APPENDIX A.

Proposed Watershed Restoration Projects
All Ownerships in the
Entiat WRIA 46
05/11/2004 Version 2.0

Source Information: This working draft list of proposed watershed restoration projects on all ownerships in the Entiat WRIA was assembled using the following information:

1) Appendix J in Version 2.0 of the Federal Watershed Assessment for the Entiat (Watershed Restoration Projects, April 1996)
2) Appendix 1-A in the August 1999 draft of the Entiat CRM Plan (Entiat River Inventory and Analysis, NRSC Stream Team Report, 1/6/98)
3) Other information about potential restoration projects in the subbasin (Preliminary discussions of habitat restoration projects during EDT analysis, Forest Service Capital Investment Program, Chelan County Public Works concerns involving Entiat Valley Road, etc.).
4) Projects suggested by USDA Forest Service personnel reviewing Appendix J of the Federal Watershed Assessment.
5) Projects in Appendix J in the Federal Watershed Assessment that were completed or dropped have been deleted from this list.

This draft list is not exhaustive, but rather provides a sense of the range and scale of potential projects.

Preface: Watershed restoration needs exist throughout the Entiat WRIA. Ecosystem function is degraded at these sites to varying degrees, depending on the location and magnitude of disturbance and the sensitivity of the area. The goal is to fully restore or establish an improving trend at degraded locations, based on the desired ecological conditions and those derived from subsequent site-specific analyses.

The priorities for development of restoration projects on all ownerships in the subbasin will be more fully clarified over the next year as the Entiat Planning Unit completes the Entiat WRIA Management Plan under the Washington State Watershed Planning Act. Over the last several years, the Planning Unit has concentrated on support of key demonstration projects (e.g., habitat diversification in the lower Entiat via rock cross vane structures installed in September 2002). Use of the Wyden Amendment has allowed some projects on private and State lands to move forward with increased participation by the Forest Service and BLM (e.g., fish passage improvement at Stormy Creek on the Entiat Valley Road).

The priorities for development of restoration projects on National Forest System (NFS) lands are still reflected in Table 5.1 (Management Strategy Priorities) in Version 2.0 of the Federal Watershed Assessment for the Entiat Analysis Area. On NFS lands, emphasis will be placed on the following categories of projects: (a) burned area recovery; (b) projects that move landscape toward a more resilient condition that is better able to handle perturbations or

withstand wildfire and insect/disease epidemics; and (c) access manangement projects designed to improve surface water control, reduce accelerated erosion/sedimentation, increase wildlife security and reduce maintenance costs. Given the cooperative atmosphere for total watershed management in the Entiat, the Forest Service will continue to support the completion of cooperative restoration projects within the subbasin in the form of: (1) facilitating access, (2) providing materials, (3) direct assistance (planning, implementation), and/or (4) joint contracting and implementation.

Organization: The Entiat WRIA (Washington State WRIA 46) can be divided into three watershed areas: (1) the Entiat River, (2) the Mad River and (3) minor Columbia River Tributaries from Swakane Canyon to Navarre Coulee. These watersheds were divided into 20 subwatersheds for analysis purposes by the Forest Service. The Federal Watershed Assessment also breaks the WRIA into three zones based on predominate landtypes and sediment characteristics. This composite breakdown is as follows:

Minor Columbia River Tributaries
Subwatersheds: Swakane-Spencer, Ribbon Mesa, Navarre Coulee

Entiat River
Subwatersheds:
Transport Zone: Headwaters Entiat, Upper Entiat, North Fork Entiat, Three Creek-Tommy
Transitional Zone: Upper Mid-Entiat, Lake-Silver-Pope, Brennegan-Preston
Depositional Zone: Lower Entiat, Lower Mid-Entiat, Mud Creek, Stormy-Potato, Roaring-Tamarack, Mills-Dinkelman

Mad River
Subwatersheds:
Transport Zone: Headwaters Mad
Transitional Zone: Upper Mad, Middle Mad
Depositional Zone: Lower Mad

In the next version of the Entiat WRIA Management Plan this working list of proposed projects may be organized based on the above arrangement. However, for the purposes of assembling this draft appendix, the proposed project list is more simply organized as follows:

Minor Columbia River Tributaries

Entiat Subbasin

A sample of proposed projects/project types in these areas follows.

