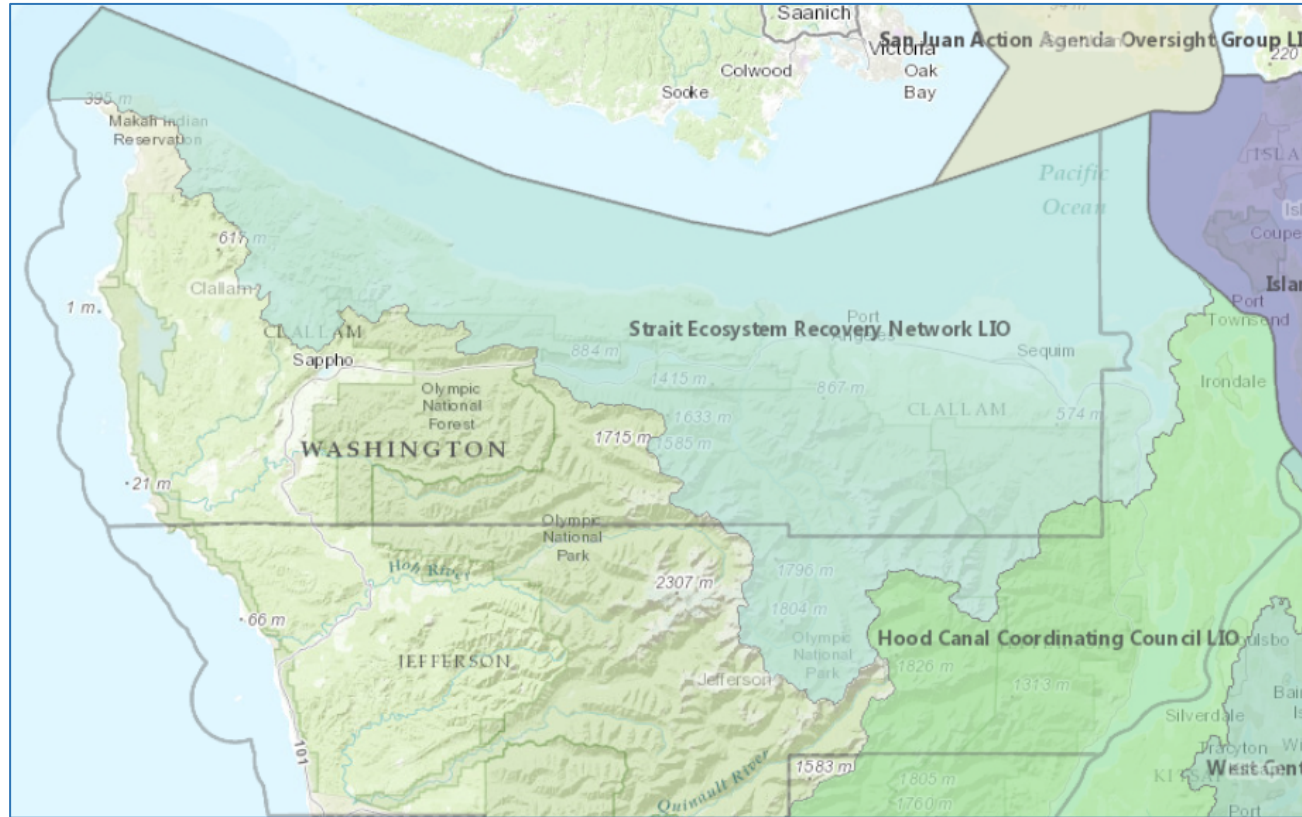


# STRAIT ECOSYSTEM PROTECTION AND RECOVERY PLAN

## STRAIT ECOSYSTEM RECOVERY NETWORK LOCAL INTEGRATING ORGANIZATION, STRAIT ACTION AREA



EFFECTIVE DATE: JUNE 30, 2017

## CREDITS AND ACKNOWLEDGEMENTS

This draft plan represents the collaborative effort of more than 30 diverse member governments and organizations of the Strait Ecosystem Recovery Network who have interest in the Strait Action Area and its adjacent geographies. Their commitment to participating in the development of this plan is testament to the inclusive and collegial working environment that the Strait Ecosystem Recovery Network embodies.

Volunteer member representatives, who participate on the Steering Group and Technical Task Force, as well as our staff, deserve special credit for their dedication, hard work, great thinking, team spirit, and long hours that made the drafting of this plan a success. Support from staff at the Puget Sound Partnership, particularly Gretchen Glaub, and her successor, Erin Ryan-Peñuela, our Ecosystem Recovery Coordinators, deserve particular mention here, without which this plan would not have been possible to accomplish.

A special acknowledgment goes out to the Jamestown S’Klallam Tribe and their staff, who have long served as our fiscal agent for capacity grants, including this one. The Strait Ecosystem Recovery Network is so very grateful for the Tribe’s continued dedication and support of our collective efforts to protect and recover this ecosystem that we all cherish.

Many thanks to you all!

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The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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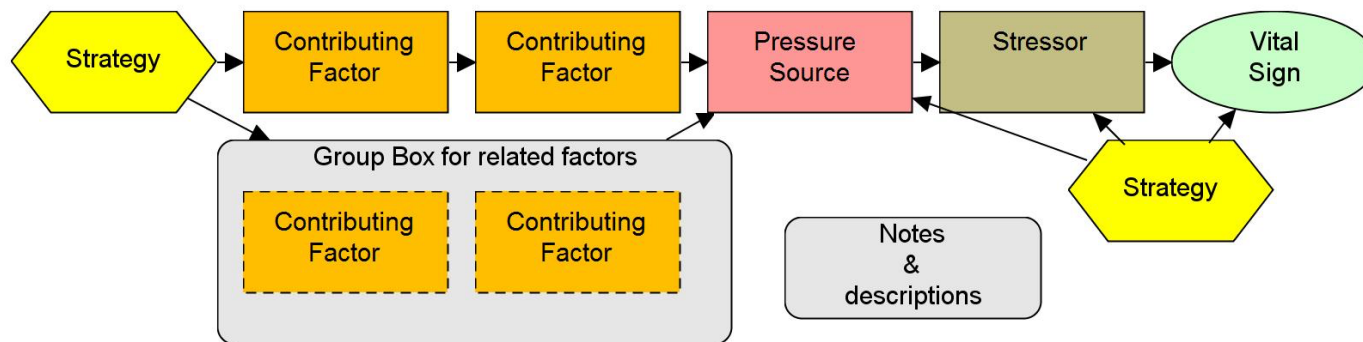
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## EXECUTIVE SUMMARY

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### BACKGROUND

Our organization, the Strait Ecosystem Recovery Network (Strait ERN), was formed in early 2009, immediately following adoption of the first Action Agenda by the Puget Sound Partnership's Leadership Council in 2008. In June 2010, the Leadership Council recognized the Strait ERN as the Local Integrating Organization (LIO) for the Strait of Juan de Fuca Action Area (Strait Action Area, see (Figure 2) on the North Olympic Peninsula.

Our geography, which is contiguous with the Strait of Juan de Fuca Action Area (see Figure 2, Strait Action Area), includes the marine waters and associated watersheds from the northwestern tip of the Olympic Peninsula (Cape Flattery) to the eastern end of the Strait of Juan de Fuca (Point Wilson at Port Townsend). It is home to the Makah, Lower Elwha Klallam, and Jamestown S'Klallam Tribes (Note: Port Gamble S'Klallam Tribe also has interest within the Strait Action Area); Clallam and Jefferson Counties; the Cities of Port Townsend, Port Angeles, and Sequim; the Dungeness National Wildlife Refuge; much of Olympic National Park and Olympic National Forest; and numerous state, Tribal, county, and city parks and recreation areas.

By design, we are an informal, inclusive, and diverse organization that operates in a collaborative and collegial working environment. Our full membership is the decision-making body (see Figure 1) and is composed of over 30 governments and organizations with interest in the Strait Action Area. Member representatives from these governments and organizations include senior Tribal, local, and regional professionals, with decades of collective technical and policy experience and knowledge working and living on the North Olympic Peninsula.

Our work is supported by a number of sub-groups and individuals. It's guided by a 7-member Steering Group (see Figure 1), which was specifically designed to mimic the diversity of our full membership. To be consistent at the local and regional levels, the Steering Group, as well as our full membership, is co-chaired by the Representative and their Alternate to the Puget Sound Partnership's Ecosystem Coordination Board for the Strait Action Area (see Table 1). When necessary, the Steering Group seeks delegation authority for decision-making from the full membership at our quarterly meetings. As needed, we form task force groups, such as our current Technical Task Force (see Figure 1), that are made up of volunteers from member organizations. These task force groups focus on planning, technical support, and implementing local strategies and actions. We are staffed by a Coordinator (see Figure 1) and supported, when necessary and fiscally possible, by other staff members. The Puget Sound Partnership's Ecosystem Recovery Coordinator (see Figure 1) is integral to our structure and also provides support where needed.

Our vision for the Strait Action Area is "a healthy and resilient ecosystem that sustains all life and human wellbeing on the North Olympic Peninsula and Strait of Juan de Fuca". To accomplish that vision, we have and will continue to work collaboratively to:

- Improve and sustain our shared ecosystem, upon which all life depends, and to
- Protect and recover its community, cultural, economic, and natural resources.

The first action identified and later supported by the Strait ERN LIO was an outreach tool, in the form of a video that explains the importance of protecting and recovering the Strait Action Area to its residents, visitors, and the larger Puget Sound region. Here we direct the reader to the 20-minute video titled "Voices of the Strait", now with a postscript from Bill Ruckelshaus, the first Chair of the Puget Sound Partnership's Leadership



Council, among so many other notable accomplishments: <https://vimeo.com/20621992>. This video also arguable exemplifies, in part, how to achieve our Vision for the Strait Action Area.

## STRAIT ECOSYSTEM PROTECTION AND RECOVERY PLAN STATUS

The key goals of Puget Sound Partnership’s long-term planning for ecosystem recovery within the Puget Sound region are to:

- Ensure that funding is targeted at the highest priority local actions
- Coordinate recovery actions across local areas and the region
- To advance these goals, the U.S. Environmental Protection Agency (EPA) EPA supported the Puget Sound region’s Local Integrating Organizations (LIO), including the Strait ERN LIO, to develop 5-year ecosystem recovery plans and associated 2-year implementation plans. This focused, strategic recovery planning will achieve the following:
- Provide a roadmap for local ecosystem strategic efforts that focuses recovery planning and actions on the highest priority recovery needs
- Build on and work in coordination with existing related recovery efforts (salmon recovery planning, for example)
- Ensure consistency (in terminology, structure, and content) of local plans with the Puget Sound Action Agenda so that LIO priorities inform regional decision making and sequencing of recovery actions
- Result from a rigorous, defensible process that will identify the highest priority recovery strategies in each LIO area, thus helping to direct limited funding to where it will be most effective
- Serve as a longer-term, durable strategic framework from which local Near Term Actions (NTAs) to be included in the Puget Sound Action Agenda can be developed
- Provide accounting of existing work underway to improve the health of the LIO area and identify gaps where work is needed

In support of these goals, we worked collaboratively to create this Ecosystem Protection and Recovery Plan to both help us achieve our Vision for the Strait Action Area and to contribute to the overall recovery of the Puget Sound region. What follows is a brief description of the planning process tasks that our Technical Task Force, Steering Group, full membership, and staff completed to create this Plan and a summary of the major outcomes from that work.

## PLANNING PROCESS TASKS AND MAJOR OUTCOMES

The process to create this Strait Ecosystem Protection and Recovery Plan and the major outcomes from each task included the following:

- A. Identifying and prioritizing Ecosystem and Human Wellbeing Components, Priority Vital Signs, and Goals (see Plan section 2.0 for details)
- Human Wellbeing Components are those human aspects of the natural environment that we would like to protect and improve. Ecosystem Components are things, beyond human wellbeing, that we care about protecting and recovering. Each of our Components is

paired with one or more Vital Signs that are utilized throughout the Puget Sound region. Vital Signs will be used to track and report on the status of the ecosystem and progress toward establishing a healthy Strait Action Area. Each Vital Sign, in turn, includes one or more indicators (i.e., metrics) of the health of the Strait Action Area. We chose to prioritize our Components (and paired Vital Signs), using a tiered approach that relies on the concept that benefits from actions focused on Tier A Components will ultimately “cascade down” to those within lower tiers (i.e., Tier B, C, and D). Our Components are not prioritized within each tier. Each of our Priority (Tier A) Vital Signs includes a set of short and long-term Goal Statements (see Table 3 and Appendix E), many of which are quantitative, that both represent what we would like to achieve for the benefit of the Strait Action Area and to contribute to the Puget Sound regions recovery Targets for each of our Priority Vital Signs.

Our seven Tier A Components (and paired Priority Vital Signs) include, in alphabetical order:

- Drift Cells (Shoreline Armoring);
- Estuaries and Embayments (Estuaries);
- Floodplains (Floodplains);
- Freshwater Quantity (Summer Stream Flow);
- Salmonids (Chinook);
- Shellfish and Finfish Harvest (Shellfish Beds; Chinook); and
- Vegetated Land Cover (Land Development and Cover).

B. Identifying and prioritizing Key Ecosystem Pressures (see Plan section 3.0 for details) – Key Ecosystem Pressures are the human actions or natural processes that give rise to stress on the ecosystem within the Strait Action Area, but also may provide benefits to humans. Key Ecosystem Pressures, that affect each of our Components and Vital Signs, include both Sources (i.e., human activities or natural processes) and associated Stressors (i.e., ecological effects of the Sources or the proximate causes of change in the ecosystem). We prioritized the Pressure Sources into categories, namely “Very High”, “High”, “Medium”, “Low”, and those that were not relevant to the Strait Action Area. Stressors were prioritized as “High”, “Medium”, “Low”, or of longer-term concern for each Source (see Table 4 and Appendix B for a complete list of Pressure Sources and Stressors).

Our “Very High” Pressure Sources include, in alphabetical order:

- Abstraction of surface water
- Airborne Pollutants ("Greenhouse Gases" related to Climate Change; includes other pollutants)
- Commercial & Industrial Areas (Including Ports)
- Domestic and Commercial Wastewater to Onsite Sewage Systems (OSS)
- Fishing & Harvesting Aquatic Resources
- Freshwater Levees, Floodgates, Tidegates
- Housing & Urban Areas
- Marine and Freshwater Finfish Aquaculture

- Marine Levees, Floodgates, Tidegates
- Marine shoreline infrastructure
- Oil Spills
- Roads & Railroad Grades (Including Culverts)
- Runoff from residential and commercial lands
- Shipping Lanes

C. Describing the current Ecosystem Recovery Context (see Plan section 4.0 for details) – To describe the current Ecosystem Recovery Context for the Strait Action Area, we developed nine Conceptual Models (see Appendix C), sometimes referred to as “situation analyses”. Conceptual Models help build a common understanding of the context within which we currently operate, including the ecological, social, economic, cultural, political and institutional systems that affect the various Components we care about. These models include multiple types of factors, called Contributing Factors that lead to the creation of Pressures on our Ecosystem and Human Wellbeing Components.

Our nine Conceptual Models include, in alphabetical order:

- Abstraction of surface water
- Commercial and industrial areas
- Freshwater levees, floodgates, and tidegates
- Housing and urban areas
- Marine levees, floodgates, and tidegates
- Marine shoreline infrastructure
- Oil spills and shipping lanes
- Onsite sewage systems
- Runoff from residential and commercial lands

As described below, the primary utility of our Conceptual Models within our planning process was as an aid in developing our initial working Results Chains.

D. Identifying Local Strategies and Actions (see Plan section 5.0) – To achieve our Goal Statements, we developed 13 Local Strategies (see Table 6). These Local Strategies, while not prioritized, are intended to mitigate Pressures or their underlying conditions and Contributing Factors, protect and recover ecosystems or species populations, or provide capacity to achieve our Goal Statements. They were developed for a long-term time horizon, such as 5-50 years, with associated Actions addressing nearer-term (< 5-year) objectives. Our local Actions (capital and non-capital projects, programs, etc.) are designed to achieve specific intermediate outcomes, objectives, and ultimately our Goal Statements. Each of our 13 Local Strategies is represented as an individual Results Chain (often referred to as a “theory of change” or sometimes “logic model”) that includes a variety of Approaches (sometimes referred to as “pathways” to achieve results) and a bundle of Actions. They comprise cause and effect mechanisms from our Actions that lead to intermediate results. Results Chains also illustrate the

relationship between intermediate results and the reduction of Pressures on our Ecosystem and Human Wellbeing Components and improvements in our Priority Vital Signs.

The mostly iterative work to identify and fully develop our Local Strategies, as represented within the respective Results Chains and associated Approaches (see Appendix D) and Actions, included the following sub-tasks:

- a. Conceptual Model Conversion – Conversion of Contributing Factors from the Conceptual Models into positive intermediate result statements and then connecting them by thinking in a logical fashion using a cause and effect (or “if-then”) context to create a set of initial working Results Chains;
- b. Salmon Recovery Adaptive Management Integration – Integration of simplified versions of the Phase 1, Elwha and Dungeness Chinook Monitoring and Adaptive Management information, where appropriate;
- c. Climate Change Adaptive Mechanism Integration – Integration of “Immediate” and “Intermediate” timeframe adaptive management strategies from our comprehensive “Climate Change Preparedness Plan for the North Olympic Peninsula”, a plan that was funded using National Estuary Program dollars. (Later, we added mitigation information.);
- d. Integrating Oil Spill Workshop Results – Integration of the outcomes from a joint workshop, that included representatives from four other LIOs (i.e., San Juan, Strait, Island, and Whatcom LIOs) who are also concerned about the effects of Oil Spill and Shipping Lane Pressure Sources on our respective geographies. Subsequently, we included most of the top Risk Mitigation Measures that resulted from the 2016 Salish Sea Oil Spill Risk Mitigation Workshop sponsored by the Washington State Department of Ecology.
- e. Mapping Actions – “Mapping” (i.e., placed) each of our 2016-2017 actions, both Near Term Actions (NTA) and salmon recovery actions, to the most appropriate of our 13 Local Strategy-driven Results Chain;
- f. Recognizing Local Strategies Working in Concert – Recognition that a single Local Strategy often times cannot achieve the desired results on its’ own. To that end, each of our Results Chains includes reference to other Local Strategies that work in concert with the one in question to achieve the desired results; and
- g. Results Chain Technical and Policy Review and Modification – Review and modification, where needed, of the technical and policy aspects of our fully drafted Results Chains for each of our 13 Local Strategies.

Our 13 Local Strategies as represented within our Results Chains, listed here by Strait ID#, include:

- STRAIT A. Drift Cell and Shoreline Conservation and Restoration;
- STRAIT B. Estuary Conservation and Restoration (rivers, streams, pocket estuaries);
- STRAIT C. Floodplain Conservation and Restoration;
- STRAIT C. Floodplain Conservation and Restoration;
- STRAIT D. Improve Riparian Corridor Management and Instream Habitat;

- STRAIT E. Eliminate Fish Passage Barriers and Excess Sediment;
- STRAIT F. Enhance Native Fish and Shellfish Populations;
- STRAIT G. Implement Local Water Resource Management Programs and Rules;
- STRAIT H. Enhance Ongoing Implementation of Local Shoreline and Land Use Management Protection, and Incentive Programs and Plans;
- STRAIT I. Implement Climate Change Adaption and Mitigation Strategies for the North Olympic Peninsula;
- STRAIT J. Implement Local Stormwater Management and Pollutant Source Control Programs using a Watershed Management Approach;
- STRAIT K. Enhance Ongoing Implementation of Water Quality Clean Up Plans (Sequim-Dungeness and Eastern Jefferson Clean Water Districts);
- STRAIT L. Enhance and Support Improvements to Regional, Tribal, and Local Oil Spill Preparedness, Prevention, and Response; and
- STRAIT M. Enhance Local Communication, Education, Behavior Change, and Public Involvement Programs.

E. Compiling Gaps, Barriers, and Needs (see Plan section 6.0) – Throughout the development of our Conceptual Models and Local Strategies / Results Chains, we compiled a comprehensive list (see Table 7) of various Data Gaps (e.g., assessments, etc.) and Barriers (e.g., policy, regulatory, enforcement, monitoring, reliable funding for local actions, and staff capacity) that may inhibit our ability to achieve results. What’s needed to eliminate these Gaps and Barriers was also identified. Most of these Data Gaps and Barriers are specific to a particular Local Strategy and respective Results Chain, whereas some are universal across all.

In summary, our comprehensive list of Gaps, Barriers, and Needs that are also illustrated on the Results Chains, includes:

- 45 Local Strategy-specific Data Gaps;
- 57 Local Strategy-specific Barriers; and
- 3 Barriers that are universal to all of our 13 Local Strategies, namely:
  - Reliable and sufficient funding for local Actions; and
  - Funding for sufficient staff capacity to both implement local Actions; and
  - Funding for sufficient staff capacity to coordinate ongoing local processes.

F. Draft Plan Review and Vetting – Our membership reviewed the major outcomes from our work to develop the draft Strait Ecosystem Protection and Recovery Plan at their September 16, 2016 Summer Quarterly Meeting. Feedback from that meeting, in the form of edits, was subsequently incorporated into our draft Plan for later submission to the Puget Sound Partnership and local vetting. Two of the major outcomes (i.e., Goal Statements; and Gaps, Barriers, and Needs) from the draft Strait Ecosystem Protection and Recovery Plan were then vetted (i.e., discussed) with and feedback requested from the following local groups:

- Clallam County Marine Resources Committee
- Chumsortium (a salmon recovery technical organization with connections to the Hood Canal Coordinating Council Lead Entity for Salmon Recovery)

- Dungeness River Management Team
- Jefferson County Marine Resources Committee
- North Olympic Lead Entity for Salmon Recovery, Technical Review Group
- Local 20 /20
- Olympic Climate Action

G. Final Plan Review and Approval – In early 2017, our Technical Task Force considered this feedback, and some staff suggested changes, when advising the Steering Group on modifications to the draft Plan. The Steering Group then considered the advise from the Technical Task Force as they worked to develop recommendations to modify the Plan for full membership review. At their May 12, 2017 Spring Quarterly Meeting, the membership considered the Steering Group’s recommendations, made modifications where needed, and then unanimously approved this final version of the Strait Ecosystem Protection and Recovery Plan.

## NEXT STEPS

Adaptive management (see Plan section 7.0) of this Strait Ecosystem Protection and Recovery Plan and comprehensive monitoring of the results of our implemented Actions will need to follow, provided sufficient funding is made available over the short and long-term. As a part of the adaptive management process, this Plan should help inform Phase 2 of the Chinook Monitoring and Adaptive Management Plan efforts for the Elwha and Dungeness watersheds in the future.

The most important next step however, is to work with federal and state government, their respective agencies, other regional organizations, and private entities to fund ecosystem protection and recovery actions across the Puget Sound basin, using what the Puget Sound Partnership refers to as a “marketplace” approach. This next step is vital to ensuring that this Plan, and those from other Local Integrating Organizations, are fully utilized when making funding decisions. Work to ensure that this occurs must include, but not be limited to, the organizations that administer EPAs National Estuary Program funding. Reliable funding for local actions that will contribute to the protection and recovery of the Puget Sound basin, over the coming months and years, will be the key to this Plan’s longevity and usefulness as we work collaboratively to achieve results.

## LESSONS LEARNED

The primary lesson learned from this effort was that creation of a Plan that includes a broad geographic scale, wide topical complexity, and diverse organizational interests and involvement was, and will likely continue to be, an iterative, not a linear, process.

## PARTICIPANTS

### PROJECT TEAM

Table 1 lists the project team members who took the lead in developing the products summarized in this LIO Ecosystem Recovery Plan.

Table 1 Project Team

GIVEN NAME	SURNAME	ORGANIZATION	POSITION	ROLE(S)
Harry	Bell	Washington Society of American Foresters, North Olympic Chapter	Chair	Steering Group Member (also see below)
Scott	Chitwood	Jamestown S'Klallam Tribe, Natural Resources Department	Director	Steering Group Member & Strait ERN Fiscal Agent
Brad	Collins	City of Port Angeles, City Council	Councilman	Steering Group Member
Phil	Johnson	Jefferson County, Board of County Commissioners	Commissioner & Ecosystem Coordination Board Designee	Co-Chair, Steering Group & Strait ERN
Jenny	Koth	Green Crow Corporation	Director of Environmental Affairs	Steering Group Member - Alternate
Cathy	Lear	Clallam County, Department of Community Development	Habitat Biologist	Steering Group Member
Darlene	Schanfald	Olympic Environmental Council	Member representative	Steering Group Member
Steve	Tharinger	Washington State Legislature	23th Legislative District Representative & Ecosystem Coordination Board Representative	Co-Chair, Steering Group & Strait ERN
Nathan	West	City of Port Angeles, Department of Economic and Community Development	Director	Steering Group Member - Alternate
Helle	Andersen	Strait ECO Net	Coordinator	Technical Task Force Member
Harry	Bell	Washington Society of American Foresters, North Olympic Chapter	Chair	Technical Task Force Member
Carol	Creasey	Clallam County, Environmental Health Services	County Hydrogeologist and Surface Water Specialist	Technical Task Force Member

GIVEN NAME	SURNAME	ORGANIZATION	POSITION	ROLE(S)
Neil	Harrington	Jamestown S'Klallam Tribe, Natural Resources Department	Environmental Biologist	Technical Task Force Member
Joe	Holtrop	Clallam Conservation District	Executive Director	Technical Task Force Member
Thom	Johnson	Point-No-Point Treaty Council	Environmental Program Manager	Technical Task Force Member
Paul	McCollum	Port Gamble S'Klallam Tribe	Natural Resource Director	Technical Task Force Member
Jacob	Melly	Clallam Count Environmental Health and Human Services	Water Quality Specialist	Technical Task Force Member
Ian	Miller	Washington State Sea Grant	Coastal Hazards Specialist	Technical Task Force Member
Kathryn	Neal	City of Port Angeles Public Works	City Engineer	Technical Task Force Member
Sam	Phillips	Port Gamble S'Klallam Tribe	Natural Resource Director	Technical Task Force Member (alternate)
Bob	Simmons	Washington State University Extension	Associate Professor Water Resources	Technical Task Force Member
Jeff	Ward	Clallam County Marine Resources Committee	Chair	Technical Task Force Member
Malloree	Weinheimer	Jefferson LandWorks Collaborative	Coordinator	Technical Task Force Member
Nathan	West	City of Port Angeles Economic and Community Development	Director	Technical Task Force Member
Dave	Wilkinson	Retired	Retiree	Technical Task Force Member
John	Cambalik	Strait Ecosystem Recovery Network (Strait and Sound Environmental, Inc.)	Coordinator	Lead Staff Member
Gretchen	Glaub	Puget Sound Partnership	Ecosystem Recovery Coordinator	Strait ERN Support Staff
Kara	Nelson	Kara Nelson Consulting	Conservation Planner and Scientist	Staff Member (Planning and Miradi Support)
Erin	Ryan-Peñuela	Puget Sound Partnership	Ecosystem Recovery Coordinator	Strait ERN Support Staff
Shannon	Weaver	Western Washington University	Student	Staff Member (Administrative Support)



GIVEN NAME	SURNAME	ORGANIZATION	POSITION	ROLE(S)
Dave	Shreffler	Shreffler Environmental	Restoration Ecologist	Staff Member (Technical Support)

## PARTNERS AND STAKEHOLDERS

Appendix A includes a list of the member organizations, external to the project team, who were involved in the development of this draft plan.

## ECOSYSTEM PROTECTION AND RECOVERY PLAN REVIEW AND APPROVAL STATUS

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### LIO PLAN DEVELOPMENT AND DECISION MAKING PROCESS

Over the past 2 years, the Strait Ecosystem Recovery Network has worked collaboratively, with its member organizations, to develop this Ecosystem Protection and Recovery Plan. Throughout the planning process our staff and Technical Task Force have provided timely drafts of the major outcomes of this Plan to our Steering Group. In turn, our Steering Group considered these drafts, modified where necessary, and submitted them as recommendations for our full membership to consider, modify, and approve at their quarterly meetings.

When developing the major outcomes for this Plan, our staff, Technical Task Force, and Steering Group, who collectively are diverse in their knowledge and expertise, used information from a variety of sources and documents (listed within the Reference section below) and their professional judgment and extensive knowledge of the Strait Action Area.

### DRAFT PLAN REVIEW AND VETTING

Our membership reviewed the major outcomes from our work to develop the draft *Strait Ecosystem Protection and Recovery Plan* at their September 16, 2016 Summer Quarterly Meeting. Feedback from that meeting, in the form of edits, was subsequently incorporated into our draft Plan for later submission to the Puget Sound Partnership and local vetting. Two of the major outcomes (*i.e.*, Goal Statements; and Gaps, Barriers, and Needs) from the draft *Strait Ecosystem Protection and Recovery Plan* were then vetted (*i.e.*, discussed) with and feedback requested from the following local groups:

- Clallam County Marine Resources Committee
- Chumsortium (a salmon recovery technical organization with connections to the Hood Canal Coordinating Council Lead Entity for Salmon Recovery)
- Dungeness River Management Team
- Jefferson County Marine Resources Committee
- North Olympic Lead Entity for Salmon Recovery, Technical Review Group
- Local 20 /20
- Olympic Climate Action

### FINAL PLAN REVIEW AND APPROVAL

In early 2017, our Technical Task Force considered this feedback, and some staff suggested changes, when advising the Steering Group on modifications to the draft Plan. The Steering Group then considered the advise from the Technical Task Force as they worked to develop recommendations to modify the Plan for full membership review. At their May 12, 2017 Spring Quarterly Meeting, the membership considered the

Steering Group’s recommendations, made modifications where needed, and then unanimously approved this final version of the *Strait Ecosystem Protection and Recovery Plan*.

**Ecosystem Protection and Recovery Plan Review and Approval**

REVIEWER/APPROVER	REVIEWED	DATE	APPROVED	DATE
Strait Ecosystem Recovery Network LIO Technical Task Force	<input checked="" type="checkbox"/>	08/30/2016; 04/19/2017	N/A	N/A
Strait Ecosystem Recovery Network LIO Steering Group	<input checked="" type="checkbox"/>	08/30/2016; 04/26/2017	N/A	N/A
Strait Ecosystem Recovery Network LIO (membership)		09/16/2016; 05/12/2017	Approved substantive changes	05/12/2017

## 1.0 STRAIT ECOSYSTEM RECOVERY NETWORK OVERVIEW

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### HISTORY, OVERVIEW, AND STRUCTURE

The Strait Ecosystem Recovery Network (Strait ERN) was formed in early 2009, immediately following adoption of the first Action Agenda by the Puget Sound Partnership's Leadership Council in 2008. Our first official quarterly meeting of the full membership was held in September 2009. In June 2010, the Leadership Council recognized the Strait ERN as the Local Integrating Organization (LIO) for the Strait of Juan de Fuca Action Area (Figure 2) on the North Olympic Peninsula.

By design, the Strait ERN LIO is an informal, inclusive, and diverse organization that operates in a collaborative and collegial working environment. Our full membership is the decision-making body (Figure 1) and is composed of over 30 governments and organizations with interest in the Strait Action Area. Member representatives from these governments and organizations include senior Tribal, local, and regional professionals, with decades of collective technical and policy experience and knowledge working and living on the North Olympic Peninsula.

