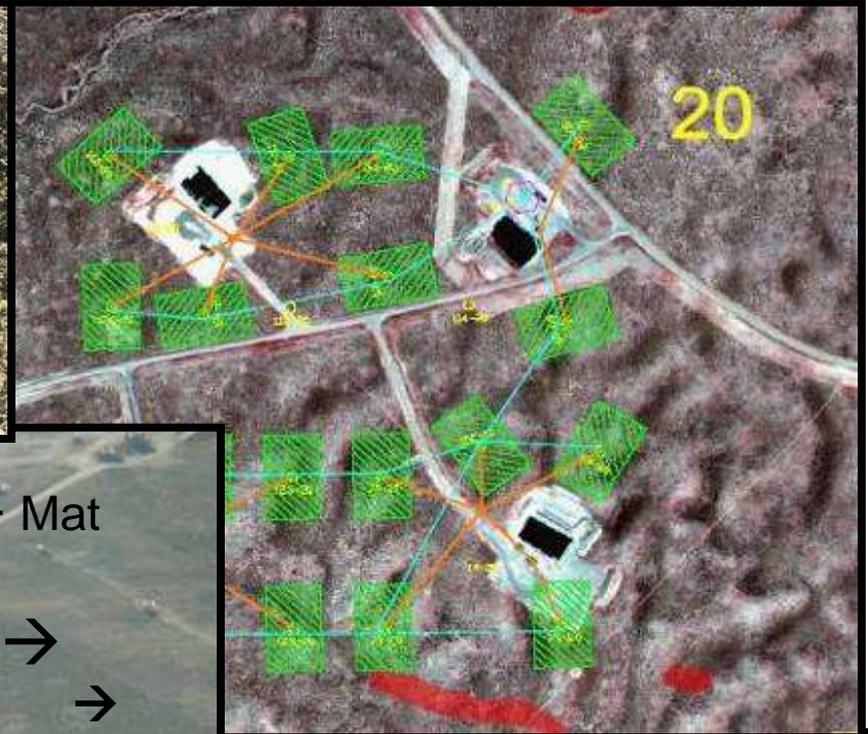
Use of Oak Mats for Pads and Roads



Hub & Spoke w/ Oak Mat Pads

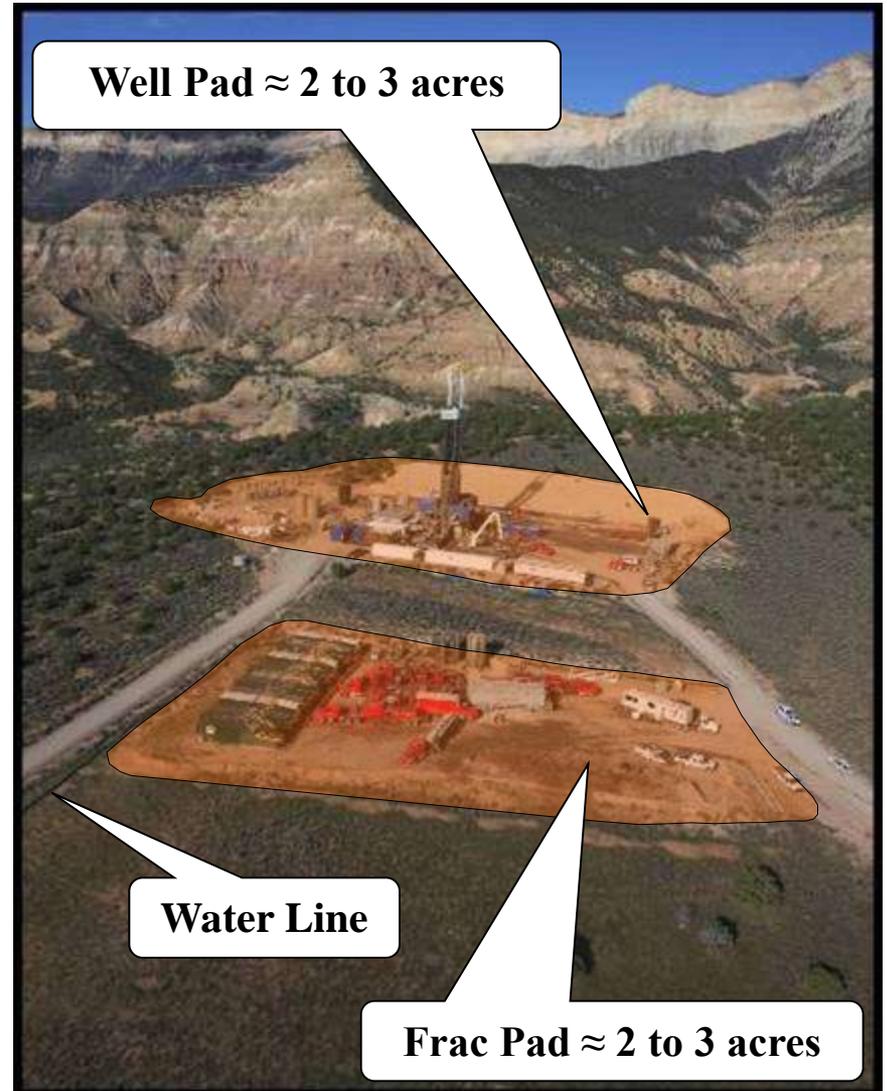


Flowering sagebrush one year after mat pads removed.



