

Pacific Coastal Salmon Recovery Fund
Performance Goals, Measures and Reporting Framework
December 2006

INTRODUCTION

Congress established the Pacific Coastal Salmon Recovery Fund (PCSRF) to contribute to the restoration and conservation of Pacific salmon and steelhead populations and their habitat. The States of Washington, Oregon, California, Idaho, and Alaska and the Pacific Coastal and Columbia River tribes (all hereafter referred to as the PCSRF grantees) have received Congressional PCSRF appropriations from the National Marine Fisheries Service (NMFS) each year since FY2000. Funds are used for salmon recovery and conservation projects carried out by local governments, tribes, state agencies, public partners, watershed councils, soil and water conservation districts, and other organizations and entities. The PCSRF is used to leverage additional state and local funds and volunteer participation from local and private sources. The PCSRF is one component of many activities and projects that have been initiated to recover Pacific salmon and steelhead listed under the Endangered Species Act (ESA).

PCSRF Program Goals

In response to Congressional and OMB direction, NMFS has worked with the PCSRF grantees over the last several years to define performance indicators to measure progress toward PCSRF goals. The major goals against which PCSRF performance can be measured are:

- (1) Enhance the availability and quality of salmon and steelhead habitat;
- (2) Improve the status of ESA-listed salmon and steelhead;
- (3) Address habitat limiting factors for ESA-listed salmon and steelhead;
- (4) Improve management practices to maintain healthy salmon populations and prevent decline of ESA-listed salmon; and
- (5) Ensure overall sustainability of naturally-spawning Pacific salmon and steelhead.

Framework Document Organization

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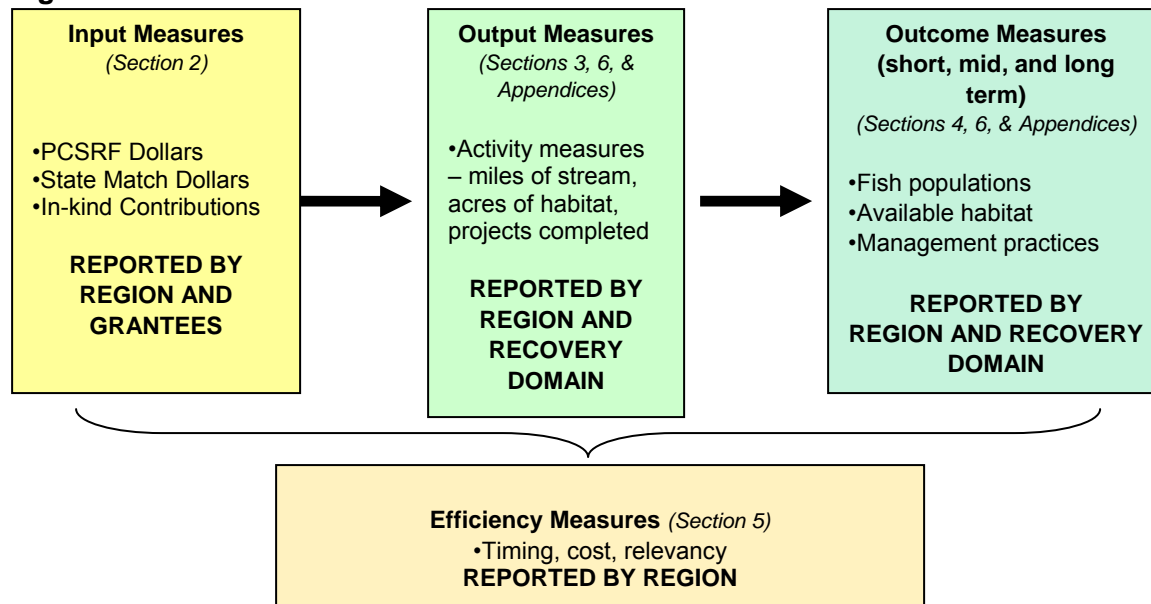
Appendix D: Limiting Factors at the Population Level

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1. PCSRF PERFORMANCE MEASUREMENT FRAMEWORK

NMFS and PCSRF grantees have developed a performance reporting framework that recognizes the challenges of addressing the goals identified above and provides an on-going, evolving mechanism to track progress. The basic structure of the framework is graphically depicted in Figure 1 below. This structure recognizes that it is possible to measure many indicators representing inputs (e.g., funding, in-kind contributions), outputs (e.g., number of projects, acres improved), outcomes (e.g., fish populations), and efficiency (e.g. project timing and funding priorities). PCSRF is tracking performance at two different spatial scales – region-wide and by recovery domain/restoration area. A recovery domain or restoration area is a geographic area that contains specific ESA-listed (or previously listed) salmon or steelhead. PCSRF funds are used in six recovery domains encompassing 16 Evolutionarily Significant Units (ESU) for salmon, ten Distinct Population Segments (DPS) for steelhead, and one restoration area with one previously listed salmon ESU. The next several pages describe this performance framework in more detail.

Figure 1: PCSRF Performance Measurement Structure



Initial efforts to track PCSRF performance focused primarily on better accounting for funded projects, e.g., number and types of projects, types and locations of restoration activities, levels of funding. This approach was practical at that time due to lack of comprehensive data on any performance indicators in the initial years of PCSRF. Over time, performance indicators have been identified that focus on reporting outcomes. PCSRF grantees also have begun to implement monitoring and evaluation programs to track progress in achieving these outcomes. The 2006 PCSRF Report to Congress demonstrates the progress made in establishing a framework to organize and report data oriented toward outputs and outcomes, rather than simply inputs. This report is available at: <http://www.nwr.noaa.gov/Salmon-Recovery-Planning/PCSRF/upload/PCSRF-Rpt-2006.pdf>.

Figure 2 provides an overall depiction of the components within the framework. The identification of major factors limiting recovery of ESA-listed species has improved the ability to track outputs and outcomes. The limiting factors were identified through planning and watershed assessments and

scientific information from Technical Review Teams (TRTs). Knowledge of limiting factors allows grantees to more effectively allocate PCSRF resources to projects that specifically address the habitat limiting factors falling within the purview of PCSRF. Annual results and possible future iterations of this framework as it evolves over time will be posted on the internet at:

<http://www.nwr.noaa.gov/Salmon-Recovery-Planning/PCSRF/index.cfm>.

Figure 2: PCSRF Performance Measurement Framework

Inputs	Reporting Categories	Outputs	PCSRF Goals (Outcomes)		
			Short-term (< 5 years)	Mid-term (5-15 years)	Long-term (>15 years)
<p>PCSRF funding to state and tribal governments through grants and contracts</p> <p>State direct match resources</p> <p>State, tribal, and other indirect contributions</p>	<ul style="list-style-type: none"> • Habitat Restoration • Habitat Protection • Habitat Access • Water Quality • Water Quantity • Hatcheries / Enhancement • Harvest Management • Watershed/Species Planning and Assessment • Recovery Plan Development and Implementation • Research, Monitoring and Evaluation • Outreach, Education and Technical Assistance 	<ul style="list-style-type: none"> • Instream habitat projects completed • Wetland habitat projects completed • Estuarine habitat projects completed • Land acquisition projects completed • Riparian habitat projects completed • Upland habitat projects completed • Fish passage projects completed • Hatchery fish enhancement projects completed • Watershed planning and assessment completed • Research, monitoring, and evaluation conducted 	<p>Enhanced availability and quality of habitat</p> <p>Improved management practices</p> <p>Major Habitat Limiting Factors addressed for ESA-listed salmon</p>	<p>Improved status of ESA-listed salmon (naturally spawning populations increased)</p> <p>Maintained healthy salmon populations</p>	<p>Overall sustainability of Pacific salmon</p>

2. REGION-WIDE INPUTS

Region-wide inputs are the funds and contributions committed to PCSRF activities and projects (Figure 4). These inputs include federal appropriations, state match of federal funds, and other in-kind contributions from states and tribes. The inputs support the activities (outputs) in the categories identified in Figure 3 (e.g., habitat restoration, habitat protection). Performance indicators can be identified for these inputs as shown below.

Figure 3: Region-wide Inputs used to track PCSRF performance

Input	Performance Indicator
Federal funding to state and tribal governments through grants and contracts	Amount of federal funding
State direct match resources	Amount of direct match
State, tribal, and other indirect contributions	Amount of indirect and in-kind contributions

3. REGION-WIDE OUTPUTS

The region-wide outputs are the specific activities and projects undertaken with PCSRF resources to achieve the outcomes/goals. Outputs include all PCSRF activities undertaken by states and tribes. Specific indicators for each output are listed in Figure 4. The output indicators help quantify PCSRF performance related to projects and activities completed. The PCSRF program reports on progress towards achievement of these output level indicators annually through the PCSRF Report to Congress.

Figure 4: Region-wide Outputs used to track PCSRF performance

Output	Performance Indicator
1. Instream habitat projects	Stream miles treated
2. Wetland habitat projects	Wetland acres treated Wetland acres created
3. Estuarine habitat projects	Estuarine acres treated Estuarine acres created
4. Land acquisition projects	Number of acres acquired Miles of streambank protected
5. Riparian habitat projects	Miles of riparian streambank treated
6. Upland habitat projects	Acres of upland habitat treated
7. Fish passage projects	Barriers/blockages removed Miles of stream made accessible Fish screens installed
8. Hatchery fish enhancement projects	Numbers of salmon marked or produced
9. Watershed planning and assessment projects	Number of watershed plans and assessments completed Number of recovery or restoration plans completed
10. Research, monitoring, and evaluation projects	Percent of total PCSRF funds dedicated for effectiveness monitoring (10% goal) Miles of stream monitored

4. REGION-WIDE OUTCOME MEASURES

The region-wide outcomes are actual results from PCSRF activities that directly track whether goals are being achieved (e.g., salmon abundance, habitat quality). Outcomes under the framework are broken out by short-term (less than five years), mid-term (five to 15 years) and long-term (greater than 15 years) with performance goals for each (See Figure 5) The template for outcomes gives further detail on the short-term, mid-term, and long-term outcome indicators for the entire PCSRF program. Many of the indicators for the outcome measures require data external to PCSRF activities, to measure overall results, such as salmon abundance and habitat condition. In the short-term, ensuring projects address limiting factors is an important component of progress.

Figure 5: Region-wide Outcome Measures to Track PCSRF Performance

	Outcomes (PCSRF Goals)	Performance Indicator
Long-term Outcome	Overall Sustainability of Pacific Salmon	Trends in abundance for ESA-listed salmon and steelhead
	Improved Status of ESA-Listed Salmon*	
Mid-term Outcome	Prevent Depletion and Maintain Healthy Salmon Populations	Trends in abundance for non-ESA-listed salmon and steelhead
	Enhanced Availability and Quality of Habitat	
Short-term Outcomes	Improved Management Practices	Number of activities incorporating information from assessments (habitat, limiting factors, harvest, monitoring, etc.)
	Major Habitat Limiting Factors Addressed for ESA-Listed Salmon*	Number of recovery plans
		Percent of output activities addressing habitat limiting factors across the region

* Applicable only in areas with ESA-listed species

5. REGION-WIDE EFFICIENCY MEASURES

While outcome measures provide a means to assess progress toward program goals, efficiency measures provide a means to assess how well the program is performing in terms of efficient and effective use of resources. Efficiency measures are intended to improve program performance. The salmon lifecycle is complex and the variables affecting recovery and survival are many. Meaningful efficiency measures take this complexity into consideration, along with external realities such as construction windows, ocean conditions, and the fact that recovery involves the actions of many people, whose behavior is not always easy to change. The efficiency measures outlined in Figure 6 are intended to ensure wise use of PCSRF resources in areas where improvements are most needed and appropriate under PCSRF (e.g., habitat limiting factors).

Figure 6: Region-wide Efficiency Indicators

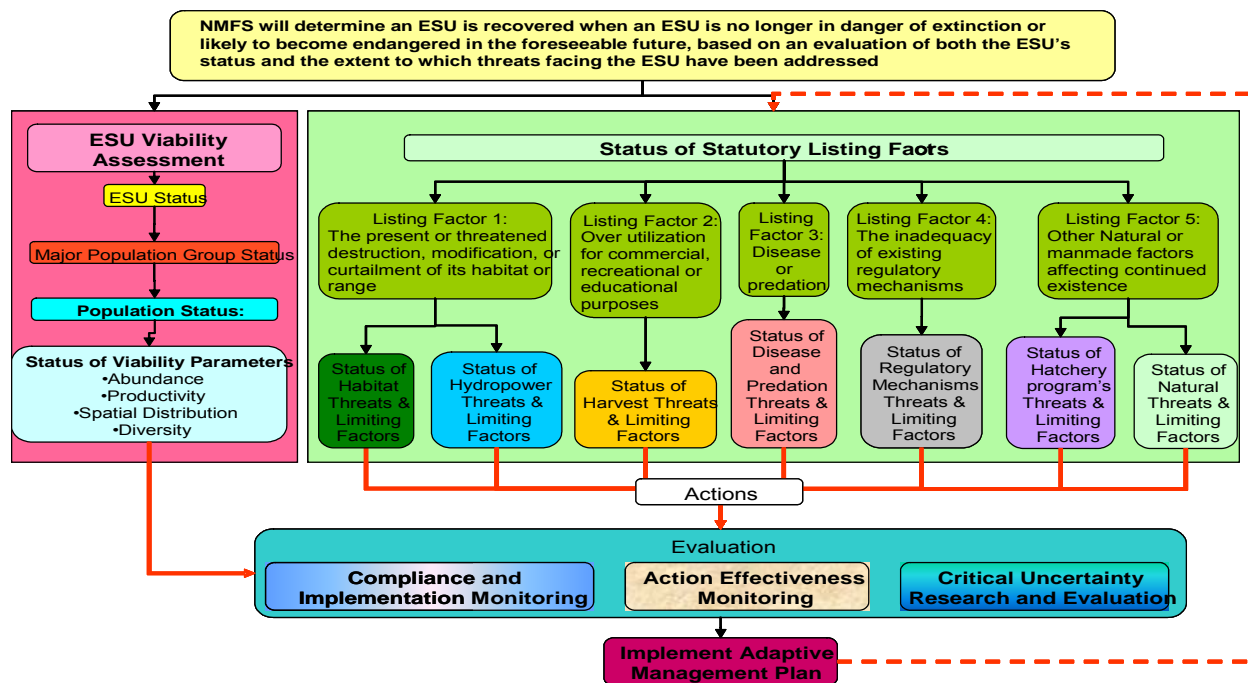
Efficiency Goal	Performance Indicator
Projects are completed within the proposed project timeframe	Number of projects completed within proposed project timeframe
Projects are completed within a 10 percent variance in proposed project costs	Number of projects completed within a 10% variance of proposed costs
Projects address a major habitat factor limiting recovery of ESA listed salmon and steelhead*	Percent of program resources expended on projects that address habitat factors limiting recovery of ESA listed Pacific salmon or used to evaluate the effectiveness of efforts to address habitat limiting factors.