The Strait ERN LIO is guided by a Steering Group (Figure 1), which consists of seven member representatives who usually meet quarterly, which was specifically designed to mimic the diversity of our full membership. To be consistent at the local and regional levels, the Steering Group, as well as our full membership, is co-chaired by the Representative and their Alternate to the Puget Sound Partnership's Ecosystem Coordination Board for the Strait Action Area (Table 1). A member representative from our fiscal agent, who manages our local capacity contracts, also serves on the Steering Group. The balance of our Steering Group is made up of volunteers from our full membership. When necessary, the Steering Group will seek delegation authority for decision-making from the full membership at our quarterly meetings.

As needed, the Strait ERN LIO forms task force groups, such as our current Technical Task Force (Figure 1), that are made up of volunteers from member organizations. These task force groups focus on planning, technical support, and implementing local strategies and actions.

The Strait ERN LIO is staffed by a Coordinator (Figure 1) and supported, when necessary and fiscally possible, by other staff members. The Puget Sound Partnership's Ecosystem Recovery Coordinator (Figure 1) is integral to our structure and also provides support where needed.

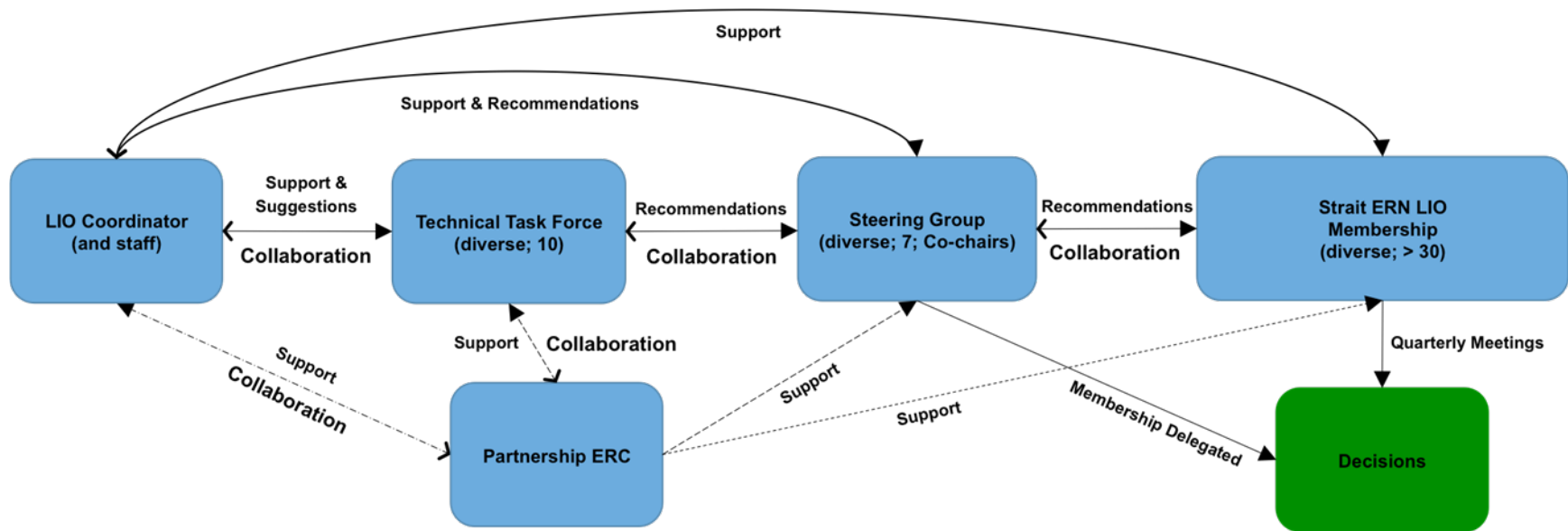


Figure 1 Strait ERN LIO operating Structure

## VISION AND MISSION

### Vision

We envision a healthy and resilient ecosystem that sustains all life and human wellbeing on the North Olympic Peninsula and Strait of Juan de Fuca

### Mission

We will work collaboratively to:

- Improve and sustain our shared ecosystem, upon which all life depends, and to
- Protect and recover its community, cultural, economic, and natural resources.

The first action identified and later supported by the Strait ERN LIO was an outreach tool, in the form of a video that explains the importance of protecting and recovering the Strait Action Area to its residents, visitors, and the larger Puget Sound region. Here we direct the reader to the 20-minute video titled “Voices of the Strait”, now with a postscript from Bill Ruckelshaus, the first Chair of the Puget Sound Partnership’s Leadership Council, among so many other notable accomplishments: <https://vimeo.com/20621992>. This video also arguable exemplifies, in part, the continuing need to coordinate and collaborate when working to achieve our Vision for the Strait Action Area.

## GEOGRAPHIC AND CULTURAL CONTEXT

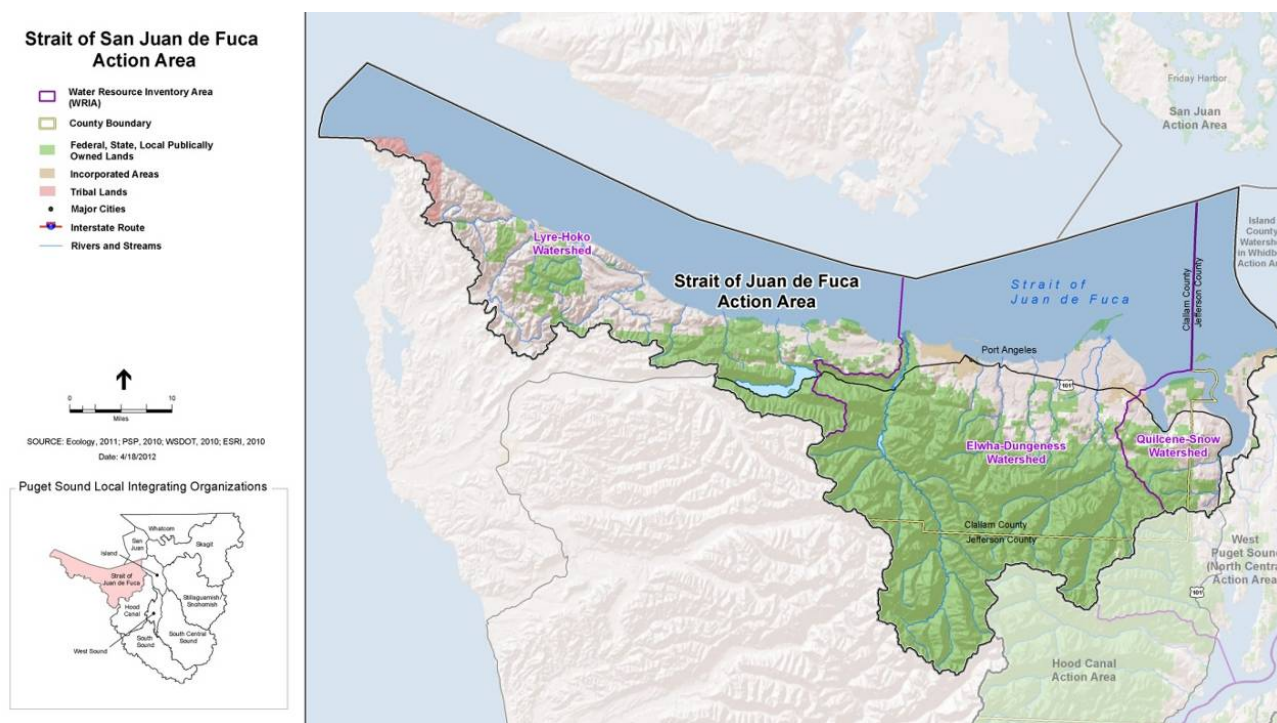
### PHYSICAL DESCRIPTION

The Strait ERN LIO geography, which is contiguous with the Strait of Juan de Fuca Action Area (Figure 2, Strait Action Area), includes the marine waters and associated watersheds from the northwestern tip of the Olympic Peninsula (Cape Flattery) to the eastern end of the Strait of Juan de Fuca (Point Wilson at Port Townsend). It is home to the Makah, Lower Elwha Klallam, and Jamestown S’Klallam Tribes (Note: Port Gamble S’Klallam Tribe also has interest within the Strait Action Area); Clallam and Jefferson Counties; the Cities of Port Townsend, Port Angeles, and Sequim; the Dungeness National Wildlife Refuge; much of Olympic National Park and Olympic National Forest; and numerous state, Tribal, county, and city parks and recreation areas.

The Strait of Juan de Fuca links the inner Puget Sound to the Pacific Ocean. It provides an essential pathway for exchange of incoming cold, dense saltwater and freshwater runoff from Puget Sound and Georgia Basin rivers. This exchange is assisted by strong ocean currents in the western end of the strait and intense tidal action in the eastern end.

The Strait Action Area includes a rugged and diverse marine shoreline of 217 linear miles that includes the Dungeness National Wildlife Refuge. The uplands and lower watersheds are either forested, used for agriculture, or are developed for housing and commercial purposes. Most of the upper watersheds are in federal, state, or private ownership including Olympic National Park, Olympic National Forest, Washington State lands (e.g., WDNR, WDFW, etc.), and commercial timberlands.

Figure 3. Strait Action Area



## BIOLOGICAL DESCRIPTION

The Strait of Juan de Fuca is the migration corridor between Puget Sound and the Pacific Ocean for many species of fish, marine mammals, birds, and humans. The marine shoreline and nearshore contain the majority of Washington’s coastal kelp resources. The Strait Action Area geography has 95 linear miles of floating kelp, 161 linear miles of non-floating kelp, and 75 linear miles of eelgrass. The kelp forests and eelgrass meadows provide food and cover for outbound and returning runs of salmonids from all over Puget Sound, as well as birds, marine mammals, and the prey species they depend on. The connectivity of kelp and eelgrass habitat in the Strait Action Area geography is essential to the function of the Puget Sound ecosystem. Sheltered bays (e.g., Discovery Bay, Sequim Bay, Dungeness Bay, and Port Angeles Harbor), bluffs and beaches, and two major river mouth (Dungeness and Elwha Rivers) and 22 “pocket” estuaries, the latter of which are mostly at the terminus of creeks entering the Strait of Juan de Fuca, also provide critically important habitat and/or a migratory corridor for salmonids, forage fish, and shellfish.

Unique populations of raptors, marine birds, Roosevelt elk, black-tailed deer, marmots, and other mammals, as well as anadromous and resident fish, are found throughout the Strait Action Area geography. Notable bird species include the federally protected northern spotted owl and marbled murrelet. Olympic National Park recently reintroduced the fisher, a larger relative of the weasel, which has been locally extinct for decades. The population of sea otters that migrates between the outer coast and the Strait of Juan de Fuca has increased from the initial 59 animals reintroduced in 1969–1970 to 800 animals, but is still small enough to be highly vulnerable to a catastrophic event such as an oil spill. Protection Island, part of the Dungeness National Wildlife Refuge, is a critically important marine bird rookery for Puget Sound. This island and other portions of the Strait Action Area geography are important haul-out areas for seals and sea lions.

The Elwha-Dungeness Watershed Plan (2005) contains a summary of the special and unique qualities of the Dungeness River basin, originally excerpted from the Dungeness River Area Watershed Management Plan (DWMC and CCDCD 1993):

The Dungeness River area watershed is unique. Located in the rain shadow of the Olympic Peninsula, it is the only coastal watershed in the Northwest where an irrigation system is necessary for agricultural crops. The irrigation system, the river and many small streams interact with a groundwater system that supplies domestic water for residences and the City of Sequim. The river supports native runs of...salmon and trout. Salmon runs in the Dungeness have declined markedly...and some are threatened. Numerous wetlands in the watershed provide habitat for a range of resident and migratory waterfowl. Low yearly rainfall in the area has given rise to unique plant communities and the watershed is a popular retirement and recreation area.

*For the Elwha River, the Elwha-Dungeness Watershed Plan (2005) also offers a brief excerpted description of the river basin:*

*The Elwha River is the largest watershed in our area... The Elwha mainstem is approximately 45 miles long, has 100 miles of tributary streams, has a basin averaging approximately ten miles wide in an east-west direction, and drains 321 square miles of the Olympic Peninsula. Eighty-three percent of the drainage, including the upper 35 miles of the mainstem, lies within Olympic National Park, and is therefore protected from timber harvest, agriculture, and other land-use disturbances. The river flows in a northerly direction into the Strait of Juan de Fuca, entering the strait five miles west of Port Angeles. In 2014, the multi-year process to remove the Elwha and Glines Canyon Dams on the Elwha River was completed. The river now flows freely, from its headwaters in the Olympic Mountains to the Strait of Juan de Fuca, for the first time in 100 years. As the largest dam removal project in U.S. history, it has reopened more than 70 miles of mostly pristine spawning and rearing habitat within the Elwha River watershed. While other necessary and important restoration and conservation work continues on the Elwha, post dam removal, salmon populations are ultimately predicted to swell from 3,000 to nearly 400,000 as all five species of Pacific salmon return to one of the Pacific Northwest's historically most productive salmon watershed. The Elwha is the largest watershed in Olympic National Park, and the return of salmon to this ecosystem will provide marine-derived nutrients to the watershed, restoring a vital food source for the range of life that inhabits it.*



## CULTURAL CONTEXT

Here we direct the reader to the following websites to start to explore the cultural context of the communities in our area:

### Tribes:

Jamestown S'Klallam Tribe [http://www.jamestowntribe.org/history/hist\\_jst.htm](http://www.jamestowntribe.org/history/hist_jst.htm)

Lower Elwha Klallam Tribe <http://www.elwha.org/cultureandhistory.html>

Makah Tribe <http://makah.com/makah-tribal-info/tribe/>

Port Gamble S'Klallam Tribe <https://www.pgst.nsn.us/land-and-people-and-lifestyle>

### Counties:

Clallam County <http://www.clallam.net/features/visitor.html>

Jefferson County <http://www.co.jefferson.wa.us/commdevelopment/vision.htm>

### Cities:

Port Angeles <http://wa-portangeles.civicplus.com/399/History>

Port Townsend <http://www.cityofpt.us/index.htm>

## SOCIO-ECONOMIC DESCRIPTION

More than three-quarters of the private land west of the Elwha watershed is zoned for commercial forest, and some areas in the western portion of the Strait Action Area geography are in their third rotation for timber harvest. Timber harvest remains an important economic sector, providing logs for domestic and export uses and raw materials for active paper mills in Port Angeles Harbor and adjacent geographies. Agriculture also is part of the rural landscape within the Strait Action Area geography, with approximately 5,000 acres of irrigated farmland in the dry Sequim-Dungeness Valley. Smaller-scale agriculture occurs in other scattered areas, particularly the Salt Creek area west of Port Angeles and in the Discovery Bay watershed.

Many other economic activities in the area also depend directly on the Strait of Juan de Fuca and Puget Sound, both as a transportation corridor and for the value that ecosystems provide, including ship building/repair; marinas; shellfish culture and harvest; Tribal, commercial, and recreational fishing; and tourism. A large retirement population, drawn by the relatively dry climate, scenic environment, and other community features, has shifted the economy in the eastern portion of the Strait Action Area geography toward more service-based activities. Commercial and residential development associated with these activities, both within the uplands and along marine and freshwater shorelines, is more common here. Most of that development is within and around the urban and urbanizing areas of Port Angeles, Sequim, and Port Townsend, where human-induced pressures on the ecosystem are prevalent. Marine transportation is hugely reliant on the Strait of Juan de Fuca, as almost all the vessels entering or leaving the seaports of Puget Sound and the Georgia Basin pass through it.

## HUMAN POPULATION

As adapted, nearly verbatim, from the Climate Change Preparedness Plan for the North Olympic Peninsula (2005) the:

*North Olympic Peninsula along the Strait of Juan de Fuca is home to four Tribes, two counties, three population hubs, and numerous unincorporated areas. The three major centers of commerce from west to east in the region are Port Angeles (pop. 19,038), Sequim (pop. 6,606), and Port Townsend (pop. 9,113). However, these numbers do not reflect the full distribution of population in the rural and unincorporated areas around each of these hubs. Clallam County's population in 2014 was estimated at 72,715 persons, and Jefferson County's estimated at 30,228 persons.*

## 2.0 ECOSYSTEM AND HUMAN WELLBEING COMPONENTS, PRIORITY VITAL SIGNS, AND GOALS

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Components are the focus of the recovery effort. Each LIO identified the priority Vital Signs, human wellbeing components, and ecosystem components for their LIO area. The strategies and actions comprising the recovery plan are designed to improve or protect the health of components either through restoration strategies or protection or mitigation strategies that reduce pressures on the ecosystem. LIO-specific goals were identified for components and, where possible and appropriate, LIOs identified the contribution toward the regional recovery targets.

For a glossary of the terms used throughout this plan, the glossary at the beginning of this document.

### SUMMARY OF COMPONENTS, VITAL SIGNS, AND GOALS

The Strait ERN LIO decided, on the recommendations of the Strait ERN LIO Steering Group and Technical Task Force and by consensus of our membership, to focus our ecosystem protection and recovery efforts on our Ecosystem and Human Wellbeing Components (Tier A Components), and seven paired Priority Vital Signs (Table 2). Benefits from our current (and likely near-future) work to implement Actions to improve these top tier Components however, such as our 2016-2017 NTAs and salmon recovery actions, will ultimately “cascade down” to those Components within lower tiers (i.e., Tier B, C, and D). Monitoring actions, that are designed to measure multiple Vital Signs may, in-turn, measure progress to improve multiple Components in various tiers.

The paired Puget Sound Vital Signs for each of our Tier A Components are included in Table 2, but with slight modifications to show how we prefer to utilize them for our work within the Strait Action Area (as indicated in regular non-bold type within the Vital Sign column). Puget Sound Vital Signs that we may consider for our Tier B Components in the future however, are noted in italic type within Table 2 and our Results Chains graphics discussed below.

Multiple Short-Term Goal Statements (i.e., 5-year, by 2017) are included in Table 2 for our Tier A Components and Priority Vital Signs. Within Table 2, those Short-Term Goal Statements noted in bold type are considered complete. Other Short-Term Goal Statements (regular type) are possible for these Components and Priority Vital Signs, but will require filling data gaps and/or additional local “groundtruthing” to complete. Long-Term Goal Statements (i.e., 20-50 years, by 2066), that are complimentary to each of our Short-Term goals, are not included within Table 2 for brevity purposes. All of our Goal Statements that relate to salmon recovery efforts were “cross-walked” with the North Olympic Peninsula Lead Entity for Salmon’s 4-Year Work Plan (2016) to ensure they are consistent. See Appendix E for a complete list of and more detail on our Short-Term and Long-Term complimentary Goal Statements for our Priority Vital Signs, unless otherwise noted. At this time, we have not considered developing Goal Statements and adopting Puget Sound Vital Signs for our Tier B, C, and D Components.

Table 2 Ecosystem components, Vital Signs and goals

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)	STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
Drift Cells (nearshore habitat and habitat forming processes) <sup>1</sup>	EC	<p>Tier A (2016-2017 Implementation Plan)</p> <ul style="list-style-type: none"> <li><b>A. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 422 linear feet of the Dungeness Drift Cell by 2021.</b></li> <li><b>B. Protect and maintain Dungeness Drift Cell function with no (zero) new shoreline modification from Lees Creek to Dungeness Spit.</b></li> <li><b>C. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 450 linear feet of Sequim Bay.</b></li> <li><b>D. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 2,900 linear feet of the Elwha Drift Cell by 2021.</b></li> <li><b>E. Port Angeles Harbor (Inside Ediz Hook to Lees Creek) - Remove 200 feet of hard armoring on the inside of Ediz Hook as part of the mitigation for the new Navy Pier.</b></li> <li>F. No short-term goal identified; see Appendix E for the complimentary long-term goal</li> <li><b>G. Protect and maintain drift cell function along the entire Strait to ensure shoreline modification does not exceed the 2013 baseline of 19% total shoreline modification (Coastal Geologic Services 3-25-16).</b></li> <li><b>H. Remove armoring, overwater structures or shoreline modifications to restore drift cell function along 200 feet of Discovery Bay.</b></li> <li>I. Data Gap: There is a pressing need to conduct a parcel-by-parcel assessment of drift cells for the entire Strait LIO. (Future NTA?)</li> </ul>	Shoreline Armoring (drift cell function)

<sup>1</sup> Component includes: bluff-backed beaches, coastal landforms, and rocky beaches.

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)		STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
Estuaries and Embayments <sup>2</sup>	EC	Tier A	To be determined	<b>Estuaries (rivers, streams, pocket estuaries)</b>
Floodplains <sup>3</sup>	EC	Tier A (2016-2017 Implementation Plan)	<p><b>A. Restore 120 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 0.0 - 3.3).</b></p> <p><b>B. Restore 50 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 3.4 - 6.5).</b></p> <p><b>C. Restore 20 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 6.5 - 8.6).</b></p> <p><b>D. Restore 30 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 8.6 -10.8).</b></p> <p><b>E. Restore 30 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 10.8 - 12.0).</b></p> <p>F. Data gap: acres of Elwha River functional floodplain that can be restored by 2021?</p> <p>G. Data gap: acres of Morse Creek functional floodplain that can be restored by 2021?</p> <p>H. Data gap: acres of Hoko River functional floodplain that can be restored by 2021?</p>	<b>Floodplains (estuarine and freshwater)</b>

<sup>2</sup> Component includes: natal Chinook estuaries, smaller stream estuaries, pocket estuaries (i.e., embayments, including coastal inlets; barrier-type; and rocky areas).

<sup>3</sup> Component includes: Large Channels (>50m bankfull width), side channels, small channels (<50m bankfull width), and floodplain water-bodies (non-channel lakes and wetlands).

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)	STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
		<ul style="list-style-type: none"> <li>I. Data gap: acres of Clallam River functional floodplain that can be restored by 2021?</li> <li>J. Data gap: Acres of Bell Creek functional floodplain that can be restored by 2021? Need to implement the Bell Creek Basin Assessment (which is contingent upon this NTA being funded) to determine acres of degraded floodplain that can be restored in the short term.</li> <li>K. Data gap: acres of Pysht River functional floodplain that can be restored by 2021?</li> <li>L. Data gap - acres of Sekiu River functional floodplain that can be restored by 2021?</li> <li>M. Data gap: acres of Bagley Creek functional floodplain that can be restored by 2021?</li> <li>N. Data gap: acres of Salt Creek functional floodplain that can be restored by 2021?</li> <li>O. Data gap: acres of Twin River functional floodplain that can be restored by 2021?</li> <li>P. Data gap: acres of Deep Creek functional floodplain that can be restored by 2021?</li> <li>Q. Data gap: acres of Lyre River functional floodplain that can be restored by 2021?</li> <li>R. Data gap: acres of McDonald Creek functional floodplain that can be restored by 2021?</li> <li><b>S. Protect through fee-simple acquisition an estimated 69.5 acres of functional floodplain (5 acres Morse Creek, 7 acres Pysht, 57.5 acres Lyre). Protect through conservation easements an estimated 34 acres of functional floodplain (11 acres Elwha, 15 acres Salt Creek, 8 acres South Bagley Creek).</b></li> </ul>	

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)	STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)		ADOPTED PRIORITY VITAL SIGN
			T. Data Gap: Need funding to locally groundtruth the PSP floodplain data and to extend the GIS floodplain analysis to Snow Creek, Salmon Creek, McDonald Creek, Siebert Creek, and other Strait LIO watersheds, which were not included in the 2016 beta (Future NTA?).	
Freshwater Quantity (surface water bodies, including rivers, streams, wetlands) <sup>4</sup>	EC	Tier A (2016-2017 Implementation Plan)	<p><b>A. During critical low-flow periods, reduce irrigation withdrawals from the Dungeness River 1 cfs annually and a total of 5 cfs by 2021.</b></p> <p><b>B. By 2021, implement shallow aquifer recharge projects designed to benefit Dungeness River and east WRIA 18 independent stream flows during critical low flow periods by infiltrating 119 acre feet of water annually.</b></p> <p>C. No short-term goal identified.  D. No short-term goal identified.  E. No short-term goal identified.  F. No short-term goal identified.  G. No short-term goal identified.</p> <p>See Appendix E for complimentary long-term goals for statements C through G.</p>	Summer Stream Flow
Salmonids (ESA and Treaty Rights Salmonid Populations) <sup>5</sup>	EC	Tier A (2016-2017 Implementation Plan)	<p><b>A. Achieve recovery goals (recolonization phase and local adaptation phase) for the Puget Sound Chinook population in the Elwha River (<a href="https://www.nps.gov/olym/learn/nature/upload/Elwha-River-Fish-Management-Plan.pdf">https://www.nps.gov/olym/learn/nature/upload/Elwha-River-Fish-Management-Plan.pdf</a>)</b></p> <p><b>B. Achieve harvest management objectives for Dungeness River Chinook as detailed in the Comprehensive Management Plan for Puget Sound Chinook</b></p>	Chinook Salmon (ESA and Treaty Rights salmonid populations)

<sup>4</sup> Component includes: large channels (>50m bankfull width), side channels, small channels (<50m bankfull width).

<sup>5</sup> Component includes: Chinook, ESA and Treaty Rights Salmonid Populations.

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)	STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
		<p>(<a href="http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/salmon_steelhead/ps-chnk-rmp.pdf">http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/salmon_steelhead/ps-chnk-rmp.pdf</a>)</p> <p>C. Achieve co-manager interim recovery goals for Salmon/Snow Creeks and Jimmycomelately Creek summer chum (<a href="http://wdfw.wa.gov/conservation/fisheries/chum/">http://wdfw.wa.gov/conservation/fisheries/chum/</a>)</p> <p>D. Stop the overall decline and start seeing improvement in natural origin coho productivity in the Strait LIO by 2021 relative to a 2016 baseline.</p> <p>E. Stop the overall decline and start seeing improvement in natural origin steelhead productivity in the Strait LIO by 2021 relative to a 2016 baseline.</p> <p>F. Stop the overall decline and start seeing improvement in natural origin pink productivity in the Dungeness by 2021 relative to a 2016 baseline.</p>	
Shellfish and Finfish Harvest <sup>6</sup>	HWB	<p>Tier A (2016-2017 Implementation Plan)</p> <p>A. Maintain existing open commercial shellfish beds and achieve a net increase of 650 acres by 2021 of commercial shellfish beds where harvest had been "conditionally approved" or "prohibited." [Note: this goal does not include the 689 acres in Dungeness Bay that were upgraded in 2015 from "conditionally approved" to "approved"]</p> <p>B. Maintain open and increase recreational shellfish beds and work with DOH and WDFW to increase beach access and recreational shellfish harvest opportunities in the Strait LIO by 2021.</p>	<p>Shellfish Beds</p> <p>Chinook Salmon (ESA and Treaty Rights salmonid populations)</p>

<sup>6</sup> Component includes: Existing and traditionally harvested resources (*i.e.*, commercial, recreational, and cultural harvested finfish, bivalves, shrimp, geoduck, and Dungeness Crab in particular), hatchery supplemented recovery and harvest efforts for native Pacific Salmonids, Olympia Oysters, and Pinto Abalone, sustainable commercial and Tribal native and non-native shellfish farms, and marine and freshwater finfish aquaculture.



ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)	STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
		<p><b>Note: Chinook Salmon Goal Statements, listed above, also apply to this Component</b></p>	
Vegetated Land Cover (riparian areas; marine & freshwater) <sup>7</sup>	EC	<p>Tier A (2016-2017 Implementation Plan)</p> <p>A. Data Gap: Need to know acres of agricultural and forest land we had historically and acres we want to restore vs. protect. (Future NTA?)</p> <p>B. Data Gap: Determine acres of prime farmland required to sustain local food supply.</p> <p>C. Ensure the average annual loss of forested land cover to developed land cover in non-federal lands does not exceed _____acres per year, as measured with Landsat-based change detection.</p> <p>D. Restore ____ miles of riparian vegetation within the Strait LIO by 2021.</p> <p>E. Protect and maintain ____ miles of riparian vegetation within the Strait LIO by 2021.</p> <p>Protect and maintain ____ acres of prime farmland within the Strait LIO by 2021.</p>	<p><b>Land Development &amp; Cover</b> (vegetated land cover)</p>
Freshwater Quality (surface water bodies, (including rivers, streams,	EC	Tier B	<p><i>Freshwater Quality (B-IBI; # Impaired Waters)</i></p>

<sup>7</sup> Component includes: Uplands, large channels (>50m bankfull width), side channels, small channels (<50m bankfull width), and floodplain water-bodies (non-channel lakes and wetlands).

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)		STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
lakes, wetlands) <sup>8</sup>				
Good Governance ( <i>consider ecological, social, and economic aspects when developing and implementing NTAs and salmon recovery actions</i> ) <sup>9</sup>	HWB	Tier B		<i>Good Governance</i>
Marine Water Quality <sup>10</sup>	EC	Tier B		<i>Marine Water Quality</i>

<sup>8</sup> Component includes: large channels (>50m bankfull width), side channels, small channels (<50m bankfull width), and floodplain water-bodies (non-channel lakes and wetlands).

<sup>9</sup> Component includes: Land Use Management, Shoreline Management, Stormwater Management, Harvest Management, and Green Sustainable Public Infrastructure (i.e., new and retrofits).

<sup>10</sup> Component includes: Offshore marine systems (i.e., Port Angeles Harbor; Dungeness Bay; Sequim Bay; Discovery Bay; Strait of Juan de Fuca).

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)		STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
Sense of Place & Sound Stewardship ( <i>consider ecological, social, and economic aspects when developing and implementing NTAs and salmon recovery actions</i> ) <sup>11</sup>	HWB	Tier B		<i>Sense of Place &amp; Sound Stewardship</i>
Drinking Water <sup>12</sup>	EC	Tier C		

<sup>11</sup> Component includes: Promoting aesthetics, cultural, and recreational benefits through K-12 and adult awareness activities, and changes in human behavior and increases in public involvement through K-12 and adult education and activities.

<sup>12</sup> Component includes: Surface water and groundwater, large and small systems, and private wells.

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)		STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
Economic Vitality <sup>13</sup>	HWB	Tier C		
Freshwater Communities <sup>14</sup>	EC	Tier C		
Marine Communities <sup>15</sup>	EC	Tier C		
Air Quality <sup>16</sup>	EC	Tier D		
Cultural Wellbeing <sup>17</sup>	HWB	Tier D		
Local Foods <sup>18</sup>	HWB	Tier D		

<sup>13</sup> Component includes: Sustainable forestry, fishing, and shellfishing, locally-grown sustainable agriculture, green building, sustainable building products, “green” sustainable public infrastructure (e.g., roads, stormwater management, shorelines, etc.), hatchery supplemented recovery and harvest efforts for native Pacific Salmonids, Olympia Oysters, and Pinto Abalone, sustainable commercial and Tribal native and non-native shellfish farms, and eco-Tourism.

<sup>14</sup> Component includes: Species and food webs including Salmonids; Terrestrial Mammals; Birds; Amphibians, etc., and Benthic Invertebrates.

<sup>15</sup> Component includes: Species and food webs including Salmonids; forage fish (herring, surf smelt, sand lance, eulachon); marine birds (resident and migratory); marine mammals (resident and migratory), marine plankton including phytoplankton and zooplankton (both holoplanktonic (*i.e.*, planktonic state throughout life cycle), and meroplanktonic (*i.e.*, planktonic state for a portion of life cycle) life histories).