Centralized Hydraulic Fracturing & Water Piping

- **This central frac pad will serve many well pads, up to four miles away.**
 - Therefore, each well pad can be smaller, because it no longer has to be constructed large enough to hold many frac tanks.
- **Centralized water storage is piped to the frac pad.**
 - Therefore, many water truck trips eliminated each day during the fracturing process.



Directional Drilling Multiple Wells On An Individual Well Pad

Reduces the footprint of oil and gas activity in wildlife habitat.

Photo of 16 Wells on 1 Well Pad...

The result: Construction of 15 fewer well pads, 15 fewer roads, 15 fewer power lines, and reduced maintenance cost.



The feasibility of directional drilling is dependent on the subsurface geology and the depth of the hole.



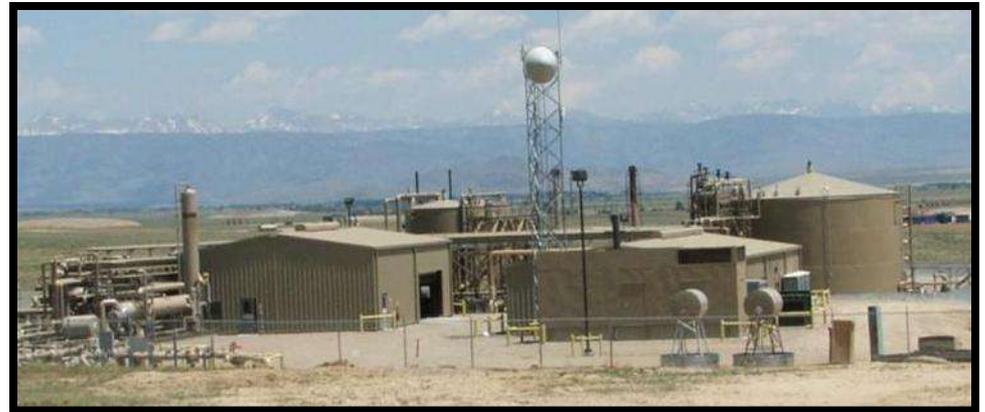
Liquids Gathering Systems Serving Offsite Production Facilities

Run liquids gathering lines (oil, gas, water, condensate) to centralized production facilities placed offsite, away from sensitive resources and habitat.

The Result:

Year-round truck traffic to each individual well is significantly reduced.

- Therefore, you may be able to use lower road standards which may result in less loss of habitat.
- There is less disturbance to wildlife because large haul trucks are not running to each well location during critical wildlife time periods to collect fluids.



A centralized production facility located outside of important wildlife habitat can service many wells and eliminate many thousands of truck trips.

Remote Telemetry Monitoring

Remote telemetry of wells and related production equipment can reduce the number of maintenance and inspection trips made during critical time periods for wildlife and result in less wildlife disturbance.



← Antenna

Electronic
Monitoring

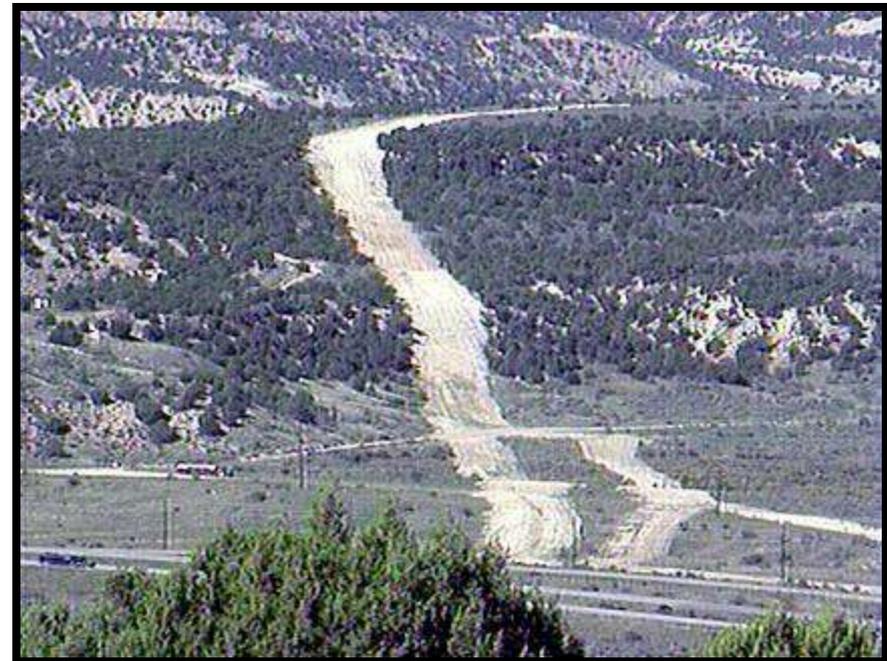


Use Common Corridors

Bury power, flow, and pipe lines **in or adjacent to the road** to eliminate cross-country vegetation clearing and resulting habitat fragmentation.



