BEAVER MANAGEMENT STRATEGY

Malheur National Forest and the Keystone Project
September 2007

This strategy renews the commitment to beaver management agreed to in the 1998 John Day Basin Beaver Restoration Memorandum of Agreement, (attached, Appendix A) as attested by the following:

USDA Forest Service, Malheur National Forest	4/20/08 Date
Linda Druskill Grant County Conservationists	2/29/2008 Date
Doug Calvin Confederated Tribes of the Warm Springs, John Day Basin Office	4-18-08 Date
Ryan Torland Oregon Department of Fish and Wildlife, John Day District Office	2/4/08 Date
Christina M. Welch Bureau of Land Management, Prineville District	10/18/2007 Date
Lorraine Voigt USDA Natural Resource Conservation Service, John Day Office	4/11/08 Date
Grant ~~County~~ Soil and Water Conservation District	4/11/08 Date
Oregon State University, Grant County Extension Office	3-3-08 Date
Confederated Tribes of the Umatilla, Pendleton Oregon	9/27/07 Date
Burns Paiute Tribe, Burns Oregon	1/22/2008 Date

BEAVER MANAGEMENT STRATEGY

Malheur National Forest and the Keystone Project

I. Goals of Strategy:

Among the Forest Service's mandates is to maintain or restore healthy ecosystems. This includes restoring and maintaining healthy wetlands and riparian habitat. The 1998 Interagency Coordination Agreement, in which the Malheur National Forest is a collaborating partner, affirms this goal and establishes a protocol for reestablishing beaver in the John Day Basin.

This beaver management strategy focuses on the need for integrating the role of beaver in aquatic restoration. The Malheur National Forest hopes to elevate the awareness of beaver and their importance to riparian system and to achieve viable and effective beaver populations on Forest Service lands.

This management strategy is in accord with the direction of the new Forest Plan Revision to achieve ecological sustainability through the use of species-of-interest such as the beaver, a key component for restoring and maintaining healthy wetland and riparian habitat.

This strategy renews the commitment to beaver management agreed to in the 1998 Memorandum of Agreement.

II. Overview

The United States Forest Service is the steward of National Forest lands, providing for human needs while protecting the ecological integrity of the forest. Healthy riparian and wetland communities are part of that ecological integrity. For dry east-side forests, it may be that our "critical resource is not trees, grass, or even soils, but water" (Langston 1995).

It is estimated that 60 to 400 million beaver once occupied and influenced the stream, river, and lake systems of most of North America (Naiman et al. 1986). By the 1800's, however, trappers in search of beaver pelts became so efficient in their craft they nearly eradicated these animals from the landscape.

Beaver are one of the few animals that actively modify their physical surroundings to provide for their own safety and access to feeding areas. Beaver dams and the resulting ponds create habitat for a multitude of other species, as well as influence the hydrologic function of the creek, including water flow, water storage, water temperature and sediment retention. Additionally, they increase the potential for ground water recharge and may also enhance subsurface flows, positively affecting aquifers and benefiting both riparian and in-stream communities.

Many of our current hydrological problems can be traced to the elimination of the beaver by 1860 (Olson and Hubert 1994). Because of the complete absence of these animals in some areas, our cultural memory lacks awareness of the importance of beaver in riparian systems. We simply do not realize what impact these animals had on their environment and what has been lost.

Since the mid-1900's, the Malheur National Forest has evaluated beaver management strategies with a goal to support their recovery and increase their dispersal throughout the Forest. Previous plans and strategies include: The Status of Beaver within the Malheur National Forest (Malhuer National Forest 1947); the collaborative Beaver Management Measure Plan (Wildlife Damage Control et al. 1991); and the collaborative Memorandum of Agreement (Confederated Tribes of the Warm Springs, et al.1998) (Appendix A).

A. Benefits of Beaver Restoration

Beaver have a tremendous impact on their environment; a few of the benefits are listed below:

Water storage: Beaver dams impound water, decreasing or retarding spring runoff by providing water storage in upstream watersheds. This offsets the effects of floods and improves and prolongs stream flows throughout the summer and during drought years (Lolo National Forest Draft Beaver Management Plan 1983).

***Water temperature mediation*:** A study of the Bridge Creek beaver on the Prineville BLM near Mitchell, Oregon showed that the existence of one beaver dam and pond forced warm water out of the channel and into the colder ground thus causing a return flow of relatively cooler water downstream (Demmer 1999, Munther 1981). Temperature mediation can vary by season; ground water and deeper subsurface flows can provide cooler water inputs in summer and warmer water inputs in winter.

