

Appendix D. Recovery Action Cost Methodology

To determine recovery action costs for the SONCC coho salmon ESU, a systematic and consistent methodology is applied. In general, cost estimates are derived from previous, similar projects or tasks (Tables D-2 to D-51). Each recovery action cost estimate is limited to the monetary expenditure required to physically perform the task, and therefore does not include secondary costs (e.g., administrative, overhead) or economic costs or benefits (e.g., fishing, tourism, lost opportunity) that may result from action implementation. Recovery actions costs presented in five year intervals out to 25 years (i.e., 0-5, 5-10, 15-20, 20-25), with one value estimated for costs beyond 25 years (i.e., 26+ years). Cost estimates are not calculated for those actions determined not essential for recovery (“NA” priority).

Factors such as project scale and location are accounted for when possible, and costs are calculated accordingly. For example, county and population-specific data is used to inform the cost of actions that occur in those particular areas. Additionally, the costs of past projects used to inform recovery action cost estimates are adjusted for inflation. The scale of a recovery action is often unknown. In these cases an assumption is made regarding the amount or extent of work needed to achieve the recovery objective. For example, if the amount of roads in need of decommissioning in a given population is unknown, the assumption is to reduce the amount of roads to a level equal to a “medium” threat. Table D-18 indicates the cost to decommission one mile of road in the Humboldt Bay watershed is \$20,938. If 85 miles of road need to be decommissioned, the estimated cost is \$1,779,730 (\$20,938 multiplied by 85 miles).

Some recovery actions involve policy changes, coordination, or other activities that rely primarily on staff time. For these types of actions, the cost is calculated by multiplying the annual salary (Table D-2) of the occupation most likely to complete the task by the amount of time anticipated to complete the task. For example, an action to educate stakeholders regarding water conservation practices may require six months of a professional biologist’s time. Table D-2 indicates a professional biologist’s time costs \$68,030 a year. In this case, the estimated cost is \$34,015 (\$68,030 multiplied by 0.5 years).

Recovery action costs are calculated for each action-step level and calculated in spreadsheets containing population specific data (e.g., watershed acreage, amount of IP habitat, road density) and recovery action type cost information. A sample spreadsheet outlining the process for calculating recovery action costs can be found in Table D - 1.

Table D - 1. Sample of the cost estimation spreadsheet.

| Action Step | Explanation | Factor 1 | Factor 2 | Cost (years 1-5) |
|--|--|----------|----------|---------------------|
| Assess and prioritize road-stream connection, and identify appropriate treatment to meet objective | Road inventory in Mattole * 878 miles total roads in watershed | 635 | 878 | \$557,530 |
| Decommission roads, guided by assessment | Road decom. in California * 286 miles (to obtain 2mi/mi ² density) | 93,279 | 286 | \$26,677,794 |
| Upgrade roads, guided by assessment | Road upgrade in Mattole * 149 miles (25% of remaining roads after decom) | 32,857 | 149 | \$4,895,693 |
| Maintain roads, guided by assessment | Gravel road maintenance * 594 (# of road miles remaining after decom) | 2,389 | 594 | \$1,419,066 |

Number of miles is unknown; use blanket assumption

Number of miles is unknown; use blanket assumption

Data from "Road Inventory" worksheet (\$635/mi)

Data from "Population Statistics" worksheet (878 total road miles in the Mattole watershed)

Table D-2. Information used to estimate cost of staff time.

| Staff Time | | | |
|------------------------------------|-------------------------|-------------------|---------------------------------|
| Occupation | Hourly Wage (seasonals) | Annual Wage (FTE) | Source |
| Biologist | 33 | 68,030 | Bureau of Labor Statistics 2009 |
| Biologist Technician | 20 | 40,900 | |
| Fish and Game Warden | 27 | 56,030 | |
| Police/Sheriff Patrol Officers | 25 | 52,810 | |
| Forest Fire Inspectors/ Prevention | 18 | 36,400 | |
| Forest and Conservation Workers | 13 | 26,110 | |
| Urban and Regional Planners | 30 | 62,400 | |
| Physical Scientists (all others) | 44 | 91,850 | |
| Engineers (all others) | 43 | 89,080 | |
| Hydrologist | 36 | 73,540 | |

Table D-3. Information used to estimate cost of lining a ditch.

| Ditch Lining | | |
|-------------------|-------|-------------------|
| Type of Liner | \$/ft | Source |
| Plain Concrete | 21 | NMFS 2008, pg. 46 |
| Flexible Membrane | 15 | |
| Galvanized Steel | 21 | |

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Table D-4. Information used to estimate cost of irrigation pipe.

| Piping | | |
|-------------------|--------|-------------------|
| Type | \$/ft* | Source |
| Aluminum Pipeline | 16 | NMFS 2008, pg. 47 |

*When number of feet of pipe is unknown, assume 1% of privately owned land is in agriculture (population stats worksheet). Assume 50% of those acres are irrigated and 1 ft per acre of land will be piped.