The lone pipeline on the right not only fragments habitat, but also reduces the scenic quality. →



Ripping-in Buried Pipelines & Utilities



Plowing and pulling pipes and lines into the ground in certain soil types will disturb much less ground and vegetation than excavating and trenching.

Plowing Method

Standard Excavating Method



For Aerial Utilities – Prevention of Avian Electrocutation

1) Isolation; 2) Insulation; or 3) Deterrence

Raptors perching on power poles can be electrocuted. Perches also provide easier hunting for raptors that prey on BLM sensitive species, such as sage-grouse.



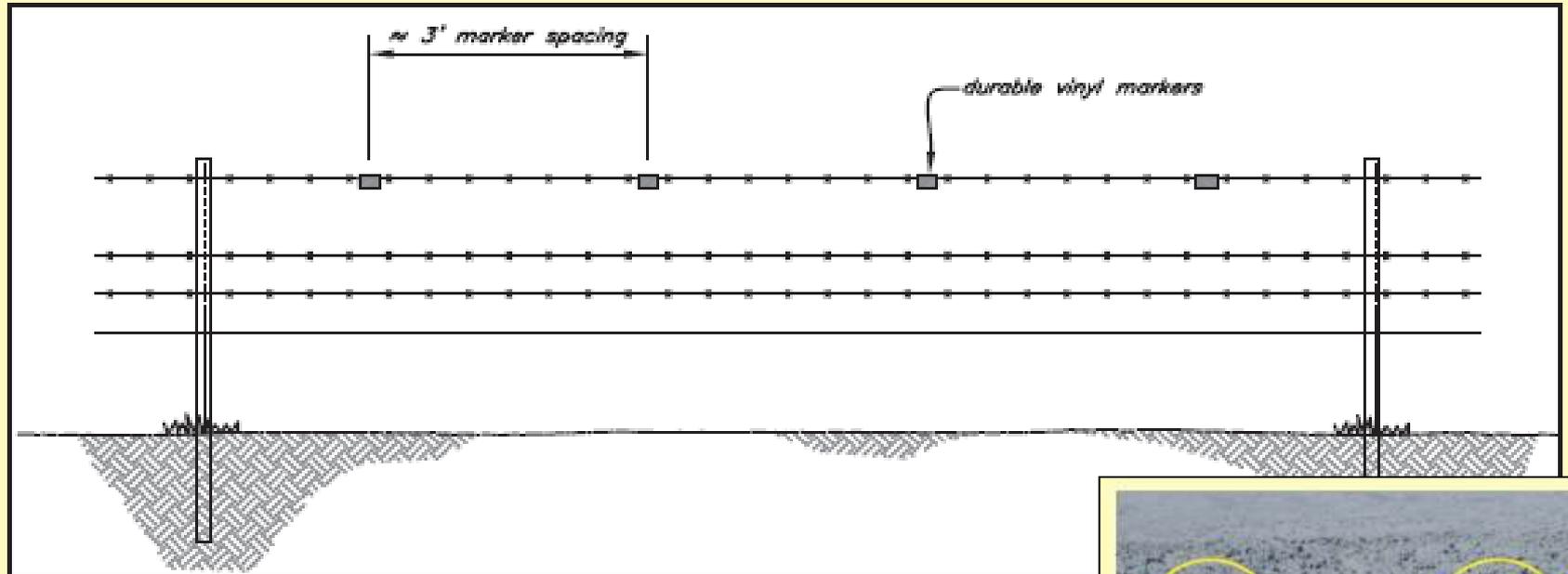
Priority Order:

- 1) Isolation:** Maintaining a minimum separation spacing of 60 inches between live wires/conductors and grounded hardware/conductors.
- 2) Insulation:** Covering live wires/conductors, or grounds where separation cannot be achieved.
- 3) Deterrence:** Installing perch discouragers where insulating techniques cannot be used.

For additional information, refer to: “Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006”

http://www.dodpif.org/downloads/APLIC_2006_SuggestedPractices.pdf

Fence Marking: Reduces Grouse, Prairie Chicken and other Avian Collisions with Fences



Owl collision with a fence.