<sup>16</sup> Component includes: Atmospheric quality.

<sup>17</sup> Component includes: Cultural traditions.

<sup>18</sup> Component includes: Locally harvestable foods for traditional, sustenance, and recreations use, such as finfish; shellfish; animals and birds; and plant-based greens, roots, nuts and fruits.

ECOSYSTEM COMPONENT (EC) OR HUMAN WELLBEING COMPONENT (HWB)		STATUS (TIER)	SHORT-TERM GOALS (5-YEAR, BY 2021) FOR EACH RELATED PRIORITY VITAL SIGN (NOTE: LETTER ID# CORRESPONDS TO MIRADI FILES & APPENDIX B DOCUMENT)	ADOPTED PRIORITY VITAL SIGN
Marine Sediment Quality <sup>19</sup>	EC	Tier D		
Outdoor Activity <sup>20</sup>	HWB	Tier D		
Submerged Aquatic Vegetation (kelp beds, eelgrass beds) <sup>21</sup>	EC	Tier D		

### 3.0 KEY PRESSURES

Pressures are the human actions or natural processes that give rise to stress on the ecosystem, but also may provide benefits to humans. By understanding the pressures and the underlying sources and stressors, our LIO can better define the context we are working within and where we need to intervene to make progress on recovery.

Selection of high priority ecosystem Pressures (Sources and Stressors) by our Technical Task Force (and staff) was prefaced by the necessary work to translate our Puget Sound ecosystem Pressure terminology from old (2009) to new (2014).

Once that task was accomplished, our Technical Task Force (and staff) considered the results from both the regional perspective of the Puget Sound Pressure Assessment (PSPA) on the Strait Action Area and Phase 1 of the Monitoring and Adaptive Management (M&AM) work on the

<sup>19</sup> Component includes: Offshore marine systems.

<sup>20</sup> Component includes: Recreation Activities.

<sup>21</sup> Component includes: Offshore marine systems, natal Chinook estuaries, pocket estuaries, and rocky pocket estuaries.

Elwha and Dungeness watersheds to inform selection of higher priority Sources and Stressors. Using these results to inform their work and the professional judgment and experience of the members, the Technical Task Force (and staff) worked to divide Pressure Sources into one of three categories, namely higher priority, lower priority (“Medium”; “Low”), and not relevant to the Strait Action Area.

Unfortunately, Phase 1 of the M&AM work did not discriminate between high and lesser priority Pressures; Phase 2 M&AM work may attempt to do that in the future. It’s also important to note that out of the 41 Pressure Sources considered “High” or “Very High” by the PSPA for the Strait Action Area, our Strait Action Area Pressure Analyses was in agreement in 26 cases (63%) and in disagreement in 15 cases (~37%). Most notable disagreements involved six Pressure Sources that were considered “Low” priority by PSPA but “Very High” by the Strait AA Pressure Analyses, including Domestic and Commercial Wastewater to Onsite Sewage Systems (OSS); Marine Shoreline Infrastructure; Freshwater Levees, Floodgates, Tidegates; Marine Levees, Floodgates, Tidegates; Oil Spills; and Abstraction of Surface Water.

Our Technical Task Force (and staff) then considered the results from the regional perspective of the PSPA on the Strait Action Area for Stressors from a variety of Assessment Units applicable to the Strait Action Area, including the Elwha and Dungeness watersheds; Strait of Juan de Fuca Marine Basin; Mid-Hood Canal; and North Central Puget Sound Stressors. Using the results from this PSPA analysis and the professional judgment and experience of the members, the Technical Task Force (and staff) identified the “High” priority Stressors for each higher priority Source that was considered important to the Strait Action Area. All other Stressors for each Source were either a lower priority (“Medium”; “Low”) or of longer-term concern to the Strait Action Area. After accomplishing this task, the Technical Task Force (and staff) worked to pair our most appropriate Priority Vital Signs to each of our higher priority Pressure Sources.

Using all of the information described above, the Technical Task Force (and staff) took the Strait Action Area Pressure Analysis one step further. Of those higher priority Pressure Sources, the Technical Task Force further discriminated “Very High”, relative to “High”, Pressure Sources using the following set of local criteria:

“Very High” Sources are those that either:

- Contain already well expressed Stressors that very intensively and negatively affect our Priority Vital Signs within a significant portion of the Strait Action Area geography, or
- Represent the highest risk, either spatially or temporally, to our Priority Vital Signs if those Stressors were to be very intensively and negatively expressed across the Strait Action Area geography.

The results from our Pressure work are summarized below in Table 3. This table also shows the relationship between our “Very High” and “High” priority Pressures Sources and our Tier A Ecosystem and Human Wellbeing Components and seven paired Priority Vital Signs.

Lists of the Pressure Sources and Stressors of concern to the Strait ERN LIO can also be found in Appendix B, including both a standard list generated from the Miradi software and a more complete and detailed list, with comments, the Strait Pressure Source to Vital Sign Priorities & Logic Connections.

For a list of pressure sources and stressors of concern in the LIO, see Appendix B.

Table 3 Pressures and their relationship to Vital Signs and components in the LIO area.

Pressure Source (Very High and High priorities only; sorted alphabetically)	Pressure Source Priority	Ecosystem and Human Wellbeing Components (Tier A only)						
		Drift Cells (nearshore habitat and habitat forming processes)	Estuaries and Embayments	Floodplains	Freshwater Quantity (surface water bodies, including rivers, streams, wetlands)	Vegetated Land Cover (riparian areas; marine & freshwater)	Salmonids (ESA and Treaty Rights Salmonid Populations)	Shellfish and Finfish Harvest
		Related Priority Vital Signs						
		Shoreline Armoring	Estuaries	Floodplains	Summer Stream Flow	Land Development and Cover	Chinook	Shellfish Beds & Chinook
Abstraction of surface water	Very High				X		X	X
Airborne Pollutants ("Greenhouse Gases" related to Climate Change; includes other pollutants)	Very High	X	X	X	X	X	X	X
Commercial & Industrial Areas (Including Ports)	Very High	X	X			X	X	X
Domestic and Commercial Wastewater to Onsite Sewage Systems (OSS)	Very High		X					X
Fishing & Harvesting Aquatic Resources	Very High						X	X
Freshwater Levees, Floodgates, Tidegates	Very High			X		X	X	X

Pressure Source (Very High and High priorities only; sorted alphabetically)	Pressure Source Priority	Ecosystem and Human Wellbeing Components (Tier A only)						
		Drift Cells (nearshore habitat and habitat forming processes)	Estuaries and Embayments	Floodplains	Freshwater Quantity (surface water bodies, including rivers, streams, wetlands)	Vegetated Land Cover (riparian areas; marine & freshwater)	Salmonids (ESA and Treaty Rights Salmonid Populations)	Shellfish and Finfish Harvest
		Related Priority Vital Signs						
		Shoreline Armoring	Estuaries	Floodplains	Summer Stream Flow	Land Development and Cover	Chinook	Shellfish Beds & Chinook
Housing & Urban Areas	Very High	X	X	X	X	X	X	X
Marine and Freshwater Finfish Aquaculture	Very High						X	X
Marine Levees, Floodgates, Tidegates	Very High	X	X			X	X	X
Marine shoreline infrastructure	Very High	X	X			X	X	X
Oil Spills	Very High		X				X	X
Roads & Railroad <i>Grades</i> * (Including Culverts)	Very High	X	X	X		X	X	X
Runoff from residential and commercial lands	Very High		X		X	X	X	X
Shipping Lanes <del>and Dredged Waterways</del> *	Very High		X				X	X



Pressure Source (Very High and High priorities only; sorted alphabetically)	Pressure Source Priority	Ecosystem and Human Wellbeing Components (Tier A only)						
		Drift Cells (nearshore habitat and habitat forming processes)	Estuaries and Embayments	Floodplains	Freshwater Quantity (surface water bodies, including rivers, streams, wetlands)	Vegetated Land Cover (riparian areas; marine & freshwater)	Salmonids (ESA and Treaty Rights Salmonid Populations)	Shellfish and Finfish Harvest
		Related Priority Vital Signs						
		Shoreline Armoring	Estuaries	Floodplains	Summer Stream Flow	Land Development and Cover	Chinook	Shellfish Beds & Chinook
Abstraction of ground water	High				X	X	X	X
Agricultural & Forestry Effluents	High							X
Annual & Perennial non-Timber Crops	High		X		X	X	X	X
Dams	High				X		X	X
Domestic & Municipal Wastewater to Sewer	High						X	X
Freshwater shoreline infrastructure	High					X	X	X
Garbage & Solid Waste	High						X	X
Industrial Runoff	High		X		X			X
Livestock Farming & Ranching	High		X		X	X	X	X
Logging & Wood Harvesting	High		X		X	X	X	X



## 4.0 CURRENT ECOSYSTEM RECOVERY CONTEXT

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### ECOSYSTEM RECOVERY CONTEXT AND CONCEPTUAL MODELS IN THE STRAIT LIO AREA

Understanding the current context within which the LIO operates will contribute to development of a more successful recovery plan. (Note that the term “situation analysis” is often used to refer to a conceptual model and related description of the recovery context, but for simplicity this section will only refer to Conceptual Models.) Conceptual Models help build a common understanding of the context within which the LIO is operating including the ecological, social, economic, cultural, political and institutional systems that affect the things the LIO cares about.

For definitions of common terms used in this section, see the glossary. For a complete set of conceptual models and associated descriptions of the current context in the LIO, see Appendix C.

Using the results from our Ecosystem and Human Wellbeing Component, Vital Sign, and Pressure work described above, our Technical Task Force (and staff) worked to develop draft Conceptual Models for only those “Very High” Pressure Sources that would both benefit from a common understanding of the context of our work and, more importantly, inform the subsequent development of our Results Chains (see the Theories of Change section below). To that end, a total of nine Conceptual Models were developed.

Development of our draft Conceptual Models primarily focused on identifying the Contributing Factors (and associated relationships) that cause our “Very High” Pressure Sources to exist and persist within the Strait Action Area, and to some degree, adjacent geographies. To help set the context for our work, we included preliminary versions of our Local Strategies within each of our Conceptual Models. These preliminary Local Strategies were subsequently categorized using the Partnership’s Considerations for Social Strategies in Planning, Strategic Initiatives, Implementation Strategies, and Near Term Actions, namely the “Show Me”, “Help Me”, “Make Me” strategic approaches as a helpful aid to organize our thinking. Our Local Strategies and strategic approach categories were further refined as we worked to develop “Theories of Change” in the form of our Results Chains.

Our nine draft Conceptual Models describing the current context in the Strait ERN LIO area can be found in Appendix C. Brief descriptions of our draft Conceptual Models follow:

#### 01. MARINE SHORELINE INFRASTRUCTURE

Our model for the Pressure Source, Marine Shoreline Infrastructure primarily focuses on Contributing Factors that would inhibit our ability to prevent new armoring, as the majority of our shoreline is not armored (or altered). The model does, however, include factors associated with existing armoring and its maintenance. Roads and Railroads (including culverts), as a Pressure Source, is also a part of this model as, in some cases, our marine shorelines include roads and railroad grades that are heavily armored damaging habitat and causing interruptions in drift cell and other ecosystem functions.

## 02. MARINE LEVEES, FLOODGATES, AND TIDEGATES

*Marine Levees, Floodgates, and Tidegates*, as a model for this Pressure Source, primarily involves legacy infrastructure in the form of existing levees. *Roads and (legacy) Railroad-grades (including culverts)* are also an important Pressure Source in this model as this infrastructure functions as levees, in some cases.

## 03. FRESHWATER LEVEES, FLOODGATES, AND TIDEGATES

Contributing Factors associated with our model for the *Freshwater Levees, Floodgates, and Tidegates* Pressure Source includes influences from agriculture and residential development. As with the marine version of this Source, our *Freshwater Levees, Floodgates, and Tidegates* Pressure Source also includes *Roads and Railroad-grades (including culverts)* as this infrastructure functions as levees (a.k.a., dikes), in some cases.

## 04. HOUSING AND URBAN AREAS

All Contributing Factor pathways for our *Housing and Urban Areas* Pressure Source model lead to conversion of natural resource lands to developed areas, primarily residential housing in our case. In turn, conversion to housing sequentially leads to or influences five of our other Pressure Sources.

## 05. ABSTRACTION OF SURFACE WATER

Abstraction of Surface Water, as a Pressure Source model is, perhaps, somewhat unique across the Puget Sound basin. Contributing Factor pathways include those involving agricultural water uses, stream flow enhancement issues, climate change effects, water management rules and water rights.

## 06. RUNOFF FROM COMMERCIAL AND RESIDENTIAL LANDS

Our model for the *Runoff from Residential and Commercial Lands* Pressure Source is likely similar to those from other Puget Sound locations. For example, our model includes Contributing Factor pathways that involve lack of landowner awareness, understanding, and incentives as well as stormwater management challenges. Perhaps somewhat unique to our model are the challenges associated with climate change adaptive mechanisms and utilizing stormwater runoff as a resource that can be reused for other purposes.

## 07. ONSITE SEWAGE SYSTEMS

Like the runoff model, our *Domestic and Commercial Wastewater to Onsite Sewage System (OSS)* Pressure Source model is likely similar to others from around the Puget Sound basin. Implementing WAC mandated local OSS programs, without a stable funding source, is clearly our most significant challenge for our two relatively rural counties, Clallam and Jefferson, that have large numbers of septic systems.

## 08. COMMERCIAL AND INDUSTRIAL AREAS

Our *Commercial and Industrial Areas* Pressure Source model focuses on industrial infrastructure within geographically limited locations in our area (i.e., Port Angeles Harbor shoreline, closed landfills); legacy shoreline and sediment contaminants (i.e., Port Angeles Harbor); an abandoned oil tank; and the need for safer chemical alternatives. This model also illustrates that this Pressure Source leads sequentially to a variety of other Sources.

## 09. OIL SPILLS AND SHIPPING LANES

Our Conceptual Model for *Oil Spills and Shipping Lanes*, as Pressure Sources, was originally drafted during an early Partnership-sponsored training session with members of the San Juan LIO. Our more advanced version of that model includes Contributing Factor pathways for oil spill preparedness, prevention, and response, as well as a pathway that's focused on the need for Tribal and local coordination and involvement

## 5.0 STRATEGIES AND ACTIONS

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After our LIO described the situation in which we are operating and what we want to achieve, we next considered the types of local strategies and associated actions that need to occur. Good strategic planning involves determining where and how our LIO will take action—as well as where our LIO will not take action.

To document and test assumptions about how specific strategies and actions are intended to effect change in the ecosystem, our LIO developed theories of change associated with specific strategies or suites of strategies in the form of results chains. Results chains help to build shared understanding of the context within which local recovery occurs. They help our LIO explain the logic behind recovery strategies to determine if recovery efforts are likely to achieve near-term objectives and longer-term goals. Results chains also provide a structure for assessing the effectiveness of specific actions and for redirecting efforts if a specific action is determined to be ineffective. In addition, our LIO can use the results chains to identify how future development of local Near Term Actions for the Puget Sound Action Agenda align with regional priorities.

Strategies and descriptions of associated theories of change are summarized below. Results chains and definitions of common terms used in this section are available in Appendix D.

Our Results Chains (Appendix D) were developed around refined versions of our geographically focused “Local Strategies”, one chain for each of our 13 strategies. The mostly iterative sub-task process we used to develop our Results Chains is summarized below.

- a. **Conceptual Model Conversion** - Using our Conceptual Models, initial versions of our Results Chains were developed by converting the Contributing Factors to positive intermediate result statements and then connecting them by thinking in a logical fashion using an “if-then” approach. *(In other words, if you complete an action, then this would produce an intermediate result. Subsequently, if you completed the next action in the chain, it would produce the next intermediate result. Such a chain of intermediate results would then theoretically lead to both reductions in Pressure Sources and the expressions of those Sources (i.e., Stressors) “on-the-ground” and ultimately, improvements in our Components, as measured by our Vital Signs.)*
- b. **Salmon Recovery Adaptive Management Integration** - We then worked to Integrate simplified versions of the Phase 1, Elwha and Dungeness Chinook Monitoring and Adaptive Management information, where appropriate, into the initial versions of our Results Chains. When doing so, we integrated this information in such a way that our Results Chains would apply to the entire Strait Action Area geography. Another important outcome of this integration step was the creation of a new set of more specific Local Strategy-driven Results Chains.
- c. **Climate Change Adaption and Mitigation Integration** - Our next step was to extract “Immediate” and “Intermediate” timeframe adaptive management strategies from our comprehensive and recently completed “*Climate Change Preparedness Plan for the North Olympic Peninsula*”, a plan that was funded using National Estuary Program dollars. Once compiled, we integrated and centralized these adaptive management strategies into one Results Chain for our climate change-related Local Strategy. Later, we added mitigation information to this Local Strategy and Results Chain.
- d. **Integrating LIO Vessel Traffic Strategy Workshop Results** – On September 13, 2016 a joint workshop was held by four LIOs (*i.e.*, San Juan, Strait, Island, and Whatcom LIOs) that are particularly concerned about the effects of the Oil Spill and Shipping Lanes Pressure Sources have on our respective geographies. Four breakout sessions were held as part of that workshop. Feedback from those breakout

sessions on our two Results Chains that contain Oil Spill and Shipping Lane-related information was incorporated into those chains and listed in more detail within Table 4. Subsequently, we included most of the top Risk Mitigation Measures that resulted from the 2016 Salish Sea Oil Spill Risk Mitigation Workshop sponsored by the Washington State Department of Ecology.

- e. **Mapping Actions** – Next, we “mapped” (*i.e.*, placed) each of our 2016-2017 actions, both Near Term Actions (NTA) and salmon recovery actions, on the most appropriate of our 13 Local Strategy-driven Results Chain. In doing so we recognized that many of these actions, when implemented, would likely provide multiple benefits among a number of our Local Strategies. However, to simplify our Results Chains each action was only represented on one Results Chain.
- f. **Recognizing Local Strategies Working in Concert** – We felt that it was important to recognize that a single Local Strategy often times cannot achieve the desired results on its’ own. To that end, each of our Results Chains includes reference to other Local Strategies that work in concert with the one in question to achieve the desired results.
- g. **Results Chain Technical and Policy Review and Modification** – Our Technical Task Force and Steering Group then reviewed and modified, where needed, the following aspects of our chains:
  - Intermediate Results (blue boxes) and logic connections (arrows);
  - Pressure Source priorities and Stressors;
  - Local Strategies (titles and descriptions);
  - Gaps / Barriers / Needs;
  - Local Strategies working in concert;
  - Goal Statements; and
  - NTA and Salmon Recovery Action mapping (placement).

## SUMMARY OF LIO STRATEGIES

Table 4 lists our 13 Local Strategies currently identified for the Strait ERN LIO area. This table includes linkages of our Local Strategies to Puget Sound-wide regional sub-strategies using the 2016-2017 Puget Sound Action Agenda identification numbers; 2014-2015 Action Agenda sub-strategy numbers are noted in parenthesis as a reference. Please note that many of our Local Strategies cut across multiple regional sub-strategies. If each of our Local Strategies needs be linked to one specific regional sub-strategy the “best fit” for each, perhaps, is noted in **bold type**. These “best fit” linkages are based on the focus of our current 2016-2017 NTAs and salmon recovery actions for that particular Local Strategy. Our stormwater and water quality clean-up plan related Local Strategies however, namely STRAIT J and K, include linkages to multiple “best fit” regional sub-strategies as we’re attempting to address a number high priority Contributing Factor pathways with our current suite of NTAs. For some of our Local Strategies, linkages to the appropriate Habitat Strategic Initiative - Regional Priorities are noted within the identification numbers (see the hyphenated numbers). This table also includes comments that briefly outline the derivation of each of our Local Strategies.

Table 4 Strategies included in the LIO Recovery Plan.

ID*	STRAIT ERN LIO STRATEGY AND ID#	DESCRIPTION	COMMENTS
16.1-1; 16.2-2; 16.3; 6.1 (B2.1; B2.2; B2.3; A6.1)	<b>A. Drift Cell and Shoreline Conservation and Restoration</b>	Enhance implementation of high priority capital and non-capital drift cell and shoreline conservation and restoration projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans.	Derived from Conceptual Models; Dungeness and Elwha Chinook M&AM, Phase 1; & initial Cap / Non-Cap 2-year Imp. Strategy
16.1-2; 16.2-1; 16.3; 6.1 (B2.1; B2.2; B2.3; A6.1)	<b>B. Estuary Conservation and Restoration (Rivers, Streams, Pocket Estuaries)</b>	Enhance implementation of high priority capital and non-capital estuary conservation and restoration projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans.	Derived from Conceptual Models; Dungeness and Elwha Chinook M&AM, Phase 1; & initial Cap / Non-Cap 2-year Imp. Strategy
5.3-1; 5.4-1 (A5.3; A5.4; A6.1)	<b>C. Floodplain Conservation and Restoration</b>	Enhance implementation of high priority capital and non-capital floodplain conservation and restoration projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans.	Derived from Conceptual Models; Dungeness and Elwha Chinook M&AM, Phase 1; & initial Cap / Non-Cap 2-year Imp. Strategy
1.3-1; 2.2-2; 6.1; Riparian Corridor Management & Strategy 2 – Cross-cutting (A1.3; A2.2; A6.1)	<b>D. Improve Riparian Corridor Management and Instream Habitat</b>	Improve local management of freshwater and marine riparian corridors and instream habitat that would provide multiple benefits	Derived from Conceptual Models; Dungeness and Elwha Chinook M&AM, Phase 1; & initial Cap / Non-Cap 2-year Imp. Strategy
2.2-4; 6.1 12.2 (A2.2; A6.1; C4.2)	<b>E. Eliminate fish passage barriers and improve instream habitat</b>	Enhance implementation of high priority capital and non-capital fish barrier and excess sediment projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans. Note: “Excess Sediment”, as described within the associated Results Chain for this Local Strategy, includes sediment from timber management activities, such as failures of forest roads and associated culverts.	Derived from Dungeness and Elwha Chinook M&AM, Phase 1; & initial Cap / Non-Cap 2-year Imp. Strategy



ID*	STRAIT ERN LIO STRATEGY AND ID#	DESCRIPTION	COMMENTS
6.3; 19.2; 19.3 (A6.3; C7.2; C7.3)	<b>F. Enhance Native Fish and Shellfish Populations</b>	Enhance native fish and shellfish populations by supporting implementation of projects and programs.	Derived from Dungeness and Elwha Chinook M&AM, Phase 1 & initial Cap / Non-Cap 2-year Imp. Strategy
1.2; 6.1; 7.1; 7.2; 7.3 (A1.2; A6.1; A7.1; A7.2; A7.3)	<b>G. Implement Local Water Resource Management Programs and Rules</b>	Develop, adopt and/or implement Water Resources Management Programs and Rules	Derived from Conceptual Models; Dungeness and Elwha Chinook M&AM, Phase 1; & initial Water Mgt. 2-year Imp. Strategy
1.2; 1.3; 3.1; 3.2; 6.1; 8.2; 8.3; 16.1-1; 16.1-2; 16.2-1; 16.2-2 (A1.2; A1.3; B1.2; B1.3; A3.1; A3.2; A6.1)	<b>H. Enhance Ongoing Implementation of Local Shoreline and Land Use Management, Protection, and Incentive Programs and Plans</b>	Enhance the ongoing implementation of shoreline and land use management, protection, and incentive programs and plans	Derived from Conceptual Models & initial Shoreline and Land Use Mgt. 2-year Imp. Strategy
1.2-5; 5.2; 5.3-4; 5.4-3; 8.2-3; 8.2-4; 8.2-5; 16.1-4; Climate Change Impacts – Cross-cutting (A1.2; A5.2; A5.3; A5.4; B1.2; B2.1)	<b>I. Implement Climate Change Adaptation and Mitigation Strategies for the North Olympic Peninsula</b>	Implement the climate change adaption strategies identified in the Climate Change Preparedness Plan for the North Olympic Peninsula. Develop and implement a mitigation plan that compliments the existing adaptation-focused Climate Change Preparedness Plan for the North Olympic Peninsula.	Derived from Conceptual Models & Climate Change 2-year Imp. Strategy

ID*	STRAIT ERN LIO STRATEGY AND ID#	DESCRIPTION	COMMENTS
1.1-1; 9.1-2; 9.2; 9.6; 10.1-1; 10.2; 10.3-4; 10.3-5; 10-4-1; 10.4-2; 10.4-3; 11.2; 21.1; 25.2 (A1.1; C1.1; C1.2; C1.6; C2.1; C2.2; C2.3; C2.4; C3.2; C9.1; D4.2)	<b>J. Implement Local Stormwater Management and Pollutant Source Control Programs using a Watershed Management Approach</b>	Develop, adopt, and/or implement Stormwater Management and Pollutant Source Control programs and work to Coordinate Implementation of these Programs using a Watershed-Based Approach.	Derived from Conceptual Models & initial Stormwater 2-year Imp. Strategy
9.1; 10.4; 11.1; 11.2; 13.1; 13.2; 13.3; 21.4 (C1.1; C2.4; C3.1; C3.2; C5.1; C5.2; C5.3; C9.4)	<b>K. Enhance Implementation of Water Quality Clean Up Plans</b>	Enhance the ongoing implementation of water quality clean up plans within the Sequim-Dungeness and Eastern Jefferson Clean Water Districts and other high priority efforts within the Strait Action Area	Derived from Conceptual Models & initial Water Quality Clean Up Plans 2-year Imp. Strategy
20.1-1; 20.2; 20.3 (C8.1; C8.2; C8.3)	<b>L. Enhance Support for Oil Spill Preparedness, Prevention and Response</b>	Support improvements in oil spill prevention, preparedness, and response, within the Strait Action Area and adjacent waters.	Derived from Conceptual Models; initial Oil Spill 2-year Imp. Strategy; & collaboration with San Juan, Island, and Whatcom LIOs
[26.2, 26.3, 27.1, 27.2, 27.3, & 28.4 as Behavior Change Cross-cutting]; 27.4; 28.5 (D5.2; D5.3; D6.1; D6.2; D6.3; D6.4; D7.4; D7.5)	<b>M. Enhance Local Communication, Education, Behavior Change and Public Involvement Programs</b>	Enhance local communication, behavior change, and public involvement efforts on the North Olympic Peninsula by increasing awareness and education of K-12 students and the general public, but with primary emphasis on implementing projects or programs that will lead to increased public involvement & supporting land and shoreline owners' efforts to accomplish specific and measureable ecosystem recovery improvements "on-the-ground".	Derived from Conceptual Models & initial Education 2-year Imp. Strategy

## THEORIES OF CHANGE

Each of our 13 Local Strategies is represented as an individual Results Chain (often referred to as a “theory of change” or sometimes “logic model”; see Appendix D) that includes a variety of Approaches (sometimes referred to as “pathways” to achieve results) that are not prioritized and a bundle of Actions. They comprise cause and effect mechanisms from our Actions that lead to intermediate results. Results Chains also illustrate the relationship between intermediate results and the reduction of Pressures on our Ecosystem and Human Wellbeing Components and improvements in our Priority Vital Signs. While each of our 2016-2017 Actions, both Near Term Actions (NTA) and salmon recovery actions, are listed below under the most appropriate of our Local Strategies and “mapped” to the respective Results Chain, 2014-2015 NTAs are not. 2014-2015 NTAs are not included, as the Puget Sound Partnership’s Performance Management System no longer tracks them. Common terms used in this section are defined in the Glossary.

### STRATEGY: A. DRIFT CELL AND SHORELINE CONSERVATION AND RESTORATION

Enhance implementation of high priority capital and non-capital drift cell and shoreline conservation and restoration projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans.

Approaches, listed alphabetically, include:

- a. Conservation measures to preserve habitat-forming processes
- b. Restoration measures to improve habitat-forming processes

#### *Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-1236 Beach Lake Acquisition and Restoration	Acquire and restore a 25-acre shoreline property adjacent to the Elwha River delta to protect natural processes and restore critical nearshore habitat for Endangered Species Act-listed salmon. Remove infrastructure, livestock, and approximately 2,000 feet of armored shoreline. Establish public access.[JC1]
	2016-0242 Port Angeles Harbor Beach Restoration and Shoreline Softening	Restore 8,606 feet (1.62 miles) of marine shoreline in Port Angeles Harbor by completing beach and estuary restoration projects.
	15-1051 R Sequim Bay Shoreline Restoration Dawley Phase	This nearshore project will restore a 1,400 foot section of Sequim Bay shoreline along the Eastern Strait of Juan de Fuca in Clallam County, WA. It is located on land given by the Dawley family to the U.S. Fish and Wildlife Service for conservation. This restoration will include the removal of 450 feet of armoring, bulkheads, fill, and overwater structures, including a pier. The shoreline will be re-contoured to blend into undisturbed adjacent beaches and the marine riparian zone will be revegetated with native plants. This project will repair habitat-sustaining shoreline processes and improve migration and survival of juvenile salmon, especially Jimmycomelately Creek ESA- listed Hood Canal summer chum. This project is located close to Jimmy

ID	NEAR TERM ACTION	DESCRIPTION
		Comelately Creek(0.5 miles), Pitship Pocket Estuary(2.5 miles), and Washington Harbor(4.5 miles), where other restoration actions have been completed. This project will also improve water quality within Sequim Bay by removing toxic creosoted pilings.
	13-1068 R Ediz Hook Beach Restoration: Phase 3	This beach restoration project on Ediz Hook in Port Angeles Harbor, Clallam County, is designed to improve forage fish spawning habitat as well as migratory corridor habitat used by numerous species of fish including listed populations of Puget Sound Chinook and steelhead. It will improve migratory conditions for salmon and other fish by removing and preventing the need for additional shoreline armoring. The project includes beach restoration, beach nourishment, and adding native dune grass vegetation which are all designed to improve nearshore conditions for forage fish as well as improving migratory corridor habitat. This proposal is modeled upon previous beach restoration projects constructed recently on the southern shore of Ediz Hook. Phase 1 included restoration of 1500' of beach along central Ediz Hook as mitigation for the Port Angeles Graving Yard project. Phase 2 was the restoration of an adjacent 1000' of beach at the former "A-Frame" log dump site. This phase 3 proposal would apply design principals from the later projects to restore nearshore habitat to a 0.66 mile reach of Ediz Hook immediately to the east of the former A-Frame site. This proposal will result in application of restoration treatments to restore habitats in two reaches. On Reach 1, beach restoration, nourishment and revegetation will be completed along 0.32 miles of shoreline. The second reach focuses primarily on controlling vehicle access and revegetation activities along a 0.34 mile reach.

**STRATEGY: B. ESTUARY CONSERVATION AND RESTORATION (RIVERS, STREAMS, POCKET ESTUARIES)**

Enhance implementation of high priority capital and non-capital estuary conservation and restoration projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans.