* Applicable only in areas with ESA-listed species

6. RECOVERY DOMAIN INDICATORS

Recovery domain reporting is focused on tracking efforts to recover ESA listed Pacific salmon. These efforts focus on reporting the information needed to determine ESU/DPS listing status and the direct contribution of PCSRF in addressing factors limiting the recovery of ESA listed Pacific salmon. NMFS has developed a Listing Status Decision Framework (Figure 7) that outlines the decision process and information components required to make listing determinations. This information focuses on both the viability of the species (red box in figure 7) as well as efforts taken to address the listing factors, threats, and limiting factors (green box in figure 7). The PCSRF is most heavily focused on addressing the habitat threats and limiting factors and indirectly focused on improving the viability of ESA listed species through these habitat actions. The PCSRF also makes a substantial investment in the evaluation component of the decision framework (blue box in Figure 7) through effectiveness monitoring of projects.

Figure 7: NMFS Listing Status Decision Framework



PCSRF will report on program inputs and outputs at the domain scale using the same indicators as those for the Region-wide reporting of indicators (see Figures 3 and 4). This reporting highlights the amount of effort expended by the program in specific areas of the landscape.

Reporting of recovery domain outcome indicators has been slightly modified from Region-wide outcome reporting. This was done to focus on recovery of ESA listed salmon and provide detail on outcomes associated with addressing habitat limiting factors (Figure 8). Within each recovery domain, PCSRF will report on trends in ESA listed salmon abundance and specific indicators for each habitat limiting factor. The metrics used to report on the habitat indicators may be different between domains based on different landscape conditions and monitoring efforts. A complete list of major limiting factors at the ESU/DPS scale is included in Appendix C and will be updated annually. Much of the data on habitat indicators are not currently available and a system will have to be put in place largely outside of PCSRF to make data reporting on habitat indicators possible.

Figure 8: Recovery Domain Outcome Measures to Track PCSRF Performance

	Outcomes (PCSRF Goals)		Performance Indicator
Long-term Outcome	Overall Sustainability of Pacific Salmon		Trends in abundance for ESA-listed salmon and steelhead
Mid-term Outcome	Improved Status of ESA-Listed Salmon		
Short-term Outcomes	Major Habitat Limiting Factors Addressed for ESA-Listed Salmon	Habitat Limiting Factor	
		Degraded Habitat-Estuarine and Nearshore Marine	Change in area, distribution, and type of tidal and submerged wetlands
		Degraded Habitat-Floodplain Connectivity and Function	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality
		Degraded Habitat-Channel Structure and Complexity	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality
		Degraded Habitat-Riparian Areas and Large Woody Debris Recruitment	Change in area, distribution, and type of riparian vegetation
		Degraded Habitat-Stream Substrate	Change in substrate composition - % fines, %gravel, embeddedness.
		Degraded Habitat-Stream Flow	No indicator identified
		Degraded Habitat-Water Quality	Change in Water Quality Index
		Degraded Habitat-Fish Passage	Change in amount of accessible habitat (miles/ % of habitat accessible)

The last component of recovery domain reporting is reporting on program efficiency on a domain by domain basis (Figure 9). PCSRF has selected measures of the amount of resources and percent of projects directed at major habitat limiting factors as an indicator of domain level efficiency. The reporting of projects addressing a major habitat limiting factor is currently calculated at the ESU/DPS scale. However, in the future the program will shift to population level calculation. The calculation requires matching the type of treatment undertaken, the ESU/DPS (or population) affected, and the major habitat limiting factors that have been identified for that ESU/DPS (or population) to determine if a project of a specific type will address a major habitat limiting factor identified for a specific ESU/DPS (or population). A complete list of the current major habitat limiting factors for each population is included as Appendix D. A current list of PCSRF treatment types and their associated habitat limiting factors are included as Appendix E.

Figure 9. Recovery domain efficiency measures

Efficiency Goal	Performance Indicator
Projects address a major habitat factor limiting recovery of ESA listed salmon and steelhead*	Percent of program resources (dollars) expended on projects that address habitat factors limiting recovery of ESA listed Pacific salmon or used to evaluate the effectiveness of efforts to address habitat limiting factors.
	Percent of projects that address habitat factors limiting recovery of ESA listed Pacific salmon or used to evaluate the effectiveness of efforts to address habitat limiting factors.

7. PCSRF RELATIONSHIP TO OTHER ACTIVITIES

PCSRF directly supports the objectives of the National Oceanic and Atmospheric Administration (NOAA) Strategic Plan by addressing the challenges of protecting listed species, sustaining fish populations, and improving habitat. The PCSRF program goals support the outcomes identified for the Ecosystems Mission Goal of the NOAA Strategic Plan. The relationship between PCSRF goals and NOAA Strategic Planning is displayed in Figure 10.

Figure 10: PCSRF Goals and NOAA Strategic Planning

PCSRF Goals	NOAA Strategic Planning Objectives	NOAA Strategic Planning Outcomes <ul style="list-style-type: none"> • Healthy and productive coastal and marine ecosystems that benefit society • A well-informed public that acts as a steward of coastal and marine ecosystems
Long Term (>15 years) Overall sustainability of Pacific salmon	<ul style="list-style-type: none"> ○ Increase number of fish stocks managed at sustainable levels ○ Increase number of protected species that reach stable or increasing population levels 	
Mid-Term (5-15 years) <ul style="list-style-type: none"> • Improved status of ESA-listed salmon (naturally spawning) • Maintained healthy salmon populations 	<ul style="list-style-type: none"> ○ Increase number of fish stocks managed at sustainable levels ○ Increase number of protected species that reach stable or increasing population levels 	
Short-Term (<5 years) <ul style="list-style-type: none"> • Enhanced habitat • Improved management practices • Limiting habitat factors addressed 	<ul style="list-style-type: none"> ○ Increase number of regional, coastal and marine ecosystems delineated with approved indicators of ecological health and socioeconomic benefits that are monitored and understood ○ Increase number of habitat acres conserved or restored ○ Increase portion of population that is knowledgeable of and acting as stewards for coastal and marine ecosystems issues ○ Increase number of coastal communities incorporating ecosystem and sustainable development principles into planning and management 	

In addition to aligning with NOAA Strategic Planning Goals, PCSRF has worked to ensure its performance goals, measures, indicators, and reporting structure are consistent with performance measurement guidelines used by the Office of Management and Budget (OMB). As part of program accountability efforts, OMB conducts performance and management assessments to ensure wise investments of federal resources to achieve specific outcomes. PCSRF grantees and NMFS have worked together to assure a performance measurement structure capable of demonstrating program results.

8. SUMMARY

Reporting on Progress

The need for performance indicators for PCSRF was first identified in December 2002. NMFS and the PCSRF grantees worked together to develop a set of performance goals and measures that would allow for program evaluation and provide a framework within which to assess progress in achieving intended results. PCSRF performance is reported in multiple ways, including:

- Annual Report to Congress (available online and hard copy)
- Structured OMB “Program Assessment Rating Tool” (PART)
- Direct public access through the PCSRF Website and database for summary reports of performance metrics (available online and updated quarterly)

Performance targets (improved levels of performance needed to achieve the stated goals) and baseline information (the starting point from which gains are measured) are reviewed and updated annually based on program funding, progress, and shifts in program priorities.

“Real-time” performance evaluations can be conducted through the ad hoc query functions on the PCSRF database. The project information is updated quarterly. As the PCSRF performance reporting continues to evolve and be refined, the PCSRF Website may be updated to provide access to other databases for landscape level metrics that show improvements in habitat and/or increases in salmon abundance. The PCSRF augments these other data sources through development of high quality indicators and a comprehensive monitoring and evaluation approach to collecting such data without sacrificing PCSRF funds needed for on-the-ground restoration projects. Ten percent of PCSRF funds are dedicated to these monitoring and evaluation efforts

Next Steps

In its Report to Congress for 2004, NMFS was able to report region-wide activities for the first time. As performance goals and measures were refined in the process of understanding the needs of salmon and the factors affecting recovery, the 2005 Report to Congress began to link PCSRF activities in individual recovery domains or restoration areas with the major factors limiting recovery.

Salmon have complex lifecycles and in many cases little is known about individual populations. Salmon restoration and conservation requires that the multiple factors affecting self-sustaining populations be addressed simultaneously. The complexity and inter-connectivity mean that tracking individual projects is only one component of understanding progress toward salmon recovery. Taking into consideration these constraints and complexity, NMFS has established program goals and initiated project-level reporting within a framework that supports data integration. As a result, data are increasingly available for measuring progress toward specific PCSRF performance goals.

The development of performance measures and a reporting framework is an iterative process that will continue to evolve as data are made available and knowledge is gained from indicators to contribute to a cumulative understanding of outcomes and program effectiveness. NMFS and its PCSRF grantees are committed to further development and refinement of this Performance Reporting Framework.

APPENDIX A: DEFINITIONS OF LIMITING FACTORS

Limiting Factor	Definition
Degraded Habitat – Estuarine and Nearshore Marine	The loss, impairment or degradation of intertidal, salt marsh and other functional estuarine and marine vegetation; altered amounts, quality, distribution and timing of freshwater inflows; loss of estuary complexity; access to previously available habitats; and inadequate large woody debris. (This factor does not include effects caused by mainstem Columbia River hydropower.)
Degraded Habitat – Floodplain Connectivity and Function	The loss, impairment or degradation of floodplain connectivity; access to previously available habitats (seasonal wetlands, off channel habitat, side channels); and a connected and functional hyporheic zone. (For ESUs/DPSs that migrate through the Columbia River, this limiting factor would apply to tributaries.)
Degraded Habitat – Channel Structure and Complexity	The loss, impairment or degradation of channels; a suitable distribution of riffles and functional pools; and functional amounts and sizes of large woody debris or other channel structure. (For ESUs/DPSs that migrate through the Columbia River, this limiting factor would apply to tributaries.)
Degraded Habitat – Riparian Areas and LWD Recruitment	Loss, degradation or impairment of riparian conditions important for production of food organisms and organic material, shading, bank stabilizing by roots, nutrient and chemical mediation, control of surface erosion, and production of large-sized woody material. (For ESUs/DPSs that migrate through the Columbia River, this limiting factor would apply to tributaries.)
Degraded Habitat – Stream Substrate	Altered sediment routing leading to an overabundance of fine-grained sediments; excess coarse -grained sediments; inadequate coarse grained sediments; and contaminated sediment. (For ESUs/DPSs that migrate through the Columbia River, this limiting factor would apply to tributaries.)
Degraded Habitat – Stream Flow	Inadequate flow, scouring flows, or changes to the hydrograph to the point that it inhibits development and survival of salmonids. (For ESUs/DPSs that migrate through the Columbia River, this limiting factor would apply to tributaries.)
Degraded Habitat – Water Quality	Degraded or impaired water quality due to abnormal temperature, or levels of suspended fine sediment, dissolved oxygen, nutrients, heavy metals, pesticides, herbicides and other contaminants (toxics). (This factor does not include effects caused by mainstem Columbia River hydropower.)
Degraded Habitat – Fish Passage	The total or partial human caused blockage to previously accessible habitat that eliminates or decreases migration ability or alters the range of conditions under which migration is possible. This may include seasonal or periodic total migration blockage. This category also includes entrainment in irrigation diversions. (For ESUs/DPSs that migrate through the Columbia River, this limiting factor would apply to tributaries.)
Mainstem Columbia River Hydropower – related Adverse Effects	Any adverse effects caused by the operation of hydroelectric dams in the mainstem Columbia and Snake Rivers. (Mainstem hydro and mainstem habitat are combined because it is not possible to distinguish the impact on survival rates between them)
Hatchery – related Adverse Effects	Any hatchery related adverse effects on natural-origin salmonid population survival and productivity.
Harvest – related Adverse Effects	Any harvest related adverse effects on survival.
Predation/Competition/ Disease	Predation or competition levels that have been elevated above likely rates in a normative system due to human action. (This factor does not include effects caused by mainstem Columbia River hydropower.)

APPENDIX B: MAJOR LIMITING FACTORS, PCSRF TREATMENTS, AND POTENTIAL OUTCOME INDICATORS BY RECOVERY DOMAIN

The following tables describe the relevant limiting factors in each recovery domain for salmon and steelhead and identify the specific activities that help to address the limiting factors. These activities represent output measures. The PCSRF grantees and database will move from not only reporting these outputs, but also reporting the outcomes that are shown as potential indicators in each table. These types of measures are only possible as comprehensive baseline monitoring and evaluation programs develop and report findings. Many of these potential indicators will require large-scale data collection efforts that currently exceed the available PCSRF resources. The previously discussed region-wide output measures in Table 5 can also be examined at the recovery domain level.