Table D-5. Information used to estimate cost of headgates.

| Install Headgates | | |
|-------------------|--------------|-------------------|
| Size of Headgate | \$/Diversion | Source |
| <3 cfs | 5,156 | NMFS 2008, pg. 47 |
| >3 cfs | 10,309 | |

Table D-6. Information used to estimate cost of storm drain retrofits.

| Storm Drain Retrofit | | |
|---------------------------------|----------------------|-----------------------|
| Action | \$/filter or program | Source |
| Catch Basin/Filter Installation | 98 | Kosciusko County 2002 |
| Annual Maintenance Program | 6,452 | |

Table D-7. Information used to estimate cost of stream flow gage installation and maintenance.

| Stream Flow Gage Installation & Maintenance | | |
|---|-----------------|---------------------------|
| Action | \$/gage or year | Source |
| Installation of State/Private Gage | 26,136 | Rhode Island DEM-WRB 2004 |
| Installation of USGS Gage | 29,545 | |
| Annual Maintenance of State/Private Gage | 7,955 | |
| Annual Maintenance of USGS Gage | 3,409 | |

5 **Table D-8. Information used to estimate cost of tidegate restoration.**

| Tidegate Restoration | | |
|----------------------|-------------|-------------------|
| Activity | \$/Tidegate | Source |
| Replace Tidegate | 120,114 | NMFS 2008, pg. 20 |
| Retrofit Tidegate | 28,571 | |

Table D-9. Information used to estimate cost of tailwater management.

| Tailwater Management | | |
|--------------------------------|-----------|-------------------|
| Area Covered by System (acres) | Cost (\$) | Source |
| 1-50 | 10,309 | NMFS 2008, pg. 45 |
| 51-100 | 20,618 | |
| 101-200 | 30,928 | |
| 201-300 | 41,237 | |
| 301-400 | 61,856 | |
| 401-500 | 82,474 | |

10 **Table D-10. Information used to estimate cost of installing, compliance, or monitoring of a forbearance program.**

| Forbearance Program | | |
|--|-----------------------|--|
| Part of Program | \$/landowner, \$/year | Source |
| Avg. cost for installation & agreements | 70,000 | Tasha McKee Sanctuary Forest, pers. comm. 2010 |
| Avg. cost for compliance & flow monitoring | 500 | |

Table D-11. Information used to estimate cost of installing or maintaining engineered beaver ponds.

| Engineered Beaver Ponds | | |
|-------------------------|------------------|--|
| Activity Type | \$/pond, \$/year | Source* |
| Installation of Pond | 15,000 | Tasha McKee Sanctuary Forest, pers. comm. 2010 |
| Maintenance of Ponds | 25,000 | |

*Recommends 10 years of maintenance following installation.

Table D-12. Information used to estimate cost of fish passage improvement.

| Fish Passage Improvement (\$/Project) | | | | | |
|---------------------------------------|-----------|---------|-------------|----------|-----------------------|
| Stream Crossing | Land Use | | | | Source |
| | Tributary | Forest | Agriculture | Suburban | |
| Total Barrier | 63,636 | 159,090 | 318,181 | 556,818 | CDFG 2004, pg I-16 |
| Partial/Temporal Barrier | 31,818 | 79,545 | 159,090 | 278,409 | |
| <i>Stream</i> | | | | | |
| Total Barrier | 159,090 | 381,818 | 556,818 | 795,454 | |
| Partial/Temporal Barrier | 79,545 | 190,909 | 278,409 | 397,727 | |

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Table D-13. Information used to estimate cost of dam removal.

| Dam Removal | | |
|--|-----------|-----------------------|
| Size of Dam | \$/ft | Source |
| one cost estimate for <15ft dam | 568,181 | CDFG 2004, pg I.11 |
| >15 ft high -cost/ft | 17,045 | |
| one estimate - unknown height; complete barrier | 1,022,727 | |
| one estimate - unknown height; partial/temporal or unknown barrier | 511,363 | |