Non-Reflective Markers

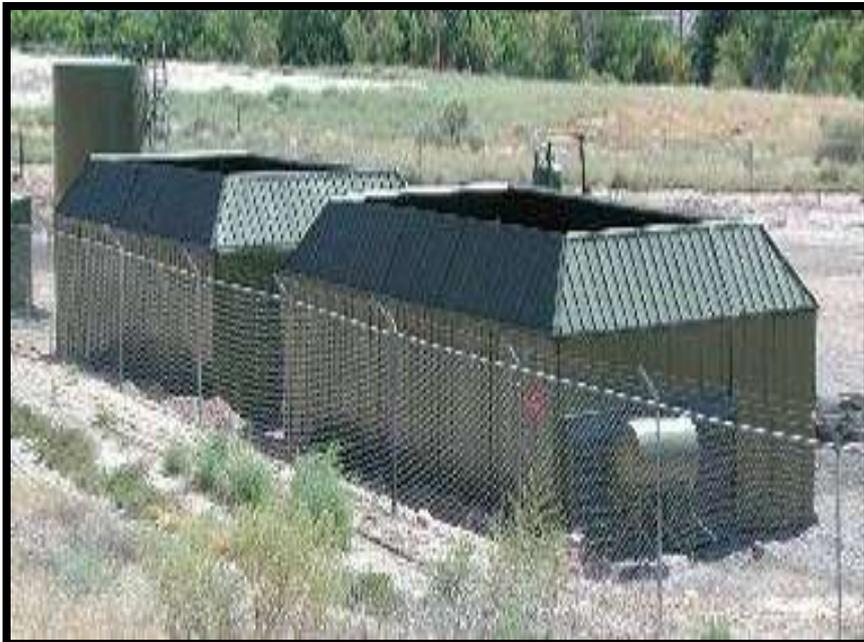
Alternate dark and white-colored markers every 3 feet.

Minimize Noise

Noise can deter wildlife from using an area.

- Use noise reduction mufflers to comply with noise standards.
- Also, consider using earthen berms, walls, sheds, and/or distance to reduce sound levels in important habitats.

4-Side, Open Compressor Building



4-Side, Closed Compressor Building



Photo courtesy of: Acoustical Control Inc.

Development Planning

Planned Development can reduce unnecessary disturbance by reducing unnecessary roads in important habitat. A **Field Development Plan** should address sensitive area avoidance or mitigation, potential road, utility, and well locations, road classes, plans for interim and final reclamation.



None of these road shortcuts are necessary.

Plan the main road system prior to development.



(Photo Simulation)

Reduce Vehicle Traffic

In important wildlife areas and during critical wildlife use periods consider:

- Seasonal restriction of public vehicular access in new development areas such as dead-end, well access roads or designated portions of the field.
- Operator enforced speed limits during critical seasons.
- Using shuttle vans and buses to transport drilling rig workers and field service personnel.



Frequent vehicular use... creates dust which degrades habitat, produces noise which disturbs wildlife, causes direct mortality from collisions, and requires higher class roads to accommodate increased traffic.

BMPs Must Be Correctly Designed, Monitored, and Maintained

It is not enough to use BMPs, they must also be properly designed, constructed, and maintained to ensure they are functioning properly. Constant monitoring, inspection, and enforcement are required to ensure BMPs remain necessary and effective.



Violations: There is oil in the pit and the net is down.

This net was placed above the pit to prevent migratory waterfowl from landing in the pit in the unlikely event oil was accidentally discharged into the pit. (Oil is not permitted in pits.)

The net has fallen down due to its poor design, construction, and a lack of maintenance and is no longer effective at preventing wildlife access.

Excluding Wildlife

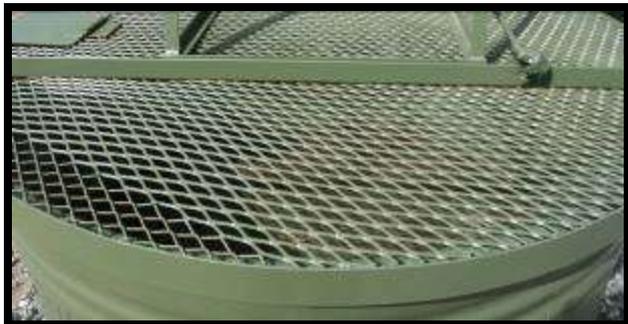
Cover all “production” related pits and tanks to exclude wildlife, regardless of pit or tank size. Migratory birds can drown in small volumes of contaminated water and other fluids. Violations of the Migratory Bird Treaty Act can result in substantial penalties.



