Central CA Coast Coho Salmon ~ Coastal Diversity Stratum

ACTIONS FOR RESTORING HABITATS

1. **Restoration- Estuary**
   1.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

      1.1.1. **Recovery Action:** Increase extent of estuarine habitat

         1.1.1.1. **Action Step:** Implement recommendations in NMFS's Russian River biological opinion (specifically estuary management RPA's).

      1.1.2. **Recovery Action:** Implement ESU and population level recovery actions for Estuaries

2. **Restoration- Floodplain Connectivity**
   2.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

      2.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Floodplain Connectivity

3. **Restoration- Habitat Complexity**
   3.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

      3.1.1. **Recovery Action:** Improve Habitat Complexity

         3.1.1.1. **Action Step:** To promote channel complexity, improve baseflows and provide rearing habitat investigate the feasibility and benefit of beaver re-location and re-introductions to Sonoma County (such as Austin, Green Valley, lower Russian River independent populations and Salmon Creek) and Marin County (such as Lagunitas, Pine Gulch, Redwood, and Walker Creek populations).

      3.1.2. **Recovery Action:** Implement ESU and population level recovery actions for Habitat Complexity

4. **Restoration- Hydrology**
   4.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

      4.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Hydrology

5. **Restoration- Landscape Patterns**

5.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

5.1.1. **Recovery Action:** Prevent increased landscape disturbance

5.1.1.1. **Action Step:** Implement Best Management Practices such as those in the Fish Friendly Farming program (California Land Stewardship Institute), or other cooperative conservation programs.

5.1.2. **Recovery Action:** Prevent impairment to watershed hydrology

5.1.2.1. **Action Step:** Conserve open space in intact landscapes, protect floodplain areas and riparian corridors, and develop conservation easements.

5.1.3. **Recovery Action:** Reduce adverse impacts to landscape patterns

5.1.3.1. **Action Step:** Work with Mendocino, Sonoma and Marin counties (including cities and local jurisdictions) to improve permitting processes, road maintenance, ordinances, etc. to reduce ongoing impacts of urbanization, agriculture, road building, grading activities, and timberland conversions.

5.1.3.2. **Action Step:** Encourage development of a county-wide HCP's with Marin and Sonoma that includes State Parks, major water diverters, counties, municipalities, timberland, and vineyard owners.

5.1.3.3. **Action Step:** Implement recommendations in NMFS' Russian River biological opinion (specifically estuary management, and Russian River flow RPA's).

6. **Restoration- Passage**

6.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

6.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Passage

7. **Restoration- Pool Habitat**

7.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

7.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Habitat Complexity

8. **Restoration- Riparian**

8.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

8.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Riparian Vegetation

9. Restoration- Sediment

9.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

9.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Sediment

10. Restoration- Viability

10.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

10.1.1. **Recovery Action:** Increase density, abundance, spatial structure, and diversity

10.1.1.1. **Action Step:** Re-introduce coho salmon to extirpated watersheds, while minimizing departure from the genetic profile that historically existed in the Stratum.

10.1.1.2. **Action Step:** Conduct a feasibility study regarding the potential contribution the Laguna de Santa Rosa to Russian River viability targets. As the largest freshwater wetland in the CCC coho salmon ESU a historical ecology study of the Laguna de Santa Rosa is recommended to identify physical processes that have been disrupted. The study could provide the foundation for a conceptual plan to prevent wetland loss and improve wetland habitats and functions for CCC coho salmon.

10.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

10.2.1. **Recovery Action:** Increase density, abundance, spatial structure, and diversity

10.2.1.1. **Action Step:** Work with Sonoma and Marin county district attorney to address environmental crimes that adversely impact coho salmon and/or their habitat.

10.3. **Objective:** Address other natural or manmade factors affecting the species continued existence

10.3.1. **Recovery Action:** Increase density, abundance, spatial structure and diversity

10.3.1.1. **Action Step:** Continue the operation of the Russian River Captive Broodstock Program.

10.3.1.2. **Action Step:** Utilize resources to increase genetic variability in captive broodstock programs as well as for adult re-introduction efforts in Marin and Sonoma County streams lacking current salmonid presence (Walker and Salmon Creek Programs are models for others).

10.3.1.3. **Action Step:** Augmentation or intervention such as juvenile collection and retention at established rearing facilities for release as adults (or other intervention methods) may be necessary at this time due to extremely low populations to ensure long-term genetic diversity is preserved. Watersheds of particular interest include Lagunitas/Olema Creek, Redwood Creek, Pine Gulch Creek and Walker Creek.

10.3.1.4. **Action Step:** Annually monitor juvenile and adult coho salmon to assess success of the implemented augmentation/intervention strategies (e.g. number of adult returns, spawning success, juvenile survival etc.) to determine if there is an increase in abundance of natural production of coho salmon in each population.

10.3.1.5. **Action Step:** Evaluate and conduct nutrient enrichment projects to improve freshwater growth and increase smolt escapement utilizing available carcasses from hatcheries and other methods (e.g. salmon analogs).