Approaches, listed alphabetically, include:

- a. Conservation measures to preserve habitat-forming processes
- b. Restoration measures to improve habitat-forming processes

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	14-1371 R Pysht Estuary Saltmarsh Restoration	The Pysht River estuary was historically used for the marine transport of logs between 1915-1975. To do so, the lower river was channelized and periodically dredged using both suction and clamshell dredges. Dredge

ID	NEAR TERM ACTION	DESCRIPTION
		<p>materials were discharged onto salt marsh or placed along channel margins. As a result, significant areas of the Pysht River estuary were disconnected from the river and or converted to upland vegetation types. Suction dredge deposits first appear in the 1951 aerial photograph series and form a series of interconnected, large mounds on what was formerly tidal marsh in the northwest portion of the estuary. Removal options for these deposits have been explored in two recently completed design projects Pysht River Estuary Saltmarsh Restoration (partial and final designs). This proposal involves the restoration of saltmarsh habitat in the Pysht River estuary through the removal of ~105,500 cubic yards of dredge deposits over 21.5 acres of historic saltmarsh habitat and the establishment of ~10,000 linear feet of tidal channels. These channels will ultimately provide benefits to a multitude of species including forage fish and salmonids including Pysht River stocks of chum, coho, chinook and steelhead. There is also documented use of the estuary by listed stocks of chinook from other areas including Puget Sound and the Columbia River.</p>
	<p>11-1343 PR Meadowbrook Creek and Dungeness River Reconnection</p>	<p>Meadowbrook Creek is the last freshwater tributary to out-migrating salmon species in the Dungeness River before entering Dungeness Bay in Sequim, WA, Clallam County. This project aims to improve access to valuable estuarine and off-channel habitat by enhancing and stabilizing the connection between Meadowbrook Creek and the mainstem of the Dungeness River. This work is part of the continuing effort to restore the floodplain and estuarine habitat of the lower Dungeness River and increase available rearing and transitional habitat for salmonids, including Chinook, coho, chum, and steelhead (NOPL 2011 Dungeness Strategy). The availability of transitional habitat and mixing of fresh and salt water in protected embayment's, side channels, and sloughs in estuaries are limiting factors in successful rearing of juvenile salmon throughout Puget Sound. Meadowbrook Creek flowed into the Dungeness River near the river mouth until 1999, when the creek breached the beach dune and began flowing directly into Dungeness Bay, thus disconnecting the historic freshwater estuary area. A very narrow (less than three feet) channel recently cut through one of several beach berms, allowing the creek to flow into the Dungeness River. This project will improve conveyance of Meadowbrook Creek through the beach berm and reduce the risk of continued dune breaching. In addition, stream habitat will be enhanced through removal of hard bank armoring and a small levee, and improve access to existing off-channel rearing habitat.</p>
	<p>12-1268 R Discovery Bay Railroad Grade Removal</p>	<p>The North Olympic Salmon Coalition is proposing the next phase in efforts to rehabilitate the Snow and Salmon Creek estuary in Lower Discovery Bay, the Discovery Bay Railroad Grade Removal project. This project was born out of SRFB projects #08-1988, Snow/Salmon Railroad Grade Removal Design and #10-1611, Snow Creek Delta Cone and Estuary Design which will complete the RR grade removal design work between Salmon and Snow creeks. The WRIA 17 Salmon Habitat Limiting Factors Analysis and the Summer Chum Salmon Recovery Plan both identify the next largest, addressable, anthropogenic impact to physical habitat in the estuary as the abandoned railroad causeway which bisects the entire estuary and armors the shoreline. This project proposes to remove 1,465' of this railroad grade and imbedded waterline and re-locate the waterline close to the highway. The result will be reconnection of 22 acres and creation of 1.5 acres of the</p>

ID	NEAR TERM ACTION	DESCRIPTION
		Salmon and Snow Creek estuarine intertidal habitat. All lands proposed for work in this project are currently owned by WDFW and the Jefferson Land Trust.

**STRATEGY: C. FLOODPLAIN CONSERVATION AND RESTORATION**

Enhance implementation of high priority capital and non-capital floodplain conservation and restoration projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans.

Approaches, listed alphabetically, include:

- a. Conservation measures to preserve habitat-forming processes
- b. Restoration measures to improve habitat-forming processes

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0130 Advancing Integrated Dungeness and Elwha Floodplain Recovery	Healthy rivers require functioning floodplains. This NTA tees up large restoration actions by facilitating a collaborative process that does stakeholder outreach, feasibility & pre-design work.
	15-1061 R Pysht River Floodplain Restoration Phase 3	This project is part of a long term effort to improve salmon habitat in the mainstem Pysht River and its major tributaries. In this Phase 3 request, we propose to construct 32 engineered logjams, install 350' of floodplain fencing and conduct riparian revegetation in the mainstem Pysht River between river mile 7.2-9.0. The project will occur on a combination of ownerships including lands recently purchased for conservation by North Olympic Land Trust using SRFB funding. Since 1994, Merrill and Ring and the Lower Elwha Klallam Tribe have conducted a series of cooperative restoration projects focusing on adding large woody debris (LWD) into channels and riparian restoration at multiple sites in the watershed. On the south fork Pysht River (Phase 1), LWD has been added to ten reaches between river mile 0.5-7.0. On the mainstem Pysht River, LWD (Phase 2) has been added on one reach (river mile 10.0-11.5). Monitoring has shown that these projects have been successful in restoring channel and riparian habitat features favored by salmon for spawning and rearing. Because of historic logging and stream cleaning practices, the entire watershed is considered chronically deficient in in-channel LWD (McHenry et al. 1994, WRIA 19 Salmon Recovery Plan). Additionally, the age and composition of riparian forests is currently not adequate to support habitat forming processes which would result in the natural addition of wood to the river.

ID	NEAR TERM ACTION	DESCRIPTION
	14-1382 R Lower Dungeness River Floodplain Restoration	<p>This large-scale restoration project will restore approximately 130 acres of Lower Dungeness River floodplain by setting back the Army Corps of Engineers east bank levee (R.M. 1-2.7) in its new location. The goal is to reconnect the Dungeness River with its historic floodplain, improve habitat conditions and restore riverine processes and functions. Constructed by the Corps in 1963, the current levee constrains the river channel, resulting in increased channel confinement, bedload aggradation, instability, and water quality impacts that are a factor in the current local shellfish closures. Dikes on both sides of the Dungeness have disconnected the river from its floodplain and disrupted river processes which prohibits flood waters from dissipating and inhibits the river's natural ability to store excess sediment outside the channel. Levee setback and channel restoration in this reach provides floodplain and side channel habitat critically-needed by salmon for spawning, rearing and migration. Riparian and instream habitat will also be restored. Priority species supported by these habitats are ESA-listed Puget Sound Chinook, Eastern Strait of Juan de Fuca Summer Chum, Coastal-Puget Sound Bull Trout, and Puget Sound Steelhead. The project benefits all migratory salmon listed above as well as coho, pink salmon and coastal cutthroat, by restoring the ecological processes of the lower Dungeness River. This project is a high priority in both the Puget Sound Chinook Recovery Plan and the North Olympic Lead Entity for Salmon's 3-year workplan.</p>
	14-1373 P Elwha Floodplain Restoration Planning Project	<p>This is a design project for factors thought to most limit salmon survival in the Lower Elwha River floodplain downstream of river mile 1.5. The project is complementary to the larger effort to restore salmon populations in the Elwha Watershed under the Elwha Fisheries and Ecosystem Restoration Act and Puget Sound Chinook Recovery Plan. Fisheries activities are guided by the Elwha Fish Restoration Plan (Ward 2008). Chapter 8 of that plan recommends a number of restoration strategies including dike removal and large wood projects in the lower river floodplain. Since 2000, the Lower Elwha Klallam Tribe has led restoration efforts in the Elwha River and has focused on reach scale restoration between river mile 1.0-3.5. In this reach 4 dikes have been removed, 50 engineered logjams constructed, 4 side channels loaded with large wood, 50,000 native trees and shrubs have been planted, and noxious weeds removed. Completion of this project will result in a completed final restoration design in the lower 1.5 miles of the Elwha River floodplain.</p>
	15-1053 R Dungeness R. RR Reach Floodplain Restoration	<p>This restoration project will restore salmon habitat forming processes to approximately 15.5 acres of floodplain, numerous side channels, and 2,000 feet of the Dungeness River. This will be accomplished by removing the environmentally harmful 585-foot long RR Trestle and its associated fill from the floodplain at River Mile 5.8 near Sequim. The Trestle, which supports the Olympic Discovery Trail (ODT), is built on 36 creosoted piling bents (5 piling each) placed on 16-foot centers. The 16-foot openings, along with the floodplain fill, have proven to severely restrict floodplain processes and have constrained the river channel to a single location (the 150-foot opening at the RR Bridge) for more than 60 years. Upstream of the Trestle the river meanders significantly, but meanders have been unable to move through the Trestle, causing channel instability and harm to salmon habitat. Negatively impacted species include 4 ESA-listed salmon and char: Puget Sound Chinook and steelhead, Eastern Strait of Juan de Fuca summer chum and bull trout, along with</p>

ID	NEAR TERM ACTION	DESCRIPTION
		fall chum, Coho, and pink salmon. Flooding in early 2015 swept away one of the Trestle's piling bents, allowing the river to migrate, and the main river channel now runs beneath the Trestle. With the Trestle damaged and the ODT temporarily closed, the time is right to restore floodplain functions by replacing the habitat-unfriendly creosoted industrial infrastructure with a 750-foot, CMZ-spanning, river-friendly pedestrian bridge built on 4 piers.
	15-1055 AR Dungeness R. Floodplain Restoration Robinson Phase	The Jamestown S'Klallam Tribe is pleased to submit the Robinson Phase of Dungeness Floodplain Restoration Project to restore more than 29 acres of floodplain habitat at River Mile 9 of the Dungeness River near Sequim, WA. The project will retire at least six development rights, move four residences from harm's way, remove infrastructure from the floodplain, and permanently conserve floodplain habitat and salmon habitat forming processes. These ecosystem restoration and conservation actions will benefit ESA -listed Chinook, bull trout, summer chum, and steelhead, along with coho, pinks, and fall chum. In addition, the project will increase public access and recreation opportunities just minutes from Sequim. During the last century, more than 800 acres of the Dungeness River's floodplain was disconnected from the river through the construction of levees, roads, and other infrastructure. Stakeholders have worked for decades to reconnect a fraction of the lost floodplain. Opportunities for floodplain restoration are rare and usually expensive. However, this project is expected to cost less than one third the costs of similar floodplain restoration projects and can be completed in less than two years. This is the top ranked project in the North Olympic Lead Entity for Salmon's 2015 grant round. Recovery of sustainable, harvestable runs of salmon on the Dungeness is a cultural and economic priority of the Tribe and this project is an important step towards that goal.
	16-1372 Lower Dungeness Floodplain Restoration	This large-scale restoration project will restore approximately 112 acres of Lower Dungeness River floodplain by setting back the Army Corps of Engineers east bank levee (R.M. 1-2.7) in its new location. The goal is to reconnect the Dungeness River with its historic floodplain, improve habitat conditions and restore riverine processes and functions needed to support various salmon species included Dungeness Chinook. Constructed by the Corps in 1963, the current levee constrains the river channel, resulting in increased channel confinement, bedload aggradation, instability, and water quality impacts that are a factor in the current local shellfish closures. Dikes on both sides of the Dungeness have disconnected the river from its floodplain and disrupted river processes which prohibits flood waters from dissipating and inhibits the river's natural ability to store excess sediment outside the channel. Levee setback and channel restoration in this reach provides floodplain and side channel habitat critically-needed by salmon for spawning, rearing and migration. Riparian and instream habitat will also be restored. Priority species supported by these habitats are ESA- listed Puget Sound Chinook, Eastern Strait of Juan de Fuca Summer Chum, Coastal-Puget Sound Bull Trout, and Puget Sound Steelhead.



ID	NEAR TERM ACTION	DESCRIPTION
	16-1529 Upper Elwha River Protection	North Olympic Land Trust will protect some of the best salmon habitat in the Elwha River watershed in perpetuity with this funding. This project will up to 30 acres between river mile 8.1 and 8.3 along the mainstem of the Elwha River with a conservation easement. The property is Priority #10 in the Elwha watershed conservation prioritization tool. This property contains habitat characteristics indicative of the best existing salmon habitat and ecosystem function. The property has 1/3 mile of Elwha River shoreline. More than half of the property is in the floodplain, river meander zone, or at high risk of erosion. Much of the property contains a mature forest canopy, providing shade for the river which keeps water temperature cool for fish. This project will protect and restore habitat for the following ESA – listed species in the Elwha River: Chinook salmon, and steelhead and bull trout. Non-listed stocks of fish will also benefit including Coho, Chum, Pink, and Sockeye salmon and cutthroat trout.
	16-1375 Lower Elwha River Protection	North Olympic Land Trust will protect some of the best salmon habitat in the Elwha River watershed in perpetuity with this funding. This project will protect up to 32 acres between river mile 2.4 and 2.8 along the mainstem of the Elwha River with a conservation easement. The property is a high priority in the Elwha watershed conservation prioritization tool. This property contains habitat characteristics indicative of the best existing salmon habitat and ecosystem function. The property has over one mile of Elwha River shoreline. More than half of the property is in the floodplain, river meander zone, or at high risk of erosion. Much of the property contains a mature forest canopy, providing shade for the river which keeps water temperature cool for fish. This project will protect and restore habitat for the following ESA – listed species in the Elwha River: Chinook salmon, and steelhead and bull trout. Non-listed stocks of fish will also benefit including Coho, Chum, Pink, and Sockeye salmon and cutthroat trout.
	16-1369 Lower Hoko River Restoration Planning	The Lower Hoko River Restoration Project will create designs to restore up to 130 acres of priority salmon habitat for chinook, coho, steelhead, and chum salmon. The project will design the restoration of in-stream channel and floodplain functions of the lower 3.4 river miles of the Hoko River in western Clallam County, WA. The primary restoration component is the removal of railroad grade infrastructure that includes creosote pilings, concrete footings and fill material. Additional restoration elements include planting of floodplain forest and a plan for managing invasive species. The project scope will also consider the possible installation of large wood to the river and the potential for future acquisition of critical floodplain habitat.

**STRATEGY: D. IMPROVE LOCAL RIPARIAN CORRIDOR MANAGEMENT AND INSTREAM HABITAT**

Improve local management of freshwater and marine riparian corridors and instream habitat that would provide multiple benefits

Approaches, listed alphabetically, include:

- a. Conservation measures
- b. Restoration measures (Large Woody Debris)
- c. Restoration measures (Non-Large Woody Debris)

**Actions**

ID	NEAR TERM ACTION	DESCRIPTION
	14-1385 AR Dungeness Landscape Protection- RM1.5 to RM 6.5	The Dungeness River flows out of the Olympic Mountains across a glacial plain (west of Sequim, WA. in Clallam County) and then into the Strait of Juan de Fuca. Over the last century, a significant portion of the Dungeness River's floodplain was disconnected from the river through the construction of levees, roads, and structures. This acquisition/restoration project sponsored by the Jamestown S'Klallam Tribe will protect and restore previously identified Dungeness River floodplain properties between RM 6.5 and River Mile 1.5 through the purchase of property and/or conservation easements. High quality floodplain forest habitat, particularly those areas with side channels and other off-channel salmon habitat, is a priority for protection as is reconnection of lost floodplain. This is a new landscape-scale phase of an ongoing riparian habitat protection project. The goal of this phase is to protect approximately 200 acres and about 3.5 miles of main-stem/side channel. Some areas of the riparian forest have been cleared in the project reach. If cleared areas are a part of the acquisition, then they will be replanted and stewarded for three years to jumpstart floodplain reforestation. The completed project will benefit listed Chinook, bull trout, summer chum, and steelhead, non-listed, coho, pinks, and fall chum as well as creating additional recreation opportunities for fisherman, hikers, and bird watchers.
	14-1384 AR Dungeness Habitat Protection- RM 6.5 to 7.5 Phase	The Dungeness River flows out of the Olympic Mountains across a glacial plain (west of Sequim, WA. in Clallam County) and then into the Strait of Juan de Fuca. Over the last century, a significant portion of the Dungeness River's floodplain was disconnected from the river through the construction of levees, roads, and structures. This acquisition/restoration project sponsored by the Jamestown S'Klallam Tribe will protect and restore previously identified Dungeness River floodplain properties between RM 6.5 (Hwy101) and River Mile 7.5 through the purchase of property and/or conservation easements. High quality floodplain forest habitat, particularly those areas with side channels and other off-channel salmon habitat, is a priority for protection as is reconnection of lost floodplain. This is a new phase of an ongoing riparian habitat protection project. The goal of this phase is to protect approximately 15 acres and especially property with existing side channel habitat. Some areas of the riparian forest have been cleared in the project reach. If cleared areas are a part of the acquisition, then they will be replanted and stewarded for three years to jumpstart floodplain reforestation. The completed project will benefit listed Chinook, bull trout, summer chum, and steelhead, non-listed, coho, pinks, and fall chum as well as creating additional recreation opportunities for fisherman, hikers, and bird watchers.
	14-1374 P Little River LWD Planning Project	The Little River is a large, low to moderate gradient tributary to the Elwha River. The Little River flows into the Elwha River at the delta of the former Aldwell Reservoir and was one of the first locations colonized by

ID	NEAR TERM ACTION	DESCRIPTION
		<p>salmon following the removal of Elwha Dam in 2012. Although the headwaters of Little River are protected in Olympic National Park, a significant proportion of the drainage has been historically affected by riparian logging, intentional wood removal from the channel and road construction impacts. As a result, salmon habitat has degraded over time. Reductions in large woody debris have led to increased channel incision and subsequent reductions in pool frequency and complexity. Increases in shear stress on the channel bed associated with reductions of in-channel wood have led to a coarsening of the channel bed and increase in substrate dominated by cobble and small boulder size particles (loss of spawning gravels). This planning project includes dozens of private property owners and we will analyze existing conditions, and engineer designs to accomplish fish habitat restoration on those parcels that have willing landowners within the lower 1.5 miles of river. This planning project will result in a final design, cost estimate and permit package to restore and maintain spawning and rearing habitat using large wood in Little River for multiple salmonid species.</p>
	<p>13-1067 R Dungeness River Riparian Restoration</p>	<p>The North Olympic Salmon Coalition will use this grant to expand and enhance riparian forest area and health within the Dungeness River watershed in the Sequim area. Work to be completed includes riparian restoration projects resulting from outreach to riverside landowners, invasive weed management on 112 acres of active river channel, and implementation of native tree and shrub plantings along a minimum of 75 acres of priority salmon habitat within the Dungeness River watershed. The Salmon Coalition will be working with the Washington Conservation Corps, Jamestown S'Klallam Tribe, Clallam County Noxious Weed Board and others on this project which will benefit several priority species of salmon and fish: ESA-listed Hood Canal-Eastern Strait of Juan de Fuca Summer Chum, ESA-listed Puget Sound Chinook, ESA-listed Puget Sound Steelhead, ESA-listed Bull Trout, pink salmon (SASSI critical), coho salmon, and coastal cutthroat trout. In the Lower Dungeness, approximately 20% of riverbank riparian vegetation has been removed or significantly denuded. Healthy riparian areas affect the quality and quantity of viable salmon habitat. Properly functioning riparian forest areas provide shade, cover, and nutrient input, moderate water temperature, reduce excess algae growth, stabilize stream banks, control sediment, reduce flooding and contribute needed large woody debris and other organic matter which are all needed for healthy salmon habitat.</p>
	<p>13-1065 R Upper Dungeness Large Wood Restoration</p>	<p>The Jamestown S'Klallam Tribe proposes to construct 11 engineered logjams (ELJ's) to advance salmon restoration in two remote Upper Dungeness River reaches within the Olympic National Forest: the Dungeness River from river mile (RM) 13.2 to 14.7 and the Gray Wolf River from RM 0.3 to 2.5. Salmon and char habitat in these river reaches was severely degraded by historical large wood removal projects and has not recovered. Wood removal has ceased, but these reaches remain extremely lacking in wood-formed large deep pools and stable spawning habitat. The ELJ's will restore stable, complex spawning and rearing habitat by scouring pools, stabilizing spawning riffles, retaining salmon carcasses, providing cover, and engendering the formation of side channels and floodplain connectivity. The primary fish species to benefit from the project include endangered Puget Sound Chinook, Puget Sound steelhead, bull trout, Upper Dungeness pinks, and coho.</p>

ID	NEAR TERM ACTION	DESCRIPTION
	13-1078 R Elwha River Revegetation Support Phase 2	Removal of two large dams on the Elwha River began in 2011. Dam removal results in the conversion of 800 acres of former reservoirs back to free-flowing river, allowing salmon access to prime spawning habitat. The reservoirs revert to floodplain habitats characterized by islands and side-channels. A revegetation plan guides efforts to accelerate the recovery of woody plant communities, but there are insufficient project funds to fully implement this work. This proposal is designed to supplement and extend revegetation efforts by: 1) funding Elwha Klallam Tribal crews to conduct weed control and install 200,000 native woody plants and 3,000 pounds of native grass seed on the dewatered Aldwell and Mills reservoir surfaces, 2) fund Washington Conservation Corps(WCC) crews to support overall revegetation activities (planting, grass seeding, exotic plant control, positioning wood, greenhouse support, and seed collection, 3) relocate large wood to create safe planting sites on 42 acres at the former Mills reservoir and 4) purchase 113,000 native plants.WCC crews will also provide logistical support for overall revegetation efforts including needed construction trail access and staging areas to planting sites as well as transporting plant materials from the project greenhouse to staging and planting areas. The effect of these efforts will be to extend weed control efforts through 2018, triple planting efforts, and increase plant survival.
	16-1377 Morse Creek Riparian Conservation	The North Olympic Land Trust will protect in perpetuity 97.3 acres of land along Morse Creek with this funding. The project will protect approximately one river mile of important salmon habitat, needed riparian areas, and would also include the removal of the hydroelectric operation and spillway sitting beside Morse Creek. The project is expected to benefit four stocks of salmon and bull trout across multiple life history stages. Morse Creek is home to ESA-Listed bull trout, steelhead trout, and Chinook salmon. Morse Creek is also habitat for even & odd year Pink, Summer Chum, and Coho salmon, sea run cutthroat trout & even some Sockeye salmon (they may be strays). Restoration of Morse Creek and recovery of its salmon species is very important to our local tribes. The Lower Elwha Klallam Tribe and other partner organizations have been advancing habitat restoration along Morse Creek for decades. The proposed acquisition builds upon previous work just two miles downstream where the Washington Department of Fish and Wildlife and the North Olympic Salmon Coalition collaborated to protect over 137 acres and remainder an important stretch of Morse Creek.
	15-1200 Snow Creek Uncas Preserve Phase 2	The overall goal is to preserve and enhance the Snow Creek riparian corridor to ensure that conditions are optimal for spawning and rearing of ESA listed summer chum, steelhead, and other species, and to maintain resilience in the face of climate change. This stock of summer chum is categorized as Group 1 in the current HCCC stock scoring and the steelhead is categorized as Group 3. Jefferson Land Trust is seeking funding for fee-simple acquisition and restoration of the riparian habitat on an 8.74-acre and a 1.92-acre property around RM 1.3 of Snow Creek, located in Jefferson County. These 10+ acres include 5+ acres of riparian habitat to be protected and restored by planting native trees and shrubs to enhance the existing vegetation. These acquisitions will add to the 2012 Snow Creek Uncas Preserve that provides public access for low-impact nature walks and is a land-based learning site for 3 programs through 2 local school districts. Within the past

ID	NEAR TERM ACTION	DESCRIPTION
		<p>year the salmon, riparian habitat, and water quality of this Preserve has been studied and stewarded by over 100 local students. This stretch of Snow Creek, identified by WDFW as priority palustrine aquatic habitat, provides spawning and rearing habitat for endangered Hood Canal Summer Chum, winter steelhead, coho, and fall chum salmon and cutthroat trout. This project fills an unprotected gap in the ongoing protection and restoration of the Snow/Salmon watershed and Discovery Bay estuary supported by Chumsortium partners.</p>
16-1373	Little River Large Woody Materials	<p>The Little River is a large, low to moderate gradient tributary to the Elwha River. The Little River flows into the Elwha River at the delta of the former Aldwell Reservoir and was one of the first locations colonized by salmon following the removal of Elwha Dam in 2012. Although the headwaters of Little River are protected in Olympic National Park, a significant proportion of the drainage has been historically affected by riparian logging, intentional wood removal from the channel and road construction impacts. As a result, salmon habitat has degraded over time. Reductions in large woody debris have led to increased channel incision and subsequent reductions in pool frequency and complexity. Increases in sheer stress on the channel bed associated with reductions of in-channel wood have led to a coarsening of the channel bed and increase in substrate dominated by cobble and small boulder size particles (loss of spawning gravels). This planning project includes dozens of private property owners and we will analyze existing conditions, and engineer designs to accomplish fish habitat restoration on those parcels that have willing landowners within the lower 1.5 miles of river. This planning project will result in a final design, cost estimate and permit package to restore and maintain spawning and rearing habitat using large wood in Little River for multiple salmonid species.</p>
16-1427	Strait of Juan de Fuca Intensely Monitoring Watershed Restoration Project	<p>This project is a restoration action within the Strait of Juan de Fuca region Intensely Monitored Watershed Project (IMW). IMW is a statewide effort to evaluate the effects of watershed restoration on habitat and salmon abundance. Within the Strait complex, East Twin River and Deep Creek are treatment sites, while the West Twin River is a control watershed. Watershed restoration was initiated in Deep Creek in 1998 and in this proposal proposes to complete watershed restoration treatments by placing large wood in complex assemblages using a heavy lift helicopter. Wood placement will be designed to improve habitat conditions and restore floodplain connectivity. Wood will be placed in complex logs at 15 sites in lower Deep Creek between river mile 0.3-2.0. Treatments will be designed to improve over-winter habitat for coho salmon, improve summer habitat for steelhead and coho, and to improve spawning habitat for multiple species including coho, steelhead, chum, and cutthroat.</p>
16-1473	East Jefferson Summer Chum Riparian Phase 3	<p>The purpose of the North Olympic Salmon Coalition's (NOSC) East Jefferson Summer Chum Riparian Phase III planning and restoration project, in Jefferson County, WA, is to control knotweed that is establishing along the lower Snow Creek riparian corridor (mouth to RM 3) and restore riparian forest area and health on 30 acres of floodplain habitat on Chimacum and Snow creeks. The target invasive species, Knotweed ( Polygonum sp.) and Reed Canarygrass ( Phalaris arundinacea) have invaded the riparian areas of these two systems, resulting in a riparian corridor that is lacking in diversity and habitat quality. The project will restore</p>

ID	NEAR TERM ACTION	DESCRIPTION
		critical rearing and spawning habitat for ESA-listed Hood Canal Summer Chum and Puget Sound Steelhead, and Puget Sound Coho.

**STRATEGY: E. ELIMINATE FISH PASSAGE BARRIERS AND IMPROVE INSTREAM HABITAT**

Enhance implementation of high priority capital and non-capital fish barrier and excess sediment projects, including, but not limited to, those that are a part of the Lead Entity Salmon Recovery 4-Year Work Plans.

Approaches, listed alphabetically, include:

- a. Improve timber management
- b. Fish passage barrier removal

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0131 Advancing Western Strait Fish Passage Barrier Removal	Correcting fish passage barriers is a quick & high value way to restore habitat & allow salmon access to needed spawning and rearing areas. This NTA will address work needed to fix passage barriers in WRIA 19 .
	14-1379 R Hoko 9000 Road Abandonment	The Hoko River is the largest watershed in WRIA 19 and historically supported large populations of anadromous salmonids including chinook, coho, and chum salmon as well as steelhead and cutthroat trout. The 9000 Road parallels the Hoko River in Clallam County for 6.5 miles. The 9000 road has been a chronic producer of fine sediment to the Hoko River. The grade was constructed using large cut and fill surfaces that are potentially unstable. In 2000 and 2005 Rayonier attempted to stabilize the road. While the early efforts to reduce landslide potential were worthwhile, large areas of unstable fill from the original grade construction remain on the old road surface. These remaining fills have landslide potential and some have recently failed and directly delivered sediment to the upper Hoko River. We propose to abandon the stream adjacent portions of the 9000 road by removing fill and side-cast and removing seven culverts to remove the road cut to its original slope. We will remove six cross-drain culverts, and one culvert in a flowing stream. We will conduct erosion control and revegetate with native trees. Additionally, we propose to conduct a one-day helicopter flight to place 100 pieces of wood in a 1.5 mile reach of the Hoko River to improve spawning and rearing habitat. This project will protect spawning and rearing habitat by reducing the chances of direct delivery of sediment the Hoko River.

ID	NEAR TERM ACTION	DESCRIPTION
12-1102 R Hoko River 9000 Road Barrier Correction		<p>This project is part of a strategic effort to recover salmon in the upper Hoko Watershed, which is the largest and potentially most productive watershed in WRIA 19. The 9000 Road crosses the upper Hoko River at river mile 21.3. The road was originally constructed in the 1930's as a railroad grade; it was converted to a mainline logging road in the early 1960's. The existing crossing on the Hoko River is a 7' corrugated metal pipe that has an outlet drop of 5', is set at an 8% gradient and is considered a total barrier to anadromous fish. The Elwha Klallam Tribe, in partnership with Rayonier Timber and the Makah Tribe; removed the previous culvert structure and deep fill (40') and replaced it with a pre-fabricated steel bridge with a total span of 105'. The project also included placement of 40 key pieces of large wood to minimize headcutting following culvert removal and to help maintain and improve salmon habitat features in the Hoko River. The 9000 road crossing was the most significant remaining human-caused barrier in the headwaters of the Hoko River which supports coho, chinook, steelhead and cutthroat. Correction of this long standing barrier allows salmon access to approximately 1.9 mile of low gradient habitat above the road crossing as well as allow fluvial transport of sediment and large wood.</p>
15-1192 R Salmon Creek Bridge Construction(West Uncas Road)		<p>Jefferson County Public Works proposes a restoration project that will remove a fish passage barrier along Salmon Creek (RM 0.75) where it intersects with West Uncas Road (MP 0.804) through the construction of an 80 ft.- 84 ft x 29 ft. concrete bridge to replace a 60 ft. long, 15.5 ft. x 9.5 ft. rise, corrugated steel pipe arch culvert. In 2008 it was discovered that the existing culvert and rip rap prevent Summer Chum from accessing prime spawning habitat and limit habitat forming processes that have the potential to negatively impact nearby salmon spawning habitat. WDFW and Jefferson County implemented emergency measures from 2009-2014 to create step pools with sandbags and temporarily backwater the culvert to facilitate Summer Chum passage. The bridge will eliminate the fish passage barrier restoring the Chum access to 0.75 RM of high-quality protected upstream spawning habitat, essentially doubling the available spawning habitat in order for the run to remain stable over the long-term.</p>

**STRATEGY: F. ENHANCE NATIVE FISH AND SHELLFISH POPULATIONS**

Enhance native fish and shellfish populations by supporting implementation of projects and programs.

