

Aquatic Restoration Plan

for National Forest System Lands of the

Applegate River-McKee Bridge 5th Field Watershed



Photo 1. McKee Bridge on the Applegate River

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"There are just two things on this material earth - people and natural resources."

Gifford Pinchot

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Executive Summary

The Applegate River-McKee Bridge 5th watershed encompasses 52,256 acres and is depicted in red outline on adjacent map. The watershed is located in southwest Oregon within the Applegate River sub-basin (depicted in brown outline) and Rogue River basin (depicted in black outline with green being National Forest System Lands (NFSL) ownership). A segment of the Applegate River and three main tributaries (Beaver Creek, Palmer Creek, and Star Gulch) reside within the watershed. The watershed contains coho salmon, a listed fish species under the Endangered Species Act (ESA), two races of steelhead trout, fall Chinook salmon, cutthroat and rainbow trout, Pacific lamprey and other non-game fishes. The aquatic restoration plan for this watershed analyzes existing aquatic and riparian data and strategically displays an active and passive restoration approach. Factors that limit aquatic productivity and diversity within the watershed are water quality, fish habitat and riparian forest health.

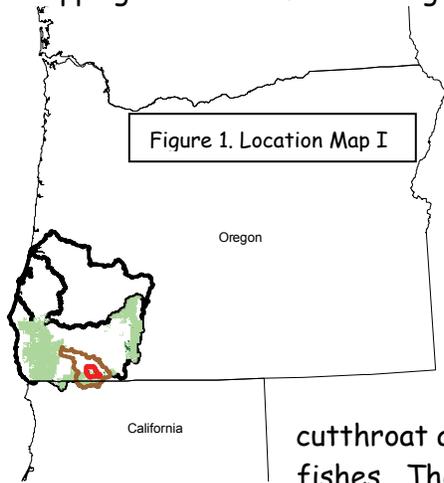


Figure 1. Location Map I

Fish habitat capability as well as water quality have been reduced by past management activities. Habitat problems include low pool quality and quantity, lack of spawning gravels, and some partial fish passage barriers. Water quality parameters affected include elevated

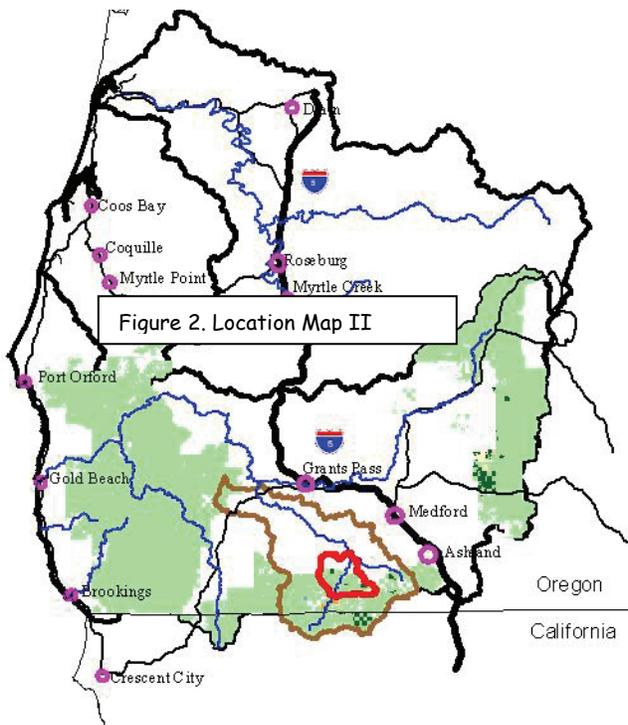
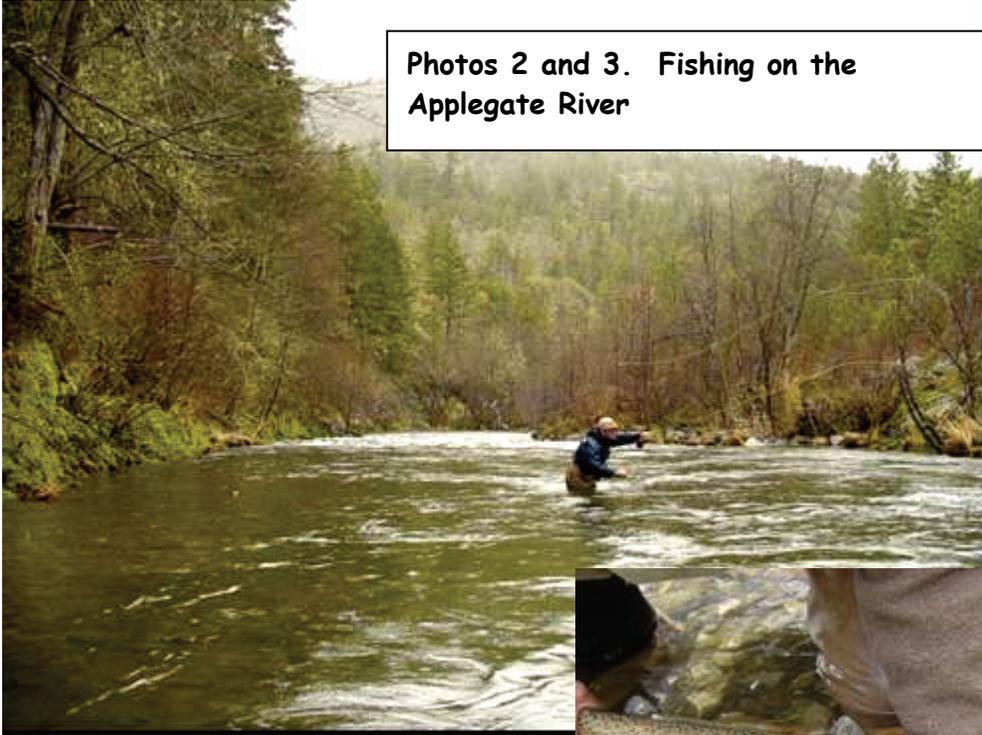