Program	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Habitat	Degraded habitat – Estuarine and nearshore marine (ESU: 1,3)	<ul style="list-style-type: none"> Channel modification Creation of new estuarine area Dike breaching/removal Increasing freshwater flow Removal of existing fill material Estuarine and nearshore land acquisition projects 	Change in area, distribution, and type of tidal and submerged wetlands.
	Degraded habitat – floodplain connectivity and function (ESU: 1-3)	<ul style="list-style-type: none"> Wetland creation/ improvement / enhancement, invasive species removal, vegetation planting Conservation grazing management/ Livestock exclusion Fencing Irrigation practice improvement Water gap development Channel connectivity Riparian and wetland land acquisition projects 	Change in condition of physical habitat - pool density and depth, cover, wood quantity and quality.
	Degraded habitat – channel structure and complexity (ESU: 1-3)	<ul style="list-style-type: none"> Bank stabilization Channel connectivity & reconfiguration Deflectors/barbs Log and Rock control (weir) Vegetation planting and/or removal / control Roughened channel Site and stream channel maintenance Spawning gravel replacement Woody debris placement Fencing Riparian land acquisition projects 	Change in condition of physical habitat - pool density and depth, cover, wood quantity and quality.
	Degraded habitat – riparian areas and LWD recruitment (ESU: 1-3)	<ul style="list-style-type: none"> Conservation grazing management/ Livestock exclusion Irrigation practice improvement Water gap development 	Change in area, distribution, and type of riparian vegetation.

TABLE 1: PUGET SOUND RECOVERY DOMAIN

Program	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
		<ul style="list-style-type: none"> • Weed control • Fencing • Vegetation planting • Riparian land acquisition projects 	
	Degraded habitat – stream substrate (ESU: 1-3)	<ul style="list-style-type: none"> • Bank stabilization • Spawning gravel placement • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Treatment for turbidity 	Change in substrate composition - % fines, %gravel, embeddedness.
Water Quality	Degraded habitat – water quality (ESU: 1)	<ul style="list-style-type: none"> • Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Planting • Water gap development • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Bank stabilization • Wetland creation/improvement/enhancement, invasive species removal, and vegetation planting • Fish Passage projects 	Change in Water Quality Index
Water	Degraded habitat – stream flow (ESU: 3)	<ul style="list-style-type: none"> • Instream flow projects 	

ESU 1=Puget Sound Chinook ESU 2=Ozette Lake Sockeye ESU 3=Hood Canal Summer Chum ESU

TABLE 2: WILLAMETTE/LOWER COLUMBIA RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Habitat	Degraded habitat – Estuarine and nearshore marine (ESU: 1,3)	<ul style="list-style-type: none"> • Channel modification • Creation of new estuarine area • Dike breaching/removal • Increasing freshwater flow • Removal of existing fill material • Estuarine and nearshore land acquisition projects 	Change in area, distribution, and type of tidal and submerged wetlands.
	Degraded habitat – floodplain connectivity and function (ESU: 1-6)	<ul style="list-style-type: none"> • Wetland creation/ improvement / enhancement, invasive species removal, vegetation planting • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Water gap development • Channel connectivity • Riparian and wetland land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – channel structure and complexity (ESU: 1-6)	<ul style="list-style-type: none"> • Bank stabilization • Channel connectivity & reconfiguration • Deflectors/barbs • Log and Rock control (weir) • Vegetation planting and/or removal / control • Roughened channel • Site and stream channel maintenance • Spawning gravel replacement • Woody debris placement • Fencing • Riparian land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – riparian areas and LWD recruitment (ESU: 1-6)	<ul style="list-style-type: none"> • Conservation grazing management/ Livestock exclusion • Irrigation practice improvement • Water gap development • Weed control • Fencing • Vegetation planting • Riparian land acquisition projects 	Change in area, distribution, and type of riparian vegetation.
	Degraded habitat – stream substrate (ESU: 1,3,4,6)	<ul style="list-style-type: none"> • Bank stabilization • Spawning gravel placement • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Treatment for turbidity 	Change in substrate composition - % fines, %gravel, embeddedness.

TABLE 2: WILLAMETTE/LOWER COLUMBIA RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Water Quality	Degraded habitat – water quality (ESU: 2,4,6)	<ul style="list-style-type: none"> • Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Planting • Water gap development • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Bank stabilization • Wetland creation/improvement/enhancement, invasive species removal, and vegetation planting • Fish Passage projects 	Change in Water Quality Index
Water Quantity	Degraded habitat – stream flow (ESU: 1,3-6)	<ul style="list-style-type: none"> • Instream flow projects 	
Habitat Access	Degraded habitat – fish passage (ESU: 1-5)	<ul style="list-style-type: none"> • Fish passage improvement • Fish screening • Instream habitat work 	Change in amount of accessible habitat - miles or % of habitat accessible

ESU 1=Columbia River Chum ESU 2=Upper Willamette River Chinook ESU 3=Lower Columbia River Chinook ESU 4=Lower Columbia River Steelhead DPS 5=Upper Willamette River Steelhead DPS 6=Lower Columbia River Coho ESU

TABLE 3: INTERIOR COLUMBIA RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Habitat	Degraded habitat – Estuarine and nearshore marine (ESU: 2)	<ul style="list-style-type: none"> • Channel modification • Creation of new estuarine area • Dike breaching/removal • Increasing freshwater flow • Removal of existing fill material • Estuarine and nearshore land acquisition projects 	Change in area, distribution, and type of tidal and submerged wetlands.
	Degraded habitat – floodplain connectivity and function (ESU: 1-3, 5-7)	<ul style="list-style-type: none"> • Wetland creation/ improvement / enhancement, invasive species removal, vegetation planting • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Water gap development • Channel connectivity • Riparian and wetland land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – channel structure and complexity (ESU: 2,3,5-7)	<ul style="list-style-type: none"> • Bank stabilization • Channel connectivity & reconfiguration • Deflectors/barbs • Log and Rock control (weir) • Vegetation planting and/or removal / control • Roughened channel • Site and stream channel maintenance • Spawning gravel replacement • Woody debris placement • Fencing • Riparian land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – riparian areas and LWD recruitment (ESU: 1,3,5,6)	<ul style="list-style-type: none"> • Conservation grazing management/ Livestock exclusion • Irrigation practice improvement • Water gap development • Weed control • Fencing • Vegetation planting • Riparian land acquisition projects 	Change in area, distribution, and type of riparian vegetation.
	Degraded habitat – stream substrate (ESU: 1,3,5-7)	<ul style="list-style-type: none"> • Bank stabilization • Spawning gravel placement • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Treatment for turbidity 	Change in substrate composition - % fines, %gravel, embeddedness.

TABLE 3: INTERIOR COLUMBIA RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Water Quality	Degraded habitat – water quality (ESU: 1,5,6)	<ul style="list-style-type: none"> • Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Planting • Water gap development • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Bank stabilization • Wetland creation/improvement/enhancement, invasive species removal, and vegetation planting • Fish Passage projects 	Change in Water Quality Index
Water Quantity	Degraded habitat – stream flow (ESU: 1,3,5-7)	<ul style="list-style-type: none"> • Instream flow projects 	
Habitat Access	Degraded habitat – fish passage (ESU: 1,6,7)	<ul style="list-style-type: none"> • Fish passage improvement • Fish screening • Instream habitat work 	Change in amount of accessible habitat - miles or % of habitat accessible

ESU 1 = Middle Columbia River Steelhead DPS 2 = Snake River Fall Chinook ESU 3 = Upper Columbia River Spring Chinook ESU 4 = Snake River Sockeye ESU 5 = Snake River Spring/Summer Chinook ESU 6 = Snake River Steelhead DPS 7 = Upper Columbia River Steelhead DPS

TABLE 4: OREGON COAST RESTORATION AREA

Program Category	Major Habitat Factor*	PCSRF Treatments Addressing Major Habitat Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Habitat	Degraded habitat – Estuarine and nearshore marine	<ul style="list-style-type: none"> • Channel modification • Creation of new estuarine area • Dike breaching/removal • Increasing freshwater flow • Removal of existing fill material • Estuarine and nearshore land acquisition projects 	Change in area, distribution, and type of tidal and submerged wetlands.
	Degraded habitat – floodplain connectivity and function	<ul style="list-style-type: none"> • Wetland creation/ improvement / enhancement, invasive species removal, vegetation planting • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Water gap development • Channel connectivity • Riparian and wetland land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – channel structure and complexity	<ul style="list-style-type: none"> • Bank stabilization • Channel connectivity & reconfiguration • Deflectors/barbs • Log and Rock control (weir) • Vegetation planting and/or removal / control • Roughened channel • Site and stream channel maintenance • Spawning gravel replacement • Woody debris placement • Fencing • Riparian land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – riparian areas and LWD recruitment	<ul style="list-style-type: none"> • Conservation grazing management/ Livestock exclusion • Irrigation practice improvement • Water gap development • Weed control • Fencing • Vegetation planting • Riparian land acquisition projects 	Change in area, distribution, and type of riparian vegetation.
	Degraded habitat – stream substrate	<ul style="list-style-type: none"> • Bank stabilization • Spawning gravel placement • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Treatment for turbidity 	Change in substrate composition - % fines, %gravel, embeddedness.

TABLE 4: OREGON COAST RESTORATION AREA

Program Category	Major Habitat Factor*	PCSRF Treatments Addressing Major Habitat Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Water Quality	Degraded habitat – water quality	<ul style="list-style-type: none"> • Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Planting • Water gap development • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Bank stabilization • Wetland creation/improvement/enhancement, invasive species removal, and vegetation planting • Fish Passage projects 	Change in Water Quality Index
Water Quantity	Degraded habitat – stream flow	<ul style="list-style-type: none"> • Instream flow projects 	
Habitat Access	Degraded habitat – fish passage	<ul style="list-style-type: none"> • Fish passage improvement • Fish screening • Instream habitat work 	Change in amount of accessible habitat - miles or % of habitat accessible

*All habitat factors listed above are associated with Oregon Coast Coho ESU.

TABLE 5: SOUTHERN OREGON/NORTHERN CALIFORNIA COAST RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor*	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Habitat	Degraded habitat – Estuarine and nearshore marine	<ul style="list-style-type: none"> • Channel modification • Creation of new estuarine area • Dike breaching/removal • Increasing freshwater flow • Removal of existing fill material • Estuarine and nearshore land acquisition projects 	Change in area, distribution, and type of tidal and submerged wetlands.
	Degraded habitat – floodplain connectivity and function	<ul style="list-style-type: none"> • Wetland creation/ improvement / enhancement, invasive species removal, vegetation planting • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Water gap development • Channel connectivity • Riparian and wetland land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – channel structure and complexity	<ul style="list-style-type: none"> • Bank stabilization • Channel connectivity & reconfiguration • Deflectors/barbs • Log and Rock control (weir) • Vegetation planting and/or removal / control • Roughened channel • Site and stream channel maintenance • Spawning gravel replacement • Woody debris placement • Fencing • Riparian land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – riparian areas and LWD recruitment	<ul style="list-style-type: none"> • Conservation grazing management/ Livestock exclusion • Irrigation practice improvement • Water gap development • Weed control • Fencing • Vegetation planting • Riparian land acquisition projects 	Change in area, distribution, and type of riparian vegetation.
	Degraded habitat – stream substrate	<ul style="list-style-type: none"> • Bank stabilization • Spawning gravel placement • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Treatment for turbidity 	Change in substrate composition - % fines, %gravel, embeddedness.

TABLE 5: SOUTHERN OREGON/NORTHERN CALIFORNIA COAST RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor*	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Water Quality	Degraded habitat – water quality	<ul style="list-style-type: none"> • Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Planting • Water gap development • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Bank stabilization • Wetland creation/improvement/enhancement, invasive species removal, and vegetation planting • Fish Passage projects 	Change in Water Quality Index
Water Quantity	Degraded habitat – stream flow	<ul style="list-style-type: none"> • Instream flow projects 	
Habitat Access	Degraded habitat – fish passage	<ul style="list-style-type: none"> • Fish passage improvement • Fish screening • Instream habitat work 	Change in amount of accessible habitat - miles or % of habitat accessible

*All limiting factors listed above are associated with Southern Oregon / Northern California Coast Coho ESU

TABLE 6: NORTH-CENTRAL CALIFORNIA COAST RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Habitat	Degraded habitat – Estuarine and nearshore marine (ESU: 1-4)	<ul style="list-style-type: none"> • Channel modification • Creation of new estuarine area • Dike breaching/removal • Increasing freshwater flow • Removal of existing fill material • Estuarine and nearshore land acquisition projects 	Change in area, distribution, and type of tidal and submerged wetlands.
	Degraded habitat – floodplain connectivity and function (ESU: 1-4)	<ul style="list-style-type: none"> • Wetland creation/ improvement / enhancement, invasive species removal, vegetation planting • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Water gap development • Channel connectivity • Riparian and wetland land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – channel structure and complexity (ESU: 1-4)	<ul style="list-style-type: none"> • Bank stabilization • Channel connectivity & reconfiguration • Deflectors/barbs • Log and Rock control (weir) • Vegetation planting and/or removal / control • Roughened channel • Site and stream channel maintenance • Spawning gravel replacement • Woody debris placement • Fencing • Riparian land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – riparian areas and LWD recruitment (ESU: 1-4)	<ul style="list-style-type: none"> • Conservation grazing management/ Livestock exclusion • Irrigation practice improvement • Water gap development • Weed control • Fencing • Vegetation planting • Riparian land acquisition projects 	Change in area, distribution, and type of riparian vegetation.
	Degraded habitat – stream substrate (ESU: 1-4)	<ul style="list-style-type: none"> • Bank stabilization • Spawning gravel placement • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Treatment for turbidity 	Change in substrate composition - % fines, %gravel, embeddedness.