Approaches, listed alphabetically, include:

- a. Hatchery management
- b. Harvest management
- c. Native shellfish reintroduction
- d. Remove derelict fishing gear

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0143 Olympia Oyster Restoration Project in the Strait of Juan de Fuca	This project will expand or enhance Olympia oyster habitat restoration efforts in two WDFW target restoration sites in the Strait of Juan de Fuca. The restoration efforts will be used to engage the public in actions needed to restore Puget Sound.
	15-1569 WDFW Smolt Monitoring 2016	The purpose of this project is to monitor adult and juvenile salmonid abundance at selected high-priority sites associated with the Fish-In Fish-Out Framework as developed by the Governor's Monitoring Forum on Salmon Recovery and Watershed Health. This project fills information gaps in the Fish-In Fish-Out Framework in order to provide coordinated monitoring of adults and juveniles for at least one population in each Major Population Group per Evolutionary Significant Unit. Specifically, monitoring will occur for: <ul style="list-style-type: none"> <li>o Salmon Creek summer chum (juveniles); adult summer chum spawner escapement in Salmon and Snow Creeko</li> <li>o Duckabush summer chum (juveniles)o</li> <li>o Wind River coho (adults)o</li> <li>o Grays River coho and steelhead (juveniles)o</li> <li>o Touchet River summer steelhead (juveniles)</li> </ul> An annual report is part of the conditions recommended by the SRFB Monitoring Panel for this project. The "compiled report" for this project due mid-winter 2017, and to include earlier generated worksite reports.

**STRATEGY: G. IMPLEMENT LOCAL WATER RESOURCE MANAGEMENT PROGRAMS AND RULES**

Develop, adopt and/or implement Water Resources Management Programs and Rules

Approaches, listed alphabetically, include:

- a. Efficient agricultural use of water
- b. Implement instream flow rules
- c. Increase water storage capacity
- d. Minimize effects of public water systems



*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0309 Ground/Surface Water Assessment of Morse and Salt Creeks	Characterization of the ground/surface water interactions along the Morse and Salt Creek drainage basins in order to address critical information gaps important for the current implementation of watershed management plans and allocation of water rights.
	2016-0125 Dungeness Off-Channel Reservoir	Acquire property and complete final design and permitting for construction of a large off-channel reservoir to store spring snowmelt and winter runoff for use as late summer irrigation in place of Dungeness River water diversions.
	16-1370 Dungeness Off-Channel Reservoir Final Design	Clallam Conservation District and project partners are seeking to complete a final design for construction of a large off-channel reservoir in the Dungeness watershed. The proposed 1,500 acre-foot reservoir will be used to capture and store high flows from the Dungeness River and stormwater runoff. Stored water will be utilized for irrigation in the late summer, reducing late summer irrigation water diversions from the Dungeness River by an estimated 50 percent. The reduced water diversions from the river will result in substantial improvements to stream flow, thereby improving habitat for all species of salmonids in the Dungeness River. Stormwater that currently collects in the irrigation ditch and pipeline system and floods downstream areas in the City of Sequim will be intercepted and diverted to the reservoir.

**STRATEGY: H. ENHANCE ONGOING IMPLEMENTATION OF LOCAL SHORELINE AND LAND USE MANAGEMENT, PROTECTION, AND INCENTIVE PROGRAMS AND PLANS**

Enhance the ongoing implementation of shoreline and land use management, protection, and incentive programs and plans

Approaches, listed alphabetically, include:

- a. Enhance incentives for shoreline and upland landowners
- b. Enhance shoreline and land use plans and programs

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0280 Regional Local Regulatory Compliance Tracking Systems Pilot	Develop and implement an enhanced database and permitting system; unifying four regulatory, community development and env. protection agencies to improve coordination, processes, reg. compliance and public engagement with an eye toward regional expansion.

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0080 Dungeness Feeder Bluff Conservation	Working with already identified willing landowners to conserve unarmored feeder bluff shorelines in the Dungeness Drift cell by purchasing bluff edge parcels, relocating homes landward and purchasing conservation easements on unarmored parcels
	2014 STRT 22 Develop and adopt an updated Clallam County SMP	Note: A more detailed description was not needed here.

**STRATEGY: I. IMPLEMENT CLIMATE CHANGE ADAPTATION AND MITIGATION STRATEGIES FOR THE NORTH OLYMPIC PENINSULA**

Implement the climate change adaption strategies identified in the *Climate Change Preparedness Plan for the North Olympic Peninsula*. Develop and implement a mitigation plan that compliments the existing adaptation-focused Climate Change Preparedness Plan for the North Olympic Peninsula.

Approaches, listed alphabetically, include:

- a. Education
- b. Plan and code updates
- c. Agriculture and forestry programs
- d. Water conservation incentives

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0204 Climate Action Planning and Implementation on the North Olympic Peninsula	This NTA will enhance the Puget Sound Starts Here campaign to raise public awareness of the Sound’s health and provide umbrella support and resources for on the ground behavior change programs to promote best practices that support ecosystem recovery.

**STRATEGY: J. IMPLEMENT LOCAL STORMWATER MANAGEMENT AND POLLUTANT SOURCE CONTROL PROGRAMS USING A WATERSHED MANAGEMENT APPROACH**

Develop, adopt, and/or implement Stormwater Management and Pollutant Source Control programs and work to Coordinate Implementation of these Programs using a Watershed-Based Approach

Approaches, listed alphabetically, include:

- a. Implement pollutant source control programs
- b. Implement stormwater management programs

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0252 Clallam County TMDL Pre-Assessment	The habitat assessment will determine the extent, quantity, and quality of potential spawning and rearing habitat features for aquatic species, especially for native kokanee and other salmonids.
	2016-0202 Bell Creek Basin Assessment	This project would assess storm flows in the Bell Creek basin given increasing storm intensity and growth projections, and use modeling to evaluate alternative strategies for stormwater management to best protect and improve water and habitat quality.
	2016-0340 Keep Puget Sound Sewage Free	Assess alternative approaches for managing and treating biosolids in order to reduce toxic loading into Puget Sound.
	2016-0199 GreenLink Watershed Plan for Bell Creek Basin, Sequim and Clallam County	Create a watershed-based plan and conduct public engagement to identify practical, implementable green infrastructure projects and recommendations to improve surface and groundwater quality, habitat, and community assets for the Bell Creek basin.
	2016-0021 Makah Hake Plant Above Ground Storage Tank Clean Up	Remove a 300,000-gallon aboveground storage tank in Neah Bay, a site recognized as a brownfield site by the U.S. Environmental Protection Agency and located 340 feet from the Strait of Juan De Fuca and harvestable shellfish beds.
	2014 STRT 32 Update, adopt, and implement the Clallam County Stormwater Mgt. Plan	Update and implement the Clallam County Stormwater Management Plan, including adoption of LID incentives and ordinances to support stormwater management.
	2014 STRT 29 Implement City of Port Angeles CSO reduction projects	Implement suite of CSO Phase 1 and Phase 2 projects to reduce CSO overflow events into the Port Angeles Harbor to one per outfall per year on average.

**STRATEGY: K. ENHANCE IMPLEMENTATION OF WATER QUALITY CLEAN UP PLANS**

Enhance the ongoing implementation of water quality clean-up plans within the Sequim-Dungeness and Eastern Jefferson Clean Water Districts and other high priority efforts within the Strait Action Area

Approaches, listed alphabetically, include:

- a. Onsite septic system (OSS) programs
- b. Pesticide and fertilizer reduction programs
- c. Pollutant identification and correction (PIC) programs

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0389 Discovery Bay-Port Townsend Pollution Identification and Correction	Will assess bacteria and nutrient pollution in the Discovery Bay watershed and Port Townsend; analyze water quality trends, extend existing data; Enforce septic corrections and prioritize agricultural BMPs, helping to protect 5000 acres of shellfish beds.
	2016-0319 Implement Clallam County’s Enhanced Pollution Identification and Correction Program in the Marine Recovery Area	Clallam Co.’s Enhanced PIC program at Meadowbrook Creek/Slough and up-watershed to Matriotti Creek--goals include increasing harvestable shellfish beds, water quality monitoring, identifying and correcting sources of pollution (i.e. OSS, ag, pet waste)
	2016-0251 Enhanced Onsite Sewage Systems in Clallam County’s Marine Recovery Area	We would coordinate monitoring of 303(d) Impaired waters to:•De-prioritize segments which are no longer Impaired•Identify additional segments needing remediation•Facilitate local cleanups and/or TMDLs

**STRATEGY: L. ENHANCE SUPPORT FOR OIL SPILL PREPAREDNESS, PREVENTION, AND RESPONSE**

Support improvements in oil spill prevention, preparedness, and response, within the Strait Action Area and adjacent waters.

Approaches, listed alphabetically, include:

- a. Preparedness
- b. Prevention
- c. Response
- d. Tribal and local collaboration and involvement

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0362 Transboundary Vessel Safety Summit2	Promote and coordinate the proactive use of maritime risk assessments by holding a transboundary vessel safety summit in 2017 to establish strategic priorities for enhancing vessel oil spill prevention, preparedness, and response in the region.
	2016-0400 Higher Volume Port Area Evaluation	Complete a study, based on the 2010 Puget Sound Vessel Traffic Risk Assessment Final Report, to verify that the maritime shipping community has sufficient, highly capable oil spill response resources available to respond to major oil spills to support Puget Sound recovery.
	2016-0359 Establish a Tribal Oil Spill Caucus2	Expand tribal participation in the Vessel Traffic Risk Assessment steering committee and other regional forums addressing vessel traffic and oil spills.

**STRATEGY: M. ENHANCE LOCAL COMMUNICATION, EDUCATION, BEHAVIOR CHANGE, AND PUBLIC INVOLVEMENT**

Enhance local communication, behavior change, and public involvement efforts on the North Olympic Peninsula by increasing awareness and education of K-12 students and the general public, but with primary emphasis on implementing projects or programs that will lead to increased public involvement & supporting land and shoreline owners’ efforts to accomplish specific and measureable ecosystem recovery improvements “on-the-ground”.

Approaches, listed alphabetically, include:

- a. Farm and OSS owner education, behavior change, and public involvement
- b. Local Oil spill education, behavior change, and public involvement
- c. Shoreline landowner education, behavior change, and public involvement
- d. Upland landowner education, behavior change, and public involvement
- e. Water resource education, behavior change, and public involvement

*Actions*

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0197 Discovery Bay Landowner Outreach	A neighborhood-based outreach program in Discovery Bay will support current shoreline armor removal, water quality and PIC programs. Outreach in site-based educational programs will increase likelihood of changed behaviors for landowners

ID	NEAR TERM ACTION	DESCRIPTION
	2016-0107 Engaging the Community in Strait Ecosystem Recovery	WSU Extension, the North Olympic Salmon Coalition, and Feiro Marine Life Center will partner to provide training and engage community volunteers in implementing Strait ERN habitat NTAs.
	2016-0138 Oil Spill Trainings to Increase Preparedness of the Local Communities	Increase the capacity of volunteers to assist in an oil spill response by providing Hazwoper and oiled wildlife trainings. Raise the general awareness in the communities about oil spills and how residents can contribute to cleanup efforts.

## 6.0 GAPS, BARRIERS, AND NEEDS

LIOs were asked to identify barriers, gaps and resource needs as they relate to ecosystem recovery planning. These include both local and regional gaps, barriers and needs and are summarized in the Table 5.

Throughout the development of our Conceptual Models and Local Strategies / Results Chains, we compiled a comprehensive list (see Table 5) of various Data Gaps (e.g., assessments, etc.) and Barriers (e.g., policy, regulatory, enforcement, monitoring, reliable funding for local actions, and staff capacity) that may inhibit our ability to achieve results. What's needed to eliminate these Gaps and Barriers was also identified. Most of these Data Gaps and Barriers are specific to a particular Local Strategy and respective Results Chain, whereas some are universal across all.

Table 5 Barriers to accomplishing ecosystem recovery in the LIO area.

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
All 13 Local Strategies / Results Chains	Lack of reliable and sufficient action implementation funding (Barrier - Funding)	Unreliable and insufficient funding for local actions that contribute to regional recovery	Reliable and sufficient funding for local actions that contribute to regional recovery projects and programs
All 13 Local Strategies / Results Chains	Limited staff capacity to implement actions (Barrier - Capacity)	Insufficient staff capacity to implement actions	Funding for sufficient staff capacity to implement actions
All 13 Local Strategies / Results Chains	Limited coordination capacity (Barrier - Capacity)	Insufficient staff capacity to coordinate local processes (e.g., LIO, Lead Entity, Marine Resource Committees)	Funding for sufficient staff capacity to coordinate local processes (e.g., LIO, Lead Entity, Marine Resource Committees)
A. Drift Cell and Shoreline Conservation and Restoration	Parcel-by-parcel (drift cell) analyses (Data Gap - Assessment)	Parcel-by-parcel assessments of drift cells are lacking for the entire Strait ERN LIO geography	Funding for parcel-by-parcel assessments of drift cells for the entire Strait ERN LIO geography
	Outdated Limiting Factors Analyses (Data Gap Assessment)	Salmonid Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17 are out of date	Funding for updating the Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17.
B. Estuary Conservation and Restoration (rivers, streams, pocket estuaries)	Parcel-by-parcel (estuary) analyses (Data Gap - Assessment)	Parcel-by-parcel assessments of estuarine shorelines are lacking for the entire Strait ERN LIO geography	Funding for parcel-by-parcel assessments of estuarine shorelines for the entire Strait ERN LIO geography
	Functional estuary assessments (Data Gap - Assessment)	Assessments of all apparently functional estuaries are lacking	Funding for assessments of all apparently functional estuaries
	Pocket estuary habitat trend analyses (Data Gap - Assessment)	Historical analyses of habitat trends for all pocket estuaries are lacking	Funding for historical analyses of habitat trends for all pocket estuaries

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
	Outdated Limiting Factors Analyses (Data Gap Assessment)	Salmonid Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17 are out of date	Funding for updating the Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17.
C. Floodplain Conservation and Restoration	Parcel-by-parcel (floodplain) analyses (Data Gap - Assessment)	Parcel-by-parcel assessments of floodplains for the entire Strait ERN LIO geography is lacking	Funding for parcel-by-parcel assessments of floodplains for the entire Strait ERN LIO geography
	Outdated Limiting Factors Analyses (Data Gap Assessment)	Salmonid Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17 are out of date	Funding for updating the Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17.
D. Improve Riparian Corridor Management and Instream Habitat	Outdated Limiting Factors Analyses (Data Gap Assessment)	Salmonid Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17 are out of date	Funding for updating the Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17.
E. Eliminate Fish Passage Barriers and Excess Sediment	Outdated Limiting Factors Analyses (Data Gap Assessment)	Salmonid Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17 are out of date	Funding for updating the Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17.
F. Enhance Native Fish and Shellfish Populations	Outdated Limiting Factors Analyses (Data Gap Assessment)	Salmonid Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17 are out of date	Funding for updating the Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17.
	Olympia Oyster priority actions not fully implemented (Barrier – Funding & Regulatory)	Recommended priority actions for enhancement of native Olympia oyster populations in Discovery Bay and Sequim Bay have been identified by WDFW and Jefferson/Clallam MRCs, but not fully implemented. Enhancement projects lack sufficient funding for capacity and availability/sources of seeded cultch and clean shell where populations are small but stable. Regulatory barriers include difficulties working near eelgrass beds, even though some enhancement techniques do not negatively affect eelgrass.	Increases in populations of native shellfish need to either be: a.) Elevated to a first-tier priority from the current second-tier for the Shellfish Strategic Initiative or, perhaps more appropriately, b.) Identified as a high priority within the Habitat Strategic Initiative. Increased funding for enhancement efforts and capacity. Guidelines need to be developed, in conjunction with regulatory agencies, to reflect restoration goals that benefit both eelgrass and native oyster populations.
	Availability of suitable tidelands for shellfish enhancement is lacking (Barrier – Funding & Regulatory)		



Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
	Reintroduction of abalone is a technical challenge (Data Gap - Technical)	Reintroduction of abalone along the Strait is a technical challenge due to sparse populations and spawning issues	
G. Implement Local Water Resource Management Programs and Rules	Inconsistent implementation and enforcement (Barrier - Enforcement)	Lack of procedures for consistent implementation and enforcement of Water Resource Management Program and Rules	Assure local governments have consistent procedures to implement and enforce Water Resource Management Programs and Rules
	Water Resource Management Rule legal challenges (Barrier – Regulatory)	Water Resource Management Rules face legal challenges that may affect local implementation	Resolve Water Resource Management Rule legal challenges
	Outdated water laws (Barrier - Regulatory)	Water laws don't match the needs of society in Washington State	Political support to update water laws to meet local needs in Washington State
	Outdated exempt well statute (Barrier – Regulatory)	Exempt well statute is outdated in Washington State	Political support to update exempt well statute to meet local needs in Washington State
	Recharge project hydrological constraints (Data Gap – Assessment)	Hydrological constraints associated with recharge projects are not well understood	Funding to understand hydrological constraints associated with recharge projects
	Water resource data gaps (Data Gap – Assessment)	Various Water Resource Management data gaps remain unfilled	Funding to fill most important data gaps to better inform development and implementation of Water Resource Management Programs
	Local Water Resource Management Program effectiveness (Data Gap – Assessment)	Effectiveness of existing local Water Resource Management Programs are not well understood	Funding to develop and implement a program to understand the effectiveness of local Water Resource Management Programs
	New domestic well metering (Data Gap – Assessment)	New domestic wells are not metered (including flow and volume) for usage	Funding to develop and implement a program to meter all new domestic wells
	Outdated Limiting Factors Analyses (Data Gap – Assessment)	Salmonid Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17 are out of date	Funding for updating the Limiting Factors Analyses (LFA) for Watershed Resource Inventory Areas (WRIA) 19, 18, and 17.
H. Enhance Ongoing Implementation of Local Shoreline and Land Use Management Protection, and Incentive Programs and Plans	Lack of a Conservation Futures Program in Clallam County (Barrier – Funding)	Clallam County lacks funding for a Conservation Futures Program	Stable funding for a Conservation Futures Program in Clallam County
	WSDOT road relocation priorities (Barriers – Policy)	WSDOT road relocation priorities do not reflect local ecosystem protection and recovery priorities	Assure WSDOT policies on road relocation priorities align with local ecosystem protection and recovery priorities
	Olympic Discovery Trail (ODT) railroad grade (Barrier – Policy)	ODT hard-armoring associated with converted railroad grade is obstructing marine shoreline functions	Funding to determine feasibility and acceptability of relocating ODT away from marine shoreline to allow for removal of hard-armored railroad grade

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
	SMP and CAO Best Available Science (Barrier – Policy)	Best Available Science (BAS) may not be fully utilized when updating local SMPs and CAOs	Assure local governments have access and capacity to fully utilize BAS when updating all local SMPs and CAOs
	SMA shoreline use enforcement (Barrier – Enforcement)	Uses of shorelines required by SMPs may not be well enforced	Assure local governments have sufficient capacity to fully enforce SMP uses of shorelines (E14)
	Unpermitted shoreline armoring enforcement (Barrier – Enforcement)	Unpermitted shoreline armoring may not be well enforced	Assure that regulators have sufficient enforcement capacity to prevent unpermitted shoreline armoring
	Permitted shoreline armoring enforcement (Barrier – Enforcement)	Permitted shoreline armoring may not be well enforced	Assure that regulators have sufficient capacity to enforce permitted shoreline armoring
	SMA and CAO riparian area ordinance enforcement (Barrier – Enforcement)	SMA and CAO ordinances, designed to protect marine and freshwater riparian areas, may not be well enforced	Assure that SMA and CAO regulators have sufficient capacity to enforce ordinances that are designed to protect marine and freshwater riparian areas
	WAC single family residence exemptions (Barriers – Regulatory)	Single family exemption in WAC does not allow for sufficient protection of shorelines	Political / policy support to modify single family exemption in WAC to better protect shorelines
	Public acquisition authority is limited in applicability and/or feasibility (Barrier – Regulatory)	Use of public acquisition authority for private lands is not always applicable and/or feasible.	Political / policy support to modify regulations to allow for public acquisition authority of private lands
	Sediment-blocking shoreline structures (Barrier – Regulatory)	Shoreline structures block sediment transport and deposition that create and support habitat	Political / policy support to develop new regulations that prohibit shoreline structures that block sediment transport and deposition
	SMP and CAO bluff edge structure setbacks (Barrier – Regulatory)	Structure setbacks from bluff edge in SMPs and CAOs is insufficient	Political / policy support to develop more protective structure setbacks (from bluff edge) in SMPs and CAO regulations and ordinances
	Existing single family residence shoreline armoring (Barrier – Regulatory)	Permits for SFR to maintain existing armoring are not designed to minimize cumulative effects on shoreline function	Political / policy support to design permits for maintaining existing SFR shoreline armoring that minimize the cumulative effects on shoreline function
	Functioning pocket estuary development (Barrier – Regulatory)	Development along functioning pocket estuaries is not prohibited	Political / policy support to develop new regulations to prohibit development along functioning pocket estuaries
	Marine and freshwater SMP and CAO riparian protection (Barrier – Regulatory)	Protective measures for marine and freshwater riparian areas in SMPs and CAOs may be insufficient	Political / policy support to develop more protective marine and freshwater riparian measures in SMPs and CAOs
	Small forest landowner riparian exemptions (Barrier – Regulatory)	Small forest landowner riparian exemptions are allowed in Hydraulic Code Permits (HCP)	Political / policy support to remove small forest landowner riparian exemptions from HCPs

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
	USACE exemptions (Barrier – Regulatory)	USACE exemptions are not limited to just emergency actions	Political / policy support to limit USACE exemptions to only emergency actions
	New development in active floodplains (Barrier – Regulatory)	New development is allowed in active floodplains	Political / policy support to develop regulations and ordinances that prohibit new development in active floodplains
	Capital facilities in Coastal Management Zones (Barrier – Regulatory)	Construction of capital facilities are allowed in CMZs	Political / policy support to prohibit construction of capital facilities in CMZs
	Clean Water Act (CWA) / Endangered Species Act (ESA) non-flood damage exemptions (Barrier – Regulatory)	CWA / ESA allows for non-flood damage exemptions	Political / policy support to modify CWA / ESA to prohibit all non-flood damage exemptions
	Non-mitigated bank hardening (Barrier – Regulatory)	Non-mitigated bank hardening is allowed along shorelines	Political / policy support to modify regulations and ordinances to prohibit bank hardening, except where mitigated, along shorelines
	Emergency construction permit mitigation (Barrier – Regulatory)	All emergency construction permits are not designed to effectively mitigate damage to ecosystem	Political / policy support to modify permits for all types of emergency construction so that they are designed to effectively mitigate damage to ecosystem
	SMP No Net Loss (NNL) Effectiveness (Data Gap – Assessment)	Effectiveness of local SMP NNL of shoreline function policy is unclear	Funding to develop and implement a NNL framework to evaluate and track local SMP effectiveness on an ongoing basis
I. Implement Climate Change Adaptation and Mitigation Strategies for the North Olympic Peninsula <i>(Note: Identifiers in parentheses refer to “Immediate” and “Intermediate” timeframe adaptive management strategies from our “Climate Change Preparedness Plan for the North Olympic Peninsula”. A webpage link to this document is included within the Reference section of this Plan.)</i>	Water supply monitoring (Barrier – Monitoring)	Water supply monitoring is insufficient	Funding to enhance existing water supply monitoring (WS4)
	Restoration site flow monitoring (Barrier – Monitoring)	Comprehensive flow monitoring is insufficient at restoration sites	Funding for comprehensive flow monitoring at restoration sites (E19)
	Freshwater and marine harmful algal bloom monitoring (Barrier – Monitoring)	Monitoring for freshwater and marine harmful algal blooms is not routinely conducted	Funding for routine monitoring of freshwater and marine harmful algal blooms (E11)
	Low-cost citizen monitoring and analyses programs (Barrier – Monitoring)	Low-cost citizen monitoring and analyses programs are limited in capacity and scope	Funding for developing and implementing low-cost citizen monitoring and analyses programs (E10)
	SMA shoreline use enforcement (Barrier – Enforcement)	Uses of shorelines required by SMPs may not be well enforced	Assure local governments have sufficient capacity to fully enforce SMP uses of shorelines (E14)
	Climate Change illustration tools (Data Gap – Habitat)	Tools to graphically illustrate Climate Change effects are lacking	Funding to develop a tool to graphically illustrate local Climate Change effects (E7)
	Critical Areas flooding potential (Data Gap – Habitat)	Mapping of flood potential, beyond FEMA, is lacking for Critical Areas	Funding to develop maps showing flood potential, beyond FEMA, for Critical Areas (C6)
	Water storage and groundwater recharge options (Data Gap – Water Quantity)	Options for water storage and groundwater recharge are not well understood	Funding to assess options for water storage and groundwater recharge (WS6)

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
	Water retention services valuation (Data Gap – Water Quantity)	Water retention services are not valued	Funding to assess the valuation of water retention services (WS10)
	Evaluation of available water resources (Data Gap – Water Quantity)	Available water resources are not fully understood	Funding to evaluate all available water resources
	Regulatory framework for water hauling / delivery / catchment / storage (Barrier - Regulatory)	Regulatory framework for hauling / delivery / catchment / storage of water is lacking	Funding to determine feasibility and a regulatory framework for hauling / delivery / catchment / storage of water (WS23)
	Climate Change effects on hydrologic regimes (Data Gap – Water Quantity)	Effects of Climate Change on hydrologic regimes are poorly understood	Funding to evaluate effects of Climate Change on hydrologic regimes (WS9)
	Insufficient watershed and nearshore habitat restoration (Barrier – Funding)	Habitat restoration in watersheds and along nearshore needs to be enhanced to adapt to the effects of Climate Change	Funding to support and enhance watershed and nearshore habitat restoration (E-18)
	Local land-based pollutant sources (Barrier – Capacity)	Nutrient laden land-based pollutant sources can potentially exacerbate the acidification of local marine waters	Capacity to strengthen local source control programs to reduce land-based pollutants that potentially enhance acidification in local marine waters (E-31)
	Availability and selection methodology of climate sensitive tree species in riparian buffers is lacking (Data Gap – Habitat)	Comprehensive selection and planting of climate sensitive tree species within riparian buffers is lacking	Capacity to select and plant climate sensitive tree species in riparian buffers (E-33)
J. Implement Local Stormwater Management Programs using a Watershed Management Approach	Local comprehensive stormwater monitoring (Barrier – Monitoring)	Local comprehensive stormwater monitoring is lacking	Funding to develop and implement local comprehensive stormwater monitoring program, one that includes metals, toxics, and pathogens
	Outdated TMDL data (Barrier – Monitoring)	TMDL data in high priority watersheds is outdated	Funding to update TMDL data in high priority watersheds
	Freshwater and marine harmful algal bloom monitoring (Barrier – Monitoring)	Routine monitoring of freshwater and marine harmful algal blooms is lacking	Ongoing funding to develop and implement a program to routinely monitor for freshwater and marine harmful algal blooms (E11)
	Low-cost citizen monitoring programs (Barrier – Monitoring)	Low-cost citizen monitoring programs are limited in capacity and scope	Ongoing funding to develop and implement low-cost citizen monitoring programs
	Limited stormwater management enforcement (Barrier – Enforcement)	Local stormwater management enforcement programs are limited	Funding to enforce stormwater management regulations and ordinances in all local jurisdictions
	Harmful (or toxic) chemicals (Barrier – Regulatory)	Harmful (or toxic chemicals) in stormwater runoff are not banned as effective source control	Political / policy support to ban harmful chemicals from use as a source control technique
	Economic incentives for safer, less toxic, chemical products (Barrier – Policy)	Lack of economic incentives for safer, less toxic, chemical alternatives	Political / policy support to develop economic incentives for safer, less toxic, chemical alternatives

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
	Low Impact Development (LID) disincentives (Barrier – Policy)	Disincentives for landowners to implement LID principles and practices	Political / policy support to develop economic and other incentives to encourage landowners to implement LID principles and practices, including retaining vegetated cover, reducing impervious surfaces, and BMPs
	Alternatives to less-toxic chemicals (Data Gap – Assessment)	Alternatives to less-toxic chemicals are not identified nor readily available	Funding to identify and make readily available less harmful alternatives for these chemicals
K. Enhance Ongoing Implementation of Water Quality Clean Up Plans (Sequim-Dungeness and Eastern Jefferson Clean Water Districts)	Stable OSS program funding (Barrier – Capacity)	Stable funding for WAC mandated local OSS programs is lacking	Secure stable funding for WAC mandated local OSS programs
	Local water quality monitoring (Barrier – Monitoring)	Local water quality monitoring program is limited	Funding to expand local water quality monitoring programs
	Out-of-date TMDL data (Barrier – Monitoring)	TMDL data is out of date in most watersheds	Funding to update TMDL data in high priority watersheds
	Regulatory enforcement (Barrier – Enforcement)	Regulatory enforcement programs are inadequate	Political / policy support from elected officials and staff to work together to enhance regulatory enforcement
	Harmful algal bloom monitoring (Barrier – Monitoring)	Monitoring for harmful algal blooms is not routinely conducted	Funding for routinely monitor for harmful algal blooms (E11)
	OSS technology limitations (Data Gap – Technical)	OSS technology to treat or filter nutrients and pathogens (fecals) is limited	Advance OSS technology to effectively filter or treat for nutrients and pathogens (fecals)
L. Enhance and Support Improvements to Regional, Tribal, and Local Oil Spill Preparedness, Prevention, and Response <i>(Note: Strait Barriers and Gaps with RMM # identifiers, included here and represented within the Results Chain, support most of the top 9 preventative Risk Mitigation Measures (RMM) identified for Puget Sound. See the RMMs cited within the 2016 Salish Sea Oil Spill Risk Mitigation Workshop Summary Report for more information. A webpage link</i>	LIO oil spill “table” capacity (Barriers – Capacity)	LIO capacity to regularly participate at oil spill “table” is insufficient	Staff capacity is needed to regularly participate at the appropriate oil spill “table”
	Strait data gaps (Data Gaps)	Data gaps, including a comprehensive Ecosystem Services Valuation, remain unfilled	Funding to fill the highest priority data gaps along the Strait, including completion of a comprehensive Ecosystem Services Valuation
	Post-spill emergency permitting (Data Gap)	Post-spill emergency permitting options are not identified and available	Policy and funding support to identify and allow for post-spill emergency permitting options
	Out-of-date Strait GRP (Data Gap)	Strait GRP is out of date; not a high priority for Ecology to update	Policy and funding support to raise priority and implement an update of Strait GRP
	GRP forage fish spawning data (Data Gap)	Up to date forage fish spawning data are not routinely included in GRPs	Policy support to include the most up to date forage fish spawning data in all GRPs
	NRDA baseline valuation damage assessments (Data Gap)	NRDA baseline valuation damage assessments are incomplete	Funding to complete all NRDA baseline valuation damage assessments
	“Zone of No Save” analyses incomplete RMM #3 (Data Gap)	“Zone of No Save” analyses is incomplete, including an Emergency Response Towing Vessel location assessment	Policy and funding support to complete a “Zone of No Save” analysis, including an Emergency Response Towing Vessel location assessment
	Tug escort requirements RMM #1 (Data Gap)	Tug escort requirements are not identified	Policy support to identify and implement tug escort requirements