Elevated water tables: Beaver dams elevate water tables behind them, providing subirrigation to areas adjacent to the stream which enhances the growth of riparian vegetation. Increased diversity of riparian plants, and increased quantity of forage benefits wildlife as well as domestic stock. Depending on topography, narrow 10 to 20 foot riparian zones can increase by several hundred feet (Wood River Beaver Management Policy). Elevated water tables also help maintain wet meadow habitat by deterring encroaching conifers.

Restoration and increase in biodiversity: Beaver pond communities are considered biologically and structurally diverse, containing 1.4 to 2.7 times as many plant species as other communities (Pollack 1994). Healthy pond, riparian and wetland habitat are extremely important to numerous wildlife and fish species for cover, shade, forage, and nesting habitat.

Willow restoration: Beaver use of willow occurs late in the plant's growth cycle, often during fall and winter when willow are dormant, resulting in earlier and often rapid and vigorous growth recovery the following spring.

Erosion reduction: Beaver dams decrease stream velocity and thus erosion potential, provide retention of sediment and organic matter, and release significantly cleaner water downstream from the dam (Butler 1995). Re-establishment of beaver dams in Current Creek, Wyoming, reduced sediment transport from 33 tons per day to 4 tons per day (Beschta 1997). Beaver dams in poor habitat can create diversity by building sediment bars which support the reestablishment of willows (Demmer 1999). Beaver have actually been used to reverse the ecological damage caused by poor management practices in some degraded riparian systems (Apple et al. 1984).

Nutrient recycling: Beaver enhance recycling of nutrients by bringing streamside vegetation and detritus (organic material) into pools. Aquatic insects shred and scrape this organic matter until it sinks and becomes part of the mud at the bottom. There, under anaerobic conditions, the vegetation breaks down into basic chemical elements: sulfur, nitrogen, phosphorous and carbon. These chemical components percolate up into the water and become nutrients for bacteria and other organisms at the beginning of the food chain. The nutrients reach fish a few steps up the chain in the form of caddis flies, stoneflies, midges and other insects. (Bergstrom 1985)

Nitrogen for nitrogen-limited forests: Flooding by beaver quadruples the amount of nitrogen available to plants (Langston 1995). In one area of previously low nitrogen levels, stream sections accumulated 1000 times more nitrogen after modification by beaver ponds (Olsen 1994).

Quality fish habitat: Beaver and fish evolved together and the long list of fish benefits provided by beaver dams far outweighs the occasional fish passage difficulties they may create (Gray 1998). A 1981 study in western Oregon showed coho salmon juveniles were bigger (a 600% increase in weight) and more numerous below beaver dams (Bergstrom 1985). In some of the flatter gradient streams, beaver ponds may cover streambed gravels reducing salmonid spawning habitat. But in small mountain streams beaver ponds provide up to 400% increases in rearing space, which is often far more limiting than spawning habitat (Munther 1981). As discussed under the water temperature mediation section, beaver can influence subsurface flows, which can in turn affect spawning, rearing and holding activities.

Enhanced recreational opportunities: Healthy and vigorous riparian areas support a wide variety of plant and animal species, and as a result provide more fishing, hunting, recreation, and wildlife viewing opportunities for forest visitors.

B. Challenges of Beaver Restoration

In some cases, beaver have also earned a reputation as pests and nuisances, again due to their industrious modification of their environment:

Conflict with forest roads: For drainages in close proximity to roads, there may be potential for blocked culverts, flooding, and fallen trees across the road. Potential conflicts can be resolved by using devices that deter beaver from building dams in culverts, pond levelers that will keep water levels below flood stage, and caging of trees at risk. Grant County Conservationists Keystone Project volunteers may be available to help construct such devices.

Conflict with willow and aspen recovery: Some restoration sites may not be initially suitable for beaver re-introduction until suitable habitat is restored. As hardwoods are restored, beaver can once again function as a mutualistic species with aspen and willow.

Conflict with livestock and wild ungulate use: Riparian areas that are currently grazed may not be able to sustain beaver populations in addition to cattle, deer and elk. Beaver remove larger, older hardwoods for dam construction and winter food storage. If the area is intensively used by cattle or wild ungulates, the addition of beavers may interrupt or arrest the resprouting and growth of willows and other riparian hardwoods. Forest wildlife biologists, range conservationists and hydrologists will need to focus on good management and planning to promote healthy habitats. Region 6 Stream Survey protocol, temperature monitoring, Proper Function Condition Assessments and other methods can be used to evaluate trends in riparian condition.