TABLE 6: NORTH-CENTRAL CALIFORNIA COAST RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Water Quality	Degraded habitat – water quality (ESU: 1,2,4)	<ul style="list-style-type: none"> • Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Planting • Water gap development • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Bank stabilization • Wetland creation/improvement/enhancement, invasive species removal, and vegetation planting • Fish Passage projects 	Change in Water Quality Index
Water Quantity	Degraded habitat – stream flow (ESU: 2-4)	<ul style="list-style-type: none"> • Instream flow projects 	
Habitat Access	Degraded habitat – fish passage (ESU: 3,4)	<ul style="list-style-type: none"> • Fish passage improvement • Fish screening • Instream habitat work 	Change in amount of accessible habitat - miles or % of habitat accessible

ESU 1 = Northern California Steelhead DPS 2 = California Coast Chinook ESU 3 = Central California Coast Coho ESU
4 = Central California Coast Steelhead DPS

TABLE 7: SOUTH CENTRAL/SOUTHERN CALIFORNIA COAST RECOVERY DOMAIN

Program Category	Major Habitat Limiting Factor*	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Habitat	Degraded habitat – Estuarine and nearshore marine	<ul style="list-style-type: none"> • Channel modification • Creation of new estuarine area • Dike breaching/removal • Increasing freshwater flow • Removal of existing fill material • Estuarine and nearshore land acquisition projects 	Change in area, distribution, and type of tidal and submerged wetlands.
	Degraded habitat – floodplain connectivity and function	<ul style="list-style-type: none"> • Wetland creation/ improvement / enhancement, invasive species removal, vegetation planting • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Water gap development • Channel connectivity • Riparian and wetland land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – channel structure and complexity	<ul style="list-style-type: none"> • Bank stabilization • Channel connectivity & reconfiguration • Deflectors/barbs • Log and Rock control (weir) • Vegetation planting and/or removal / control • Roughened channel • Site and stream channel maintenance • Spawning gravel replacement • Woody debris placement • Fencing • Riparian land acquisition projects 	Change in condition of physical habitat -pool density and depth, cover, wood quantity and quality.
	Degraded habitat – riparian areas and LWD recruitment	<ul style="list-style-type: none"> • Conservation grazing management/ Livestock exclusion • Irrigation practice improvement • Water gap development • Weed control • Fencing • Vegetation planting • Riparian land acquisition projects 	Change in area, distribution, and type of riparian vegetation.
	Degraded habitat – stream substrate	<ul style="list-style-type: none"> • Bank stabilization • Spawning gravel placement • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Treatment for turbidity 	Change in substrate composition - % fines, %gravel, embeddedness.

TABLE 7: SOUTH CENTRAL/SOUTHERN CALIFORNIA COAST RECOVERY DOMAIN			
Program Category	Major Habitat Limiting Factor*	PCSRF Treatments Addressing Major Habitat Limiting Factors (from PCSRF database)	Potential Habitat Indicator (from other data sources)
Water Quality	Degraded habitat – water quality	<ul style="list-style-type: none"> • Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH • Conservation grazing management/ Livestock exclusion • Fencing • Irrigation practice improvement • Planting • Water gap development • No till agriculture • Road drainage system and stream crossing improvements, obliteration, and reconstruction • Terracing • Upland erosion control • Bank stabilization • Wetland creation/improvement/enhancement, invasive species removal, and vegetation planting • Fish Passage projects 	Change in Water Quality Index
Water Quantity	Degraded habitat – stream flow	<ul style="list-style-type: none"> • Instream flow projects 	
Habitat Access	Degraded habitat – fish passage	<ul style="list-style-type: none"> • Fish passage improvement • Fish screening • Instream habitat work 	Change in amount of accessible habitat - miles or % of habitat accessible

*All limiting factors listed above are associated with South-Central California Coast Steelhead DPS and Southern California Coast Steelhead DPS

PCSRF Limiting Factors identified for ESA listed salmon ESUs/DPSs.													
X = Major ESU/DPS level limiting factor													
A limiting factor must be a major limiting factor for at least one MPG to be identified as a major limiting factor for the ESU/DPS.													
Recovery Domain/ Restoration area	ESU/DPS	Limiting Factors											
		Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease
Puget Sound	Puget Sound Chinook Salmon	x	x	x	x	x		x					
	Hood Canal Summer-run Chum salmon	x	x	x	x	x	x						
	Ozette Lake Sockeye Salmon		x	x	x	x							x
Interior Columbia	Upper Columbia River Spring-run Chinook Salmon		x	x	x	x	x				x	x	
	Upper Columbia River Steelhead		x	x		x	x		x	x			x
	Snake River Fall-run Chinook Salmon	x	x	x						x		x	
	Snake River Spring/Summer-run Chinook Salmon		x	x	x	x	x	x		x			
	Snake River Steelhead		x	x	x	x	x	x	x	x			x
	Snake River Sockeye Salmon										x		
Willamette/Lower Columbia	Middle Columbia River Steelhead		x		x	x	x	x	x	x			x
	Lower Columbia River Chinook Salmon	x	x	x	x	x	x		x		x	x	
	Upper Willamette River Chinook Salmon		x	x	x			x	x		x		
	Columbia River Chum salmon	y	x	x	x	x	x		x				
	Lower Columbia River Steelhead		x	x	x	x	x	x	x				x
	Upper Willamette River Steelhead		x	x	x		x		x		x		
Oregon/Northern California Coast	Lower Columbia River Coho Salmon		x	x	x	x	x	x			x	x	
	Southern Oregon/Northern California Coast coho	x	x	x	x	x	x	x	x		x		x
	Oregon Coast Restoration area		x	x	x	x		x					x
	North Central California Coast	x	x	x	x	x	x	x					x
	Central Coast Coho Salmon	x	x	x	x	x	x		x				
	Northern California Steelhead	x	x	x	x	x		x					x
CA Central Valley	Central CA Coast Steelhead	x	x	x	x	x	x		x				
	Sacramento River Winter-run chinook salmon			x				x	x	x		x	x
	Central Valley Spring-run chinook salmon			x	x	x	x	x	x				
South-Central/Southern California Coast	CA Central Valley Steelhead			x		x	x	x	x		x	x	
	South Central CA Coast Steelhead	x	x	x	x	x	x	x	x				x
	Southern CA Steelhead	x	x	x	x	x	x	x	x				x

Appendix D. Salmonid Population-Limiting Factor Matrix

PCSRF Limiting Factors identified for ESA listed salmon and steelhead populations, Major Population Groups (MPG), and ESUs/DPSs.																
++ = Major population level limiting factor, + = minor population level limiting factor, NA = Not applicable at the population scale																
Y = Major MPG or ESU/DPS level limiting factor, N = Not a major MPG or ESU/DPS level limiting factor																
A limiting factor must be a major limiting factor for at least 50% of populations within an MPG to be a Major limiting factor for the MPG																
A limiting factor must be a major limiting factor for at least one MPG to be identified as a major limiting factor for the ESU/DPS.																
Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors												
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease	
Puget Sound	Puget Sound Chinook Salmon	Strait of Georgia	N.F. Nooksack	++	++	++	++	++	+	++	+		+	+	+	
			S.F. Nooksack	++	++	++	++	++	+	++	++		+	+	+	
			Summary	Y	Y	Y	Y	Y	N	Y	N		N	N	N	
			North Sound	Lower Skagit	++	++	++	++	++	+	+	+		+	+	+
				Upper Skagit	++	++	+	++	++	+	+	+		+	+	+
				Cascade	++	++	+	++	++	+	NA	+		+	+	+
				Lower Sauk	++	++	++	++	++	+	+	+		+	+	+
				Upper Sauk	++	++	+	++	++	+	NA	+		+	+	+
				Suiattle	++	++	+	++	++	+	NA	+		+	+	+
				N.F. Stillaguamish	++	++	++	++	++	+	++	+		+	+	+
		S. F. Stillaguamish		++	++	++	++	++	+	++	+		+	+	+	
		South Sound	Skykomish	++	++	+	++	++	+	++	+		+	+	+	
			Snoqualmie	++	++	++	++	+	+	++	+		+	+	+	
			Summary	Y	Y	N	Y	Y	N	N	N		N	N	N	
			Sammamish	++	++	++	++	+	++	++	++		+	+	+	
			Cedar	++	++	++	++	+	+	+	+		+	+	+	
			Duwamish/Green	++	++	++	++	+	+	+	+		+	+	+	
			White	++	++	++	++	+	++	++	++		+	+	+	
			Puyallup	++	++	++	++	+	+	++	+		+	+	+	
		Hood Canal	Nisqually	++	++	+	+	+	++	+	+		+	+	+	
			Summary	Y	Y	Y	Y	N	N	N	N		N	N	N	
			Skokomish	++	++	++	++	++	+	+	+		+	+	+	
			Mid-Hood Canal Rivers	++	++	+	++	+	+	NA	+		+	+	+	
			Summary	Y	Y	N	Y	N	N	N	N		N	N	N	
			Strait of Juan deFuca	Dungeness	+	++	++	++	++	++	++	++		+	+	+
				Elwha	++	++	++	++	++	+	++	+		+	+	++
				Summary	N	Y	Y	Y	Y	N	Y	N		N	N	N
		Puget Sound	Puget Sound Chinook Salmon		ESU/DPS Summary	Y	Y	Y	Y	Y	N	Y	N		N	N
Puget Sound	Hood Canal Summer-run Chum salmon	Hood Canal Summer-run Chum salmon	Strait of Juan deFuca	++	++	++	++	++	++	+	+		+	+	+	
			Hood Canal	++	++	++	++	++	++	+	+		+	+	+	
Puget Sound	Hood Canal Summer-run Chum salmon		ESU/DPS Summary	Y	Y	Y	Y	Y	Y	N	N		N	N	N	
Puget Sound	Ozette Lake Sockeye Salmon		Ozette Lake sockeye	NA	++	++	++	++	NA	+	+		NA	NA	++	
Puget Sound	Ozette Lake Sockeye Salmon		ESU/DPS Summary	N	Y	Y	Y	Y	N	N	N		N	N	Y	

Appendix D. Salmonid Population-Limiting Factor Matrix

PCSRF Limiting Factors identified for ESA listed salmon and steelhead populations, Major Population Groups (MPG), and ESUs/DPSs.															
++ = Major population level limiting factor, + = minor population level limiting factor, NA = Not applicable at the population scale															
Y = Major MPG or ESU/DPS level limiting factor, N = Not a major MPG or ESU/DPS level limiting factor															
A limiting factor must be a major limiting factor for at least 50% of populations within an MPG to be a Major limiting factor for the MPG															
A limiting factor must be a major limiting factor for at least one MPG to be identified as a major limiting factor for the ESU/DPS.															
Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors											
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease
Interior Columbia	Upper Columbia River Spring-run Chinook Salmon		Wenatchee River	+	++	++	++	+	+	+	+	++	++	+	+
			Entiat River	+	++	++	++	++	+	+	+	++	++	+	+
			Methow River	+	++	++	++	+	++	+	+	++	++	+	+
			Okanogan River*	+	+	+	++	+	++	++	++	++	++	NA	+
Interior Columbia	Upper Columbia River Spring-run Chinook Salmon		ESU/DPS Summary	N	Y	Y	Y	Y	Y	N	N	Y	Y	N	N
Interior Columbia	Upper Columbia River Steelhead		Wenatchee River	+	++	++	+	+	+	+	++	++	+	+	++
			Entiat River	+	++	++	+	++	+	+	+	++	++	+	++
			Methow River	+	++	++	+	+	++	+	+	++	++	+	++
			Okanogan River	+	+	+	+	++	++	+	++	++	++	+	++
			Crab Creek	+	+	+	+	+	++	++	++	++	++	NA	+
Interior Columbia	Upper Columbia River Steelhead		ESU/DPS Summary	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y
Interior Columbia	Snake River Fall-run Chinook Salmon		Snake River Lower Mainstem	++	++	++	+	+	+	+	+	++	+	++	+
			Marsing Reach												
			Salmon Falls												
Interior Columbia	Snake River Fall-run Chinook Salmon		ESU/DPS Summary	Y	Y	Y	N	N	N	N	N	Y	N	Y	N

Appendix D. Salmonid Population-Limiting Factor Matrix

PCSRF Limiting Factors identified for ESA listed salmon and steelhead populations, Major Population Groups (MPG), and ESUs/DPSs.																
+++ = Major population level limiting factor, ++ = minor population level limiting factor, NA = Not applicable at the population scale																
Y = Major MPG or ESU/DPS level limiting factor, N = Not a major MPG or ESU/DPS level limiting factor																
A limiting factor must be a major limiting factor for at least 50% of populations within an MPG to be a Major limiting factor for the MPG																
A limiting factor must be a major limiting factor for at least one MPG to be identified as a major limiting factor for the ESU/DPS.																
Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors												
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease	
Interior Columbia	Snake River Spring/Summer-run Chinook Salmon	Lower Snake; Mainstem Tributaries	Tucannon River	+	++	++	++	+	++	++	+	++	+	+	+	
			Asotin Creek*	+	++	++	++	++	++	+	++	+	++	+	+	+
			Summary	N	Y	Y	Y	Y	N	Y	N	N	Y	N	N	N
	Grande Ronde/Imnaha	Upper Grande Ronde	+	++	++	+	++	++	+	++	++	+	++	+	+	+
		Wallowa/Lostine	+	++	++	++	+	++	++	+	++	+	++	+	+	+
		Imnaha River	+	++	++	+	+	+	+	+	+	+	++	+	+	+
		Catherine Creek	+	++	++	++	+	++	++	+	++	+	++	+	+	+
		Minam River	+	NA	NA	+	NA	NA	+	NA	+	NA	++	+	+	+
		Wenaha River	+	NA	NA	+	NA	NA	+	NA	+	NA	++	+	+	+
		Big Sheep Creek*	+	++	++	++	+	++	+	++	+	++	+	+	+	+
		Lookingglass Creek*	+	+	+	+	+	NA	+	++	++	+	++	+	+	+
		Summary	N	Y	Y	N	N	N	N	N	Y	N	N	N	N	
		So. Fk. Salmon River	South Fork Salmon River	+	+	++	+	++	+	+	+	+	++	+	+	+
	Secesh River		+	+	++	+	++	+	+	+	+	++	+	+	+	+
	Little Salmon R. and tribs		+	++	++	++	++	++	+	+	+	++	+	+	+	+
	East Fork So. Fk. Salmon		+	++	++	++	++	+	++	+	++	+	++	+	+	+
	Summary		N	N	Y	N	Y	N	N	N	Y	N	N	N	N	
	Middle Fork Salmon River		Upper Middle Fork tribs	+	NA	NA	NA	NA	NA	NA	NA	NA	NA	++	+	+
		Chamberlain Cr. and tribs	+	NA	NA	NA	NA	NA	NA	NA	NA	NA	++	+	+	+
		Big Creek	+	NA	+	NA	+	NA	NA	NA	NA	NA	++	+	+	+
		Bear Valley/Elk Creek	+	NA	+	+	+	NA	+	+	+	++	+	+	+	+
		Marsh Creek	+	NA	+	+	+	NA	NA	NA	NA	++	+	+	+	+
		Loon Creek	+	NA	NA	NA	NA	+	NA	NA	NA	++	+	+	+	+
		Camas Creek	+	NA	NA	+	+	+	NA	+	++	+	+	+	+	+
		Lower Middle Fork Tribs	+	NA	NA	NA	NA	NA	NA	NA	NA	NA	++	+	+	+
		Sulphur Creek	+	NA	NA	NA	NA	NA	NA	NA	NA	NA	++	+	+	+
		Summary	N	N	N	N	N	N	N	N	N	Y	N	N	N	