Figure 2. Location Map II

stream temperatures and excessive sedimentation. Specific management activities that have directly degraded water quality and fish habitat include road-building within riparian areas, timber harvest of large trees in the riparian area, stream cleanout of large wood, water diversions, and hydraulic and placer mining. The riparian forest has been impacted by roads, past mining impacts, past timber harvest, noxious weeds, and fire exclusion. The result of riparian impacts is a lack of future large wood recruitment to floodplains and streams - a primary component in these stream systems for high quality fish habitat and water quality.

Proposed active restoration within the watershed on NFSL was prioritized by water quality (\$1,629,600, Table 6), fish habitat (\$832,000, Table 10), and riparian forest conditions (\$901,000, Table 12); totaling \$3,362,600. These projects were then combined

and prioritized with a watershed approach for restoration, selecting the highest priority projects as depicted on Table 1. Total estimated cost for these high priority activities is \$1,816,600. High priority projects are surface-flow restoration, road improvement or



Photos 2 and 3. Fishing on the Applegate River

decommissioning, removal of a partial fish barrier, mining violation enforcement, thinning riparian vegetation, placement of instream large wood, and removal of non-native plant species within riparian areas.



These projects will be the focal point during the next few years. Work will continue until these high priorities are completed. Completion of this priority work will place the watershed in a recovery mode. Cooperative work, partnerships and supplemental external funding will increase restoration success in this watershed and more completely involve the public in understanding and meeting restoration objectives. Passive restoration, for example vegetation recovery and growth, and protection of the processes that provide a natural range of large wood, sediment and shade to streams, could take as much as 200 years. Completion of the projects listed in this report will have immediate short-term benefits such as fine sediment reduction, better fish passage and improved fish habitat and the long-term benefit of allowing more natural processes to operate within the watershed to improve and maintain water quality and aquatic and riparian habitat.

The following three appendices (water quality, fish habitat, and riparian forest condition) are supporting documentation for this report and provide in-depth discussion regarding existing conditions, active and passive restoration and prioritization of projects depicted on tables and maps.