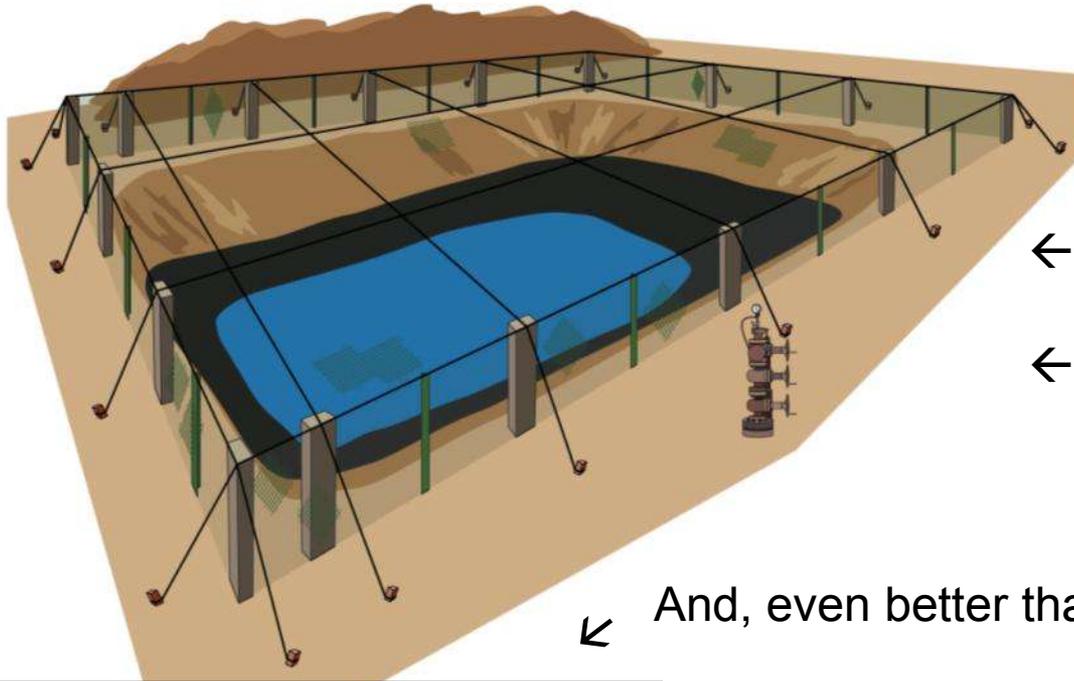
Searching for dead birds in an **open** tank.

Unfortunate Results:

Tank and drip-pan with wildlife exclosures.



Excluding Wildlife: A Better Pit and Mud System Design



← Fencing and Netting
Keep Wildlife Out.

← Liners Keep Liquids In.

← And, even better than open pits...

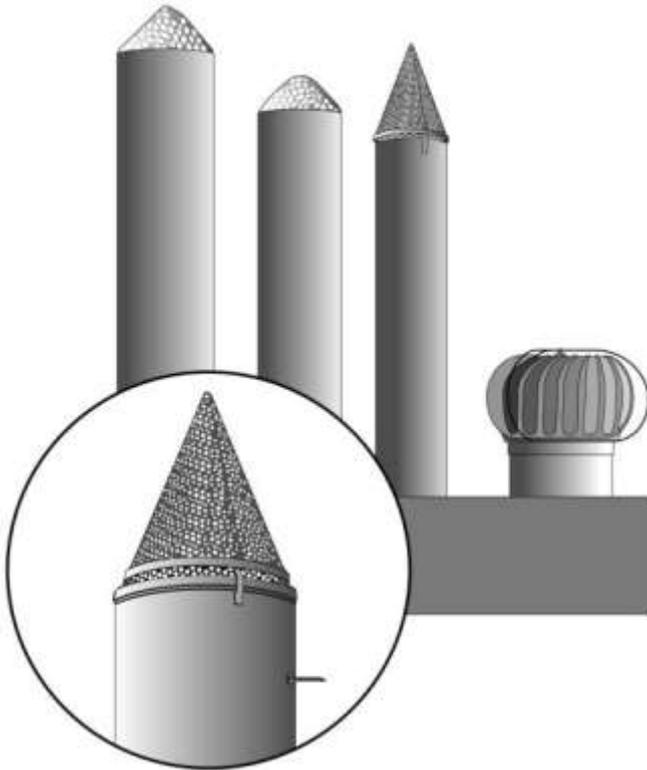


...is the use of
closed loop
mud-tank
systems.



Excluding Wildlife: Screening or Enclosures

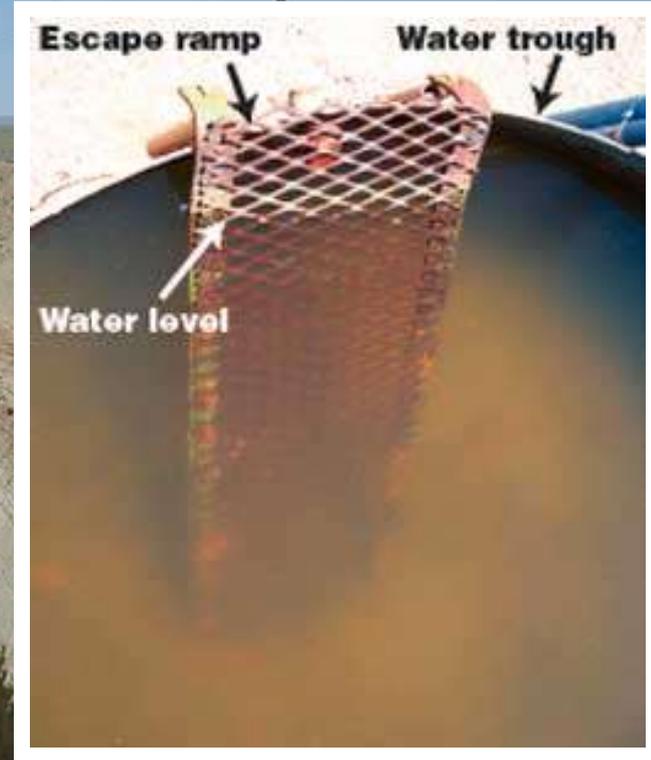
“**Bird Cones**” keep birds and bats from roosting, nesting, or sleeping in open-vent exhaust stacks.