Appendix D. Salmonid Population-Limiting Factor Matrix

PCSRF Limiting Factors identified for ESA listed salmon and steelhead populations, Major Population Groups (MPG), and ESUs/DPSs.															
++ = Major population level limiting factor, + = minor population level limiting factor, NA = Not applicable at the population scale															
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A limiting factor must be a major limiting factor for at least 50% of populations within an MPG to be a Major limiting factor for the MPG															
A limiting factor must be a major limiting factor for at least one MPG to be identified as a major limiting factor for the ESU/DPS.															
Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors											
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease
Interior Columbia	Snake River Spring/Summer-run Chinook Salmon	Upper Salmon River	Lemhi River	+	++	++	++	+	++	+	++	+	+	+	
			Upper Salmon and Tribes	+	+	++	++	+	++	++	+	++	+	+	+
			Pahsimeroi River	+	++	++	++	+	++	+	++	++	+	+	+
			Upper Salmon below RFL	+	++	++	+	+	++	++	+	++	+	+	+
			Panther Creek	+	+	+	+	++	+	++	++	++	+	+	+
			East Fork Salmon river	+	++	++	+	+	++	++	+	++	+	+	+
			North Fork Salmon River	+	++	++	++	+	++	+	++	+	++	+	+
			Valley Creek	+	+	++	++	+	+	NA	NA	++	+	+	+
			Yankee Fork	+	++	++	++	+	NA	++	+	++	+	+	+
			Summary				N	Y	Y	Y	N	Y	Y	N	Y
Interior Columbia	Snake River Spring/Summer-run Chinook Salmon	ESU/DPS Summary		N	Y	Y	Y	Y	Y	Y	N	Y	N	N	N

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors												
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease	
Interior Columbia	Snake River Steelhead	Lower Snake	Tucannon River	+	++	++	++	+	++	+	+	++	+	+	++	
			Asotin Creek	+	++	++	++	++	+	+	+	++	+	+	++	
			Summary	N	Y	Y	Y	Y	Y	N	N	Y	N	N	Y	
		Clearwater	Lower Clearwater River	+	++	++	++	++	+	+	+	++	+	+	++	
			SF Clearwater River	+	++	++	++	++	+	+	+	++	+	+	++	
			Lolo Creek	+	+	++	++	++	+	+	NA	++	+	+	++	
			Selway River	+	NA	NA	NA	NA	NA	NA	NA	++	+	+	++	
			Lochsa River	+	+	+	++	+	+	+	+	++	+	+	++	
			NF Clearwater River	+	+	+	+	+	+	+	++	++	++	NA	++	
			Summary	N	N	N	Y	Y	N	N	N	Y	N	N	Y	
			Grande Ronde	Lower Grande Ronde River	+	+	+	++	+	++	+	++	+	++	+	++
				Joseph Creek	+	++	++	++	+	+	++	+	++	+	+	++
				Wallowa River	+	+	++	++	+	++	++	+	++	+	+	++
				Upper Grand Ronde River	+	+	++	++	++	+	++	+	++	+	+	++
				Summary	N	N	Y	Y	N	N	Y	N	Y	N	N	Y
		Salmon		Little Salmon and Lower Salmon Tributaries	+	++	++	++	++	+	+	+	++	+	+	++
			South Fork Salmon River	+	+	++	++	++	+	+	+	++	+	++	++	
			Secesh River	+	+	+	+	+	+	+	NA	++	+	++	++	
			Chamberlain Creek	+	NA	NA	NA	NA	NA	NA	NA	++	+	+	++	
			Lower Middle Fork Salmon River	+	+	+	+	+	+	+	NA	++	+	++	++	
			Upper Middle Fork Salmon River	+	+	+	+	+	NA	+	+	++	NA	++	++	
			Panther Creek	+	++	++	++	+	+	++	+	++	+	+	++	
			North Fork Salmon River	+	++	++	++	+	++	+	+	++	+	+	++	
			Lemhi River	+	++	++	+	+	++	+	++	++	+	+	++	
			Pahsimeroi River	+	++	++	+	+	++	++	++	++	+	+	++	
			East Fork Salmon River	+	++	++	+	+	NA	+	++	++	++	+	++	
			Imnaha	Upper Mainstem Salmon River	+	+	++	+	+	++	NA	+	++	++	+	++
		Summary		N	N	Y	N	Y	Y	N	N	Y	N	N	Y	
		Imnaha River		+	++	++	++	+	+	+	+	++	+	+	++	
		Hells Canyon	Summary	N	Y	Y	Y	N	N	N	N	Y	N	N	Y	
Hells Canyon Tributaries	+		+	+	+	+	+	+	+	++	++	+	++			
Summary	N	N	N	N	N	N	N	N	Y	Y	N	N	Y			
Interior Columbia	Snake River Steelhead	ESU/DPS Summary		N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	
Interior Columbia	Snake River Sockeye Salmon	Redfish Lake		+	NA	NA	NA	NA	NA	NA	NA	++	+	+	+	
Interior Columbia	Snake River Sockeye Salmon	ESU/DPS Summary		N	N	N	N	N	N	N	N	Y	NA	N	N	

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors													
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease		
Interior Columbia	Middle Columbia River Steelhead	Cascade Eastern Slope	Rock Creek	-- TRT without enough local info to make a cal													
			Willow Creek				++		++		++	++	NA				
			Klickitat River	-- TRT without enough local info to make a cal													
			Fifteen Mile Creek	+	+	+	++	++	++	++	NA	++	NA	+	++		
			Deschutes River Eastside	+	+	++	++	+	++	+	+	++	++	+	++		
			Deschutes River Westside	+	+	++	+	++	+	++	++	++	++	+	++		
			Big White Salmon River	NA	NA	NA	NA	NA	NA	NA	++	++	NA	+			
			Crooked River	NA	NA	NA	++	NA	NA	NA	++	++	NA	+	++		
			Summary	N	N	N	Y	N	Y	N	Y	Y	N	N	Y		
		John Day River	Lower Mainstem John Day River	+	+	+	++	+	++	++	+	++	++	+	++		
			Middle Fork John Day River	+	+	++	++	+	+	++	+	++	+	+	++		
			South Fork John Day River	+	+	+	++	++	+	++	+	++	+	+	++		
			Upper Mainstem John Day River	+	+	+	++	++	++	+	+	++	+	+	++		
			North Fork John Day River	+	+	+	++	++	+	++	+	++	+	+	++		
			Summary	N	N	N	Y	Y	N	Y	N	Y	N	N	Y		
		Walla Walla and Umatilla	Umatilla River	+	+	+	++	++	+	++	++	++	+	+	++		
			Walla Walla River	+	+	+	++	+	++	++	++	++	+	+	++		
		Touchet River	Touchet River	+	+	++	++	++	++	+	+	++	+	+	++		
			Summary	N	N	N	Y	Y	Y	Y	Y	Y	N	N	Y		
		Yakima River	Satus Creek	+	++	++	++	+	+	++	+	++	NA	+	++		
			Toppenish Creek	+	++	+	++	+	++	++	+	++	NA	+	++		
			Naches River	+	++	+	++	+	++	+	++	++	NA	+	++		
			Upper Yakima River	+	++	+	++	+	++	+	++	++	NA	+	++		
			Summary	N	Y	N	Y	N	Y	N	N	Y	N	N	Y		
		Interior Columbia	Middle Columbia River Steelhead	ESU/DPS Summary		N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors															
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease				
Willamette/Lower Columbia	Lower Columbia River Chinook Salmon	Fall Run Coastal	Grays River Fall Run	++	++	++	++	++	+	++	+	+	+	+	++	+			
			Elochoman River Fall Run	++	++	++	++	++	+	+	+	+	+	++	++	+			
			Mill Creek Fall Run	++	++	++	++	++	++	+	+	+	+	+	+	++	++	+	
			Youngs Bay Fall Run	++	++	++	++	+	+	+	+	+	+	+	++	++	+		
			Big Creek Fall Run	++	++	++	++	+	+	+	+	+	+	+	++	++	+		
			Clatskanie Fall Run	++	++	++	++	+	+	+	+	+	+	+	++	++	+		
			Scappoose Creek Fall Run	++	++	++	++	+	+	+	+	+	+	+	+	++	++	+	
			Summary	Y	Y	Y	Y	N	N	N	N	N	N	Y	Y	N			
			Fall Run Cascade	Lower Cowlitz Fall Run	++	++	++	++	++	++	+	+	+	+	+	++	++	+	
				Upper Cowlitz Fall Run	+	++	++	++	++	+	+	++	+	+	++	+	++	+	
				Toutle River Fall Run	++	++	++	++	++	+	+	++	+	+	++	++	+		
				Coweeman River Fall Run	++	++	++	++	++	+	++	+	+	+	+	++	++	+	
				Kalama River Fall Run	++	++	++	++	++	++	++	+	+	+	++	++	+		
				Lewis River Fall Run	++	++	++	++	++	++	+	+	+	+	+	++	++	+	
				Salmon Creek Fall Run	++	++	++	++	++	++	+	+	+	+	+	++	++	+	
		Washougal River Fall Run		++	++	++	++	++	+	+	+	+	+	+	++	++	+		
		Clackamas River Fall Run		++	++	++	++	+	+	+	+	+	+	+	++	++	+		
		Sandy River Fall Run		++	++	++	++	+	+	+	+	+	+	+	++	++	+		
		Summary		Y	Y	Y	Y	Y	N	N	N	N	N	N	Y	N			
		Fall Run Gorge		Lower Gorge Fall Run	++	++	++	++	++	++	+	+	+	+	+	++	++	+	
				Upper Gorge Fall Run	++	++	++	++	+	+	+	+	++	+	++	+	++	+	
				Hood River Fall Run	++	++	++	++	+	++	+	+	+	+	+	++	++	+	
				White Salmon River Fall Run	+	++	++	++	++	+	++	+	++	+	+	++	++	+	
			Summary	Y	Y	Y	Y	N	N	N	N	N	N	N	Y	N			
			Late Fall Run Cascade	Lewis River Late Fall Run	++	++	++	+	++	++	+	++	+	+	++	+	++	+	
				Sandy River Late Fall Run	++	++	++	++	+	+	+	+	+	+	+	++	++	+	
				Summary	Y	Y	Y	N	N	N	N	N	N	N	Y	N			
				Spring Run Cascade	Upper Cowlitz Spring Run	+	++	++	++	++	++	++	++	++	+	+	+	+	+
					Cispus River Spring Run	+	++	++	++	++	++	++	++	++	+	+	+	+	+
					Tilton River Spring Run	+	++	++	++	++	++	+	++	+	+	+	+	+	+
					Toutle River Spring Run	+	++	++	++	++	+	++	+	+	+	+	+	+	+
					Kalama River Spring Run	+	++	++	++	++	++	+	++	+	+	+	+	+	+
					Lewis River Spring Run	+	++	++	++	++	++	+	++	+	+	+	+	+	+
					Sandy River Spring Run	++	++	++	++	+	+	+	+	+	+	+	+	++	+
		Summary			N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N	N		
		Spring Run Gorge			White Salmon River Spring Run	+	++	++	++	++	+	+	++	+	+	+	+	+	+
					Hood River Spring Run	++	++	++	++	+	+	+	+	+	+	+	+	++	+
					Summary	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	
					ESU/DPS Summary	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	N