Aquatic Restoration Plan

Applegate River-McKee Bridge Watershed

I. The Integrated Work Planning Process and Restoration of the Watershed

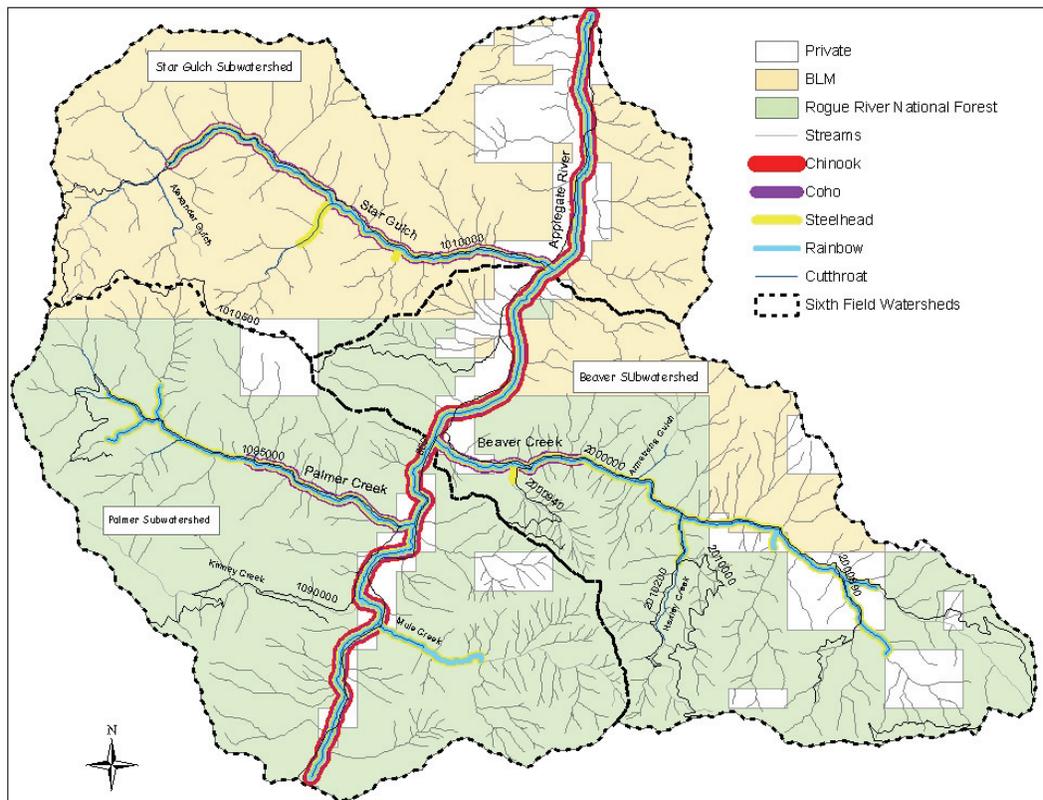
This plan prioritizes aquatic restoration projects on National Forest System Lands (NFSL) within the Applegate River-McKee Bridge 5th field watershed for the improvement and recovery of water quality, fish habitat, and riparian forest conditions. The Forest Integrated Work Planning process (IWP) describes the restoration goals on the Forest and rates the Applegate - McKee Bridge Watershed as one of the third highest overall priority for restoration on the Forest. This plan tiers to the Regional Watershed Restoration Strategy goals of restoring high priority water and fish watersheds with a combination of active and passive restoration strategies. Active restoration includes the usual suite of projects associated with watershed restoration - road upgrades, fixing erosion problems, culture of riparian forests and instream habitat improvement. Passive restoration is vegetation recovery and growth accompanied with substantive and effective aquatic input by fish biologists and hydrologists during project planning to ensure the watershed remains on a recovery path.

The analysis for this plan was an interdisciplinary team effort with review from multiple Federal and State agencies. Watershed Analysis, Water Quality Restoration Plan, Road Analysis, stream and fish surveys, and existing aquatic and riparian data were utilized to determine the current condition and present needs for the watershed. This plan provides a listing of projects, suggested timeline and costs that restoration specialists, decision makers, and grant writers may use in promoting a team and interagency approach to improvement of aquatic resources in this watershed. Partnerships are an essential element of the implementation of this plan. Restoration, through cooperative work and supplemental external funding will more than double restoration outputs and increase restoration success in this watershed.