Table D-14. Information used to estimate cost of bridge construction.

| Bridge Construction | | |
|-----------------------|-----------------------|---------------------|
| Bridge Type | \$/sq. ft. of decking | Source |
| RC Slab | 191 | California DOT 2008 |
| RC Box Girder | 170 | |
| CIP/PS Slab | 168 | |
| CIP/PS Box Girder | 298 | |
| PC/PS "I" Girder | 231 | |
| PC/PS Bulb "T" Girder | 239 | |
| Average | 216 | |

Table D-15. Information used to estimate cost of arch/box culvert replacement.

| Replacing a Culvert w/ a New Type of Structure | | |
|--|----------------|---------------------|
| New Type of Crossing | Avg. Cost (\$) | Source |
| Bridge <40ft | 51,546 | NMFS 2008, pg 11-15 |
| Bridge >40ft | 103,093 | |
| Bottomless/Open Bottom Arch | 193,961 | |
| Natural Bottom Pipe Arch | 215,776 | |
| Box Culvert | 248,352 | |

5 **Table D-16. Information used to estimate cost of road construction.**

| Road Construction (for relocation purposes) | | |
|---|-----------|----------|
| Type of Road | \$/mile | Source |
| Non paved: two directional 12' shared path | 175,000 | DOT 2010 |
| Undivided 2 lane rural road w/ 5' paved shoulders | 1,713,000 | |

Table D-17. Information used to estimate cost of road upgrade.

| Road Upgrade | | |
|------------------|--------|----------------------|
| Location | \$/mi* | Source |
| California | 18,104 | NMFS 2008, pg. 43-44 |
| Mendocino County | 34,278 | |
| Siskiyou County | 50,119 | |
| Klamath River | 29,186 | |
| Salmon River | 41,453 | |
| Smith River | 53,068 | |
| Eel River | 32,658 | |
| Mattole River | 32,857 | |
| SONCC | 14,535 | |
| Russian River | 95,275 | |
| Garcia River | 32,528 | |

*If number of miles unknown, assume 25% of road miles remaining in watershed after decommissioning to the level of 2 mi/mi².

Table D-18. Information used to estimate cost of road decommissioning.

| Road Decommissioning | | |
|----------------------|---------|-------------------|
| Location | \$/mi* | Source |
| California | 93,279 | NMFS 2008, pg. 42 |
| Humboldt Bay | 20,938 | |
| Klamath | 33,801 | |
| Mendocino | 34,884 | |
| Trinity | 61,525 | |
| Salmon River | 48,242 | |
| Van Duzen River | 89,149 | |
| SONCC | 141,395 | |

*If number of miles unknown, reduce watershed road density to 2 mi/mi².

Table D-19. Information used to estimate cost of road maintenance.

| Average Road Maintenance Cost | | |
|-------------------------------|--------|--------------------|
| Type* | \$/mi* | Source |
| Gravel Roads | 2,389 | Jahren et al. 2005 |
| Bituminous Roads | 2,639 | |

*If type and number of miles is unknown, assume 'gravel roads' and total number of miles of road in the watershed after decommissioning to a level of 2mi/mi².

5 **Table D-20. Information used to estimate cost of installing a fish ladder.**

| New Fish Ladder | | |
|------------------|-----------|-----------------|
| Size of Waterway | \$/Ladder | Source |
| Large Waterway | 1,022,727 | NMFS 2008, pg 9 |
| Small Waterway | 568,181 | |

Table D-21. Information used to estimate cost of gate installation.

| Average Cost of Gate and Installation | | |
|--|---------|--|
| Gate | \$/gate | Source |
| Aluminum Gate (5ft tall, 10ft wide) + installation | 880 | www.pro fenceworks.com (site accessed March 4, 2011) |

Table D-22. Information used to estimate cost of culvert replacement.

| Culvert Replacement (\$/Culvert) | | | | | |
|----------------------------------|-------------|--------------|--------------|-------------|-------------------|
| Size of Waterway | Road Type | | | | Source |
| | Forest Road | Minor 2 Lane | Major 2 Lane | Hwy 4+ Lane | |
| Small (0-10') | 31,976 | 87,209 | 174,419 | 319,767 | NMFS 2008, pg. 10 |
| Medium (10-20') | 87,209 | 220,930 | 319,767 | 436,047 | |
| Large (20-30') | 133,721 | 267,442 | 406,977 | 813,953 | |

*if number and type of barriers is unknown, assume 1 barrier per 5 miles of high IP miles and type is 'small' and 'forest road'.