Drips from Fuel, Chemical, and Methanol Tanks should be Captured and Screened or Enclosed to Prevent Wildlife and Livestock Use.



Wildlife Escape Ramps to Prevent: Pit, Trench, and Tank Entrapment



Off-Site

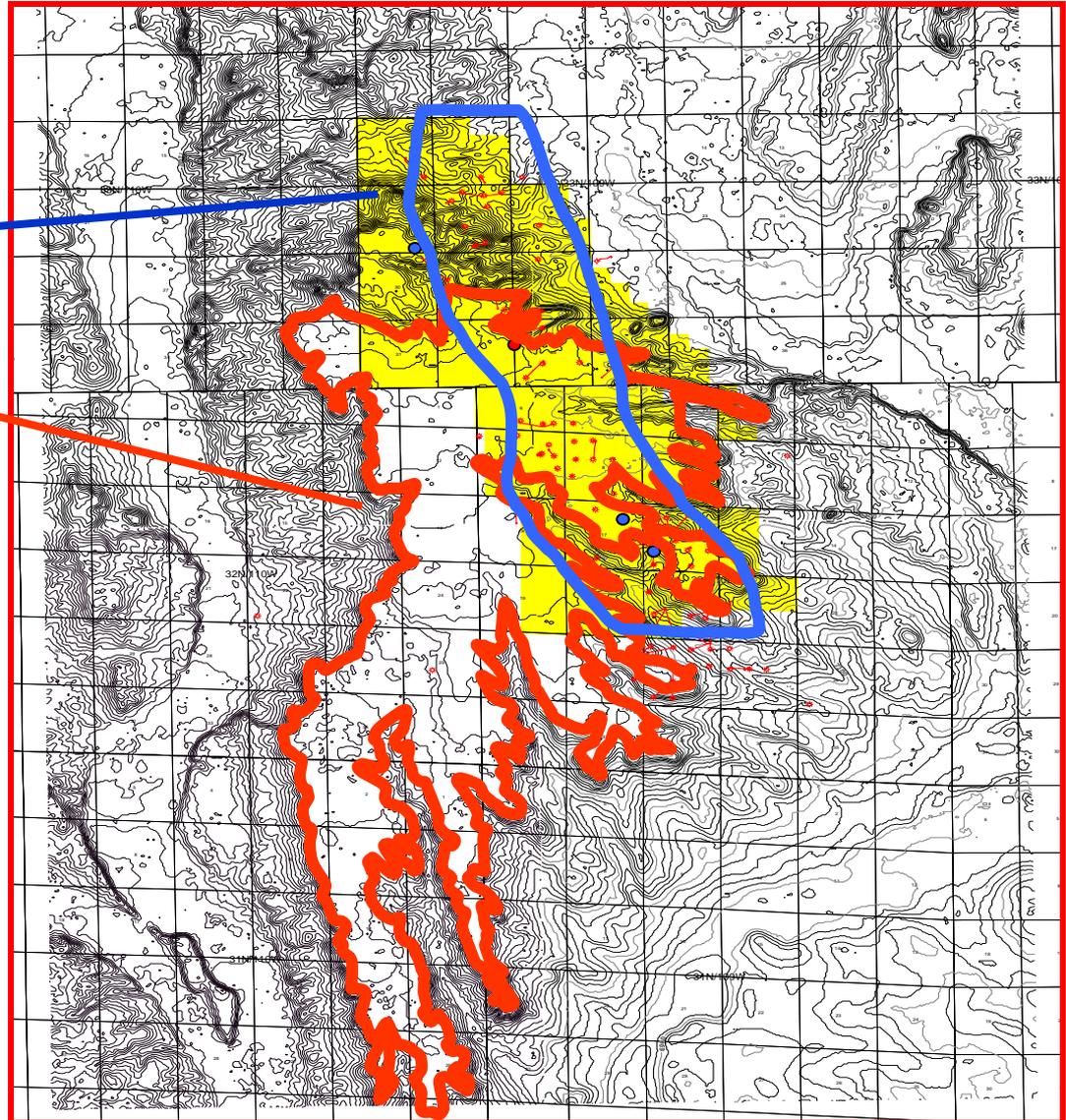
Habitat Mitigation

Photo of an energy production area and an area of wildlife habitat that could be improved to compensate for energy development.