II. The Applegate River- McKee Bridge Watershed at a Glance

Applegate River-McKee Bridge 5th Field Watershed (52,256 acres) is located in the Klamath Mountains Physiographic Province in Southwestern Oregon within the Applegate River 4th field sub-basin, 491, 520 acres in size. Annual average precipitation is approximately 40 inches. Applegate River-McKee Bridge 5th Field Watershed has three priority watersheds: Beaver (17,489 acres), Palmer (18,668 acres), and Star Gulch (16,099 acres). Land ownership of the watershed entails Rogue River-Siskiyou National Forest (27,457 acres, 53%), Medford Bureau of Land Management (17,800 acres, 34%), and private land (7,004 acres, 13%). Most of the land ownership in Beaver and Palmer subwatersheds is on NFSL. Land ownership in Star Gulch is mostly managed by Medford Bureau of Land Management (BLM) with NFSL encompassing $\frac{3}{4}$ mile of stream segment in the lower subwatershed. Important fish-bearing streams in the watershed are the Applegate River and the three principal tributaries: Beaver Creek, Palmer Creek, and Star Gulch. This watershed contains four anadromous fish species (coho salmon, Chinook salmon, summer and winter runs of steelhead trout), Pacific lamprey and two resident salmonids (rainbow and cutthroat trout). Southern Oregon/Northern California (SONC) coho salmon and coho critical habitat are listed as threatened under the Endangered Species Act (ESA).

Figure 3. Vicinity Map with Fish Distribution



III. Past Restoration

Past restoration on National Forest System Lands (NFSL) in the watershed include road rehabilitation and closure, culvert replacement and culvert revetment for fish passage, fish habitat enhancement, surface-flow restoration, irrigation diversion dam fish barrier removal, water rights transfer, riparian planting, and fuels reduction outside of the inner (<150 feet) Riparian Reserve. Projects were accomplished with the help of various partners (PayCo, Applegate Watershed Council, Oregon Water Trust, Oregon Department of Fish and Wildlife, USDI Bureau of Land Management-Medford District (BLM)), grants, and USDA Forest Service (FS) funds. Broad networks of partners have provided support, linkage to the community and access of additional funding sources not readily accessible to the FS.

IV. Looking Ahead to Future Restoration

Active Restoration

Proposed projects restoring the major aquatic limitations within the watershed were prioritized first by water quality, Table 6; fish habitat, Table 10; and riparian forest conditions, Table 12, then prioritized as an entire group, by 5th field watershed, Table 1, below. The high priority projects depicted in Table 1 will be the focal point during the next few years to restore the Applegate River-McKee Bridge 5th field watershed on NFSL. Work should continue until the top ten overall high priority projects are completed. With these projects completed, the watershed will be on its way toward recovery. Recovery is a relative term in today's paradigm of major roads and active management in these anadromous subwatersheds. Successful restoration will minimize the negative effects of this infrastructure and these activities on aquatic and riparian habitats in the watershed.

Subwatersheds within the Applegate-McKee Bridge watershed have different aquatic limitations. Channel surface flow is primarily a concern within Palmer Creek and Star Gulch (Priority 1) as dry stream channels presents a direct barrier to migrating fish. Road sediment is the primary aquatic habitat degradation factor within the Beaver Creek subwatershed (Priorities 2 and 3), especially in Haskins Gulch (Priority 2), as large amounts of decomposed granite sand fills gravel interspace in many areas. An irrigation diversion dam within lower Palmer Creek (Priority 4) is a concern during lower stream flows for coho salmon and steelhead trout fish passage upstream. It appears that most anadromous fish are able to migrate above the irrigation diversion dam during high flows, although during a low water year, the dam is a concern.

Large wood placement in Star Gulch, Palmer, and Beaver could occur in the next two to three years and improve stream habitat for several decades until riparian areas grow to contribute future large wood. Priority areas are those within coho habitat and lacking habitat complexity. Project Priority 1, located in Star Gulch on NFSL, should be evaluated and implemented (if project is deemed necessary) along with instream wood. Next priority would occur in Palmer Creek in coho areas without prior instream wood placement followed by areas

still below optimal levels. Instream wood placement has occurred within Beaver Creek in coho habitat on NFSL. At this time, no recommendations are made in this reach except to reevaluate past large wood placement and add wood in coho reaches where wood is currently below optimal levels on private lands.