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
<i>to that report is included within the Reference section of this Plan.)</i>	Redundancy requirements, by vessel type (Data Gap)	Redundancy requirements, by vessel type, are missing	Policy support to identify and implement redundancy requirements, by vessel type
	Propulsion fuel carrying capacity (Data Gap)	Propulsion fuel carrying capacities, by vessel type and size, are unknown	Policy support to identify and utilize propulsion fuel carrying capacities, by vessel type and size
	Individual tanker incident and accident history (Data Gap)	History of individual tanker incidents and accidents is unknown	Policy support to identify and utilize the history of incidents and accidents, by individual vessel
	Comparison of U.S. and Canadian vessel requirements (Data Gap)	Requirements for U.S. vessels relative to Canadian vessels are unclear	Policy and funding support to compare and analyze requirements for U.S. and Canadian vessels
	Shipping lane boundary location alarms (Data Gap)	Feasibility of shipping lane boundary location alarms is unknown	Policy and funding support to determine the feasibility of shipping lane boundary location alarms
	Economic drivers as risk analyses criteria (Data Gap)	Local and regional economic drivers are not integrated into risk analyses	Funding to analyze and integrate local and regional economic drivers into all risk analyses
	Carrying capacity analyses (Data Gap)	Understanding of carrying capacity of individual vessels is incomplete	Funding to analyze carrying capacity for individual vessels
	Local and state agency preparedness inconsistency (Data Gap)	Policies, data, and geographic boundaries among state and local agencies (including local emergency preparedness) are inconsistent and not well coordinated when updating GRPs	Policy and funding support to analyze and assure that policies, data, and geographic boundaries among state and local agencies (including local emergency preparedness) are consistent and well coordinated when updating GRPs
	Response / contingency plan resource verification (Data Gap)	Resources to implement response / contingency plans are not routinely verified	Policy and funding to routinely verify resources that would be called upon when implementing response / contingency plans
	Federal agency policy consistency and coordination (Barrier – Policy)	Policies among federal agencies (e.g., DOI, NOAA, etc.) are inconsistent and not well coordinated	Policy support to assure that policies among federal agencies (e.g., DOI, NOAA, etc.) are consistent and well coordinated
	Oil dispersant policies (Data Gap)	Policies on the use of dispersants during oil spill events are not well determined nor publicized	Policy and funding support to determine and publicize the use of dispersants in advance of oil spill events
	Increase focus on high risk areas RMM #4 (Barrier – Policy)	High risk areas lack focus	Policy support to increase focus on high risk areas
	Tribal oil spill event liaisons (Barrier – Policy)	Dedicated points of contact for each Tribe are not identified to serve as liaisons during oil spill events	Policy support to proactively identify dedicated points of contact for each Tribe who would serve as liaisons during spill events
	“Develop and implement an OPA-like” regional advisory council RMM #2 (Barrier – Policy)	Puget Sound lacks an “OPA-like” regional advisory council that includes Tribes and local representatives	Policy and funding support to develop and implement an “OPA-like” regional advisory council for the Salish Sea and adjacent coast, that includes Tribal and local representatives

Local Strategy / Results Chain	Barriers and Data Gaps	Detailed Description	Resources Needed to Overcome
	Preposition Best Available Technology (BAT) equipped tugs identified and stationed RMM #3 (Data Gap)	Prepositioned BAT equipped tugs are not identified nor stationed	Policy and funding support to assure that BAT equipped tugs are identified and prepositioned at key stations
	Advanced high-level Transboundary coordination RMM #5 (Barrier – Policy)	High-level Transboundary oil spill prevention, preparedness, and response is not well coordinated	Policy support to significantly advance coordination of high-level Transboundary oil spill prevention, preparedness, and response
	Pending Risk Mitigation Measures implemented RMM #6 (Barrier – Policy)	Pending Risk Mitigation Measures include, for example, increased Automatic Identification System (AIS) carriage; Vessel Traffic Service (VTS) upgrades; protected fuel tanks; 46 CFR M <sup>1</sup> , fishing vessel inspections ( <sup>1</sup> Inspection standards for commercial towing vessels).	Policy support to implement these Risk Mitigation Measures
	Two-person minimum bridge watch required RMM #8 (Barrier – Policy)	Require a minimum two-person bridge watch on a.) Tugs towing laden barges carrying pollutants in the Vessel Traffic Service zone; and b.) Commercial vessels in reduced visibility conditions.	Policy support that requires two-person bridge watches
M. Enhance Local Communication, Education, Behavior Change, and Public Involvement Programs	Local behavior change research (Data Gap)	Behavior change research along Strait of Juan de Fuca and North Olympic Peninsula is lacking	Funding support to conduct behavior change research along Strait of Juan de Fuca and on the North Olympic Peninsula
	Water Rights Rule compliance (Data Gap)	Water Rights Rule compliance is not fully assessed	Funding support to assess compliance with Water Rights Rules

## 7.0 ADAPTIVE MANAGEMENT

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Adaptive management is an iterative process intended to be used early and often during planning and other project and program stages in order to: 1) raise key questions for managers, governmental, and non-governmental entities regarding the optimum approach for achieving recovery goals; 2) design ways to answer those questions and address major issues; and 3) incorporate new monitoring data and other relevant information into decision making to improve salmon recovery program design and implementation. Adaptive management can help address questions about how to make progress and attain our recovery goals, as well as identify the impact of proposed actions. Adaptive management allows for flexibility to be incorporated into design and implementation due to uncertainty and the need to adjust based on future conditions.

### ADAPTIVE MANAGEMENT IN THE STRAIT ERN LIO

At present, the Strait ERN LIO does not have a Strait Action Area-wide comprehensive monitoring and adaptive management program. Salmon recovery organizations however, have worked collaboratively to complete Phase 1 of a Monitoring and Adaptive Management Plan for Elwha and Dungeness Chinook, with Phase 2 to follow, depending on funding availability. Extensive monitoring is being conducted within the Elwha River watershed and nearshore to understand the recovery of the ecosystem and fish populations, post dam removal. Biological and water quality monitoring does occur within other portions of the Strait Action Area, but in many cases is conducted on a project specific basis that's often tied to available grant funding for a limited time period. Streamkeepers of Clallam County, a long-running volunteer program, provides monitoring services to various watershed planning groups and habitat restoration project sponsors within the county, but resources and capacity to do this work is quite limited and mostly grant funded.

Clearly, there is a need to develop a Strait Action Area-wide comprehensive and well-coordinated monitoring and adaptive management program, one that leverages and enhances existing efforts. Development of such a program would require initial funding, perhaps in the form of an NTA within some future biennium. It's important to point out that implementation of a program will require a long-term stable funding source.



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## GLOSSARY OF TERMS

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**Ecological components** - Ecological components (components) are the things (beyond human wellbeing) the LIO cares about conserving. They can be individual species, habitat types, ecological processes, or ecosystems chosen to encompass the full breadth of conservation objectives for the LIO geography. Components can be consistent with Puget Sound Vital Signs (e.g. Estuaries or Chinook) or, if LIO interests are not well captured by PSP's adopted Vital Signs, they can go beyond the scope of the Vital Signs (e.g. Small Tributaries or Steelhead). They should be representative of the priority biophysical parts of the ecosystem the LIO would like to recover.

**Human Wellbeing components** are the priority aspects of human wellbeing directly related to the health of the natural environment that the LIO would like to protect. This can include human wellbeing related to physical and psychological health, economic health, or social and cultural health. For example, an LIO might be particularly interested in protecting or restoring Cultural Traditions associated with fishing, shellfishing or farming. As with ecological components, human wellbeing components could be totally consistent with the Puget Sound Vital Signs (e.g. Harvestable Shellfish Beds) or they could go beyond the scope of the Vital Signs (e.g. Flood Safety).

**Vital Signs** Puget Sound Vital Signs are used to track and report on the status of the ecosystem and progress toward establishing a healthy Puget Sound, as defined by the Partnership's six goals. Each vital sign includes one or more indicators of the health of the Sound and associated qualitative or numerical recovery targets for the year 2020. Vital Signs can address priority ecological and human components of Puget Sound (e.g. Estuaries and Local Foods, respectively) or priority pressures that need to be reduced to recover the Sound (e.g. Shoreline Armoring and Onsite Sewage Systems). The Vital Signs are representative of Puget Sound ecosystems and human wellbeing and are not intended to address all aspects of Puget Sound health.

**Pressures.** Human actions or natural processes that give rise to stress on the ecosystem, but also may provide benefits to humans.

**Source.** Sources are defined as human activities or natural processes that have caused, are causing, or may cause the destruction, degradation, and/or impairment of Vital Signs, ecosystem components or human wellbeing components. Sources include the cause of stress (e.g., residential and commercial development) and associated **stressors** (e.g., habitat conversion due to development). Sources deliver stressors directly to ecosystem components.

**Stressors.** Stressors represent the ecological effects of sources or the proximate cause of change in the Puget Sound ecosystem. They can also be thought of as the biophysical factors that are altered by pressure sources. Examples of stressors include land conversion due to development, altered flows due to climate change, shoreline hardening, or shading of shallow water habitat.

**Conceptual Models** are used to describe underlying causes and contextual relationships that contribute to pressures (human actions or natural processes that give rise to stress on the ecosystem, but also may provide benefits to people). They are typically described for each priority pressure as opposed to being organized by component or Vital Sign. They can also be used to identify positive factors and opportunities that would be desirable to maintain or strengthen with strategies and actions. Conceptual models have multiple functions:

They help to create a common understanding among recovery partners of the current ecological, social, and political context within the watershed

They allow LIOs to describe and better understand how existing or proposed ecosystem recovery strategies are addressing the highest priority pressures within the watershed

They help to illuminate and identify gaps and high priority problems that currently are not being addressed by LIO recovery efforts

They provide the starting point for identifying alternative strategies and actions if status and trends monitoring or effectiveness assessments suggest recovery efforts are not having the desired effect and need to be adapted

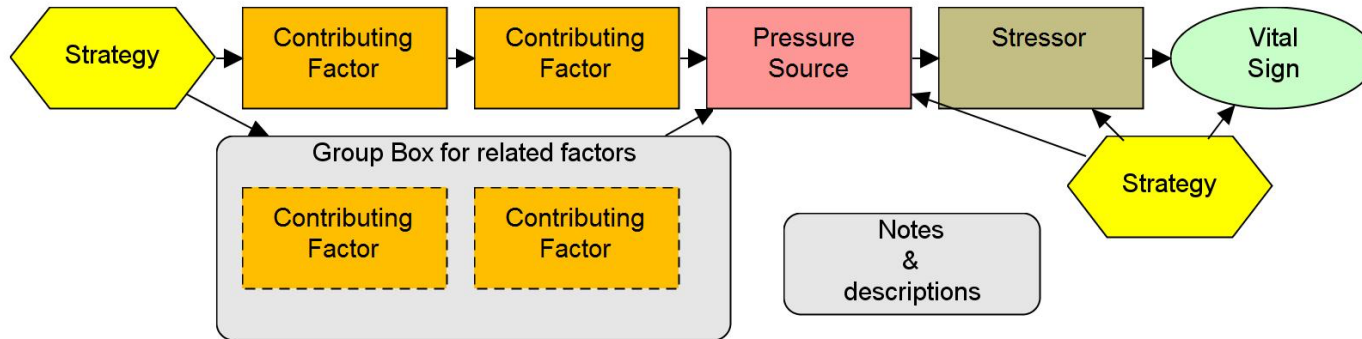


Figure 4 Conceptual Model Key

**Contributing Factors** is a general term used to describe the multiple types of factors that lead to the creation of pressures on the ecosystem and human wellbeing. They can include negative factors, also known as root causes or drivers, or enabling conditions that are allowing a problem to persist. They can also include positive factors and opportunities that the LIO might want to enhance. Most factors can be associated with one or more stakeholders – individuals, groups, communities or institutions – that have an interest in and are affected by some aspect of the ecosystem. Understanding the relationship between different types of factors and people’s interests is important for developing effective strategies.

Contributing factors may be economic, political, cultural, institutional or technical. Probing questions to identify contributing factors include:

Why is this pressure source occurring?

Who is involved directly or indirectly?

Why are they doing it?

What authorities are in place?

What information is available or missing?

What are the motivations?

Who is positively or adversely affected?

**Results chains:** Articulated theories of change associated with a strategy action or suite of actions. They comprise cause and effect chains showing the relationship between desired intermediate results, pressure reduction results, and ecosystem components or Vital Signs that will be affected by the action(s).

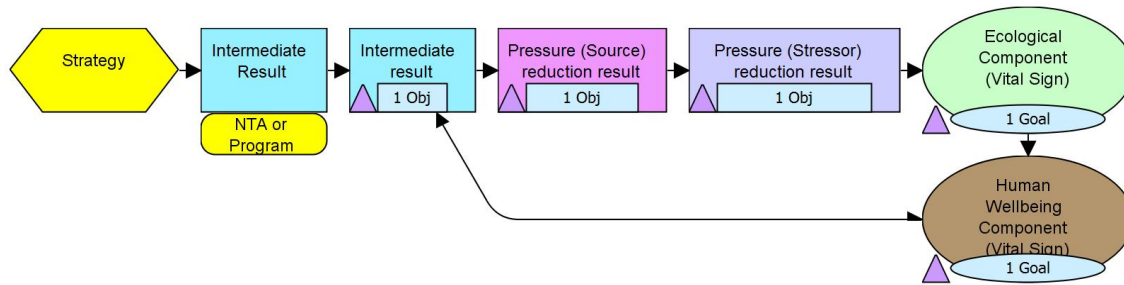


Figure 5 Results Chain Key

**Strategy:** A bundle of actions that, when combined, are intended to achieve a common goal. Strategies are intended to mitigate pressures or their underlying conditions and contributing factors, restore ecosystems or species populations, or provide capacity to achieve goals. Strategies include one or more actions (capital projects, programs, etc.) and are designed to achieve specific outcomes, objectives, and goals. They are usually developed on a long-term time horizon such as 5-50 years, with associated actions (see more below) addressing nearer-term objectives. The Open Standards for the Practice of Conservation describes strategies as:

Linked to pressures or components – directly affect one or more pressures or components

Focused – outline specific courses of action that need to be carried out

Feasible – accomplishable in light of the action’s resources, timeline, and constraints

Appropriate – acceptable to and fitting within project-specific cultural, social, and biological norms.

**Approaches:** Approaches (or “pathways”) represent a series of intermediate results that contribute to reductions in Pressures and improvements in Components and Vital Signs.

**Action:** A specific action focused on delivery of a specific outcome or output associated with a desired result. Actions include capital projects (e.g. restoration and acquisition), program development or implementation, education and outreach, research, etc. Actions can be completed on a near-term (i.e. 2 years or less) or longer-term time scale. LIOs will insert 2016 NTAs on the results chain

**Intermediate results:** Intermediate results are the expected changes following the implementation of a strategy or action that are necessary steps toward achieving the desired future status and goals.

**Objectives:** Objectives are the desired outcomes for critical intermediate results, or interim goals. Objectives are identified for a subset of intermediate results in a results chain. Like goals, a good objective is results-oriented, measurable, time limited, specific, and practical. LIOs should consider objectives as interim measurements of progress towards goals and include the 2020 timeframe as well as subsequent 2 or 5 year timeframes.

## APPENDICES

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- A. Strait ERN LIO Member Organization List
- B. Pressure Sources and Stressors of Concern in the Strait ERN LIO
- C. Conceptual Models
- D. Results Chains
- E. Goal Statements

### A. STRAIT ERN LIO MEMBER ORGANIZATION LIST

ORGANIZATIONAL PARTNER
2020 Climate Change Action Group
Chumsortium
City of Port Angeles
City of Sequim
Clallam County
Clallam County Marine Resources Committee
Coastal Watershed Institute
Conservation Districts, Clallam or Jefferson
Feiro Marine Life Center
Hood Canal Coordinating Council
Jamestown S'Klallam Tribe
Jefferson Clean Water District
Jefferson County
Jefferson County Marine Resources Committee

**ORGANIZATIONAL PARTNER**

Lower Elwha Klallam Tribe

Makah Tribe

Multi-Vision Integration, LLC

North Olympic Land Trust

North Olympic Peninsula Lead Entity for Salmon

North Olympic Peninsula Resource Conservation &amp; Development Council

North Olympic Salmon Coalition

North Olympic Timber Action Committee

Northwest Straits Commission

Olympic Climate Action Group

Olympic Environmental Council

Point-No-Point Treaty Council

Port Gamble S'Klallam Tribe

Puget Sound Partnership

Puget Sound Partnership Leadership Council

Sequim-Dungeness Clean Water District

Shreffler Environmental

Strait ECO Net

Washington Department of Ecology

Washington Sea Grant

Washington Society of American Foresters

WRIA 18 East - Dungeness River Management Team



**ORGANIZATIONAL PARTNER**

WSU Clallam County Extension (Clallam County BeachWatchers, Shore Stewards)

WSU Jefferson County Extension (Jefferson County Beach/Water Watchers)

**B. PRESSURE SOURCES AND STRESSORS OF CONCERN IN THE STRAIT ERN LIO**

Strait Source ID	Strait Priority Pressure Sources			Strait Priority Stressor Relationships			Strait Ecosystem and Human Wellbeing Components (only Tier A, 2-year Implementation and Tier B Components are included here; See "cascading benefits" approach for explanation)	Strait Vital Signs (only Priority Vital Signs, 2-year Implementation Vital Signs, in bold type, and Vital Signs linked to Tier B Components, in regular type, are included here)
	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
<b>Begin "Very High" and "High" priority Pressure Sources</b>								
1	Runoff from residential and commercial lands	Very High	Stormwater prevention actions are needed in Clallam and Jefferson counties and in Port Townsend; Stormwater management and retrofit actions are needed in Port Angeles, Sequim, and Port Townsend; Would benefit from a Conceptual Model	Introduction, spread, or amplification of human pathogens Non-point source, non-persistent toxic chemicals in aquatic systems	High  High	Includes pet waste pollutants  This stressor was not represented in the conceptual model and does not appear in the source-stressor relationship sheet. Add	Vegetated Land Cover; Freshwater Quantity; Estuaries and Embayments; Salmonids; Shellfish and Finfish Harvest; Freshwater Quality; Marine Water Quality; Good Governance; Sense of Place & Sound Stewardship	Land Development and Cover; Chinook; Shellfish Beds; Summer Stream Flows; Estuaries; Freshwater Quality; Marine Water Quality; Good Governance; Sense of Place & Sound Stewardship

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						if appropriate? - Yes		
				Non-point source conventional water pollutants	High			
				Altered peak flows from land cover change	High	Altered watershed hydrology		
				Altered low flows from land cover change	High	Altered watershed hydrology		
				Changes in water temperature from local causes	Longer term concerns			
				Harmful algal blooms	High	Steering Group changed from Relevant to High on 07AUG2015 ; Concerned		

Strait Source ID	Strait Priority Pressure Sources			Strait Priority Stressor Relationships			Strait Ecosystem and Human Wellbeing Components (only Tier A, 2-year Implementation and Tier B Components are included here; See "cascading benefits" approach for explanation)	Strait Vital Signs (only Priority Vital Signs, 2-year Implementation Vital Signs, in bold type, and Vital Signs linked to Tier B Components, in regular type, are included here)
	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						with nutrient-HAB linkages		
2	Industrial Runoff	High	Industrial stormwater management and retrofit actions are primarily needed for small watersheds and marine shoreline areas draining to Port Angeles Harbor	Non-point source, persistent toxic chemicals in aquatic systems	High		Freshwater Quantity; Shellfish and Finfish Harvest; Estuaries and Embayments; Marine Water Quality; Good Governance; Sense of Place & Sound Stewardship	Chinook; Shellfish Beds; Estuaries; Marine Water Quality; Good Governance; Sense of Place & Sound Stewardship
				Non-point source, non-persistent toxic chemicals in aquatic systems	High	This stressor was not represented in the conceptual model and does not appear in the source-stressor relationship sheet. Add if appropriate?		
				Altered peak flows from	High	Altered watershed hydrology		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				land cover change		(PA Harbor watersheds)		
				Altered low flows from land cover change	High	Altered watershed hydrology (PA Harbor watersheds)		
				Changes in water temperature from local causes	High	Watersheds draining to PA Harbor		
				Harmful algal blooms	High	Steering Group changed from Relevant to High on 07AUG2015 ; Concerned with nutrient-HAB linkages		
3	Domestic & Municipal Wastewater to Sewer	High	Very High PSPA result may be due to Port Angeles CSO problem (check with	Point source conventional water pollutants	High		Salmonids; Shellfish and Finfish Harvest; Freshwater Quality; Marine Water Quality;	Chinook; Shellfish Beds; Freshwater Quality; Marine

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			Partnership), but CSO work will be completed by 2016; Persistent toxic chemicals (and possibly nutrients) still are a concern from municipal WWTPs (including Clallam Bay, Port Angeles, Sequim, Port Townsend); WDOH has expressed more concern about WWTP effluents than septic; Likely can not be addressed at local level in 2-Year timeframe; Instead, consider advocating for addressing concern at Puget Sound level and supporting preventative measures (e.g., drug take back programs) to eliminate toxics	Point source, persistent toxic chemicals in aquatic systems	High		Sense of Place & Sound Stewardship	Water Quality; Sense of Place & Sound Stewardship
				Point source, non-persistent toxic chemicals in aquatic systems	High			
				Harmful algal blooms	Medium			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			from entering waste stream.					
4	Domestic and Commercial Wastewater to Onsite Sewage Systems (OSS)	Very High	Both counties, perhaps more than most Puget Sound counties, have multiple thousands of OSS to manage; OSS and PIC work in these two counties is mostly grant dependent - no stable funding source yet exists for this state mandated work; Concerned that PSPA did not rank as a highly rated Source for Strait Action Area; Would benefit from a Conceptual Model	Introduction, spread, or amplification of human pathogens	High	CWD focus is on human pathogens	Shellfish and Finfish Harvest; Estuaries and Embayments; Fresh Water Quality; Good Governance; Sense of Place & Sound Stewardship	Shellfish Beds; On-Site Septic systems; Estuaries; Freshwater Quality; Marine Water Quality; Good Governance; Sense of Place & Sound Stewardship
				Non-point source conventional water pollutants	High			
				Harmful algal blooms	High	Steering Group changed from Relevant to High on 07AUG2015 ; Concerned with nutrient-HAB linkages		
5		High	Lead Entity for salmon recovery 3-	Shoreline hardening	High		Salmonids; Shellfish and Finfish Harvest;	Chinook; Land Development

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
	Freshwater shoreline infrastructure		Year Work Plans address this Source; Freshwater shoreline armoring mostly associated with impacts to floodplains, which is covered well by "Freshwater Levees, Floodgates, and Tidegates" Source; Actions are needed to support landowner incentives to permanently protect freshwater shorelines from modifications	Conversion of land cover for residential, commercial, and industrial use	High		Vegetated Land Cover; Good Governance; Sense of Place & Sound Stewardship	and Cover; Good Governance; Sense of Place & Sound Stewardship
				Culverts and other fish passage barriers	High			
				Terrestrial and freshwater species disturbance in natural landscapes	Longer term concerns			
				In channel structural barriers to water, sediment, debris flows	Longer term concerns			
			Other structural barriers to water, sediment, debris flows	Longer term concerns				

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
6	Marine shoreline infrastructure	Very High	14% of Strait Action Area marine shoreline is altered; Protecting and preventing new alterations is important to maintain functional drift cells and migratory corridor along Strait; Targeted armoring removal and/or structure setbacks in some drift cells are needed where landowners are willing; Port Angeles shoreline, an important part of the migratory corridor, is heavily armored (armor removal, where possible, in PA Harbor is a focus); Concern expressed about possible new Navy pier within Port Angeles Harbor; Actions are needed	Shoreline hardening	High		Drift Cells; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Good Governance; Larger River Estuaries and Embayments; Sense of Place & Sound Stewardship	Chinook; Shellfish Beds; Land Development and Cover; Shoreline Armoring; Estuaries; Good Governance; Sense of Place & Sound Stewardship
				Conversion of land cover for residential, commercial, and industrial use	High			
				Shading of shallow water habitat	Longer term concerns			
				Culverts and other fish passage barriers	High			
				Species disturbance - marine	Longer term concerns			
				Other structural barriers to water, sediment, debris flows	Longer term concerns			



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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			to support landowner incentives to permanently protect marine shorelines from modifications; Would benefit from a Conceptual Model					
7	Freshwater Levees, Floodgates, Tidegates	Very High	Removal and/or setback of legacy dikes along watersheds is needed to reconnect rivers with historic floodplains (e.g., lower Dungeness River, a 2014 NTA); Actions are needed to support landowner incentives to permanently protect freshwater floodplains from development; Would benefit from a Conceptual Model	Shoreline hardening Conversion of land cover for residential, commercial, and industrial use Culverts and other fish passage barriers Altered peak flows from land cover change Altered low flows from land cover change	High High Longer term concerns Longer term concerns Longer term concerns		Floodplains; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Good Governance; Sense of Place & Sound Stewardship	Chinook; Land Development and Cover; Floodplains; Good Governance; Sense of Place & Sound Stewardship

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Changes in water temperature from local causes	Longer term concerns			
8	Marine Levees, Floodgates, Tidegates	Very High	Actions to removal and/or setback of legacy levees within estuaries and tidally influenced areas is needed to reconnect to historic salt marshes and tideflats / channels (e.g., west side of Elwha estuary; and Pysht River estuary, both of which are represented in 2014 NTAs); Actions are needed to support landowner incentives to permanently protect tidally influenced land from development; Would benefit from a Conceptual Model	Shoreline hardening	High		Drift Cells; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Good Governance; Larger River Estuaries and Embayments; Sense of Place & Sound Stewardship	Chinook; Shellfish Beds; Land Development and Cover; Shoreline Armoring; Estuaries; Good Governance; Sense of Place & Sound Stewardship
				Conversion of land cover for residential, commercial, and industrial use	High			
				Culverts and other fish passage barriers	High	Concerns expressed about Cooper Creek and Grays Marsh estuary culverts / tide gates		
				Other structural barriers to water, sediment, debris flows	High			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
9	Commercial & Industrial Areas (Including Ports)	Very High	Removal of East Cell of Port Angeles Landfill nearing completion, though West Cell still problematic but will be costly; Contaminated sediments in Port Angeles Harbor continue to be of great concern; Non-financial support from Strait ERN LIO may be developed to help promote ongoing clean up phases to move forward in 2016-2017 biennium; Implementation of PA Harbor clean-up plans, which have or will be funded by responsible parties, will clearly go beyond 2-Year NTA Work Plan; Would	Conversion of land cover for residential, commercial, and industrial use	Longer term concerns		Drift Cells; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Marine Water Quality; Good Governance; Larger River Estuaries and Embayment's;	Chinook; Shellfish Beds; Land Development and Cover; Shoreline Armoring; Estuaries; Marine Water Quality; Good Governance
				Terrestrial habitat fragmentation	Longer term concerns			
				Non-point source, persistent toxic chemicals in aquatic systems	High			
				Non-point source, non-persistent toxic chemicals in aquatic systems	High	This stressor was not represented in the conceptual model and does not appear in the source-stressor relationship sheet. Add if		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			benefit from a Conceptual Model			appropriate? - Yes		
				Terrestrial and freshwater species disturbance in human dominated areas	Longer term concerns			
				Culverts and other fish passage barriers	High			
				Displacement by non-natives	Longer term concerns			
10	Garbage & Solid Waste	High	Consider educating public via Strait ECO Net, Clallam and Jefferson MRCs, and Feiro and PT Marine Science Centers as part of their work; Concerned with trash and microplastics on beaches - support	Species disturbance - marine	High	Debris from recreational boats and vehicles & stormwater runoff	Salmonids; Shellfish and Finfish Harvest; Fresh Water Quality; Marine Water Quality; Good Governance; Sense of Place & Sound Stewardship	Chinook; Shellfish Beds; Freshwater Quality; Marine Water Quality; Good Governance; Sense of Place & Sound Stewardship
				Non-point source, persistent toxic chemicals in	High	Concern about possible bioaccumulation of toxics either		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			beach cleanup events; need financial incentives and enhanced waste reduction / recycling and educational programs	aquatic systems		released directly from certain microplastics and/or adsorbed from the water column and concentrated on the surfaces of these materials		
11	Oil Spills	Very High	Oil spill preparedness is important along Strait, though 2014-2015 oil spill preparedness NTAs Action Agenda were deferred to Puget Sound regional prevention activities (risk reduction activities) as a higher priority; Check with Makah Tribe Office of Marine affairs on	Large spills	High		Salmonids; Shellfish and Finfish Harvest; Marine Water Quality; Larger River Estuaries and Embayments; Sense of Place & Sound Stewardship	Chinook; Shellfish Beds; Estuaries; Marine Water Quality; Sense of Place & Sound Stewardship

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			status of these prevention efforts; Consider a new Action that focuses or supports prevention activities instead of preparedness for 2-Year NTA Work Plan; Would benefit from a Conceptual Model - include Shipping Lanes Source in this model					
12	Dams	High	While Elwha dams were removed, concern with impacts from smaller dams, namely on McDonald Creek (possible removal under discussion), and Canyon Creek (a Dungeness River tributary) remain; Fish passage problem resulting from Canyon Creek dam will be	Dams as fish passage barriers	High	Fish passage problem resulting from Canyon Creek dam will be corrected in summer of 2015, but dam will remain in place for sometime	Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Good Governance	Chinook; Summer Stream Flows; Good Governance
				Flow regulation --	High			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			corrected in summer of 2015, but dam will remain in place for sometime; Dam on Morse Creek is above falls so may not be a concern	prevention of flood flows				
				In channel structural barriers to water, sediment, debris flows	High			
				Altered low flows from withdrawals	High			
				Changes in water temperature from local causes	High			
<b>13</b>	Roads & Railroads (Including Culverts)	Very High	Removal and/or setback of Towne Road, a part of lower Dungeness River floodplain 2014 NTA (essentially covered under Freshwater Levees, Tidegates, and Floodgates Source); Initial phased actions for	Conversion of land cover for transportation & utilities	High		Floodplains; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Drift Cells; Fresh Water Quality; Good Governance; Larger River Estuaries and Embayments;	Chinook; Land Development and Cover; Floodplains; Shoreline Armoring; Freshwater Quality; Estuaries; Good Governance
				Terrestrial habitat fragmentation	Longer term concerns			
				Culverts and other fish passage barriers	High			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			other road impacts, such as Ward Road, Hwy 112 Pysht River watershed, and Hwy 101 Discovery Bay watershed, may be needed, though these problems may not be accomplished within 2-Year timeframe; marine shoreline armoring associated with Olympic Discovery Trail on the old railroad grade; Applies to a number of other Conceptual Models - separate model not needed	Barriers to terrestrial animal movement and migration	Longer term concerns			
				Terrestrial and freshwater species disturbance in human dominated areas	Longer term concerns			
				Terrestrial and freshwater species disturbance in natural landscapes	Longer term concerns			
				Non-point source, persistent toxic chemicals in aquatic systems	High			
				Non-point source, non-	High	This stressor was not		



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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				persistent toxic chemicals in aquatic systems		represented in the conceptual model and does not appear in the source-stressor relationship sheet. Add if appropriate? - Yes		
				Non-point source conventional water pollutants	High			
				Changing air temperature	Low Longer term concerns			
14	Housing & Urban Areas <i>(Note: This Pressure Source spans</i>	Very High	Actions needed to support upcoming local jurisdictions required Comprehensive Plan revisions; Would	Conversion of land cover for residential, commercial, and industrial use	High		Drift Cells; Floodplains; Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Freshwater Quality;	Chinook; Shellfish Beds; Land Development and Cover; Shoreline