Productive Energy Area

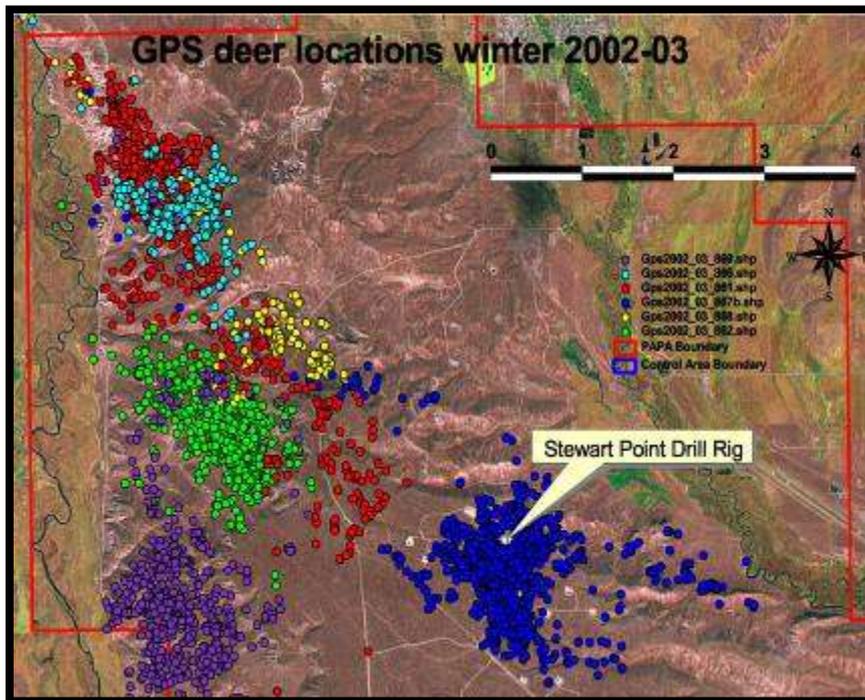
Potential habitat mitigation area

In some cases, the cumulative impacts of development to wildlife habitat may necessitate taking actions to enhance local or off-site habitat. Habitat mitigation helps to reduce the impacts of habitat loss or fragmentation until full, final reclamation at the end of the oil and gas field life.



Wildlife Monitoring

Monitoring wildlife populations is critical to confirming that our mitigation is necessary and effective. It also provides the justification for taking new actions or avoiding unproductive actions.



Each colored dot represents one deer with a GPS collar that records three times per day.

← The blue dots represent the locations of a tagged mule deer around a winter drilling operation.

Monitoring deer populations during winter drilling operations. Photo overlay is a summertime photo.

Final Reclamation

Final reclamation begins when well production ends. Ensure the site is recontoured, stable, and fully revegetated. If reclamation is done correctly, over time, the habitat will restore itself.

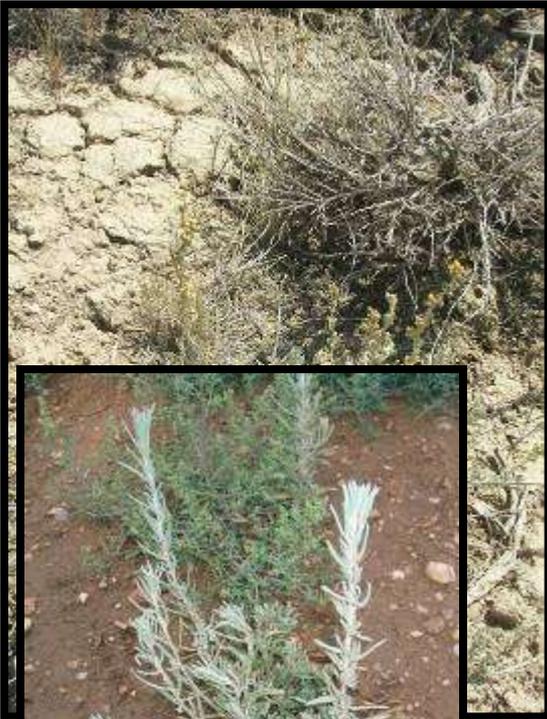
Remember, oil and gas development is not a permanent use of the land.



This reclaimed well pad has been recontoured (reshaped) to the pre-drilling contour, revegetated with native species, and over time will blend with the surrounding seamless landscape.

Habitat Restoration

Each species has its own habitat needs. Final reclamation practices should be focused on restoring important habitat where it exists.