After large wood enhancement has been completed within coho critical habitat, place large wood within steelhead reaches in Beaver and Palmer Creeks. Beaver Creek would have highest priority since higher summer stream flows generally exist, followed by Palmer Creek which has been observed with minimal flows during low water years; typically retains surface flow in reaches above Sourdough Gulch in Palmer Creek. Steelhead habitat within Star Gulch on NFSL also contains coho critical habitat and would be enhanced when Priority 1 is implemented.

Gullying on a closed nonsystem road within China Gulch (Priority 7) is a problem, but a lower priority due to the small measured impacts from this area. Hanley Gulch has high road density in a watershed with granitic geology, but is a lower priority (Priority 8) since a nominal amount of sediment movement has been observed after storm events.

Thinning riparian areas (Priority 8) and blackberry removal (Priority 9) will improve future large wood recruitment and shade by increasing native riparian species reestablishment success are recommendations common to all these subwatersheds.

Total estimated funds for high priority proposed restoration work are \$1,816,600, as stated in the last row of Table 1. Project priority locations are depicted on Figure 4.

Potential partners for restoration work are: Applegate Watershed Council, Oregon Watershed Enhancement Board, PayCo Title II, Oregon Water Trust, Oregon Department of Fish and Wildlife, BLM and National Forest Fish and Wildlife Foundation (NFWF).

Passive Restoration

Passive restoration occurs simultaneously with active restoration and active restoration work complements and accelerates soil stabilization, vegetation recovery and general healing in the watershed. Active restoration in Applegate - McKee Bridge watershed will include efficient work to facilitate these processes over a longer time period. For example, after thinning and other riparian culture work is completed, full recovery of riparian areas could take as much as 200 years. Riparian tree growth will re-establish historic large wood contribution levels for streams and fish habitat.

Passive restoration will take over when the most efficient and cost-effective active measures have been completed. Lower priority restoration work, not shown in the tables below may or may not be completed in the future depending on funds available and partners willing to help finance this work. Hydrologist, fish biologist and other specialist input to future projects will ensure that the processes restored with watershed restoration remain relatively intact while providing for natural events such as wind storms, floods and fires. Using the riparian

example above, future projects during the recovery period will be planned to ensure that the riparian forest remains in a condition where trees may become large, decadent and attrition of the stand causes wood to enter the stream channel or fall in the floodplain.