Proposed Restoration Projects – Minor Columbia River Tributaries

1) Upper Swakane Restoration Projects: A variety of projects in Upper Swakane Canyon resulting from recent Envronmental Analysis (EA) by the Forest Service (prescribed fire, mechanical thinning, road management meadow restoration, weed control, etc.). National Forest System lands are involved with some coordination involving State lands and Chelan County road rights-of-way.

2) Johnson Creek Road Rehabilitation: Drainage improvement, spot aggregate surfacing and erosion control, primarily on County Road section down from Mud Creek.

3) See also some applicable project types listed under items #14-21 for National Forest System lands in the WRIA.

Proposed Restoration Projects - Entiat Subbasin

1) Entiat River – Instream Habitat Diversification: See NRCS Stream Team Report for details on proposed instream structure placement (rock cross vane structures, large woody debris, etc.) through river mile (RM) 20 (see Appendix 1-A). Implement Alternative 4 for pool development downstream of Potato Creek and for streambank protection above Potato Creek. Multiple ownerships are involved.

2) Entiat River Corridor - Riparian Planting: See NRCS Stream Team Report for details on 39,950 feet of proposed riparian planting from the mouth of the river through RM 20 (see Appendix 1-A). Primary emphasis on maintenance of existing, native riparian vegetation, with secondary emphasis placed on planting. Multiple ownerships are involved.

3) Entiat River "Bridge to Bridge" Fish Habitat Restoration: Proposed project includes components of items #1 and #2 noted above, with significant potential for side-channel habitat development. Mulitiple ownerships are involved.

4) Off-Channel Habitat – Jon Small Property: Development of a pond (with LWD) and outlet stream (600' long) on the Jon Small property to create off-channel, rearing/refuge habitat. This WDFW promoted project also includes bio-engineered bank stabilization work along the Entiat River at this site.

5) Fish Screening of Diversions and Pumps: Installation, upgrade and/or maintenance of fish screens on water withdrawal facilities in the lower subbasin. See 1997 WDFW Inventory of Entiat River screening needs. Inventory update and additional screen installation work are being proposed by WDFW for Bonneville Power Administration FY2003 grant funding.

6) Irrigation System Improvements: A variety of improvements on the major irrigation ditches in the subbasin. The combination of the Knapp-Wham and Hannan-Detweiler systems is the primary candidate and is being proposed for preliminary design via Bureau of Reclamation funding in FY2003. This project would involve upgrade and extension of the Knapp-Wham system, well installations and closure of the Hannan-Detweiler ditch. The NRCS may also

provide opportunities for irrigation delivery and application systems technology improvements.

7) On-Farm Resource Management Improvements: Ongoing planning and application of conservation practices via the NRCS's Environmental Quality Incentive Program (EQIP), Wildlife Habitat Incentive Program (WHIP), and other programs that provide cost-share opportunities that make the implementation of conservation practices economically viable, will continue. Irrigation Water Management (IWM), Nutrient Management, and Pest Management may be used to address water quality and quantity concerns.

8) Wetlands Improvements: Projects targeted at maintenance or enhancement of the function of wetland areas in the subbasin, especially in the lower river corridor where sites have been modified by flood control work.

9) Entiaqua River Park and Outdoor Learning Center: Project involves development of a park/learning center facility in concert with restoration of the riparian area at the mouth of the Entiat. See Entiaqua River Park Briefing Paper for details on proposed park and related riparian restoration work envisioned at this time. Chelan PUD, City of Entiat and Chelan County lands and/or rights–of-way are involved.

10) Livestock Access Management: A few locations in the lower river corridor need fencing and off-stream water development to restrict stock access to riparian areas and stream banks.

11) Fish Passage Maintenance and Improvement: Various projects involving the correction of aquatic connectivity (fish passage +) problems on roads in the WRIA. For example, culvert replacement on the Entiat Valley Road at Stormy Creek to provide fish passage (multi-funded through a SRFB Grant; Involves Chelan County ROW). Refer to County-sponsored culvert/fish passage inventory. Also see section 15a under NFS lands below.