Table D-23. Information used to estimate cost of tributary and floodplain reconnection.

| Floodplain and Tributary Reconnection (\$/acre) | | | | |
|---|------------------------|----------|-------------|------------------|
| Materials | Extent of Earth Moving | | | Source |
| | Minimal | Moderate | Substantial | |
| Minimal | 8,721 | 17,442 | 40,698 | NMFS 2008, pg 26 |
| Moderate | 17,442 | 29,070 | 58,140 | |
| Substantial | 40,698 | 58,140 | 81,395 | |

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Table D-24. Information used to estimate cost of side channel reconnection projects.

| Side Channel Reconnection (\$/acre) | | | | |
|-------------------------------------|--------------------|---------|---------|------------------|
| Extent of Earthmoving | Energy of Waterway | | | Source |
| | Low | Medium | High | |
| Minimal/Near | 34,884 | 63,953 | 87,209 | NMFS 2008, pg 26 |
| Moderate/Avg. Distance | 58,140 | 98,837 | 174,419 | |
| Substantial/Far | 93,023 | 191,860 | 290,698 | |

Table D-25. Information used to estimate cost of supplementing spawning gravel.

| Spawning Gravel Supplementation | |
|---------------------------------|-------------------|
| \$/cubic yard | Source |
| 28 | NMFS 2008, pg. 25 |

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Table D-26. Information used to estimate cost of placing large woody debris structures.

| LWD Structure Placement | |
|-------------------------|---------------------|
| Avg. \$/mi* | Source |
| 547,850 | NMFS 2008, pg 23-24 |

*If length unknown, assume 25% of high IP miles, unless this results in less than 1, then use total IP miles.

Table D-27. Information used to estimate cost of channel restoration.

| Channel Restoration | | |
|-------------------------------|-----------|------------------|
| Type | \$/mi | Source |
| Large scale reach restoration | 4,217,623 | NMFS 2008, pg 27 |

Table D-28. Information used to estimate cost of creating off channel ponds.

| Creation of Off Channel Pond | |
|------------------------------|--|
| \$/project* | Source |
| 102,258 | Bob Pagliuco: NOAA RC pers. comm. 2010; averaged from proposed projects: Lower Terwer Creek and Salt Creek |

*If number of projects is unknown, assume 1 project/mi. in 25% of total high IP miles, unless this results in less than 1, then use 25% of total IP miles.

5 **Table D-29. Information used to estimate cost of reintroducing beavers.**

| Beaver Reintroduction | |
|---------------------------------|--|
| \$/beaver family translocation* | Source |
| 10,000 | Michael Pollock NMFS, personal communication Feb. 2011 |

*If numbers are unknown, assume 1 per mi in 5% of high IP miles.

Table D-30. Information used to estimate cost of riparian planting.

| Riparian Planting (\$/acre) | | | | |
|------------------------------|----------------------------|--------------------------|----------------------|------------------|
| Materials/Site Accessibility | Level of Site Preparation* | | | Source |
| | Flat/Light Clearing | Avg. Slope/Avg. Clearing | Steep/Heavy Clearing | |
| Low Cost | 17,442 | 40,698 | 93,023 | NMFS 2008, pg 32 |
| Medium Cost | 26,163 | 63,954 | 110,465 | |
| High Cost | 46,512 | 78,488 | 1,366,279 | |

*If type of riparian thinning is unknown, assume 'flat/light clearing' and 'low cost'.

*If number of acres is unknown, assume 80 acres per mile will need to be treated in 15% of high IP miles.

Table D-31. Information used to estimate cost of thinning upslope riparian areas.

| Upslope Riparian Thinning | | |
|--------------------------------|----------|-------------------|
| Type | \$/acre* | Source |
| Mechanical | 876 | NMFS 2008, pg. 64 |
| Hand 15-30% slope 40-60% cover | 928 | |
| Hand 30-50% slope 60-90% cover | 1,237 | |
| Chemical | 155 | |
| Average | 799 | |

*If number of acres is unknown, assume 80 acres/mi will be thinned within 15% of high IP habitat miles.

Table D-32. Information used to estimate cost of bank stabilization.

| Bank Stabilization* | | |
|-------------------------|--------|-------------------|
| Distance From Road (mi) | \$/ft* | Source |
| 0.25-0.5 | 284 | NMFS 2008, pg. 38 |
| 0.5-1 | 313 | |
| 1-2 | 341 | |
| 2-3 | 369 | |
| >3 | 398 | |

*If number of feet is unknown, assume 1% of IP miles will be treated.