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors												
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease	
Willamette/Lower Columbia	Upper Willamette River Chinook Salmon		Clackamas	+	++	++	++	+	+	+	++	+	+	+		
			Molalla	+	++	++	++	+	+	+	NA	+	+	+	+	
			Calapooia	+	++	++	++	+	+	+	++	++	+	+	+	+
			North Santiam	+	++	++	++	+	+	+	++	++	+	++	+	+
			South Santiam	+	++	++	++	+	+	+	++	++	+	++	+	+
			McKenzie	+	++	++	++	+	+	+	++	++	+	++	+	+
			Middle Fork Willamette	+	++	++	++	++	+	+	++	++	+	++	+	+
Willamette/Lower Columbia	Upper Willamette River Chinook Salmon		ESU/DPS Summary	N	Y	Y	Y	N	N	Y	Y	N	Y	N	N	
Willamette/Lower Columbia	Columbia River Chum salmon	Coastal	Grays River	++	++	++	+	++	++	+	+	+	+	+	+	
			Elochoman River	++	++	++	++	++	+	+	+	+	+	+	+	+
			Mill Creek	++	++	++	++	++	+	+	++	+	+	+	+	+
			Youngs Bay	++	+	+	+	+	+	+	++	+	+	+	+	+
			Big Creek	++	+	+	+	+	+	+	++	+	+	+	+	+
			Clatskanie River	++	+	+	+	+	+	+	++	+	+	+	+	+
			Scappoose Creek	++	+	+	+	+	+	+	++	+	+	+	+	+
			Summary	Y	N	N	N	N	N	N	Y	N	N	N	N	
			Cascade	Cowlitz River	++	++	++	+	++	++	+	+	+	+	+	+
				Kalama River	++	++	++	+	++	++	+	++	+	+	+	+
				Lewis River	++	++	++	+	++	++	+	+	+	+	+	+
				Salmon Creek	++	++	++	++	++	++	++	++	++	++	++	++
				Washougal River	++	++	++	++	++	+	+	+	+	+	+	+
				Clackamas River	++	+	+	+	+	+	+	++	+	+	+	+
				Sandy River	++	+	+	+	+	+	+	++	+	+	+	+
				Summary	Y	Y	Y	N	Y	Y	N	Y	N	N	N	
			Gorge	Lower Gorge	++	++	++	++	++	++	+	+	+	+	+	+
	Upper Gorge	++		++	++	++	++	+	+	++	++	++	++	++		
	Summary	Y		Y	Y	Y	Y	N	N	N	N	N	N			
Willamette/Lower Columbia	Columbia River Chum salmon		ESU/DPS Summary	Y	Y	Y	Y	Y	Y	N	Y	N	N	N		

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors													
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease		
Willamette/Lower Columbia	Lower Columbia River Steelhead	Cascade Winter	Lower Cowlitz Winter	+	++	++	++	++	+	++	+	+	++	+	++		
			Coweman Winter	+	++	++	++	++	++	+	+	+	++	+	++		
			South Fork Toutle Winter	+	++	++	++	++	++	+	+	+	+	+	++		
			North Fork Toutle Winter	+	++	++	++	++	++	+	++	+	+	+	++		
			Upper Cowlitz Winter	+	++	++	++	++	++	+	++	+	NA	+	++		
			Cispus Winter	+	++	++	++	++	++	+	++	+	NA	+	++		
			Tilton Winter	+	++	++	++	+	++	+	++	+	NA	+	++		
			Kalama Winter	+	++	++	+	++	+	++	++	+	+	+	++		
			North Fork Lewis Winter	+	++	++	++	++	+	++	+	++	+	++	+	++	
			East Fork Lewis Winter	+	++	++	+	++	++	+	+	+	+	+	++		
			Salmon Creek Winter	+	++	++	++	++	++	++	+	+	++	+	++		
			Washougal Winter	+	++	++	++	++	++	+	+	+	++	+	++		
			Clackamas Winter	+	++	++	++	+	+	+	+	+	+	+	++		
			Sandy Winter	+	++	++	++	+	+	+	+	+	+	+	++		
		Summary				N	Y	Y	Y	Y	Y	N	Y	N	N	Y	
		Cascade Summer	Kalama Summer	+	++	++	++	++	++	+	+	+	+	+	++		
			North Fork Lewis	+	++	++	++	+	++	++	++	+	++	+	++		
			East Fork Lewis	+	++	++	+	++	++	++	+	+	+	++			
			Washougal Summer	+	++	++	+	++	++	+	+	+	++	++			
			Summary				N	Y	Y	N	N	Y	Y	N	N	N	Y
			Gorge Winter	Lower Gorge Winter	+	++	++	++	++	++	+	+	+	+	+	++	
		Upper Gorge Winter		+	++	++	++	++	++	+	+	++	+	+	++		
		Hood River Winter		+	++	++	++	+	++	+	+	+	NA	+	+		
		Summary				N	Y	Y	Y	Y	Y	N	Y	N	N	Y	
		Gorge Summer	Wind Summer	+	++	++	++	++	++	+	+	+	+	+	++		
			Hood Summer	+	++	++	++	+	++	+	+	+	+	+	+		
			Summary				N	Y	Y	Y	N	Y	N	N	N	N	
Willamette/Lower Columbia	Lower Columbia River Steelhead	ESU/DPS Summary		N	Y	Y	Y	Y	Y	Y	N	N	N	Y			
		Willamette/Lower Columbia	Upper Willamette River Steelhead	Molalla	+	++	++	++	+	+	+	+	+	+			
North Santiam	+			++	++	++	+	++	+	++	+	++	+				
South Santiam	+			++	++	++	+	++	+	++	+	++	+				
Calapooia	+			++	++	++	+	++	+	+	+	+	+				
Willamette/Lower Columbia	Upper Willamette River Steelhead	ESU/DPS Summary		N	Y	Y	Y	N	Y	N	Y	N	Y	N			

Appendix D. Salmonid Population-Limiting Factor Matrix

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors															
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease				
Willamette/Lower Columbia	Lower Columbia River Coho Salmon	Coast	Youngs Bay	+	++	++	++	+	+	+	+	+	+	++	++	+			
			Grays River	+	++	++	+	++	+	+	+	+	+	+	++	++	+		
			Big Creek	+	++	++	++	+	+	+	+	+	+	+	++	++	+		
			Elochoman	+	++	++	+	++	++	+	+	+	+	+	++	++	+		
			Clatskanie	+	++	++	++	+	+	+	+	+	+	+	++	++	+		
			Mill Creek	+	++	++	++	+	++	++	+	++	++	+	+	++	++	+	
			Scappoose Creek	+	++	++	++	+	+	+	+	+	+	+	+	++	++	+	
			Summary	N	Y	Y	Y	N	N	N	N	N	N	Y	Y	N			
			Cascade	Upper Cowlitz	+	++	++	++	+	+	+	++	+	NA	++	+			
				Cispus	+	++	++	++	+	+	+	++	+	NA	++	+			
				Tilton	+	++	++	++	++	++	++	++	++	+	++	++	+		
				North Fork Toutle	+	++	++	++	++	++	++	++	++	+	++	++	+		
				South Fork Toutle	+	++	++	++	+	+	++	+	+	+	++	++	+		
				Lower Cowlitz	+	++	++	++	++	+	++	+	+	+	++	++	+		
				Coweeman	+	++	++	++	++	++	++	++	+	+	++	++	+		
		Kalama		+	+	++	++	++	++	+	+	+	+	++	++	+			
		North Fork Lewis		+	++	++	++	+	++	+	++	+	+	++	++	+			
		East Fork Lewis		+	++	++	++	++	++	++	++	+	+	++	++	+			
		Salmon Creek		+	++	++	++	++	++	++	++	++	+	++	++	+			
		Clackamas		+	++	++	++	+	+	+	+	+	+	++	++	+			
		Washougal		+	++	++	++	++	++	++	++	+	+	++	++	+			
		Sandy		+	++	++	++	+	+	+	+	+	+	++	++	+			
		Summary		N	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N		
		Gorge	Lower Gorge Tributaries	+	++	++	++	++	++	+	+	+	+	++	++	+			
			WA Upper Gorge Tributaries and White Salmon River	+	++	++	++	+	++	++	+	++	++	++	++	+			
			OR Upper Gorge Tributaries and Hood River	+	++	++	++	+	++	+	+	+	+	++	++	+			
			Summary	N	Y	Y	Y	N	Y	N	N	N	N	Y	Y	N			
		Willamette/Lower Columbia	Lower Columbia River Coho Salmon		ESU/DPS Summary	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	

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Oregon/Northern California Coast	Southern Oregon/Northern California Coast coho	Interior Rogue	Illinois River	+	++	++	++	+	++	++	++		+	+	+		
			Middle Rogue/Applegate Rivers	+	++	++	++	++	++	+		+	+	+			
			Upper Rogue River	+	+	++	++	++	+	++		+	+	++			
					Summary	N	Y	Y	Y	Y	Y	Y		N	N	N	
				Interior Klamath	Middle Klamath River	+	+	+	++	++	++	++		+	+	++	
					Upper Klamath River	+	+	+	++	++	++	++		+	+	++	
					Salmon River	+	+	++	++	++	++	++		+	+	+	
					Scott River	+	++	++	++	+	++	++		+	+	+	
					Shasta River	+	++	++	++	++	++	+		+	+	+	
					Summary	N	N	Y	Y	Y	Y	Y		N	N	N	
				Interior Trinity	Lower Trinity River	+	+	++	++	++	++	+		++	+	+	
					Upper Trinity River	+	++	++	++	+	++	++		++	+	+	
					South Fork Trinity River	+	+	++	++	++	++	++		+	+	+	
					Summary	N	N	Y	Y	Y	Y	Y		Y	N	N	
				Interior Eel	South Fork Eel River	+	+	++	++	++	+	++	++		+	+	++
					Mainstem Eel River	+	+	++	++	++	++	++	+		+	+	++
					Middle Mainstem Eel River	+	+	++	++	++	++	++	+		+	+	++
					Upper Mainstem Eel River	+	+	++	++	++	++	++	+		+	+	++
					North Fork Eel River	+	+	++	++	++	++	++	+		+	+	++
					Middle Fork Eel River	+	+	++	++	++	+	++	++		+	+	++
					Summary	N	N	Y	Y	Y	Y	Y	N		N	N	Y
				Northern Coastal	Elk River	++	++	++	++	+	+	++	+		++	+	+
					Lower Rogue River	+	++	++	++	++	++	++	+		+	+	+
					Chetco River	++	++	++	++	+	++	++	+		+	+	+
					Winchuck River	++	++	++	++	+	+	++	++		+	+	+
					Summary	Y	Y	Y	Y	N	N	Y	N		N	N	N
				Central Coastal	Smith River	++	++	++	++	++	+	++	+		+	+	+
					Lower Klamath River	+	+	++	++	++	++	++	+		+	+	++
					Redwood Creek	++	++	++	++	++	++	++	+		+	+	+
					Maple Creek/Big Lagoon	+	++	++	++	++	+	++	++		+	+	+
					Little River	++	++	++	++	++	+	++	+		+	+	+
					Mad River	++	++	++	++	++	+	++	+		+	+	+
					Summary	Y	Y	Y	Y	Y	N	Y	N		N	N	N
					Southern Coastal	Humboldt Bay tributaries	+	++	++	++	++	++	++	+		+	+
				Lower Eel/Van Duzen Rivers		+	++	++	++	++	++	++	+		+	+	++
				Bear River		+	++	++	++	++	++	++	++		+	+	+
				Mattole River		+	++	++	++	++	++	++	+		+	+	+
					Summary	N	Y	Y	Y	Y	N	Y	N		N	N	N
		Oregon/Northern California Coast	Southern Oregon/Northern California Coast coho		ESU/DPS Summary	Y	Y	Y	Y	Y	Y	Y	Y		Y	N	Y

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Oregon/Northern California Coast	Oregon Coast Coho	Northern	Necanicum	++	++	++	++	+	NA	+	+		NA	+	+		
			Nehalem	++	++	++	++	++	NA	++	NA		+	+	+		
			Tillamook Bay	++	++	++	++	++	NA	++	NA		NA	+	+		
			Nestucca	++	++	++	++	++	NA	++	NA		NA	+	+		
			Summary	Y	Y	Y	Y	Y	NA	Y	N		N	N	N		
			North-Central	Salmon	+	++	++	++	+	NA	++	+		++	+	+	
				Siletz	+	++	++	++	+	NA	++	+		NA	+	+	
				Yaquina	++	++	++	++	+	NA	++	NA		NA	+	+	
				Beaver	+	+	++	++	++	NA	+	NA		NA	+	+	
				Alsea	+	++	++	++	++	NA	++	NA		+	+	+	
		Siuslaw		++	++	++	++	++	NA	++	NA		NA	+	+		
		Summary		N	Y	Y	Y	Y	N	N	Y	N		N	N	N	
		Lakes		Siltcoos	+	++	++	++	+	NA	++	NA		NA	+	++	
			Tahkenitch	+	++	++	++	++	NA	++	NA		NA	+	++		
			Tenmile	+	++	++	++	++	NA	++	NA		NA	+	++		
			Summary	N	Y	Y	Y	Y	N	N	Y	N		N	N	Y	
			Umpqua River	Lower Umpqua	++	++	++	++	++	+	++	+		+	+	+	
		Middle Umpqua		++	++	++	++	+	++	++	NA		+	+	+		
		North Umpqua		+	++	++	++	+	+	++	+		++	+	+		
		South Umpqua		+	++	++	++	+	++	++	NA		++	+	+		
		Summary		N	Y	Y	Y	Y	N	N	Y	N		N	N	N	
		South-Central	Coos	++	++	++	++	+	NA	++	NA		+	+	+		
			Coquille	++	++	++	++	+	+	++	NA		+	+	+		
			Floras	+	++	++	++	+	++	++	NA		NA	+	+		
			Sixes	+	++	++	++	+	++	++	NA		NA	+	+		
			Summary	N	Y	Y	Y	Y	N	N	Y	N		N	N	N	
		Oregon/Northern California Coast	Oregon Coast Coho		ESU/DPS Summary	N	Y	Y	Y	Y	N	Y	N		N	N	Y