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
	<i>two printed pages.)</i>		benefit from a Conceptual Model; Would benefit from a Conceptual Model	Terrestrial habitat fragmentation	High		Marine Water Quality; Good Governance; Larger River Estuaries and Embayments; Sense of Place & Sound Stewardship	Armoring; Floodplains; Summer Stream Flows Freshwater Quality; Marine Water Quality; Estuaries; Good Governance; Sense of Place & Sound Stewardship
				Non-point source, persistent toxic chemicals in aquatic systems	High			
				Non-point source, non-persistent toxic chemicals in aquatic systems	High	This stressor was not represented in the conceptual model and does not appear in the source-stressor relationship sheet. Add if appropriate? - Yes		
				Non-point source conventional water pollutants	High			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Terrestrial and freshwater species disturbance in human dominated areas	Longer term concerns			
				Terrestrial and freshwater species disturbance in natural landscapes	Longer term concerns			
				Species disturbance - marine	Longer term concerns			
				Altered peak flows from land cover change	Longer term concerns			
				Altered low flows from land cover change	Longer term concerns			
				Displacement by non-natives	Longer term concerns			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
15	Airborne Pollutants ("Greenhouse Gases" related to Climate Change; includes other pollutants) (Note: This Pressure Source spans two printed pages.)	Very High	Need Targeted Management Actions to implement recommended Adaptive Mechanisms from nearly completed <i>Planning for Climate Change on the NOP</i> project; no separate Conceptual Model needed - applies to all other Conceptual Models	Altered peak flows from climate change	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP project	Drift Cells; Floodplains; Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Fresh Water Quality; Marine Water Quality; Good Governance; Larger River Estuaries and Embayments; Sense of Place & Sound Stewardship	Chinook; Shellfish Beds; Summer Stream Flows; Floodplains; Land Development and Cover; Shoreline Armoring; Freshwater Quality; Marine Water Quality; Estuaries; Good Governance; Sense of Place & Sound Stewardship
				Altered low flows from climate change	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP project		
				Spread of disease and parasites to native species	Longer term concerns			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Non-point source, persistent toxic chemicals in aquatic systems	Longer term concerns			
				Changing air temperature (as it subsequently may cause changes in freshwater and marine water temperature)	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP project		
				Changing precipitation amounts and patterns	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						the NOP project		
				Climate Change	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP project		
				Air pollution from mobile sources	Medium	Includes airborne pollutants other than "Greenhouse Gases"; It's unclear however, what can be done within 2016-2017 biennium		
				Air pollution from	Medium	Includes airborne pollutants		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				stationary sources		other than "Greenhouse Gases; Stressor needs to include airborne pollutants from human sewage and agriculture as "stationary sources"; It's unclear however, what can be done within 2016-2017 biennium		
				Other structural barriers to water, sediment, debris flows	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						project; Changing sea level (and storm) conditions may prompt landowners to harden their shorelines, including using levees, culverts, and tidegates to control water movement		
				Culverts and other fish passage barriers	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP project; Changing sea level (and storm)		



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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						conditions may prompt landowners to harden their shorelines, including using levees, culverts, and tidegates to control water movement		
				Sea level rise	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP project		
				Shoreline hardening	High	Priority dependent on recommended Adaptive Mechanisms from nearly		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						completed Planning for Climate Change on the NOP project		
				Changing ocean condition	High	Priority dependent on recommended Adaptive Mechanisms from nearly completed Planning for Climate Change on the NOP project		
16	Abstraction of surface water	Very High	Important stream flow improvement actions will be needed in 2016-2017; Would benefit from a Conceptual Model	Terrestrial and freshwater species disturbance in human dominated areas	Longer term concerns	Decided to include, even though the description for this Stressor is not in complete alignment with Source description.	Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Fresh Water Quality; Good Governance; Sense of Place & Sound Stewardship	Chinook; Summer Stream Flows; Fresh Water Quality; Good Governance; Sense of Place & Sound Stewardship

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Terrestrial and freshwater species disturbance in natural landscapes	Longer term concerns	Decided to include, even though the description for this Stressor is not in complete alignment with Source description.		
				Altered low flows from withdrawals	High	Unclear why this Stressor is not considered a High or Very High by PSPA, particularly within the Dungeness watershed		
				Non-point source, persistent toxic chemicals in aquatic systems	High	Added due to stormwater runoff into open irrigation ditches within the		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						Dungeness watershed.		
				Non-point source, non-persistent toxic chemicals in aquatic systems	High	This stressor was not represented in the conceptual model and does not appear in the source-stressor relationship sheet. Add if appropriate? Added due to stormwater runoff into open irrigation ditches within the Dungeness watershed.		
				Non-point source conventional water pollutants	High	Added due to stormwater runoff into open irrigation		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						ditches within the Dungeness watershed.		
				Introduction, spread, or amplification of human pathogens	Longer term concerns			
				Changes in water temperature from local causes	Longer term concerns			
17	Abstraction of ground water	High	Important groundwater recharge actions will be needed in 2016-2017, primarily in Dungeness watershed	Altered low flows from land cover change	High		Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Good Governance; Sense of Place & Sound Stewardship	Chinook; Summer Stream Flows; Land Development and Cover; Good Governance; Sense of Place & Sound Stewardship
				Altered low flows from withdrawals	High			
18	Fishing & Harvesting Aquatic Resources	Very High	Actions may be needed to enhance harvest enforcement actions and remove	Derelict fishing gear	High		Salmonids; Shellfish and Finfish Harvest; Good Governance;	Chinook; Shellfish Beds; Good Governance;
				Animal harvest	High			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			derelict fishing gear (old and new) along Strait; no Conceptual Model needed	Bycatch	Longer term concerns		Sense of Place & Sound Stewardship	Sense of Place & Sound Stewardship
				Non-timber plant harvest	Longer term concerns			
				Predation from increased native species	Longer term concerns	Included due to changes in food chain as a result of harvest activities, albeit a likely weak association.		
				Displacement by increased native species	Longer term concerns	Included due to changes in food chain as a result of harvest activities, albeit a likely weak association.		
19	Logging & Wood Harvesting	High	Actions may be needed to support upcoming local jurisdictions required Comprehensive Plan	Terrestrial and freshwater species disturbance in	Longer term concerns	Targeted management is already in place via Forest and	Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Good Governance;	Chinook; Land Development and Cover; Summer Stream Flows;

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
		High	revisions and to develop landowner incentives to protect ecologically sound / well managed forests from conversion to residential housing; <i>Consider non-financial support for Forest and Fish CMER efforts within Puget Sound</i>	natural landscapes	High	Fish programs.	Larger River Estuaries and Embayments; Sense of Place & Sound Stewardship	Estuaries; Good Governance; Sense of Place & Sound Stewardship
				Conversion of land cover for residential, commercial, and industrial use		Targeted management is already in place via Forest and Fish programs.		
				Conversion of land cover for natural resource production	Longer term concerns	Targeted management is already in place via Forest and Fish programs.		
				Timber harvest				
20	Agricultural & Forestry Effluents	High	Actions are needed to continue managing farm animal waste (currently a part of	Introduction, spread, or amplification of human pathogens	High		Shellfish and Finfish Harvest; Freshwater Quality; Marine Water Quality; Good Governance;	Shellfish Beds; Freshwater Quality; Marine Water Quality;

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			CWD efforts); Consider non-financial advocacy support for efforts to identify affordable alternatives for biosolids disposal at Puget Sound regional level	Non-point source, persistent toxic chemicals in aquatic systems	Longer term concerns	This stressor needs to include persistent toxic chemicals from biosolids and herbicides/pesticides	Good Governance	
				Non-point source conventional water pollutants	High			
				Changes in water temperature from local causes	Longer term concerns			
				Harmful algal blooms	Longer term concerns			
21	Annual & Perennial non-Timber Crops	High	Actions may be needed to support upcoming local jurisdictions required Comprehensive Plan revisions and to	Conversion of land cover for residential, commercial, and industrial use	High	Included as a reduction in extent and quality of riparian habitat due to	Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Good Governance; Larger River Estuaries	Chinook; Land Development and Cover; Summer Stream Flows; Estuaries;



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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			develop landowner incentives to protect ecologically sound farms, to keep farming, and prevent conversion to residential housing			conversion. However, targeted management programs for agriculture (via Conservation Districts) and forestry (via Forest and Fish) are already in place.	and Embayments; Sense of Place & Sound Stewardship	Good Governance; Sense of Place & Sound Stewardship
22	Livestock Farming & Ranching	High	Actions may be needed to support upcoming local jurisdictions required Comprehensive Plan revisions and to develop landowner incentives to protect ecologically sound farms, to keep farming, and prevent conversion to residential housing	Conversion of land cover for residential, commercial, and industrial use	High	Included as a reduction in extent and quality of riparian habitat due to conversion. However, targeted management programs for agriculture (via Conservation Districts) and forestry (via	Freshwater Quantity; Salmonids; Shellfish and Finfish Harvest; Vegetated Land Cover; Good Governance; Larger River Estuaries and Embayments; Sense of Place & Sound Stewardship	Chinook; Land Development and Cover; Summer Stream Flows; Estuaries; Good Governance; Sense of Place & Sound Stewardship

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
						Forest and Fish) are already in place.		
23	Shipping Lanes and Dredged Waterways	Very High	Primarily focused on vessel traffic issues related to risk of oil spills; other issues include bilge and wastewater discharges; and Greenhouse gases and other pollutants; Very High approved by membership 2016SEP16 resulting from joint LIO oil spill strategy workshop on 2016SEP13; include as part of Oil Spill Conceptual Model	Conversion of land cover for transportation & utilities	Low		Drift Cells; Salmonids; Shellfish and Finfish Harvest; Larger River Estuaries and Embayments; Marine Water Quality; Sense of Place & Sound Stewardship	Chinook; Shellfish Beds; Estuaries; Marine Water Quality; Sense of Place; Sound Stewardship
				Species disturbance - marine	High	Vessel traffic issues related to risk of oil spills		
				Displacement by non-natives	Medium			
				Spread of disease and parasites to native species	Medium			
				Changing air temperature	Medium			
25	Marine & Freshwater Finfish Aquaculture	Very High	Defer to Ecosystem Recovery Plan to focus on other Sources for 2-year NTA Work Plan; Current finfish aquaculture facilities	Conversion of land cover for natural resource production	Medium	Aquaculture related conversion only here	Salmonids; Shellfish and Finfish Harvest; Good Governance	Chinook; Good Governance
				Terrestrial and	Low			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			in Port Angeles Harbor are limited in size hence effect may not be a concern; Elevated to Very High by SG & TTF on 2016AUG30; Approved by membership 2016SEP16; no Conceptual Model needed; Component and Vital Sign connections to be included in Results Chain	freshwater species disturbance in natural landscapes				
				Species disturbance - marine	Low			
				Predation from increased native species	Low			
				Displacement by increased native species	Low			
				Predation from non-native species	Low			
				Displacement by non-natives	Medium			
				Non-point source conventional water pollutants	Medium			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Non-native genetic material	Medium			
				Spread of disease and parasites to native species	High			
<b>Begin "Medium" and "Low" priority Pressure Sources</b>								
24	Industrial Wastewater	Medium	Persistent toxic chemicals may be a concern from industrial WWTPs (including Port Angeles), but can not be addressed in 2-Year timeframe; <i>Instead, consider advocating for addressing concern at Puget Sound level</i>	Point source, persistent toxic chemicals in aquatic systems	Medium			
				Point source, non-persistent toxic chemicals in aquatic systems	Medium			
				Point source conventional water pollutants	Medium			
				Changes in water temperature	Medium	Non-pertinent to Strait Action		

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				from local causes		Area or not relevant to Source		
				Harmful algal blooms	Medium			
26	Marine shellfish aquaculture	Low	Defer to Ecosystem Recovery Plan to focus on other Sources for 2-year NTA Work Plan; 30 acre geoduck farm was under consideration in outer Dungeness Bay, but permitting process would be rigorous - concerns expressed over aesthetics (visual impact); marine debris (tubes, etc.), and effects on eelgrass beds, benthic infauna, and benthic fish community, and birds (see	Derelict fishing gear	Low			
				Conversion of land cover for natural resource production	Medium	Aquaculture related conversion only here		
				Species disturbance - marine	Low			
				Non-native genetic material	Medium			
				Spread of disease and parasites to native species	Medium			
				Displacement by increased native species	Low			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			Washington Sea Grant report); Leave this Source in the 5-Strategy as these operations are generally well managed by permits; note that shellfish provide benefits by removing pollutants via filter feeding activities	Displacement by non-natives	Medium			
27	Recreational Activities	Medium	Add as a Strait AA Source but defer to Ecosystem Recovery Plan to focus on other Sources for 2-year NTA Work Plan; Specifically, footprint of golf courses and pet waste were cited as some concerns	Terrestrial and freshwater species disturbance in natural landscapes	Low			
				Species disturbance - marine	Low			
				Predation from non-native species	Low			
				Displacement by non-natives	Low			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Introduction, spread, or amplification of human pathogens	Medium	Includes pet waste pollutants from a variety of recreational areas		
				Non-point source, persistent toxic chemicals in aquatic systems	Medium	Includes pollutants from golf course runoff		
				Non-point source, non-persistent toxic chemicals in aquatic systems	Medium	Includes pollutants from golf course runoff		
				Non-point source conventional water pollutants	Medium	Includes pollutants from golf course runoff		
				Spread of disease and parasites to	Low			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				native species				
				Air pollution from mobile sources	Low			
				Changing air temperature	Low			
28	War, Civil Unrest & Military Exercises	Medium	Add as a Strait AA Source but defer to Ecosystem Recovery Plan to focus on other Sources for 2-year NTA Work Plan; Military exercises within Strait of Juan de Fuca cited as a concern (i.e., pertaining to marine mammals disturbance by sonar; Does not include PA Harbor Navy dock plans as it's already covered under Marine Shoreline Infrastructure as a "permanent	Terrestrial and freshwater species disturbance in human dominated areas	Low			
				Terrestrial and freshwater species disturbance in natural landscapes	Low			
				Species disturbance - marine	Medium	Includes effects of military exercises on marine mammals		



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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
			footprint" by definition)					
29	Fire & Fire Suppression	Low	Add as a Strait AA Source but defer to Ecosystem Recovery Plan to focus on other Sources for 2-year NTA Work Plan	Terrestrial and freshwater species disturbance in natural landscapes	Low			
				Changes in water temperature from local causes	Low			
30	Utility & Service Lines	Low		Conversion of land cover for transportation & utilities	Low			
				Terrestrial habitat fragmentation	Low			
				Terrestrial and freshwater species disturbance in human dominated areas	Low			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Terrestrial and freshwater species disturbance in natural landscapes	Low			
				Displacement by non-natives	Low			
31	Tourism & Recreation Areas	Low	Add as a Strait AA Source but defer to Ecosystem Recovery Plan to focus on other Sources for 2-year NTA Work Plan	Conversion of land cover for residential, commercial, and industrial use	Low			
				Terrestrial habitat fragmentation	Low			
				Terrestrial and freshwater species disturbance in natural landscapes	Low			
				Species disturbance - marine	Low			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
32	Mining & Quarrying	Low	Add as a Strait AA Source but defer to Ecosystem Recovery Plan to focus on other Sources for 2-year NTA Work Plan	Terrestrial and freshwater species disturbance in human dominated areas	Low			
				Conversion of land cover for natural resource production	Low	Includes conversion of landcover for mining and quarrying only		
				Species disturbance - marine	Low			
				Altered peak flows from land cover change	Low			
				Altered low flows from land cover change	Low			
				Air pollution from mobile sources	Low			
				Air pollution from	Low			

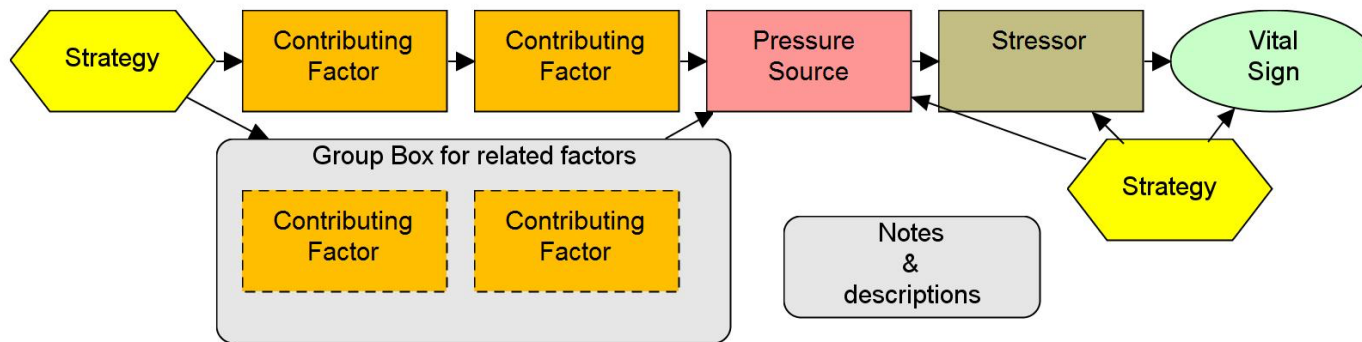
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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				stationary sources				
33	Renewable Energy	Low	Concerns expressed about testing of and future tidal energy projects within Strait Action Area	Species disturbance - marine	Low			
34	Release of Excess Energy (light, heat, sound)	Low	Concerns expressed about effects of sonar from military exercises within Strait of Juan de Fuca and the periodic "mystery booms" on wildlife, likely emanating from industrial activities (metal fusing?), within Strait Action Area	Species disturbance - marine	Low			
35	Seepage from mining	Low	Concern expressed about surface runoff and effects on groundwater from potential future reactivation of gravel mine within Elwha watershed	Terrestrial and freshwater species disturbance in human dominated areas	Low			

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	Pressure Sources (2009 translation to new 2015 terminology)	Source Priorities	Priority Source Notes	Pressure Stressors	Stressor Priorities	Priority Stressor Notes		
				Conversion of land cover for natural resource production	Low	Includes conversion of landcover for mining and quarrying only		
				Non-point source conventional water pollutants	Low			
				Altered low flows from land cover change	Low			
				Air pollution from mobile sources	Low			
				Air pollution from stationary sources	Low			

## C. CONCEPTUAL MODELS

This section describes the contributing factors and underlying conditions related to ecosystem recovery in the LIO . Conceptual models illustrate the relationship between contributing factors and different types of degradation of ecosystem and human wellbeing components.

### KEY AND DEFINITIONS FOR CONCEPTUAL MODELS



**Figure 2. Conceptual Model Key**

In this section, we use the following terminology to describe the current context in our LIO:

A strategy is a bundle of actions that, when combined, are intended to achieve a common goal. Strategies are intended to mitigate pressures or their underlying conditions and root causes, restore ecosystems or species populations, or provide capacity to achieve goals. Strategies include one or more actions (capital projects, programs, etc.) and are designed to achieve specific outcomes, objectives, and goals.

Contributing factors include the indirect threats, root causes, underlying factors, and other factors contributing to the existence or persistence of pressures. Contributing factors can be social, political or ecological and they can also include opportunities or factors outside the scope of the recovery effort, such as regional population growth or global market forces.

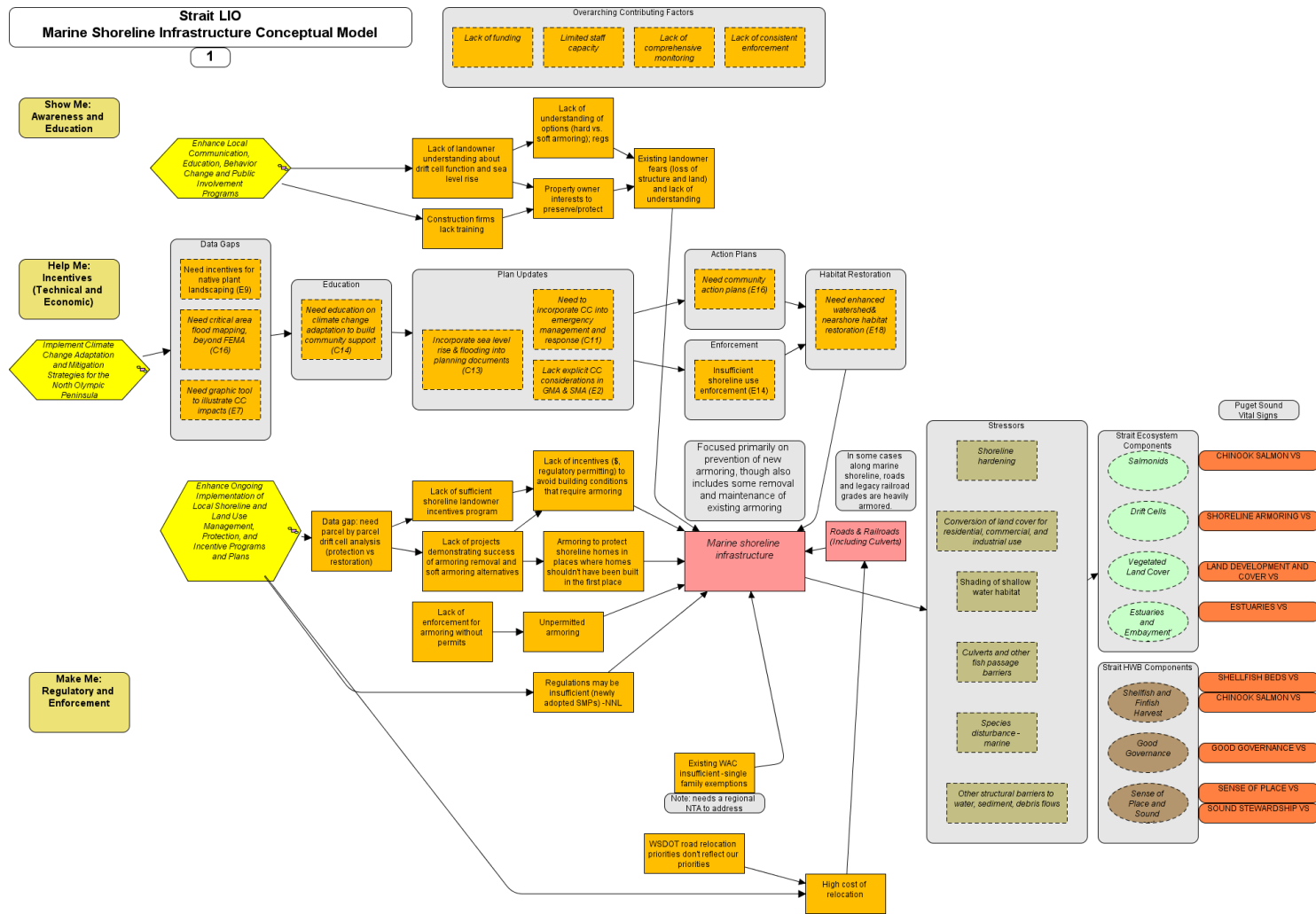
Pressure sources are human actions that contribute to the creation of stressors that degrade the ecosystem of human wellbeing components. Pressure sources, although often damaging to the environment are often beneficial to humans in other ways.

Stressors are the most proximate causes of ecosystem degradation, such as shoreline hardening, land conversion or altered flows.

Components are the parts of the ecosystem or the attributes of human wellbeing that are the focus of the LIO's ecosystem recovery efforts.

# 01. MARINE SHORELINE INFRASTRUCTURE

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.



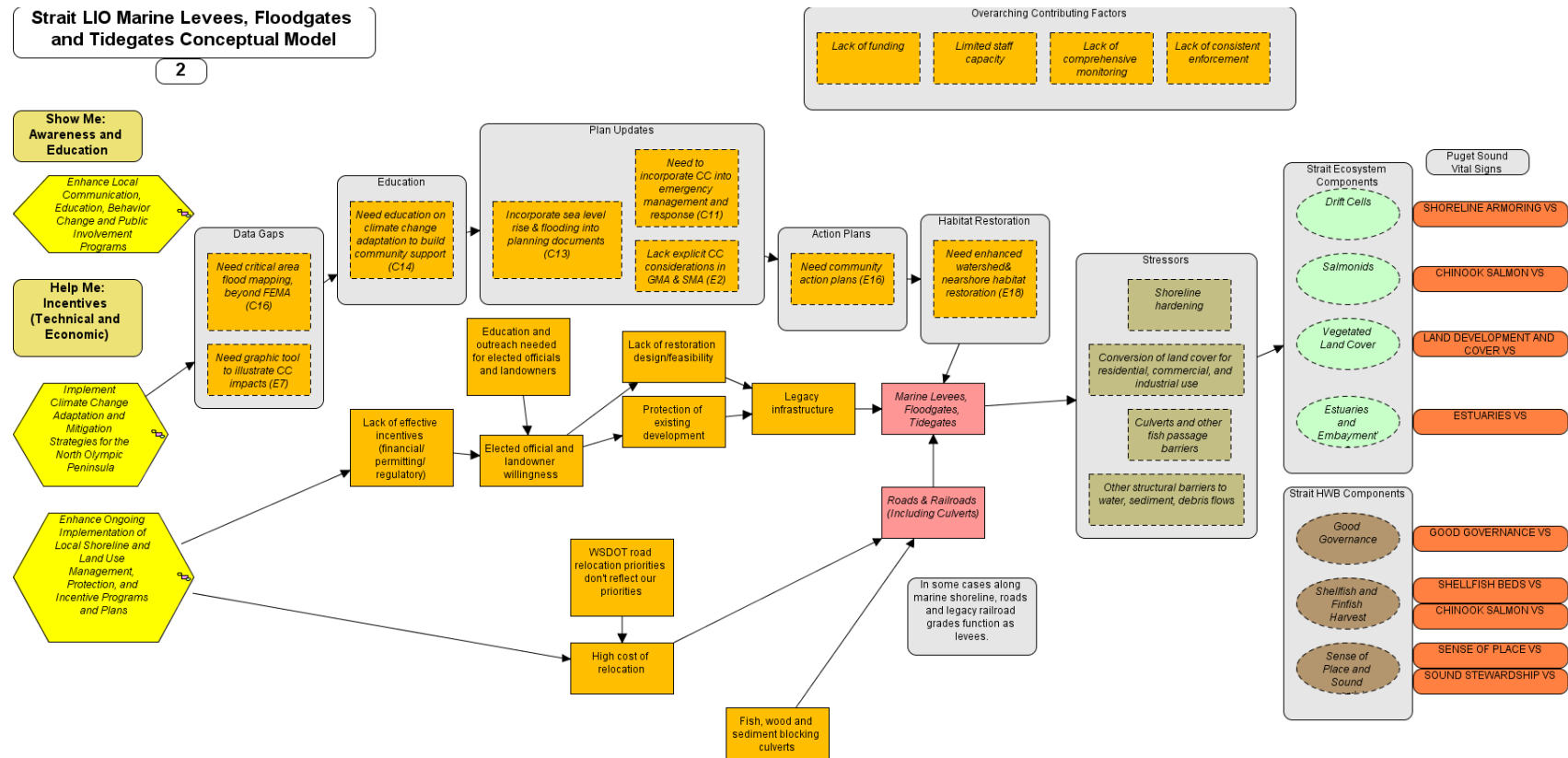


*Description of contributing factors related to 01. Marine Shoreline Infrastructure*

Our model for the Pressure Source, *Marine Shoreline Infrastructure* primarily focuses on Contributing Factors that would inhibit our ability to prevent new armoring, as the majority of our shoreline is not armored (or altered). The model does, however, include factors associated with existing armoring and its maintenance. *Roads and Railroads (including culverts)*, as a Pressure Source, is also a part of this model as, in some cases, our marine shorelines include roads and railroad grades that are heavily armored damaging habitat and causing interruptions in drift cell and other ecosystem functions.

## 02. MARINE LEVEES, FLOODGATES, AND TIDEGATES

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.

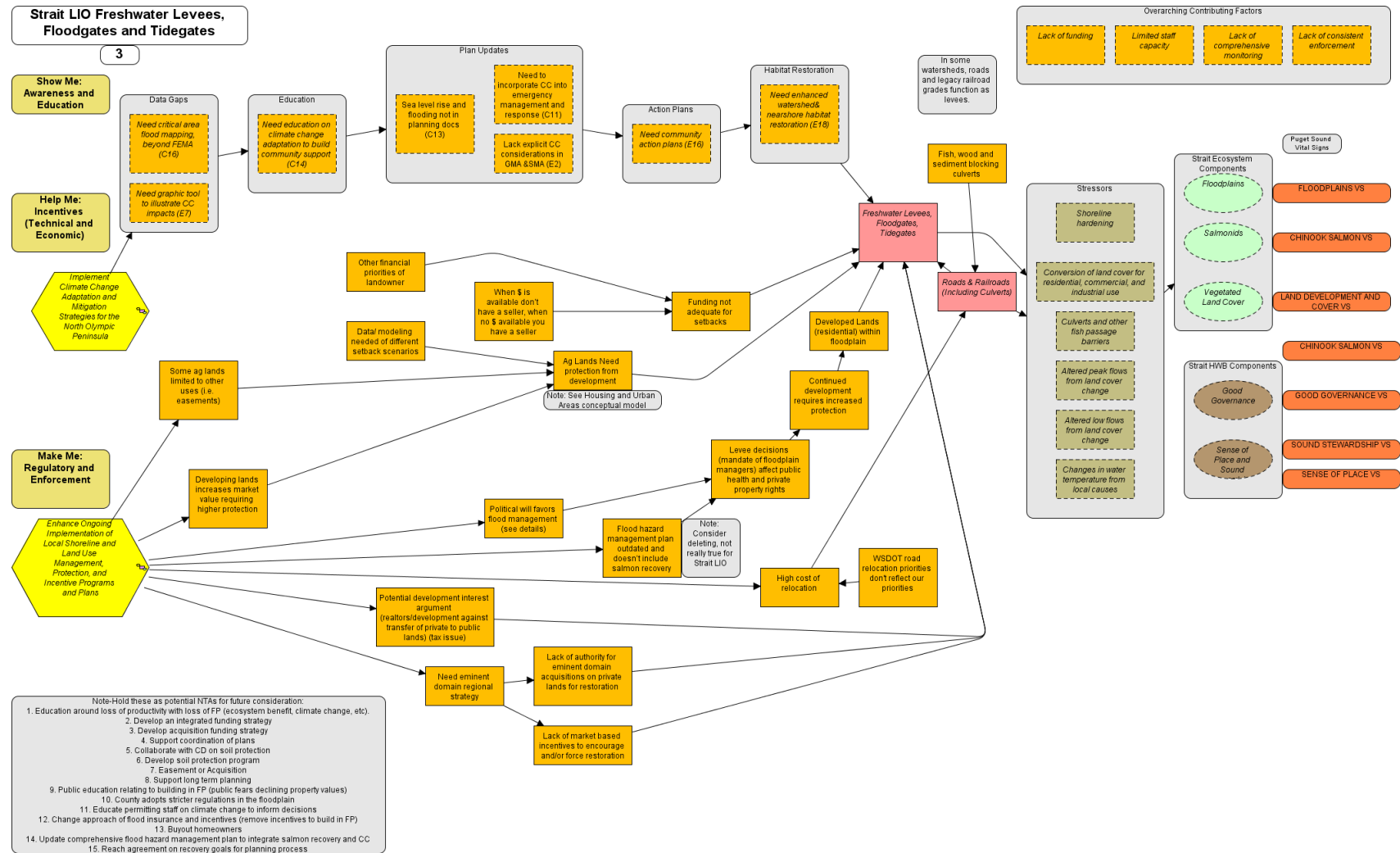


### Description of contributing factors related to 02. Marine Levees, Floodgates and Tidegates

Marine Levees, Floodgates, and Tidegates, as a model for this Pressure Source, primarily involves legacy infrastructure in the form of existing levees. Roads and (legacy) Railroad-grades (including culverts) are also an important Pressure Source in this model as this infrastructure functions as levees, in some cases.