10.3.1.6. **Action Step:** Annually capture or retain (during rescue efforts) - adequate numbers of fish from streams in Marin and Sonoma County for use as broodstock.

11. Restoration- Water Quality

11.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

11.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Water Quality

THREAT ABATEMENT ACTIONS

12. Threat- Agricultural Practices

12.1. **Objective:** Address the present of threatened destruction, modification or curtailment of the species habitat or range

12.1.1. **Recovery Action:** Prevent adverse alterations to riparian species composition and structure

12.1.1.1. **Action Step:** Implement BMP's for agricultural activities similar to those in the Fish Friendly Farming program (CDFG 2004).

12.1.1.2. **Action Step:** Solicit cooperation from NRCS, RCDs, Farm Bureau, and others to devise incentive programs and incentive-based approaches to encourage increased involvement and support existing landowners who conduct operations in a manner compatible with salmon recovery priorities.

12.1.1.3. **Action Step:** Streamline permit processing where landowners are conducting actions aligned with recovery priorities.

12.1.1.4. **Action Step:** Agricultural users should utilize BMP's in Vineyard Frost Protection: A guide for Northern Coastal California (Sotoyome Resource Conservation District, 2011).

12.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

12.2.1. **Recovery Action:** Prevent impairment to riparian species composition and structure

12.2.1.1. **Action Step:** Develop riparian setbacks/buffers where they do not currently occur, and enforce requirements of local regulations where they do.

12.2.1.2. **Action Step:** Enforce requirements of local regulations and riparian setbacks.

12.2.1.3. **Action Step:** Implement programs to purchase land/conservation easements to encourage the re-establishment and/or enhancement of natural riparian communities.

12.2.2. **Recovery Action:** Prevent impairment to floodplain connectivity

12.2.2.1. **Action Step:** Utilize HCPs, Safe Harbor agreements or other regulatory authorities to protect coho salmon and their habitat.

12.2.2.2. **Action Step:** Work with Sonoma, Mendocino and Marin counties to develop more protective regulations in regard to vineyard development.

13. Threat- Channel Modification

13.1. **Objective:** Address the inadequacy of existing regulatory mechanisms

13.1.1. **Recovery Action:** Prevent impairment to instream habitat complexity (reduced large wood and/or shelter)

13.1.1.1. **Action Step:** All proposed flood control projects should include habitat protection, and/or alternatives that minimize impacts to salmon habitat.

13.1.1.2. **Action Step:** Agencies should develop large woody debris retention programs and move away from the practice of removing instream large woody debris under high flow "emergencies."

13.1.1.3. **Action Step:** Develop a mitigation policy that requires in-kind replacement of removed large woody debris at a 3:1 ratio.

13.1.2. **Recovery Action:** Prevent impairment to floodplain connectivity

13.1.2.1. **Action Step:** Encourage counties to develop a Sensitive Habitat Ordinance similar to that in place for the County of Santa Cruz.

13.1.2.2. **Action Step:** Counties and municipalities should adopt a policy of "managed retreat" (removal of problematic infrastructure and replacement with native vegetation or flood tolerant land uses) for areas highly susceptible to, or previously damaged from, flooding.

14. Threat- Disease/Predation/Competition

14.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

14.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Disease, Predation and Competition

15. Threat- Fire/Fuel Management

15.1. **Objective:** Address the inadequacy of existing regulatory mechanisms

15.1.1. **Recovery Action:** Prevent impairment to water quality

15.1.1.1. **Action Step:** Reconcile differences between USFS fire retardant and suppression guidelines with recommendations in the NPS EIR for fire management on National Park lands within the Lagunitas, Pine Gulch, and Redwood Creek watersheds.

15.1.2. **Recovery Action:** Prevent increased landscape disturbance

15.1.2.1. **Action Step:** Encourage the NPS to adopt the ESA emergency consultation guidelines and biological resource protection so that ESA consultations are initiated whenever coho salmon resources are at risk from fires and/or fire suppression activities.

16. Threat- Fishing/Collecting

16.1. **Objective:** Address other natural or manmade factors affecting the species' continued existence

16.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Fishing/Collecting.

17. Threat- Hatcheries

17.1. **Objective:** Address other natural or manmade factors affecting the species' continued existence

17.1.1. **Recovery Action:** Improve density, abundance, spatial structure, and diversity

17.1.1.1. **Action Step:** Ensure the threat of hatcheries remains low. See Viability actions for specific recommendations regarding hatchery practices.

18. **Threat- Livestock**

18.1. **Objective:** Address the inadequacy of existing regulatory mechanisms

18.1.1. **Recovery Action:** Prevent impairment to water quality (increased turbidity, suspended sediment, and/or toxicity)

18.1.1.1. **Action Step:** Livestock and Ranch Managers should utilize Groundwork: A Handbook for Small-Scale Erosion Control in Coastal California (MRCD, 2007), and Management Tips to Enhance Land & Water Quality for Small Acreage Properties (Sotoyome Resource Conservation District, 2007), and The Grazing Handbook (Sotoyome Resource Conservation District, 2007).