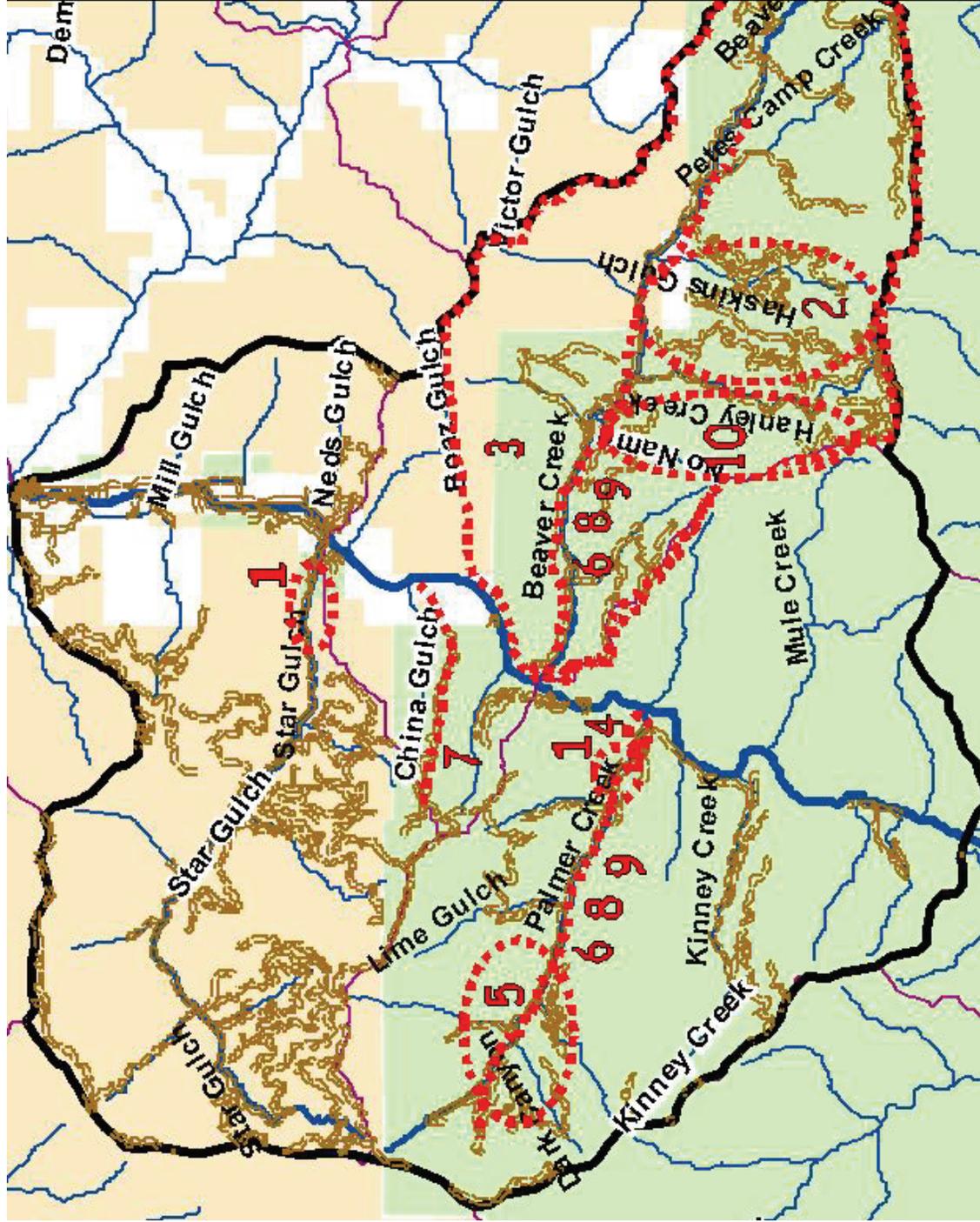
V. Restoration Priority Table and Map

Table 1. Proposed Aquatic - Active Restoration Activities on NFSL

Overall 5th Field Priority	Limiting Factors	Project Area	Existing Condition	Aquatic Health Risk	Proposed Restoration	Estimated Cost	Years to Recovery
1	Fish Habitat	Palmer Creek (adj. to FSR 1095-300) and Star Gulch (NFSL)	Historic mining site and low water ford that has altered the stream channel	<ul style="list-style-type: none"> Loss of fish habitat & outmigration due to subsurface flow. Unstable streambanks; Stream heating from excessive channel width and water withdrawal 	<ul style="list-style-type: none"> Restore channel/ bank configuration 	\$80,000 Palmer Ck, \$90,000 Star Gulch = \$170,000	5 years to recovery after treatment
2	Water Quality	Beaver Creek (Haskins Gulch est. 2-4 miles)	High Road Density	<ul style="list-style-type: none"> Degradation of Habitat from sediment 	<ul style="list-style-type: none"> Refine with field surveys Decommission and stabilize roads and/or improve road surface 	\$36,000/mile (est. 4 miles - \$144,000)	5
3	Water Quality	Beaver Creek	Unidentified sediment sources	<ul style="list-style-type: none"> Degradation of habitat from sediment 	<ul style="list-style-type: none"> Identify and repair sediment producing sites 	\$36,000/ mile (estimated 6 miles = \$216,000)	5
4	Fish Habitat	Palmer	Water Diversion	<ul style="list-style-type: none"> Partial fish barrier during spawning. Barrier during low flows 	<ul style="list-style-type: none"> Work with private landowner and OWT for possible water transfer to Applegate River and remove water diversion and existing fish screen Or...Replace water diversion with fish friendly diversion. 	\$12,000	Following spawning season after treatment
5	Water Quality	Palmer	Illegal mining violations	<ul style="list-style-type: none"> Degradation of streambanks and habitat from sediment 	<ul style="list-style-type: none"> Monitor and enforce illegal mining violations Require miners to submit a plan of operation 	\$1,600/year for 1st year, \$750 per year for 4 years = \$4,600	5