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Table D-33. Information used to estimate cost of wetland restoration.

| Wetland Restoration | | |
|---|---------|-------------------|
| Type | \$/acre | Source |
| Seasonal Wetland (large scale) | 11,111 | NMFS 2008, pg. 28 |
| Wetland Enhancement (reveg, exotic spp. removal, modest management) | 1,235 | |
| Restore Tidal Action to Salt Pond | 1,266 | |
| Levee Construction/Repair, Extensive Dredging | 34,177 | |
| Highly Engineered, Large Soil Volume, Channel Excavation, Low Berms | 70,886 | |

Table D-34. Information used to estimate cost of livestock management.

| Livestock Management | | |
|--------------------------------------|-------|-------------------|
| Fencing Activity | \$/ft | Source |
| Riparian Fencing - Conventional* | 3.09 | NMFS 2008, pg. 29 |
| Riparian Fencing and Planting | 18.69 | |
| Riparian Fencing w/ Water Relocation | 9 | |

*If number of feet is unknown, assume 5% of high IP miles.

Table D-35. Information used to estimate cost of landslide/gully stabilization.

| Landslide/Gully Stabilization | |
|-------------------------------|-------------------|
| \$/Acre | Source |
| 2,609 | NMFS, 2008 pg. 44 |

5 **Table D-36. Information used to estimate cost of estuary restoration.**

| Estuary Restoration | | |
|--|---------|---|
| Type of Project | \$/acre | Source |
| Small- Tidegate removal, culvert upgrade; restore tidal salt marsh | 6,000 | Coastal Resources Management Council 2010 |
| Medium- Automated tidegates, culverts, 500 ft new dikes | 67,000 | |
| Large- Automated tidegates, excavation of fill, re-vegetation | 20,000 | |

Table D-37. Information used to estimate cost of setting back or breaching levees.

| Levee Setback and Breach | | |
|--|------------------------------|--|
| Type of Project | \$/linear foot*, \$/breach** | Source |
| Setback, includes construction of new levee and restoration of wetlands inside levee | 31.7 | Bob Pagliuco: NOAA RC pers. comm. 2010; from proposed project, McDaniel Slough |
| Breach | 30,000 | |

*If number of feet is unknown, assume 1% of high IP miles.

**If number of breaches is unknown, assume 1/mile of 1% of high IP miles.

Table D-38. Information used to estimate cost of water development away from streams.

| Water Development Away from Streams | | |
|-------------------------------------|-----------|------------|
| Materials | \$/ft, \$ | Source |
| Piping* | 0.4 | USEPA 1990 |
| Tank** | 407 | |

*If length of piping is unknown, assume 500 ft/project.

**If number of projects (tanks) is unknown, assume 1 per mile in 5% of high IP miles.

Table D-39. Information used to estimate cost of day-lighting a stream section.

| Stream Day-lighting | |
|---------------------|--|
| \$/lineal foot* | Source |
| 886 | Leah Mahan: NOAA RC pers. comm. Dec. 2010; average from projects, Madrona Park Creek and Ravenna Creek |

*If number of feet is unknown assume 5,280 (1 mi).

Table D-40. Information used to estimate cost of creating a conservation easement.

| Conservation Easement | | |
|---|---------|-------------------|
| Region | \$/acre | Source |
| Wolverton Gulch, Van Duzen River, Humboldt County, Monterey County, Arroyo Seco River | 1,992 | NMFS 2008, pg. 55 |
| South Coast, Santa Barbara | 65,000 | |
| San Joaquin River | 6,867 | |
| Battle Creek | 395 | |
| North Fork Consumnes River | 1,101 | |
| Mill Creek/Deer Creek | 223 | |
| Tuolumne River | 6,282 | |
| San Joaquin Delta | 3,205 | |
| Mill Creek/Deer Creek - Sac River | 5,385 | |
| Sacramento River | 1,646 | |
| Lower Tuolumne/San Joaquin | 1,646 | |
| CA | 534 | |

Table D-41. Information used to estimate cost of performing a road inventory.

| Road Inventories | | |
|----------------------|-------|-------------------|
| Location | \$/mi | Source |
| Humboldt County | 829 | NMFS 2008, pg. 61 |
| Eel River | 538 | |
| Mattole River | 635 | |
| Russian River | 936 | |
| Salmon Creek | 1068 | |
| Gualala River | 837 | |
| Avg. all Inventories | 807 | |

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Table D-42. Information used to estimate cost of performing an erosion assessment.

| Erosion Assessments | | |
|---------------------------------|----------|------------------|
| Location | \$/acre* | Source |
| Humboldt County | 9.5 | NMFS 2008, pg 61 |
| Del Norte County | 11.9 | |
| Average all assessments in CA** | 10.7 | |

*When number of acres unknown, assume 25% of total watershed acres.