19. **Threat- Logging**

19.1. **Objective:** Address the present or threatened destruction, modification or curtailment of the species habitat or range

19.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Logging

20. **Threat- Mining**

20.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

20.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Mining

21. **Threat- Recreation**

21.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

21.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Recreation

22. **Threat- Residential/Commercial Development**

22.1. **Objective:** Address the present or threatened destruction, modification or curtailment of the species habitat or range

22.1.1. **Recovery Action:** Prevent impairment to riparian species composition and structure

22.1.1.1. **Action Step:** Use native plants when landscaping and discourage the use of exotic invasive plants.

22.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

22.2.1. **Recovery Action:** Prevent impairment to riparian species composition and structure

22.2.1.1. **Action Step:** Encourage Sonoma and Marin counties to develop and implement ordinances (e.g. Santa Cruz County Code 2008) to restrict

subdivisions by requiring a minimum acreage limit for parcels in concert with limits on water supply and groundwater recharge areas.

22.2.1.2. **Action Step:** Provide technical and staff support to counties to encourage general plan updates to include measures to protect coho salmon (CDFG 2004).

22.2.1.3. **Action Step:** Enforce existing building permit programs to minimize unpermitted construction.

22.2.2. **Recovery Action:** Prevent impairment to watershed hydrology

22.2.2.1. **Action Step:** Encourage infill and high density developments over dispersal of low density rural residential in undeveloped areas.

23. Threat- Roads/Railroads

23.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

23.1.1. **Recovery Action:** Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)

23.1.1.1. **Action Step:** Forest and ranch managers should utilize the Handbook for Forest and Ranch Roads (PWA, 1994).

23.1.1.2. **Action Step:** Mendocino, Sonoma and Marin Public works departments should utilize the Fishnet 4C Road Manual or an equivalent manual (e.g., 5 Counties Road Manual) for all related road activities.

23.1.2. **Recovery Action:** Prevent impairment to passage and migration

23.1.2.1. **Action Step:** Using the most recent established protocols, conduct passage assessments where they do not currently exist.

23.1.2.2. **Action Step:** Assess private and public road stream crossings for barrier potential and implement recommendations.

23.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

23.2.1. **Recovery Action:** Prevent impairment to watershed hydrology

23.2.1.1. **Action Step:** Continue education of Caltrans, County road engineers, and County maintenance staff regarding watershed processes and the adverse effects of improper road construction and maintenance on salmonids and their habitats.

24. Threat- Severe Weather Patterns

24.1. **Objective:** Address other natural or manmade factors affecting the species' continued existence

24.1.1. **Recovery Action:** Prevent impairment to hydrology

24.1.1.1. **Action Step:** Implement water conservation strategies that provide for drought contingencies without relying on interception of surface flows or groundwater depletion.

24.1.1.2. **Action Step:** Identify and work with water users to minimize depletion of summer base flows from unauthorized water uses.

25. Threat- Water Diversion/Impoundment

25.1. **Objective:** Address the present or threatened destruction, modification or curtailment of the species habitat or range

25.1.1. **Recovery Action:** Prevent impairment to stream hydrology (impaired water flow)

25.1.1.1. **Action Step:** Promote water conservation best practices such as drip irrigation for vineyards.

25.1.1.2. **Action Step:** Promote the use of reclaimed water for agricultural or other uses.

25.1.1.3. **Action Step:** Institutionalize programs to purchase easements on water rights to encourage the maintenance of surface flows.

25.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

25.2.1. **Recovery Action:** Prevent impairment to stream hydrology (impaired water flow)

25.2.1.1. **Action Step:** Identify and work with the SWRCB to eliminate depletion of summer base flows from unauthorized water uses. Coordinate efforts by Federal and State, and County law enforcement agencies to remove illegal diversions from streams.

25.2.1.2. **Action Step:** Promote the use of reclaimed water for agricultural or other uses.

25.2.2. **Recovery Action:** Prevent impairment to watershed hydrology

25.2.2.1. **Action Step:** Improve coordination between agencies and others to address season of diversion, off-stream reservoirs, bypass flows protective of coho salmon and their habitats, and avoidance of adverse impacts caused by water diversion (CDFG 2004).

25.2.2.2. **Action Step:** Evaluate requests for on-stream dams above migratory reaches for effects on the natural hydrograph and the supply of spawning gravel for recruitment downstream (CDFG 2004).

25.2.2.3. **Action Step:** Develop and implement regulations for groundwater use.

25.2.3. **Recovery Action:** Improve flow conditions

25.2.3.1. **Action Step:** Petition SWRCB to declare CCC coho salmon watersheds with existing populations and ongoing diversions in the Coastal Diversity Stratum declared as fully appropriated during the summer months. Encourage water right applications for existing rights holders who seek to shift the timing or manner of diversion from a less protective to more protective practice.

26. Threat- Watershed Process

26.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of habitat or range

26.1.1. **Recovery Action:** Implement ESU and population level recovery actions for Watershed Process