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North Central California Coast	CA Coastal Chinook	North Coastal	Redwood Creek Fall	++	+	++	++	++	+	++	+		NA	+	+		
			(Redwood Creek Spring)	++	+	++	++	++	+	++	+		NA	+	+		
			Little River Fall	++	+	++	++	++	+	++	+		NA	+	+		
			Mad River Fall	++	+	++	++	++	+	++	+		+	+	+		
			Mad River Spring	++	+	++	++	++	+	++	+		+	+	+		
			Humboldt Bay Fall	++	+	++	++	++	+	++	+		+	+	+		
			Lower Eel River Fall (S Fk Eel)	++	+	++	++	++	++	++	+		NA	+	++		
		Bear River Fall	++	+	++	++	++	++	++	+		NA	+	++			
		Mattole River Fall	++	+	++	++	++	++	++	+		+	+	++			
		Summary				Y	N	Y	Y	Y	N	Y	N		N	N	N
		North Mountain Interior			Lower Eel River Fall (Van Duzen River/Larabee Creek)	++	+	++	++	++	++	++	+		+	+	++
					Upper Eel River Fall	++	+	++	++	++	++	++	+		+	+	++
					(Van Duzen River Spring)	++	+	++	++	++	+	++	+		NA	+	++
					North Fork Eel River Spring	++	+	++	++	++	++	++	+		+	+	++
					Middle Fork Eel River Spring (Upper Eel River Spring)	++	+	++	++	++	++	++	+		+	+	++
		Summary				Y	N	Y	Y	Y	Y	Y	N		N	N	Y
		North-Central Coastal			Ten Mile River Fall	+	+	++	++	++	+	+	+		+	+	+
					Noyo River Fall	+	+	++	++	++	+	+	+		NA	+	+
					Big River Fall	+	+	++	++	++	+	+	+		NA	+	+
		Summary				N	N	Y	Y	Y	N	N	N		N	N	N
		Central Coast			Navarro River Fall	+	+	++	++	++	+	+	+		NA	+	+
					Garcia River Fall	++	++	++	++	++	+	+	+		+	+	+
					Gualala River Fall	++	++	++	++	++	++	+	+		+	+	+
					Russian River Fall	+	++	++	++	++	++	++	+		+	+	+
		Summary				N	Y	Y	Y	Y	N	N	N		N	N	N
		North Central California Coast	CA Coastal Chinook	ESU/DPS Summary		Y	Y	Y	Y	Y	Y	Y	N		N	N	Y

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North Central California Coast	Central Coast Coho Salmon	Lost Coast - Navarro Point	Ten Mile River	+	++	++	++	++	+	+	+		+	+	+	
			Noyo River	+	+	++	++	++	++	+	+		++	+	+	
			Big River	+	++	++	++	++	+	+	+		+	+	+	
			Albion River	+	+	++	++	++	++	+	+		+	+	+	
		Summary				N	N	Y	Y	Y	N	N	N	N	N	N
		Navarro Point - Gualala Point	Navarro River	+	++	++	++	++	++	+	+			+	+	+
			Garcia River	+	++	++	++	++	++	+	++		NA	+	+	
			Gualala River	+	++	++	++	++	++	+	++		+	+	+	
			Summary				N	Y	Y	Y	Y	N	Y		N	N
		Coastal	Russian River	+	++	++	++	++	++	+	++			+	+	+
			Walker Creek	+	++	++	++	++	++	+	++		NA	+	+	
			Lagunitas Creek	+	++	++	++	++	++	+	++		NA	+	+	
			Summary				N	Y	Y	Y	Y	N	Y		N	N
		Santa Cruz Mountains	Pescadero Creek	++	++	++	++	+	++	++	+			+	+	+
			San Lorenzo River	++	++	++	++	++	++	+	+			++	+	+
			Summary				Y	Y	Y	Y	N	Y	N		N	N
North Central California Coast	Central Coast Coho Salmon	ESU/DPS Summary		Y	Y	Y	Y	Y	Y	N	Y		N	N	N	

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North Central California Coast	Northern California Steelhead	Northern Klamath Mtns	Mad River Winter	+	++	++	++	++	+	++	+		++	+	+		
			Mad River Summer	+	++	++	++	++	+	++	+		++	+	+		
			Van Duzen River Winter	++	+	++	++	++	+	++	+		NA	+	++		
			Van Duzen River Summer	++	+	++	++	++	+	++	+		NA	+	++		
			Larabee Creek Winter	++	+	++	++	++	+	++	+		NA	+	++		
			Larabee Creek Summer	++	+	++	++	++	+	++	+		NA	+	++		
			Dobbyn Creek Winter	++	+	++	++	++	+	++	+		NA	+	++		
			Kekawaka Creek Winter	++	+	++	++	++	+	++	+		NA	+	++		
			North Fk Eel River Winter	++	+	++	++	++	+	++	+		NA	+	++		
			North Fk Eel River Summer	++	+	++	++	++	+	++	+		NA	+	++		
			Middle Fk Eel River Winter	++	+	++	++	++	+	++	+		NA	+	++		
			Middle Fk Eel River Summer	++	+	++	++	++	+	++	+		NA	+	++		
			Upper Eel River Winter (Upper Mid. Mainstem Eel Summer)	++	+	++	++	++	+	++	+		NA	+	++		
			Summary	Y	N	Y	Y	Y	N	Y	N		NA	N	Y		
				Southern Klamath Mtns	Price Creek Winter	++	+	++	++	++	+	++	+		NA	+	++
					South Fk Eel River Winter	++	+	++	++	++	+	++	+		NA	+	++
					South Fk Eel River Summer	++	+	++	++	++	+	++	+		NA	+	++
					Jewett Creek Winter	+	++	++	++	++	+	+	+		++	+	++
					Pipe Creek Winter	+	++	++	++	++	+	+	+		++	+	++
					Chamise Creek Winter	+	++	++	++	++	+	+	+		++	+	++
					Woodman Creek Winter	+	++	++	++	++	+	+	+		++	+	++
					Outlet Creek Winter	+	++	++	++	++	+	+	+		++	+	++
					Tomki Creek Winter	+	+	+	++	++	+	+	+		+	+	++
					Mattole River Winter	+	+	++	++	++	+	+	+		NA	+	+
					Mattole River Summer	+	+	++	++	++	+	+	+		NA	+	+
					Summary	N	N	Y	Y	Y	N	N	N		N	N	Y

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors										
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects
		Northern Coastal	Redwood Creek Winter	++	+	++	++	++	+	++	+	NA	+	+
			Redwood Creek Summer	++	+	++	++	++	+	++	+	NA	+	+
			Maple Creek Winter	+	++	++	++	++	+	++	+	NA	+	+
			Little River Winter	+	++	++	++	++	+	++	+	NA	+	+
			Mad River Winter	+	++	++	++	++	+	++	+	++	+	+
			Mad River Summer	+	++	++	++	++	+	++	+	++	+	+
			Humboldt Bay Winter	++	++	++	++	++	+	++	+	+	+	+
			South Fk Eel River Winter	++	+	++	++	++	++	++	+	NA	+	++
			South Fk Eel River Summer	++	+	++	++	++	++	++	+	NA	+	++
			Bear River Winter	++	+	++	++	++	++	++	+	NA	+	++
			Mattole River Winter	++	+	++	++	++	++	++	+	+	+	++
			Mattole River Summer	++	+	++	++	++	++	++	+	+	+	++
			Summary	Y	N	Y	Y	Y	N	Y	N		N	N
North Central California Coast	Northern California Steelhead	Central Coastal	Usal Creek Winter	++	++	++	++	++	+	+	+		+	+
			Cottaneva Creek Winter	+	++	++	++	++	+	+	+		+	+
			Wages Creek Winter	+	++	++	++	++	+	+	+		+	+
			Ten Mile River Winter	++	++	++	++	++	+	+	+		+	+
			Pudding Creek Winter	++	++	++	++	++	+	+	+		+	+
			Noyo River Winter	+	++	++	++	++	+	+	+		+	+
			Hare Creek Winter	+	++	++	++	++	+	+	+		+	+
			Caspar Creek Winter	+	++	++	++	++	+	+	+		+	+
			Russian Gulch (Me) Winter	+	++	++	++	++	+	+	+		+	+
			Big River Winter	+	++	++	++	++	+	+	+		+	+
			Albion River Winter	+	++	++	++	++	+	+	+		+	+
			Big Salmon Creek Winter	+	++	++	++	++	+	+	+		+	+
			Summary	N	Y	Y	Y	Y	N	N	N		N	N
		Southern Coastal	Navarro River Winter	+	++	++	++	++	+	+	+		+	+
			Elk Creek Winter	+	++	++	++	++	+	+	+		+	+
			Brush Creek Winter	+	++	++	++	++	+	+	+		+	+
			Garcia River Winter	+	++	++	++	++	+	+	+		+	+
			Gualala River Winter	+	++	++	++	++	+	+	+		+	+
			Summary	N	Y	Y	Y	Y	N	N	N		N	N
North Central California Coast	Northern California Steelhead		ESU/DPS Summary	Y	Y	Y	Y	Y	N	Y	N		N	Y

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North Central California Coast	Central CA Coast Steelhead	North Coastal	Austin Creek Winter	++	+	++	++	++	++	+	+		+	+	+		
			Salmon Creek Winter	++	+	++	++	++	+	+	+		+	+	+		
			Americano Creek Winter	++	+	++	++	++	++	+	+		NA	NA	+		
			Stemple Creek Winter	++	+	++	++	++	++	+	+		NA	NA	+		
			Walker Creek Winter	++	+	++	++	++	++	+	+		NA	NA	+		
			Lagunitas Creek Winter	++	+	++	++	++	++	+	++		NA	+	+		
			Summary	Y	N	Y	Y	Y	Y	N	N		N	N	N		
			Interior	Mark West Creek Winter	++	++	++	++	+	++	+	+		+	+	+	
				Dry Creek Winter	++	++	++	++	++	++	+	++		++	+	+	
				Maacama Creek Winter	++	+	++	++	+	++	+	+		+	+	+	
				Upper Russian River Winter	++	+	++	++	+	++	+	+		+	+	+	
				Summary	Y	N	Y	Y	N	Y	N	N		N	N	N	
				Santa Cruz Mountains	Pilarcitos Creek Winter	++	++	++	++	++	++	+	++		+	+	+
					San Gregorio Creek Winter	++	+	++	++	+	++	++	+		+	+	+
					Pescadero Creek Winter	++	++	++	++	++	++	+	+		+	+	+
		Waddell Creek Winter			+	+	++	++	++	+	+	+		+	+	+	
		Scott Creek Winter			+	++	++	++	++	+	+	+		+	+	+	
		Laguna Creek Winter			++	++	++	++	+	++	+	++		+	+	+	
		San Lorenzo River Winter			++	++	++	++	++	++	+	+		++	+	+	
		Soquel Creek Winter			+	++	++	++	+	++	++	++		+	+	+	
		Aptos Creek Winter			++	++	++	++	++	++	+	+		+	+	+	
		Summary			Y	Y	Y	Y	Y	Y	N	N		N	N	N	
		Coastal S. F. Bay	Corte Madera Creek Winter		++	++	++	++	+	++	+	++		+	+	+	
			Miller Creek Winter		++	++	++	++	+	++	+	++		+	+	+	
			Novato Creek Winter		++	++	++	++	+	++	+	++		+	+	+	
			Guadalupe River Winter		++	++	++	++	+	++	+	++		+	+	+	
			Stevens Creek Winter		++	++	++	++	+	++	+	++		+	+	+	
			San Francisquito Creek Winter	++	++	++	++	+	++	+	++		+	+	+		
			San Mateo Creek Winter	++	++	++	++	+	++	+	++		+	+	+		
			Summary	Y	Y	Y	Y	N	Y	N	Y		N	N	N		
			Interior S. F. Bay	Petaluma River Winter	++	++	++	++	+	++	+	++		+	+	+	
				Sonoma Creek Winter	++	++	++	++	+	++	+	++		+	+	+	
				Napa River Winter	++	++	++	++	+	++	+	++		+	+	+	
				San Pablo Creek Winter	++	++	++	++	+	++	+	++		+	+	+	
				San Leandro Creek Winter	++	++	++	++	+	++	+	++		+	+	+	
				San Lorenzo Creek Winter	++	++	++	++	+	++	+	++		+	+	+	
				Alameda Creek Winter	++	++	++	++	+	++	+	++		+	+	+	
		Coyote Creek Winter		++	++	++	++	+	++	+	++		+	+	+		
		Summary		Y	Y	Y	Y	N	Y	N	Y		N	N	N		
		ESU/DPS Summary		Y	Y	Y	Y	Y	Y	N	Y		N	N	N		

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CA Central Valley	Sacramento River Winter-run chinook salmon	Basalt and Porous Lava	Little Sacramento River	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
			Pit R, Fall Cr, Hat Cr	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
			McCloud R	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
			Battle Cr	+	+	++	+	+	++	++	++		++	++	+		
			below Keswick	+	+	++	+	+	++	++	++		++	++	++		
CA Central Valley	Sacramento River Winter-run chinook salmon		ESU/DPS Summary	N	N	Y	N	N	Y	Y	Y		Y	Y	Y		
CA Central Valley	Central Valley Spring-run chinook salmon	Basalt and Porous Lava	Little Sacramento River	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
			Pit R, Fall Cr, Hat Cr	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
			McCloud R	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
			Battle Cr	+	+	++	+	+	++	++	++		++	++	+		
			Summary				N	N	N	N	N	N	Y		N	N	N
			Northern Sierra Nevada	Mill Cr	+	+	+	+	+	++	++	++		+	+	+	
				Deer Cr	+	+	+	+	+	++	++	++		+	+	+	
				Butte Cr	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA	
				West Branch Feather R	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA	
				North Fork Feather R	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA	
		Middle Fork Feather R		NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
		Yuba R		+	+	++	++	++	++	++	++		+	+	+		
		North and Middle Fork American R		NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
		South Fork American R		NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA		
		below Oroville		+	+	+	+	+	++	+	++		++	++	++		
		Summary				N	N	N	N	N	Y	Y	Y		N	N	N
		Southern Sierra Nevada	Mokelumne R	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA	
			Stanislaus R	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA	
			Merced R	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA	
			San Joaquin R	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA	
Summary				N	N	N	N	N	N	Y		N	N	N			
Clear, Cottonwood, Thomes, Stony	+		+	++	++	++	++	++	++		+	+	+				
Summary				N	N	Y	Y	Y	Y	Y	Y		N	N	N		
CA Central Valley	Central Valley Spring-run chinook salmon		ESU/DPS Summary	N	N	Y	Y	Y	Y	Y	Y		N	N	N		