← Plant This

Not

This →



Crested wheatgrass

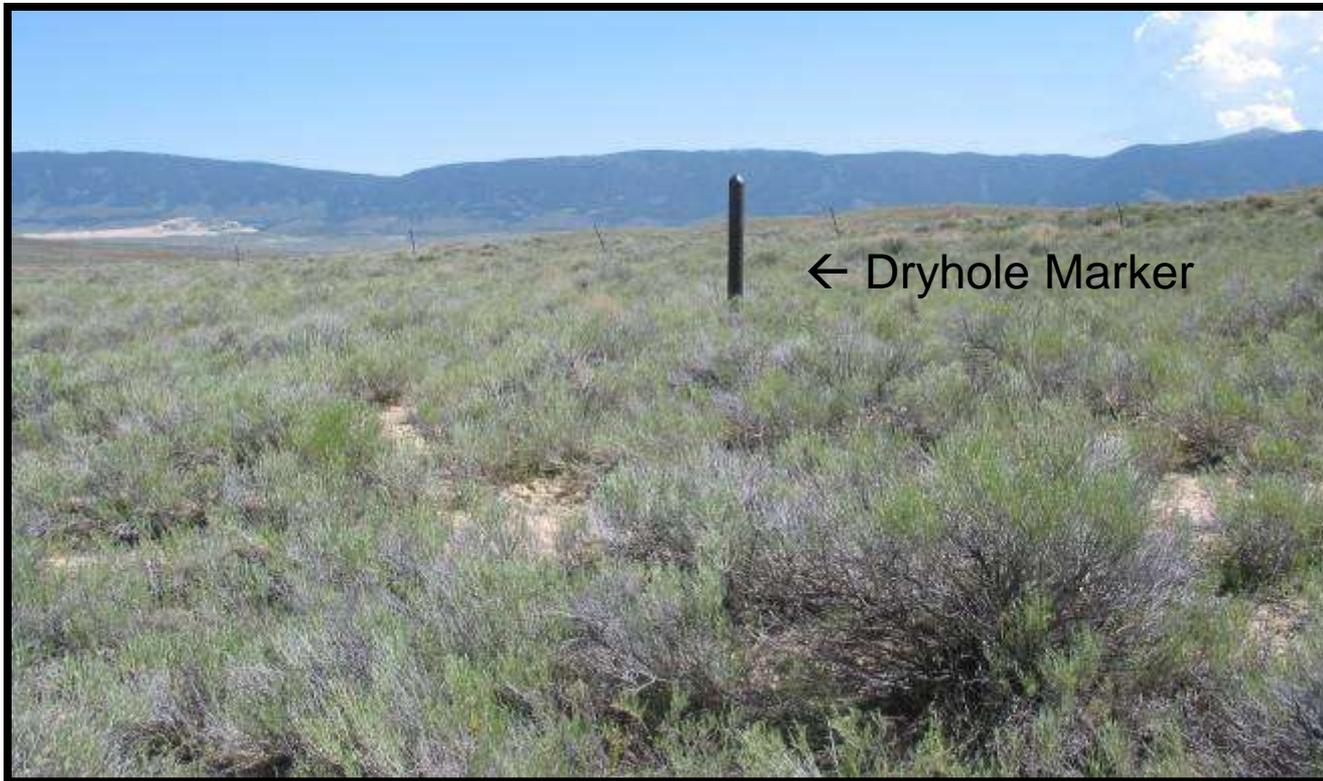
Final Reclamation Monitoring

Questions to ask:

Is the site stable from wind and water erosion?

Has the native plant community reestablished itself over time?

Has habitat been restored to proper species composition, size, and structure?



In this photo, the native plant community is slowly reestablishing itself on the reclaimed well pad. The dryhole marker indicates the old well location.

(Avoid the use of surface dryhole markers that can serve as raptor perches.)

In Summary:

Minimize the Footprint of Energy Development

To reduce wildlife habitat fragmentation, loss, and degradation, consider:

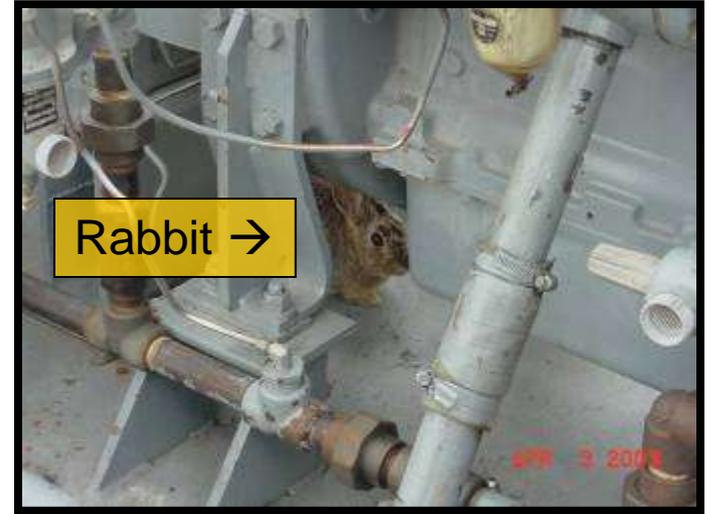
- lower class roads
- use of common corridors for roads, power, & pipelines
- smaller pads
- interim reclamation of roads and well pads
- native plant species for reclamation





Pronghorn Adjacent to Drill Rig

Deer on Well Pad



Hawk Nest on Tank Stairs

