Appendix G: Aquatic Conservation Strategy Objectives

Aquatic Conservation Strategy Objectives for Action Alternatives

Objective 1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

Effect: The proposed action would open the overstocked stands and allow sunlight to reach the forest floor promoting understory species vigor and diversity in composition including that within the riparian reserves. In addition, intervals of openings within the riparian corridor are preferred over a continuous canopy of diseased and dying conifer to reduce the risk of stand replacing fire. Multi-story vegetation components should result from treating diseased and dying conifer and thinning. These treatments will have a neutral to beneficial effect on the distribution, diversity, and complexity of watershed and landscape-scale features.

Objective 2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

Effect: All confluences among tributaries will be maintained. The proposed action would allow the processes that support a proper functioning condition over their current status of decline[1,2]. Sunlight is currently limited from reaching the forest floor by the dense conifer canopy. The shrub component of plant communities should improve on adjacent slopes as sunlight reaches the forest floor. Riparian vegetation is suppressed due to this lack of light as well as over-browsing by ungulates. Thinning activities adjacent to and within the riparian reserve, which preserve mature healthy conifer and open the canopy, will favor regeneration and establishment of riparian plant communities including willow. During high flows the contribution of nutrients, woody debris and sediment are redistributed within the watershed and plant communities have an opportunity to expand from in the downstream direction. Future management to reduce over-browsing would enhance these improved conditions.

In addition, reduction of stand density may have some beneficial effects on connectivity by reducing the risk of fire within the Riparian Reserves. This alternative will have a neutral to beneficial effect on spatial connectivity within and between the watersheds.

Objective 3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

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[1] USDI Bureau of Land Management, *Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas*, Technical Reference 1737-11, 1994.

[2] Reid, L.M. and R.R. Ziemer, USDA Forest Service, Pacific Southwest Research Station. *Evaluating the Biological Significance of Intermittent Streams*, Summary of workshop held at the Humboldt Interagency Watershed Analysis Center May 4, 1994.

Effect: The proposed action will have a neutral effect and no negative effects on the physical integrity of the aquatic system. No skidding equipment will be allowed within 20 feet of the channels, so banks and stream features will be avoided and remain intact. With improved sunlight, the riparian vegetation is expected to improve bank strength. With sufficient improved vegetation along the banks, the channel should narrow and the channel bottom should sustain attributes that reflect a higher proper functioning condition[3].

Objective 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

Effect: The greatest potential for erosion commonly occurs during and immediately after the disturbance activity. The implementations of BMP's are designed to protect water quality even if stream flow is present at the time of proposed activities. Roads typically carry most of the sediment from a hillslope disturbance to the stream. With very little slope, sediment transport is limited by slope in the project area.

Objective 5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Effect: The proposed action will have a beneficial effect on improving the riparian vegetation vigor and composition and thus on the sediment regime. Bank strength will increase due to increased soil strength from additional root strength from more vigorous riparian vegetation[4]. Slopes adjacent to the channel are generally less than 3 percent. There will be little to no opportunity for activities to affect sediment movement in the project area because of low slopes.

Objective 6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high and low flows must be protected.

Effect: The proposed action will have a neutral to slightly beneficial effect of short duration on maintenance of instream flows. Surface flow in the project area is primarily intermittent. A reduction in evapotranspiration may temporarily prolong and slightly increase seasonal runoff/base flows in the project area until the riparian vegetation becomes re-established. Studies indicate that forest openings retain snow longer compared to forested stands as sublimation occurs more rapidly on branch surfaces[5]. This would tend to have a beneficial effect on increasing the duration of snowmelt. Renewal of riparian vegetation will eventually lead to stream processes that reduce energy, detain sediment, build banks and discourage entrenchment. This is a beneficial effect for the surface and subsurface flow.

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[3] USDI Bureau of Land Management, *Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas*, Technical Reference 1737-11, 1994.
[4] Rosgen, D. 1996. *Applied River Morphology*, Ch.6. p.14.
[5] Pomeroy, J. W. and J. Parviainen, N. Hedstrom, D. M. Gray. *Coupled modeling of forest snow interception and sublimation. Hydrological Processes* Vol. 12, Issue 15, Date: December 1998, pps: 2317-2337; www.Interscience.Wiley.com.

Objective 7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

Effect: The proposed action will have a beneficial effect on stream and floodplain interaction by encouraging under-story vegetation to establish and improving conditions for riparian vegetation from increased sunlight. Under-story vegetation on the floodplain and within the riparian reserves will increase the channel roughness and detain sediment, flow and reduce energy. Water tables are influenced by topographic lows; detention of sediment will lead to bank building processes, improved floodplain function and water table elevation.

Objective 8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Effect: Thinning activities will reduce the risk of stand-replacing fires in the Riparian Reserves and promote stand health. Near-stream conifer removal is likely to provide beneficial effects to willow regeneration by allowing full to partial sunlight conditions for willow while reducing conifer competition. This should incrementally improve habitat for the Willow Flycatcher. Habitat for the Willow Flycatcher in the McCloud Flats area, along the McCloud River outside of the project area, has been ground verified and mapped using landsat imagery by the California Department of Fish and Game, and Humboldt State University from data collected during 1997 and 1998[6]. For entrenched channels coarse woody debris will add channel roughness favorable for the channel building processes; for low-gradient channels, too much woody debris can have adverse impacts[7]. Entrenchment of streams may result in draw-down of alluvial aquifers responsible for sustenance of deep-rooted riparian communities[8]. The proposed action will have a beneficial effect on Objective 8.

Objective 9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

Effect: The proposed action will be beneficial in directing the species composition and structural diversity of plant communities to a more desirable state within the project area and thus will have a beneficial effect on populations of native plants, invertebrates and vertebrate riparian-dependent species within the project area. The intermittent nature of the streams creates dry to wet soil moisture conditions that limit the establishment of riparian species to those areas where conditions are favorable. The proposed action will have a neutral to beneficial effect for Objective 9.

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[6] Stermer, C. J., T. S. Burton, R. L. Callas, and Dr. Lawrence Fox III, 1998. *Habitat Predictability Model for Willow Flycatchers (Empidonax trailii) in Northern California, using Landsat Thematic Imagery*, Organization of Fish and Wildlife Information Managers In: 4th Microcomputer Applications in Fish & Wildlife Conference, Symposium 4,Technology in the Wildlife Profession: Research, Application, and Education.

[7] Rosgen, D. 1996. *Applied River Morphology*

[8] Minshall, G., S.E. Jensen, and W.S. Platts. 1989. *The Ecology of Stream and Riparian Habitats of the Great Basin Region: a Community Profile*. U.S. Fish and Wildlife Service Biological Report 85 (7.24) p. 44.