12) Entiat Valley Road Rehabilitation Projects- Chelan County and USFS:

a) Road relocation and riparian/stream bank restoration at MP 16.3 (CC ROW)
b) Fill slope stabilization at MP 17.2 (upper end of Thomas property; CC ROW)
c) Fill slope stabilization at site just within NF boundary ("wood duck site")
d) Possible correction of Valley Road-River overflow concerns at several other sites
e) Improvements to stream crossings at Mud and Potato Creeks
f) Other Valley Road sites to be identified in next version of project list

13) Improvement of Road Management Practices on State and Private Lands: Cooperative effort to improve road maintenance and management practices on roads in the lower Entiat River corridor to improve surface water control, reduce sedimentation and improve/maintain fish passage. Projects include improved management of lower Mud Creek and lower Tyee roads; crossing replacements in Stormy Creek, etc.

14) Ecosystem Restoration Priorities on National Forest System (NFS) Lands: The overall strategy for ecosystem restoration/maintenance on NFS lands in the WRIA is being revised

(update of approach in Version 2.0 of the Federal Watershed Assessment). This strategy will focus on restoring forest ecosystem pattern, composition and process on five general areas across the Entiat Ranger District. Prescribed fire, chainsaws and biological agents will be the most often used tools to reduce tree density. Wherever possible, biomass will be extracted rather than left or burned in place. Prescribed fire will be used to maintain native shrubs and forbs. Cooperative work with intermingled and adjacent ownerships will be promoted. The five areas and possible treatments being considered in this strategy are described below. Approximately 1500 to 2000 acres of mechanical thinning or prescribed fire are planned for treatment annually. 10 % of these acres will be thinned by a commercial timber sale.

a. Dry Forest with "Dry Site Strategy" already being implemented—Crum and Swakane Canyons.

- Complete logging and prescribed burning per EA Decision Notices. For example, maintenance underburns in Swakane, Rattlesnake and Tenas areas to retain low fuel loadings
- Identify and conduct follow-up thinning/burning in order to maintain the desired condition.
- Reforest small patches within some draws on the north side of lower Crum Canyon.

b. 1988 Dinkelman Fire area:

- Maintain existing large tree stands with underburning (estimated start 2006).
- Reduce tree density in stands that established after the Dinkelman Fire.
- Ensure that some western larch is able to develop mistletoe-free.

c. 1994 Tyee Fire area:

- Use prescribed fire to maintain low understory density in existing overstory standswithin Potato, Mud and Tyee areas.
- Monitor reforestation efforts and evaluate the need for replanting or tree density reduction.

d. 1970 Fire area (Preston/Fox , Tillicum/Roaring):

- Reduce tree density in stands that established after the 1970's fires. Most actions will occur in ponderosa pine and Douglas-fir stands.
- Maintain existing large tree stands with underburning. For example, underburn pine overstory stands in Preston-Fox area to maintain low fuel loadings (estimate 4,000 acres over 8 years). Begin similar process in Roaring-Tillicum area in 2005.

e. Upper Entiat Valley area - No recent wildfires:

- Use prescribed fire and commercial and non-commercial thinning to restore the landscape to a more sustainable condition and return some stands to a condition that is consistent with the landscape's natural range of variability.
- Implement a vegetation management plan for developed campgrounds, recreation residence tracts, and dry/mesic forest Late Successional Reserves identified as at risk form stand replacing fires. Objectives of treatments are to; improve overall ecosystem sustainability, reduce the risk of stand replacing fires in key wildlife

habitat, and decrease pathogen and insect related mortality in developed site vegetation.

Implementation of the Okanogan-Wenatchee National Forest's Fire Implementation Plan may meet the objectives of the treatments described above. This Fire Plan includes evaluating all natural wildfires in wilderness areas for use for resource benefits in 2002--- with expansion of this process to non-wilderness areas in succeeding years.

15) Road Rehabilitation and Management on NFS Lands: The overall strategy for road management on NFS Lands in the WRIA will be dictated by the results of Roads Analysis and related evaluations (e.g., Pavement Analysis). Various actions will continue to be planned in project analysis areas to reduce resource impacts (e.g., reduce accelerated sedimentation), improve public safety (e.g., inter-visible turnouts) and enhance user enjoyment. Specific actions could include improvement in surface water control, surfacing, closures, and road to trail conversions, etc. Work will include coordination of roads analysis and road rehabilitation work with other landowners: Longview Fibre (intermingled), WDNR/WDFW (intermingled), BPA (major transmission line ROW roads), and BLM.