Negative public perception: Some people object to beaver activity because beaver dams impound water on public lands which "belongs" downstream on private lands. Fallen or dead trees from beaver flooding and felling activity "don't look good." Mowed willows and the impact to riparian vegetation by a large beaver colony give the appearance of animals "eating themselves out of house and home." Continued education through workshops, newsletters and school presentations may positively influence both agency and public perception.

III. Proposed Activities

A. Inventory and Monitoring of Beaver and Habitat

Sightings of beaver, as well as new dams, current activity at old dams, and sightings of peeled sticks and beaver-felled trees will be recorded in the FAUNA database, which records locations of animals and features and can be used to generate a GIS map. FAUNA is a corporate database which can be shared with adjacent Forests.

In addition, each Forest Service Ranger District maintains various databases documenting historic beaver activity denoted by old dams, beaver-scarred stumps and trees, and old channels. The Districts also have historic written records of stream reaches occupied by beaver in the past. This information can be transferred to and tracked in FAUNA as well.

Other sources of information about beaver activity include the Oregon Department of Fish and Wildlife, the Bureau of Land Management, tribal governments, The Nature Conservancy, and private landowners with property immediately adjacent to the Forest.

B. Identification of Watersheds and Subwatersheds with Potential for Beaver Recovery

Using recent and historic records, potential beaver habitat can be mapped and compared with the location and distribution of currently active colonies. Habitat is a key factor in beaver distribution. Some studies indicate that where beaver have been allowed to recover, all suitable habitat within their range becomes occupied (Naiman et al. 1988). This information can be useful for identifying creeks that have supported beaver in the past, yet currently may need management to restore them to habitat suitable for beaver. Appendix B summaries key habitat components to consider during field reconnaissance.

The Forest Service will recognize beaver as a key species for healthy riparian and wetland habitat and provide input to National Forest Management Act (NFMA) or National Environmental Policy Act (NEPA) planning efforts which have the potential for a beaver restoration component. Beaver management strategies can be addressed at the Watershed Assessment level or in site-specific, on-the-ground projects.

The Forest Service will follow beaver management guidelines being incorporated into the Blue Mountain Forest Plan Revision.

C. Habitat Restoration

Drainages historically occupied by beaver, but which may be currently unsuitable for relocations, may require management for improvement and recovery. Restoration activities may include planting riparian hardwoods (species such as willow, red osier dogwood, and alder) and building exclosures (such as temporary fences) to protect and enhance existing or planted riparian hardwoods until they are established. Downcut creeks with adequate forage and dam building materials (hardwoods or conifers) may benefit from beaver, the resulting ponds, and the potential for dams to elevate water tables.

D. Relocation of Live-trapped Beaver to the Forest

Oregon Department of Fish and Wildlife (ODFW) Responsibilities: ODFW will receive and coordinate all beaver complaints and requests for removal of beaver from private property. Holding facilities for beaver prior to relocation will remain on ODFW compounds.

Lethal removal of beaver on private lands will be done so in accordance with Oregon State law. Beaver are classified as a predator on private lands and may be taken without a permit year round. Otherwise landowners will be directed to legal trapping seasons. However, non-lethal methods or relocation will be attempted whenever possible.

Relocations may require temporary road closures, where possible, to reduce harassment of newly established colonies. Coordination with District range personnel

and permittees will occur to evaluate the potential for resting an area from grazing in order to provide high quality forage for beaver.

Forest Service Responsibilities: Forest Biologists will identify streams currently capable of sustaining active beaver colonies. Historic or current beaver activity, suitable gradient, and adequate food and dam building resources will be evaluated. Potential impact to roads, culverts, current grazing regimes, and downstream residents will be considered. See Appendix B.

Forest wildlife biologists, fisheries biologists, hydrologists, and range and engineering personnel will be consulted prior to any relocation.

Whenever possible, relocation of live-trapped beaver will occur during late summer or fall months, to encourage the animals to stay in the area.

Relocated animals can be monitored to see if they remain in the area or move from the drainage. Impacts to vegetation, culverts or roads will be noted. If necessary, beaver exclusion devices and pond levelers may be installed to eliminate flooding or culvert blockages. Forest Service personnel will complete NEPA requirements prior to installation of these devices.

Grant County Conservationists Keystone Volunteers: Grant County Conservationists Keystone Volunteers have expressed availability to live trap, relocate and construct beaver baffler, pond leveling and other devices.

E. Education and Information Sharing

Public workshops: Two beaver workshops were successfully conducted in 1998 and in 2004. Grant County Conservationists Keystone Project and the Malheur National Forest were the primary planners and coordinators of the workshops. Additional workshops addressing beaver issues may be conducted every three to four years to continue to provide information about beaver to agency personnel and the public.