**Average does not include figure of \$3,157/acre.

Table D-43. Information used to estimate cost of conducting a fuels management program.

| Fuel Management Program | | |
|---|----------|--------------------------|
| Type of Program* | \$/acre* | Source |
| Prescribed burn: brush/grass | 35 | USDA Forest Service 2004 |
| Prescribed burn: ponderosa pine | 98 | |
| Prescribed burn: mixed conifer | 198 | |
| Prescribed burn: Douglas fir | 14 | |
| Mechanical Treatment: Low intensity | 426 | FRFTP 2006 |
| Mechanical Treatment: High Intensity | 851 | |

*If type of program and number of acres is unknown, assume 25% of high IP habitat will be treated w/ mechanical thinning and 25% will be treated with burning. Treat IP miles as square miles and convert to acres.

Table D-44. Information used to estimate cost of running a lifecycle monitoring station.

| Life Cycle Monitoring Station | |
|-------------------------------|-----------|
| \$/Monitoring Station | Source |
| 204,000 | NMFS 2008 |

Table D-45. Information used to estimate cost of removing invasive plants.

| Removal of Invasive Plant Species | | |
|---|----------|--|
| Species | \$/acre* | Source |
| <i>Arundo</i> | 29,762 | Neil 2002 |
| Himalayan Blackberry | 990 | Bennet 2007 (avg) |
| Purple Loosestrife and Water Chestnut | 361 | USFWS 2001 |
| Pepperweed and Giant Reed | 1,000 | Northern California Conservation Center 2010 |
| Average (excluding outlier of <i>Arundo</i>) | 784 | |

*If number of acres is unknown, assume 80 acres per mile will be treated in 5% of high IP miles.

5 **Table D-46. Information used to estimate cost of eradicating pikeminnow.**

| Pikeminnow Eradication | |
|------------------------|-------------------|
| \$/Fish | Source |
| 6.65 | NMFS 2008, pg. 67 |

*Cost averaged from rewards in a bounty program.

Table D-47. Information used to estimate cost of installing fish screens.

| Fish Screens | | |
|-------------------|------------|------------------|
| Size of Tributary | \$/Screen* | Source |
| Large Trib | 45,454 | NMFS 2008, pg 16 |
| Small Trib | 11,364 | |

*If number and type of screens is unknown, assume 'small trib' and 1 screen per mile in 5% of the high IP miles.

Table D-48. Information used to estimate cost of maintaining fish screens.

| Fish Screen Maintenance | |
|-------------------------|-------------------|
| \$/Screen/yr | Source |
| 1,566 | NMFS 2008, pg. 68 |

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Table D-49. Information used to estimate cost of education and outreach programs.

| Education and Outreach Programs | | |
|---------------------------------|------------|--------------------|
| Type | \$/program | Source |
| General Education and Outreach | 76,136 | CDFG, 2004 pg 1.42 |
| Coho Specific Education | 55,682 | |

Table D-50. Information used to estimate cost of all aspects of running a conservation hatchery.

| Conservation Hatchery | | |
|---|----------------|---|
| Type of Operation | \$/year | Source |
| General Operation | 120,000 | pers. comm. Jeff Jahn 2010; estimate from Monterey County Conservation Hatchery |
| Robust Monitoring and Evaluation Program to Support Program | 250,000 | pers. comm. Jeff Jahn 2010; estimate from Russian River monitoring program |
| Genetic Component (samples, assessments) | 50,000 | pers. comm. Jeff Jahn 2010; estimate from Russian River genetic program |

5 Table D-51. Information used to estimate cost of converting a production hatchery to a conservation hatchery.

| Conversion to Conservation Hatchery | | |
|--|----------------|--|
| Extent of Retrofit | \$/type | Source |
| No retrofit needed, facilities in place | 0 | pers. comm. Jeff Jahn 2010; estimated based on heavy retrofitting in the Russian River Conservation Hatchery |
| Light retrofit (a few extra tanks, etc.) | 50,000 | |
| Medium retrofit | 150,000 | |
| Heavy retrofitting with extensive new infrastructure | 500,000 | |

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