Upper Entiat	
Stormy->Fox Creek	(Preston-Fox analysis)
Ardenvoir->Berg Creek	
Dick Mesa->Gray Canyon	
Roaring Ridge->Miners	
Swakane->Roaring Ridge	(Swakane in progress)

"Road Rehab" projects involve a variety of treatments, including drainage improvement, flood/runoff damage repair, spot surfacing, erosion control on cuts and fills (armoring, mulching, seeding, planting), culvert cleanout/repair, road closures (gates, berms and road obliteration). Priority will be given to completing BE-mandated road rehab projects. Example projects include the following:

- Mad Hornet Analysis Area Road closures
- Preston-Fox Road Rehab and Slope Stabailization
- Preston/Fox Roads to trails conversions
- Swakane Area Road Rehab
- Crum Canyon Road Rehab (include powerline roads)
- Roaring-Mills Road Rehab (include USFWS $$ for private roads).
- Post Salvage/Reforestation Road Rehab and Closures (within Tyee Burn)

Some specific projects and areas of emphasis are as follows (not listed by priority):

a. Fish Passage Maintenance and Improvement on NFS Lands: Various projects involving the correction of fish passage problems on roads on NFS lands in the WRIA. For example, culvert replacement on two locations in Stormy Creek to provide fish passage (FS ROW); installation of composite baffles in concrete box culverts in Mud Creek, maintenance of crossings on Indian Creek, replace two culverts on Tillicum Creek, etc. Refer to Forest Service stream crossing culvert/fish passage inventory.

b. Example Road Maintenance/Rehabilitation Projects on NFS Lands:

b1. Drainage Improvement and Spot Surfacing Entiat River Road – Continue drainage improvement/spot surfacing on Entiat River Road from North Fork CG area to Cottonwood Trailhead, maintaining a gravel surface from above North Fork CG to trailhead

b2. Upgrade Spur Road Junctions with Valley Road - Drainage improvement and surfacing of lower section of the following roads (from Valley Road junction to an adequate equipment unload location that also addresses reduction in sediment delivery):

a. Preston Creek Road (asphalt)
b. Shady Pass Road (asphalt)
c. North Fork Road (asphalt)
d. Duncan Ridge Road (aggregate)

b3. Shady Pass Road Upgrade - Continue to improve drainage, alignments, turnouts, spot surfacing on this route---improve public safety (single lane with turnouts)

b4. Riparian Road Decommissioning/Relocation Projects:

- Main Mud Creek Road - Riparian Road Relocation – Relocate existing road from Harris Canyon to N Fork junction; 2 miles of existing road reconstruction with minor new construction.
- Potato Creek/North Fork Potato Creek – Riparian Road Relocation - Relocation of sections of main Potato Creek Rd (above North Fork) in concert with relocation of N. Fork Potato Creek Road; on hold waiting for additional road analysis
- Upper Crum Canyon Road (to Dick Mesa) – future via Tiny Crum EA
- Upper Swakane Canyon Road – in progress via Swakane EA
- Other road sections identified via Roads Analysis

b5. Asphalt Paving Projects:

- Maintenance of Existing Paving on NFS Roads (Need Pavement analysis)
  - Upper Entiat Valley Road (County to North Fork)
  - Tommy Creek Road
  - Campground Repaving (Silver Falls +)
  - Tyee Ridge Road
- Asphalt paving lower Tillicum Creek Road - from Tyee Road junction to switchbacks in section 27; estimate 3.5-4.0 miles paving; needs analysis

16) Trail/Trailhead Projects on NFS Lands: A sample of projects includes the following:

a. Mad River Trail Improvements: A series of trail relocations and other mprovements on the main Mad River trail to benefit riparian resources, reduce maintenance costs and improve user experience. Includes several trail stream crossing improvements

in Upper Mad-Maverick Saddle area. Major improvement is proposed construction of a trail bridgeover the Mad River at Maverick Saddle to replace the existing ford.

b. **Pyramid & Crow Creek Trail Rehab:** Annual and heavy back log maintenace.

c. **Silver Falls Barrier Free Trail and National Recreational Trail Improvements:** On-going work to maintain these popular facilities (Also see item #17 below).

d. **Lake Creek Trail System:** Backlog maintenace including repair and harden all stream crossings, install turnpiking through all wet areas, improve trailway drainage (concrete grid blocks, culverts, drain dips); 14 miles.

e. **Duncan Hill Trail:** Reconstruct Duncan Hill Trail #1434; 6.8 miles.