Signing wetland and riparian restoration projects: Grant County Conservationists Keystone Project and Forest Service biologists have developed small signs explaining the benefits of beaver and their contribution to riparian and wetland health. Larger interpretive signs may be developed for major riparian restoration and beaver relocation projects. Sign posting on National Forest lands will be coordinated through the Forest Service.

Develop power point presentation and videos for use in schools or presentations to hunting and fishing organizations: Grant County Conservationists Keystone Project has purchased several videos and books for the local library to be made available for school and group presentations. A power point presentation on the benefits of beaver to wetland habitat, suitable for both adults and children, has been developed. Local schools have been notified of the availability of these resources.

Involve students in riparian restoration: The Malheur National Forest has hosted several school classes on various restoration projects in the past, including planting of riparian hardwoods and building of cages for hardwood protection. An "adopt a creek" program may be implemented to teach students about the benefits of beaver, show them the long-term benefits of beaver dams and resulting ponds and encourage participation in additional hands-on planting projects.

Information Dissemination: The Keystone Project will disseminate information on beaver and their habitats via e-mail and other venues to those who have expressed interest in keeping updated on beaver.

Collaborative Meetings: The Malheur National Forest may host annual meetings with other entities such as the Oregon Department of Fish and Wildlife, tribal governments, Keystone Project representatives and other interested parties for information sharing about beaver. Topics to discuss could include: trends in trapping, requests for beaver removal, updates about stream reaches on both public and private lands suitable for beaver reestablishment and beaver problems successfully (or unsuccessfully) handled.

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INTERAGENCY COORDINATION AGREEMENT

between the

USDA Forest Service, Malheur National Forest; Oregon Department of Fish and Wildlife, John Day District Office; Confederated Tribes of Warm Springs, John Day Basin Office; Bureau of Land Management, Prineville District; USDA Wildlife Services, Eastern Oregon Office; USDA Natural Resources Conservation Service, John Day Office; Oregon State University, Grant County Extension Office; Grant Soil and Water Conservation District; and the Grant County Conservationists

for the purpose of

cooperative beaver management in the John Day Basin

This coordination agreement is made by and between:

- The USDA Forest Service, Malheur National Forest, hereinafter "Forest Service"; the Oregon Department of Fish and Wildlife, John Day District Office, hereinafter. "Department";
- the Confederated Tribes of Warm Springs, John Day Basin Office, hereinafter "Tribes"; the Bureau of Land Management, Prineville District, hereinafter "Bureau";
- the Wildlife Services, hereinafter "WS";
- the USDA Natural Resources Conservation Service, John Day Office, hereinafter "NRCS";
- the Oregon State University, Grant County Extension Office,_ hereinafter "OSU"; the Grant Soil and Water Conservation District; and
- the Grant County Conservationists, hereinafter "GCC".

Whereas, the natural resource managers of the John Day Basin recognize that cooperation on matters of mutual interest regarding fish and wildlife populations and habitat under their respective jurisdictions is critical to successful management; and

Whereas, the managers recognize the need to manage beaver habitat as part of their watershed restoration and recovery efforts; and

Whereas, the managers desire to initiate a cooperative effort regarding management of beaver habitat and populations as part of their overall watershed activities.

Now, therefore, the parties hereto agree as follows:

1. Coordinated beaver habitat management will be implemented as an integral element of ongoing multiple-use programs for public lands in the basin.
2. As opportunities arise on private lands, as expressed by the landowners, they will be pursued.
3. Efforts will be coordinated by Ranger District, Resource Area, Basin Office, and District Office personnel on a watershed basis. Each watershed will receive -a broad-scale, habitat review for its suitability for beaver management, based on agency management requirements and potential private land issues.
4. Following the initial review, the parties will select at least five priority watersheds for which to conduct a more detailed habitat mapping exercise.
5. Habitat mapping, by watershed, will be conducted by the parties to define the following:

   a) Areas with existing beaver activity and suitable habitat;

   b) areas lacking beaver activity, but with suitable habitat for reintroduction;

c) areas with beaver activity that may be causing problems (e.g., road flooding) which require special attention from an applied management solution;
d) areas with existing beaver activity (or potential for reintroduction) which need harvest protection to maintain the system, or provide for its establishment following introduction;
e)areas of historic, but currently unsuitable,. habitat, that may require management attention for improvement or recovery.