Overall 5th Field Priority	Limiting Factors	Project Area	Existing Condition	Aquatic Health Risk	Proposed Restoration	Estimated Cost	Years to Recovery
6	Fish Habitat	<i>Coho critical habitat</i> Star Gulch Palmer <i>Steelhead habitat</i> Beaver and Palmer	Lack of instream large wood	<ul style="list-style-type: none"> Lack of fish habitat diversity Loss of hiding cover Loss of pool forming structure Loss of sediment storage capacity 	<ul style="list-style-type: none"> Instream large wood placement 	Coho Habitat Star Gulch (\$65,000), Palmer (\$100,000), Steelhead Habitat Beaver (\$100,000), Palmer (\$100,000) = \$440,000	5 years or after a major storm event
7	Water Quality	China Gulch	Road gulying on closed road	<ul style="list-style-type: none"> Degradation of downstream habitat from sediment 	<ul style="list-style-type: none"> Repair closed road 	\$36,000/mile; est. 2 miles = \$72,000	7
8	Riparian	Coho critical habitat, than steelhead habitat Beaver Palmer	Riparian Reserves in poor vegetation condition	<ul style="list-style-type: none"> Slows recovery of developing future large wood recruitment Increased likelihood of stand replacement fire 	<ul style="list-style-type: none"> Reduce vegetation density by thinning Clear under story vegetation Limb up 8 feet Prescribed burning 	Range of \$50,000-\$200,000 within each 6th field watershed (maximum, 3 sub-watersheds @ \$600,000)	50 years after treatment
9	Riparian	Beaver, Palmer, Star Gulch, and Applegate River within coho critical habitat, than steelhead habitat	Encroachment on native species	<ul style="list-style-type: none"> Prevent new growth of trees (future large wood recruitment) 	<ul style="list-style-type: none"> Remove nonnative species blackberries 	\$10,000 over a 5 year period for coho and similar for steelhead habitat = \$50,000	5 years. Treat periodically after 5 years, when needed.
10	Water Quality	Hanley Gulch	High road density	<ul style="list-style-type: none"> Degradation of habitat from sediment 	<ul style="list-style-type: none"> Decommission roads 	\$36,000/mile; est. 3 miles = \$108,000	5
TOTAL						\$1,816,600	

Figure 4. Proposed Aquatic -Active Restoration Activities on NFSL (priority numbers from Table 6 coincides with numbers below)



VI. Restoration Monitoring Measures

Table 2 Proposed Aquatic Monitoring for Active Restoration on NFSL

Project / Activity	Parameters to be Monitored	How will they Be monitored?	Frequency	Approximate Cost	Resource	Opportunities for monitoring integration
Restore channel and surface flow in Palmer Creek and Star Gulch	Number of linear feet of stream channel in Palmer Creek and Star Gulch where surface flow is restored during the period of fish outmigration.	Fish bio and hydrologist WIT Database	Post project	\$1,800	Aquatic	
Decommission/stabilize roads and surface erosion and mining violations	Number of miles of road or acres of sediment sources stabilized to prevent sediment delivery to the stream system.	Engineering and hydrology INFRA Database	Annually	\$900/yr for 6 years = \$5,400	Aquatic	
Removal/replacement of partial fish barriers in Palmer Creek	Number of miles of habitat opened to year-round fish migration by repair of human-caused partial or total barriers to fish migration.	Fish biologist WIT Database	Post project	\$900	Aquatic	
Instream large wood placement (all subwatersheds)	Miles of fish-bearing streams of large wood replacement to enhance and rehabilitate to move the habitat toward reference conditions	Fish biologist WIT Database	Annually	\$900/yr for 6 years = \$5,400	Aquatic	
Riparian thinning and prescribed burning (all subwatersheds)	Acres of riparian area receiving treatments to promote future large wood recruitment and reduce fire hazard.	Fish bio and hydrologist WIT Database	Annually	\$900/yr for 4 years = \$3,600	Aquatic	Fire Fuels, Forest Health, Terrestrial Wildlife

Appendices

Removed August 17, 2007

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