f. **Klone Peak Trail 1427:** Heavy maintenance, grid block installation and switchback reconstruction.

g. **Cougar L.O. Trail:** Closure of user built treads and braided trail sections, heavy maintenance of designated route from junction with Cougar Ridge trail 1418

17) Developed/Dispersed Campground Rehabilitation Projects on NFS Lands: A variety of projects are planned at National Forest recreation sites in the WRIA to reduce riparian impacts, improve public safety and enhance user experiences. A Vegetation Management Plan is also being developed for recreation sites in the upper Entiat valley (hazard tree management, etc.). A "Respect the River" approach will be used to implement projects such as:

- Rehabilitation of the Silver Falls Recreation Area will involve reconstruction of parking area and trailhead, campsite and spur road rehabilitation/re-locations.
- Continue rehabilitation of sanitation facilities at developed campgrounds (pit toilet replacement)
- Rehabilitation of Cottonwood Campground - Bank stability, revegetation (grass, shrub, tree) and access control.
- Complete and implement a Developed Campground Vegetation Management Plan for Fox Creek, Lake Creek, and Silver Falls CG's as well as Recreation Residence tracts

18) Noxious Weed Control on NFS Lands: Continue to implement a hand control/spray program targeting toadflax and knapweed in priority areas

19) Wildlife Habitat Projects on NFS Lands: Project implementation will be based on priority species.

a. **Shrub/forb/grass revegtation for wildlife:**

- Plant/seed/fertilize preferred vegetation to increase forage and improve security/thermal cover in burned areas, where needed to supplement natural recovery (especially thermal cover on winter range; Potato Creek-Johnson Creek area).

- Pruning - Medicine Ridge/Miners Gold timber sale area.
- Continue with native seed collection/propagation program.

b. Actions to Improve Wildlife Security:

- Access management: Reduce road densities where needed to improve habitat effectiveness of limited habitats - See access management actions above (includes closures, obliterations, riparian road re-locations, enforcement of winter recreation access restrictions, etc.)
- Promote vegetative screening: planting along existing roads and in roadway of closed/obliterated roads, on priority sections
- Various projects to protect known nest sites in more susceptible, key habitats (e.g., snag signing Potato Creek-Johnson Creek, Tyee Ridge)

c. Wildlife Habitat Structural Improvements:

- Nest/den structure maintenance/installation in habitats where they are limited (e.g., bird/bat boxes in Tyee Fire priority areas; Potato-Johnson Creek)
- Guzzler maintenance; additional installations, especially along Columbia River tributaries
- Riparian fencing (associated with active allotments)

d. Nutritional supplementation: Install selenium blocks for Swakane Bighorn Sheep

20) Range Resource Projects on NFS Lands: Projects based on allottment activity.

a. Stock tank relocation: Move watering sites out of riparian areas.

b. Protection of springs/riparian areas: Protect springs/riparian areas from direct livestock impacts in targeted pastures and use sites (via fencing, salting, riding, temporary water sources).

c. Rehabiltate High Use Sites: Monitor and rehabilitate high use sites, such as Tillicum fan unload and Tillicum-Indian lamb sorting sites on Mosquito Ridge Sheep allottment

21) Other Restoration/Rehabilitation Project Examples on NFS Lands:

a. Erosion Control/Soil quality restoration: Continue soil rehab (decompaction), erosion control work/monitoring in the Tyee Fire area; complete implementation of other actions approved in project analyses (e.g., road closures).

b. 2001 Tommy Creek Fire Rehabilitation: Complete suppression rehabilitation and Burned Area Emergency Rehabilitation for this recently burned area.

c. Water Chance Reconstruction: On-going effort to reduce aquatic connectivity and sedimentation problems posed by these temporary facilities.

d. **Streambank Stabilization/Riparian Planting:** Bio-engineering work at various sites, for example:

- Entiat River Streambank Rehab (eroding bank near Potato Creek confluence).
- North Fork System (S Pyramid Creek, Crow Creek).
- Riparian planting - Indian Creek , Roaring Creek, other burned area sites.
- Alluvial fans - Fox Creek vicinity, Tillicum fan
- Maintenance riparian plantings at stream crossing sites

e. **Entiat Spawning Channel:** Explore potential for additional fish habitat improvement work in the adjacent reach.

f. **Revegetation of Mud Creek Meadows:** Continue site restoration, with emphasis on noxious weed control).