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CA Central Valley	CA Central Valley Steelhead	Basalt and Porous Lava	Battle Cr (popid:3)	+	+	++	+	+	++	++	++		++	++	+					
			Battle Cr (popid:4)	+	+	++	+	+	++	++	++		++	++	+					
			Bear R (Sac trib) (popid:7)	+	+	++	++	++	++	++	++				+	+	+			
			Little Cow Cr (popid:49)	+	+	++	++	++	++	++	++				+	+	+			
			Little Cow Cr (popid:50)	+	+	++	++	++	++	++	++				+	+	+			
			Little Cow Cr (popid:51)	+	+	++	++	++	++	++	++				+	+	+			
			Little Cow Cr (popid:52)	+	+	++	++	++	++	++	++				+	+	+			
			McCloud R (popid:58)	NA	NA	NA	NA	NA	NA	NA	NA	++			NA	NA	NA			
			Pit R (popid:66)	NA	NA	NA	NA	NA	NA	NA	NA	++			NA	NA	NA			
			Pit R (popid:67)	NA	NA	NA	NA	NA	NA	NA	NA	++			NA	NA	NA			
			Upper Sacramento R (popid:78)	NA	NA	NA	NA	NA	NA	NA	NA	++			NA	NA	NA			
			Summary				N	N	Y	N	N	Y	Y	Y		N	N	N		
					Central Western CA	Del Puerto Cr (popid:35)	NA	++	++	++	NA	++	++	++		+	+	+		
						LoneTree Cr (popid:53)	NA	++	++	++	NA	++	++	++		+	+	+		
						Los Banos Cr (popid:54)	NA	++	++	++	NA	++	++	++		+	+	+		
						Los Gatos Cr (popid:55)	NA	NA	NA	NA	NA	NA	NA	++			NA	NA	NA	
						Los Gatos Cr (popid:56)	NA	NA	NA	NA	NA	NA	NA	++			NA	NA	NA	
						Panoche Cr (popid:64)	NA	NA	NA	NA	NA	NA	NA	++			NA	NA	NA	
						Summary				N	N	N	N	N	N	Y		N	N	N
								Northern Sierra Nevada	American R (popid:1)	+	+	++	+	++	++	+	++		++	++
Antelope Cr (popid:2)	NA	++							++	+	+	++	++	++			+	+	+	
Bear R (Feather trb) (popid:5)	+	+							++	++	++	++	++	++			+	+	+	
Bear R (Feather trb) (popid:6)	NA	NA	NA	NA	NA				NA	NA	++			NA	NA	NA				
Big Chico Cr (popid:10)																				
Big Chico Cr (popid:8)	+	+	++	+	++				++	+	++			++	++	+				
Big Chico Cr (popid:9)																				
Butte Cr (popid:11)	+	+	++	+	++				++	+	++			++	++	+				
Butte Cr (popid:12)																				
Coon Cr (popid:24)	NA	++	++	++	+				++	++	++			+	+	+				
Coon Cr (popid:25)	NA	+	++	++	+				++	++	++			++	+	+				
Cosumnes R (popid:26)																				
Deer Cr (Sac trib) (popid:34)	NA	++	++	++	+				++	++	++			+	+	+				
Feather R (popid:37)	+	+	++	+	++				++	+	++			++	++	+				
Feather R (popid:38)		+	++	+	++				++	+	++			++	++	+				
Feather R (popid:39)		+	++	+	++	++	+	++			++	++	+							
Mill Cr (popid:61)	NA	+	++	+	++	++	++	++			+	+	+							
Paynes Cr (popid:65)	NA	+	++	++	++	++	++	++			+	+	+							
Toomes Cr (popid:76)	NA	+	++	++	++	++	++	++			+	+	+							
Yuba R (popid:80)	+	+	++	+	++	++	+	++			++	++	+							
Yuba R (popid:81)	+	+	++	+	++	++	+	++			++	++	+							
Summary				N	N	Y	N	Y	Y	N	Y		Y	Y	N					

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CA Central Valley	CA Central Valley Steelhead	Northwestern CA	Cache Cr (popid:13)	NA	+	++	++	++	++	++	++	++		+	+	+	
			Clear Cr (popid:23)	NA	++	++	+	+	+	++	++	++	++		+	+	+
			Cottonwood Cr (popid:27)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Cottonwood Cr (popid:28)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Cottonwood Cr (popid:29)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Cottonwood Cr (popid:30)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Cottonwood Cr (popid:31)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Cottonwood Cr (popid:32)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Elder Cr (popid:36)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Putah Cr (popid:69)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Stony Cr (popid:71)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Stony Cr (popid:72)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Sweany Cr (popid:74)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Thomes Cr (popid:75)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Summary				N	N	Y	N	Y	Y	Y	Y		N	N

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		Southern Sierra Nevada	Calaveras R (popid:14)	NA	++	+	++	++	++	++	++	++		+	+	+	
			Calaveras R (popid:15)	NA	++	+	++	++	++	++	++	++	++		+	+	+
			Calaveras R (popid:16)	NA	++	+	++	++	++	++	++	++	++		+	+	+
			Calaveras R (popid:17)	NA	+	++	+	++	++	++	++	++	++		+	+	+
			Caliente Cr (popid:18)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Caliente Cr (popid:19)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Caliente Cr (popid:20)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Chowchilla R (popid:21)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Chowchilla R (popid:22)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Deer Cr (Kaweah trib) (popid:33)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Fresno R (popid:40)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kaweah R (popid:41)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kaweah R (popid:42)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kaweah R (popid:43)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kern R (popid:44)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kern R (popid:45)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kern R (popid:46)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kings R (popid:47)	NA	NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Kings R (popid:48)		NA	NA	NA	NA	NA	NA	NA	NA	++		NA	NA	NA
			Merced R (popid:59)	NA	++	++	+	++	++	++	++	++	++		+	+	+
			Merced R (popid:60)	NA	++	++	+	++	++	++	++	++	++		+	+	+
			Mokelumne R (popid:62)	NA	++	++	++	++	++	++	+	++	++		+	+	+
			Mokelumne R (popid:63)	NA	++	++	++	++	++	++	+	++	++		+	+	+
			Poso Cr (popid:68)		NA	++	+	++	++	++	++	++	++		+	+	+
			Stanislaus R (popid:70)	NA	++	++	+	++	++	++	++	++	++		+	+	+
			Tuolumne R (popid:77)	NA	++	++	+	++	++	++	++	++	++		+	+	+
			Upper San Joaquin R (popid:79)	NA	++	++	+	++	++	++	++	++	++		+	+	+
			Summary	N	N	N	N	N	N	N	N	N	Y		N	N	N
			Suisun Bay Tributaries														
		Marsh Cr (popid:57)															
		Suisun Bay Tribs (popid:73)															
		Summary	N	N	N	N	N	N	N	N	N	N		N	N	N	
CA Central Valley	CA Central Valley Steelhead		ESU/DPS Summary	N	N	Y	N	Y	Y	Y	Y	Y		Y	Y	N	

Appendix D. Salmonid Population-Limiting Factor Matrix

PCSRF Limiting Factors identified for ESA listed salmon and steelhead populations, Major Population Groups (MPG), and ESUs/DPSs.																		
++ = Major population level limiting factor, + = minor population level limiting factor, NA = Not applicable at the population scale																		
Y = Major MPG or ESU/DPS level limiting factor, N = Not a major MPG or ESU/DPS level limiting factor																		
A limiting factor must be a major limiting factor for at least 50% of populations within an MPG to be a Major limiting factor for the MPG																		
A limiting factor must be a major limiting factor for at least one MPG to be identified as a major limiting factor for the ESU/DPS.																		
Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors														
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease			
South-Central/Southern California Coast	Southern CA Steelhead	Monte Arido Highlands	Santa Maria River	++	++	+	++	++	++	++	++	++	++	NA	NA	++		
			Santa Ynez River	++	++	++	++	++	++	+	++	NA	NA	++				
			Ventura River	++	++	++	++	++	++	++	++	NA	NA	++				
			Santa Clara River	++	++	++	++	++	++	+	++	NA	NA	++				
			Summary				Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	
			Conception Coast	Jalama Creek														
				Canada de Santa Anita														
				Canada de la Gaviota														
				Canada San Onofre														
				Arroyo Hondo	++	+	+	+	NA	NA	NA	++	NA	NA	NA			
				Arroyo Quemado														
				Tajiguas Creek														
		Canada del Refugio																
		Canada del Venadito																
		Canada del Corral																
		Canada del Capitan																
		Gato Canyon																
		Dos Pueblos Canyon																
		Eagle Canyon																
		Tecolote Canyon																
		Bell Canyon																
		Goleta Slough Complex		++	++	++	++	++	+	++	++	NA	NA	++				
		Arroyo Burro		++	++	++	++	++	+	++	+	NA	NA	++				
		Mission Creek	++	++	++	++	++	+	++	++	NA	NA	++					
		Montecito Creek	++	++	+	++	++	++	++	++	NA	NA	NA					
		Oak Creek																
		San Ysidro Creek																
		Romero Creek																
		Arroyo Paredon																
		Carpinteria Salt Marsh Complex																
		Carpinteria Creek	++	++	++	++	++	+	++	++	NA	NA	++					
		Rincon Creek	++	++	+	++	++	+	++	++	NA	NA	++					
		Summary				Y	Y	Y	Y	Y	N	Y	Y	N	N	Y		
		Santa Monica Mountains	Big Sycamore Canyon															
			Arroyo Sequit															
			Malibu Creek	++	++	+	++	++	++	++	++	NA	NA	++				
		Topanga Canyon	++	++	+	++	++	+	++	+	NA	NA	++					
		Summary				Y	Y	N	Y	Y	N	Y	N	N	N	Y		
		Mojave Rim	Los Angeles River															
			San Gabriel River	++	++	+	++	+	+	++	++	NA	NA	+				
		Summary				Y	Y	N	Y	N	N	Y	Y	N	N	N		
		Santa Catalina Gulf Coast	San Juan Creek	++	++	++	++	++	+	++	++	NA	NA	++				
San Mateo Creek	++		++	++	++	++	++	+	+	NA	NA	++						
San Onofre Creek																		
Santa Margarita River	++		++	++	++	++	++	+	++	NA	NA	++						
San Luis Rey River																		
San Diego River																		
Sweetwater River																		

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Recovery Domain	ESU	Major Population Group or Stratum	Population	Limiting Factors																
				Degraded Habitat-Estuarine and Nearshore Marine	Degraded Habitat-Floodplain Connectivity and Function	Degraded Habitat-Channel Structure and Complexity	Degraded Habitat-Riparian Areas and LWD Recruitment	Degraded Habitat-Stream Substrate	Degraded Habitat-Stream Flow	Degraded Habitat-Water Quality	Degraded Habitat-Fish Passage	Mainstem Columbia River Hydropower-related Adverse Effects	Hatchery-related Adverse Effects	Harvest-related Adverse Effects	Predation/Competition/ Disease					
			Otay River																	
			Tijuana River																	
			Summary	Y	Y	Y	Y	Y	Y	N	Y		N	N	Y					
South-Central/Southern California Coast	Southern CA Steelhead		ESU/DPS Summary	Y	Y	Y	Y	Y	Y	Y	Y		N	N	Y					

APPENDIX E: HABITAT LIMITING FACTORS AND PCSRF PROJECTS AND TREATMENTS THAT ADDRESS THE FACTORS

Habitat Limiting Factor	Project Type	Treatments (PCSRF Activities)
Degraded Habitat-Estuarine and Nearshore Marine	Estuarine work	Channel modification, creation of new estuarine area, dike breaching/removal, increasing freshwater flow, removal of existing fill material
Degraded Habitat-Floodplain Connectivity and Function	Wetland work	Wetland creation, wetland improvement / enhancement, wetland invasive species removal, wetland vegetation planting
	Riparian treatment	Conservation grazing management, fencing, irrigation practice improvement, livestock exclusion, vegetation planting, water gap development
	Instream habitat work	Channel connectivity
Degraded Habitat-Channel Structure and Complexity	Instream habitat work	Bank stabilization, channel connectivity, channel reconfiguration, deflectors/barbs, log control (weir), plant removal / control, rock control (weir), roughened channel, site maintenance, spawning gravel replacement, stream channel maintenance, woody debris placement, other instream projects.
	Riparian treatment	Fencing, vegetation planting
Degraded Habitat-Riparian Areas and Large Woody Debris Recruitment	Riparian treatment	Conservation grazing management, irrigation practice improvement, livestock exclusion, water gap development, weed control, fencing, vegetation planting
	Land acquisition	Riparian land acquisition projects – dependent on location
Degraded Habitat-Stream Substrate	Instream habitat work	Bank stabilization, spawning gravel placement
	Upland habitat treatment	No till agriculture, road drainage system improvements, road obliteration, road reconstruction, road stream crossing improvements, terracing, upland erosion control
	Water quality limitation	Treatment for turbidity
Degraded Habitat-Stream Flow	Instream flow	Instream flow projects
Degraded Habitat-Water Quality	Water quality limitation	Treatment for bacteria, dissolved oxygen, heavy metals, nutrients, pesticides, temperature, turbidity, pH
	Riparian treatment	Conservation grazing management, fencing, irrigation practice improvement, livestock exclusion, planting, water gap development
	Upland habitat treatment	No till agriculture, road drainage system improvements, road obliteration, road reconstruction, road stream crossing improvements, terracing, upland erosion control
	Instream habitat work	Bank stabilization
	Wetland work	Wetland creation, wetland improvement/enhancement, wetland invasive species removal, wetland vegetation planting
Degraded Habitat-Fish Passage	Fish passage	Fish passage projects