6. A brief description of desired beaver habitat goals and objectives, along with beaver and habitat management strategies will be defined following the mapping effort to incorporate management requirements into ongoing multiple-use activities for the priority watersheds.
7. Potential public cooperators, who would be interested in participating in a coordinated program of beaver habitat management, will be identified.
8. Within each priority watershed, a communication plan will be developed to resolve issues and complaints that may arise and require management attention (e.g., dam removal, plugged culverts or flooded roads).
9. Initiate implementation of these measures beginning in early 1998, in order to complete the mapping, objectives, goals and strategies by the 1998 field season. Developing interim management strategies should not necessarily wait for the completion of mapping.
10. Meet prior to the 1998 field season to determine progress in information gathering.

11.**Grant Soil and Water Conservation District** will:

a) Provide names of landowners interested in accepting transplanted beavers to the other parties; and '
b) advise landowners regarding the need to develop appropriate management plans if the transplant site is grazed, obtain cooperator or other appropriate agreements and refer the landowners to the NRCS for management planning.

12.**Natural Resource Conservation Service** will:

a) Assist the GSWCD with their responsibilities and work with landowners to develop appropriate management plans.

13.**Oreqon Department of Fish and Wildlife** will:

a) Identify suitable sites for transplants, on both public-and private lands, in consultation with other parties, including other fisheries staff;
b) process complaints and refer them to the WS;
c) secure an agreement with WS that meets current statutory authorities for trapping and relocating beavers;
d) work with other agencies to assure appropriate data is collected and recorded including a map showing transplant site locations, data of transplant, sex and other information considered a minimum to evaluate the program;
e) assist with monitoring transplanted beaver activity;
f) consider harvest prohibitions where necessary; and

g) identify locations with surplus beaver.

14.**USDA Wildlife Services** will:

a) Take the lead to process complaints, trap, and relocate beavers;
b) obtain needed site access;
c) train other interested parties in trapping, handling, and releasing beavers;
d) keep all records in consultation with the other parties including a map showing trapping locations, transplant sites, dates, numbers,, estimated ages (adult/juvenile), and sex of beavers relocated;
e) if possible, tag all beavers prior to release;
f) provide traps; and
g) collect fees.

15. **Confederated Tribes of Warm Springs** will:

a) Develop funding agreements to transfer funds among the agencies;
b) assist with mapping, suitability analysis; monitoring, and other program evaluations; and
c) submit funding requests for program operations.

16.**OSU Extension Office** will:

a) Prepare and coordinate the public information effort;
b) obtain photos and information from parties to include in a beaver management brochure, print and distribute;
c) arrange for news releases and feature articles in newspapers and other publications; and
d) pursue educational opportunities at local schools, organizations, and other groups.

17.**USDA Forest Service** will:

a) Assist in identifying potential transplant sites on public lands;
b) take the lead on suitability studies on public lands;
c) ensure that allotment management plans consider the suitability of beaver habitat; and) assist in identifying areas with surplus beavers.

18. **USDI Bureau of Land Management** will:

a) Assist in identifying potential transplant sites on public lands;
b) take the lead on suitability studies on public lands; and
c) assist in identifying areas with surplus beavers.

19.That nothing in this agreement shall be construed as obligating any of the parties in the expenditure of funds or the future payment of monies in excess of appropriations authorized by law.

20.That nothing herein contained shall be construed as limiting or affecting, in any way, the delegated authority of the parties or the reserved rights of the Tribes.

21.That this agreement shall become effective as soon as it is signed by parties and shall continue until termination by one or more parties upon 30 days notice, in writing, to the others, of its intention to terminate upon the date indicated.

22.That amendments to the Agreement may be proposed by one of more parties and shall become effective upon approval by all parties.

Grant County Soil and Water Conservation District

USDA Forest Service
Malheur National Forest

Oregon Dept. of Fish & Wildlife John Day District Office

Confederated Tribes of Warm Springs
John Day Basin Office

Bureau of Land Management
Prineville District

USDA Natural Resource Conservation Service, John Day Office

USDA Wildlife Services, John Day Office

Oregon State University
Grant County Extension Office

Grant County Conservationists

Identification of Watersheds and Subwatersheds with Potential for Beaver Recovery

Key habitat components:

- A channel gradient of less than six percent
- Channels with suitable soils/sediment for dam construction
- Water flows stable and sufficient to make a pond
- Deciduous trees, shrubs, sedges for adequate food supply
- Winter conditions which will not freeze ponds
- Sufficient valley floor area to allow for flooding
- Shelter (riparian shrubs) for safety and building materials
- Protection from trapping and recreational killing until colonies are well established