### 03. FRESHWATER LEVELS, FLOODGATES, AND TIDEGATES

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.

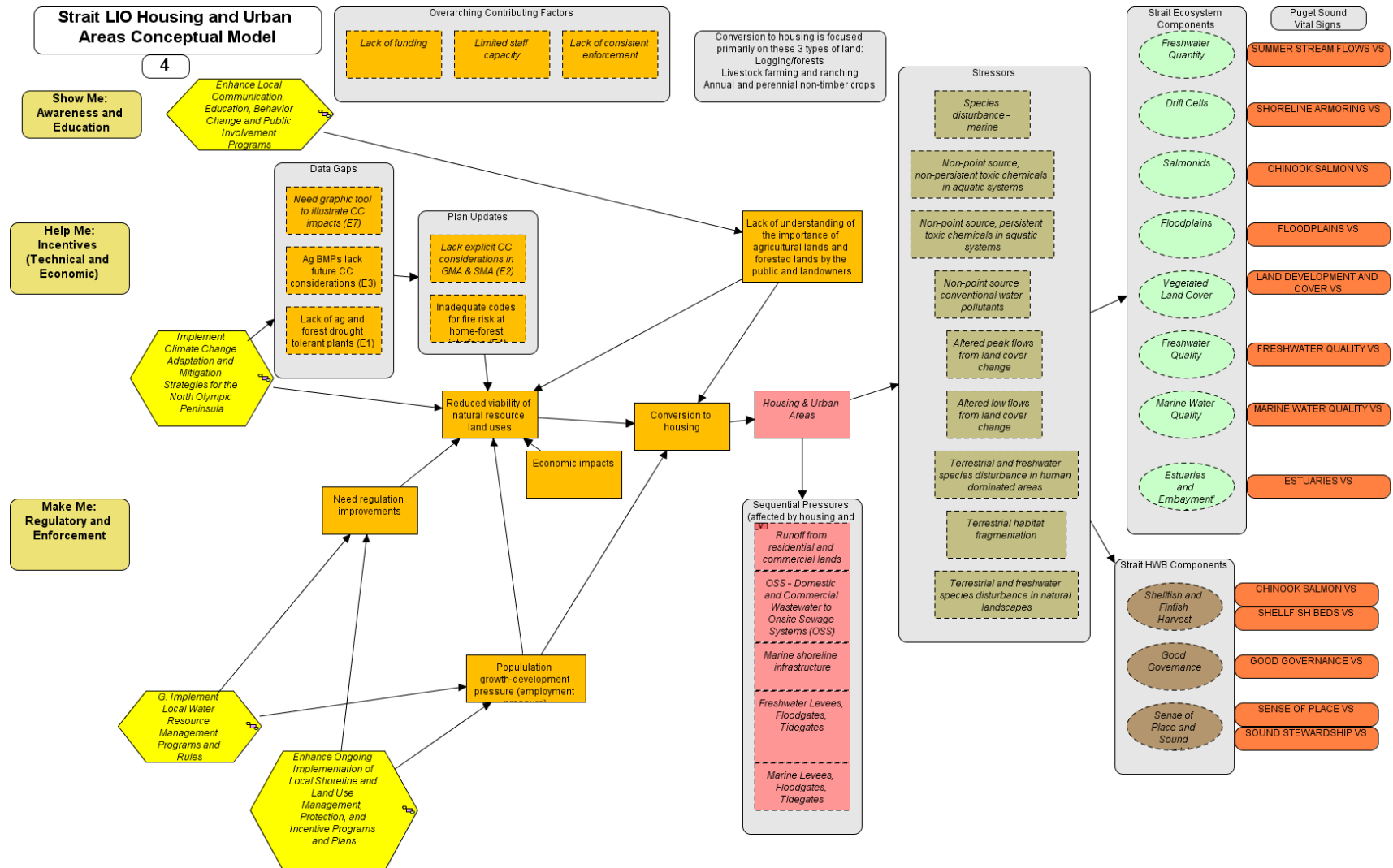


*Description of contributing factors related to 03. Freshwater Levees, Floodgates, and Tidegates*

Contributing Factors associated with our model for the *Freshwater Levees, Floodgates, and Tidegates* Pressure Source includes influences from agriculture and residential development. As with the marine version of this Source, our *Freshwater Levees, Floodgates, and Tidegates* Pressure Source also includes *Roads and Railroad-grades (including culverts)* as this infrastructure functions as levees (a.k.a., dikes), in some cases.

## 04. HOUSING AND URBAN AREAS

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.

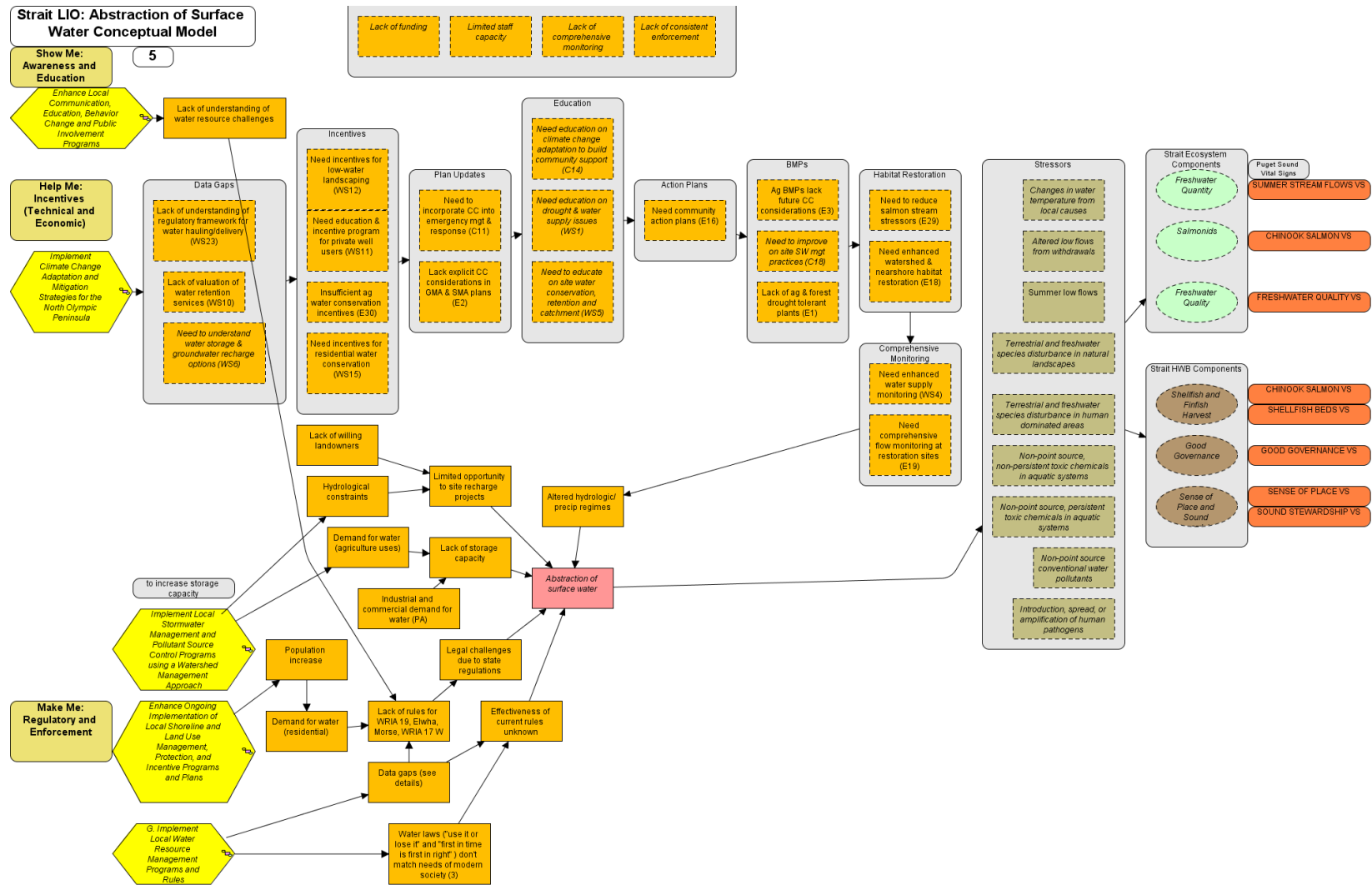


*Description of contributing factors related to 04. Housing and Urban Areas*

All Contributing Factor pathways for our *Housing and Urban Areas* Pressure Source model lead to conversion of natural resource lands to developed areas, primarily residential housing in our case. In turn, conversion to housing sequentially leads to or influences five of our other Pressure Sources.

## 05. ABSTRACTION OF SURFACE WATER

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.



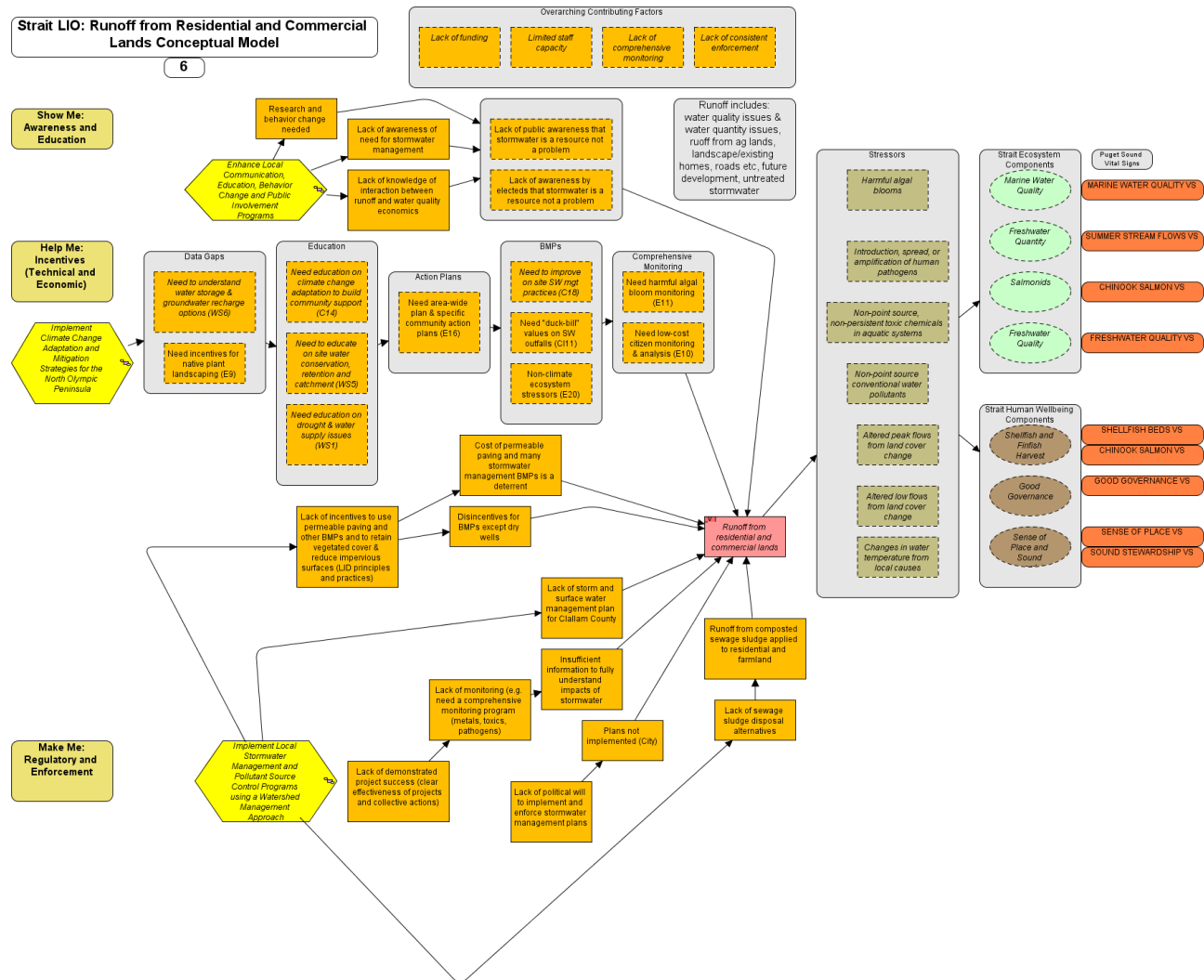
*Description of contributing factors related to 05. Abstraction of Surface Water*

Abstraction of Surface Water, as a Pressure Source model is, perhaps, somewhat unique across the Puget Sound basin. Contributing Factor pathways include those involving agricultural water uses, stream flow enhancement issues, climate change effects, water management rules and water rights.



## 06. RUNOFF FROM RESIDENTIAL AND COMMERCIAL LANDS

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.

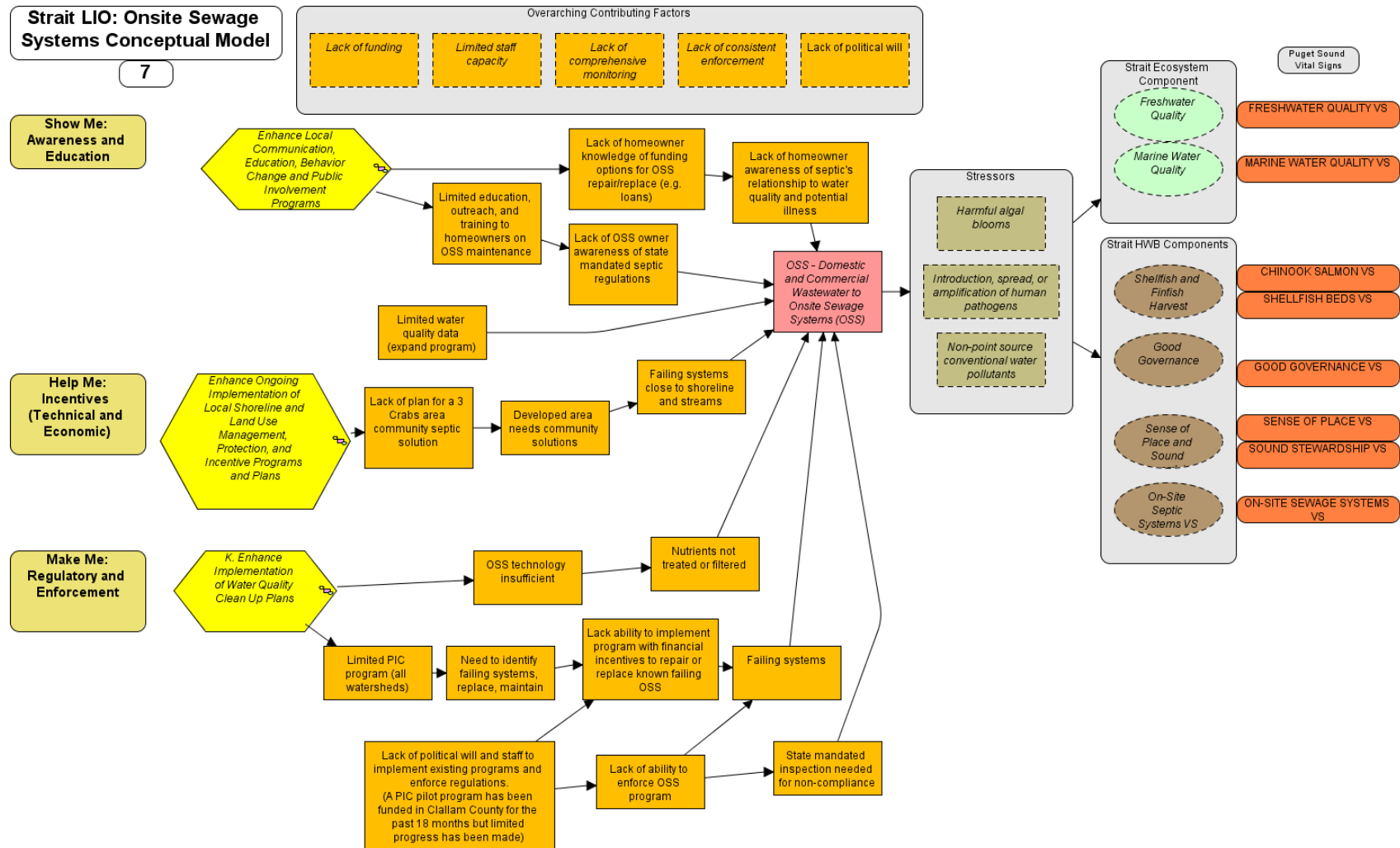


*Description of contributing factors related to 06. Runoff from residential and commercial lands*

Our model for the *Runoff from Residential and Commercial Lands* Pressure Source is likely similar to those from other Puget Sound locations. For example, our model includes Contributing Factor pathways that involve lack of landowner awareness, understanding, and incentives as well as stormwater management challenges. Perhaps somewhat unique to our model are the challenges associated with climate change adaptive mechanisms and utilizing stormwater runoff as a resource that can be reused for other purposes.

## 07. ONSITE SEWAGE SYSTEMS

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.

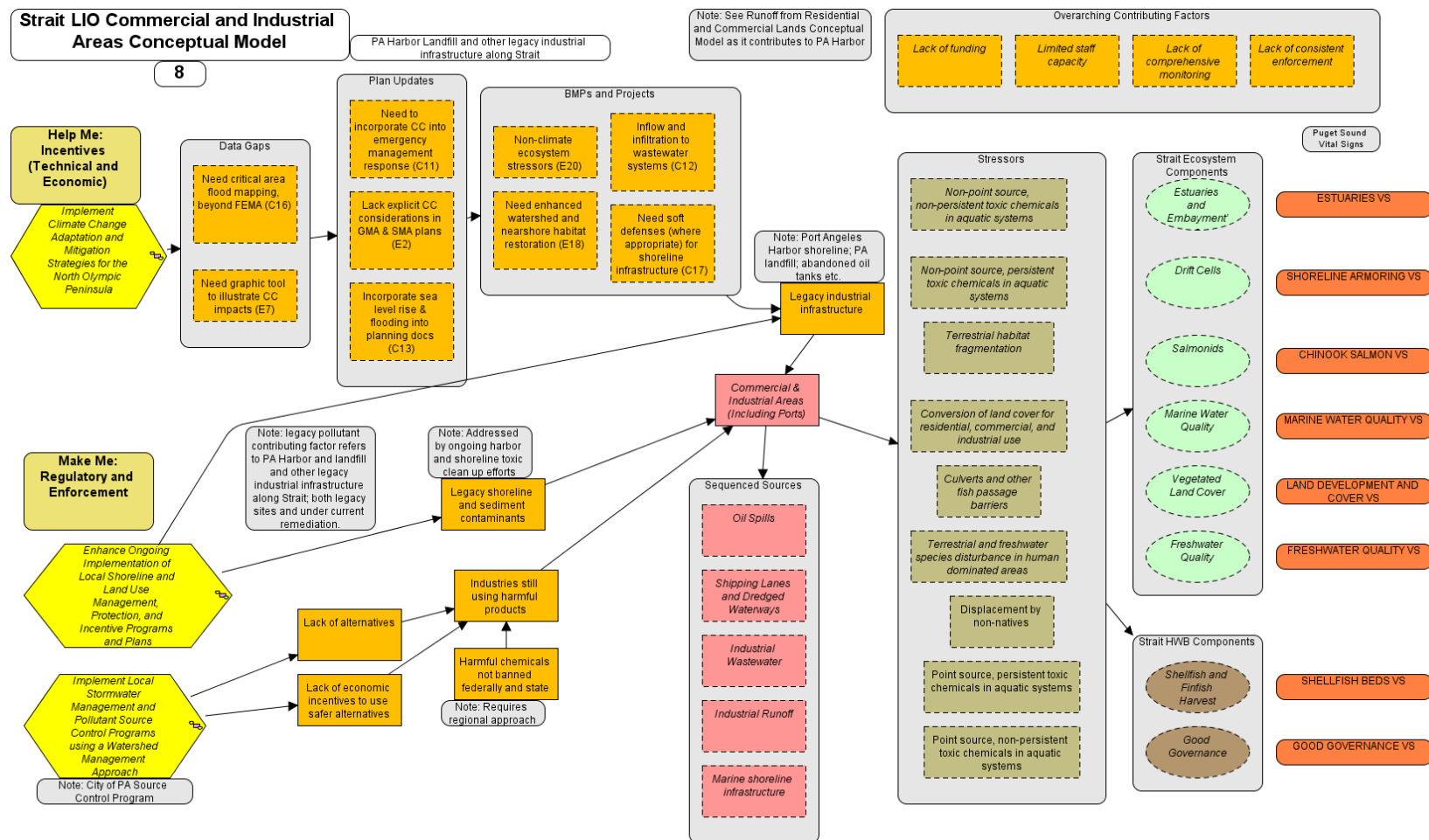


Description of contributing factors related to 07. Onsite Sewage Systems

Like the runoff model, our *Domestic and Commercial Wastewater to Onsite Sewage System (OSS)* Pressure Source model is likely similar to others from around the Puget Sound basin. Implementing WAC mandated local OSS programs, without a stable funding source, is clearly our most significant challenge for our two relatively rural counties, Clallam and Jefferson, that have large numbers of septic systems.

## 08. COMMERCIAL AND INDUSTRIAL AREAS

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.



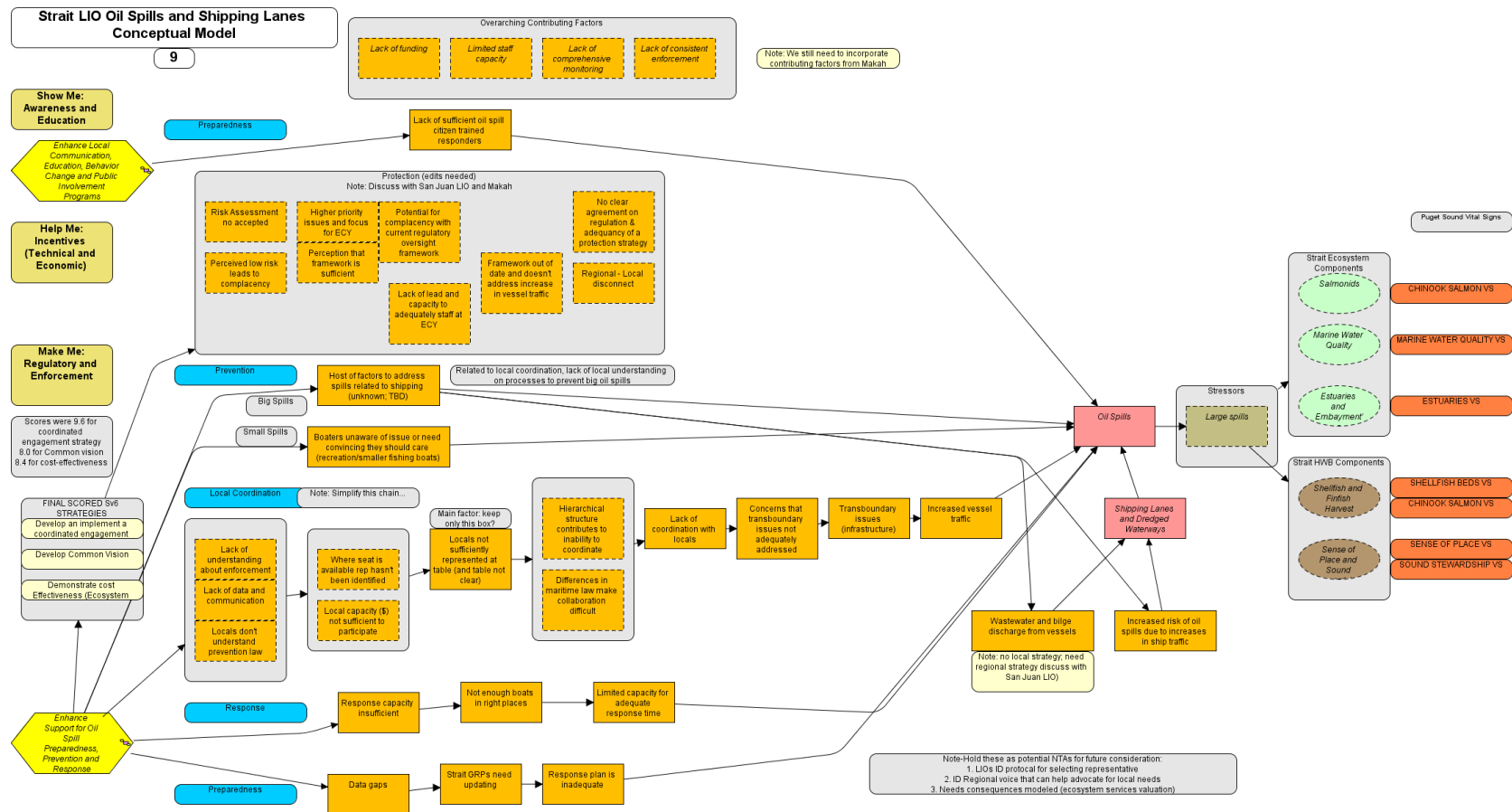
### Description of contributing factors related to 08. Commercial and Industrial Areas

Our Commercial and Industrial Areas Pressure Source model focuses on industrial infrastructure within geographically limited locations in our area (i.e., Port Angeles Harbor shoreline, closed landfills); legacy shoreline and sediment contaminants (i.e., Port Angeles Harbor); an abandoned oil

tank; and the need for safer chemical alternatives. This model also illustrates that this Pressure Source leads sequentially to a variety of other Sources.

# 09. OIL SPILLS AND SHIPPING LANES

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.



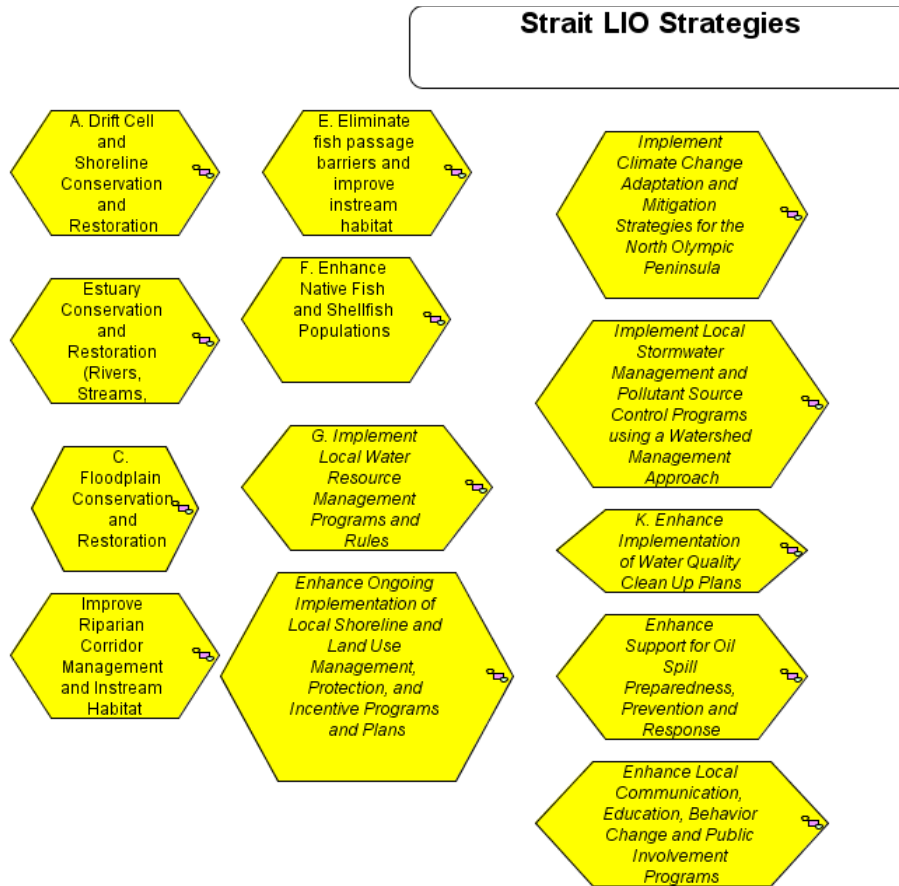
Description of contributing factors related to 09. Oil Spills and Shipping Lanes

Our Conceptual Model for *Oil Spills* and *Shipping Lanes*, as Pressure Sources, was originally drafted during an early Partnership-sponsored training session with members of the San Juan LIO. Our more advanced version of that model includes Contributing Factor pathways for oil spill preparedness, prevention, and response, as well as a pathway that's focused on the need for Tribal and local coordination and involvement



## ALL STRATEGIES

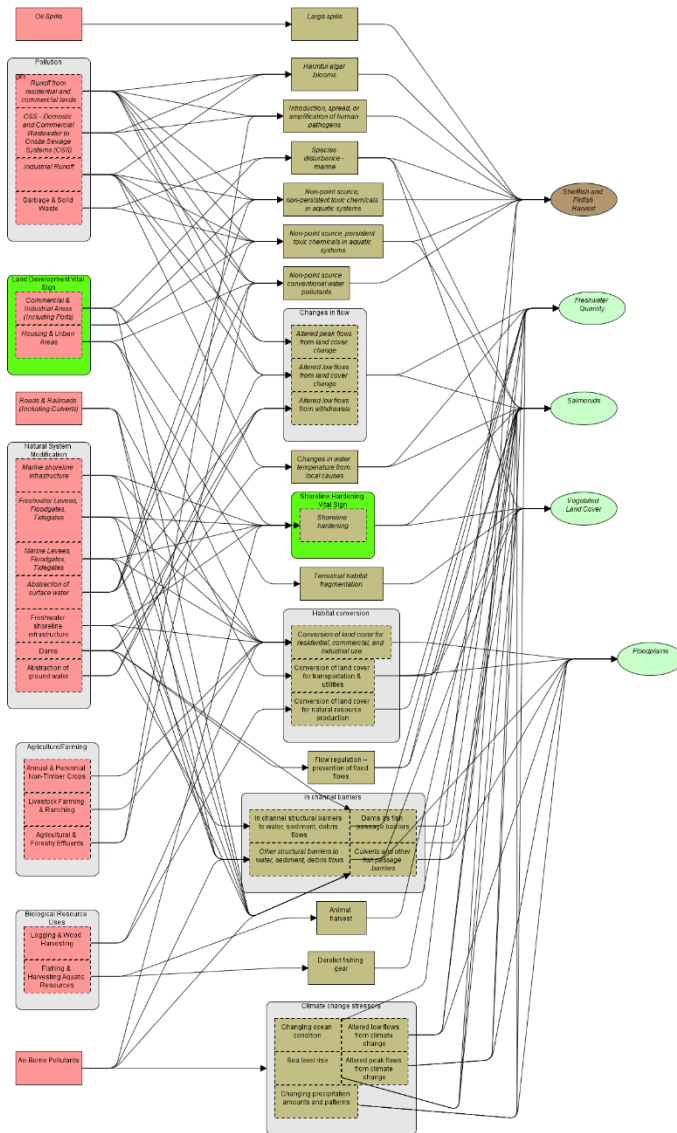
The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.



## **SOURCE-STRESSOR-VS RELATIONSHIPS**

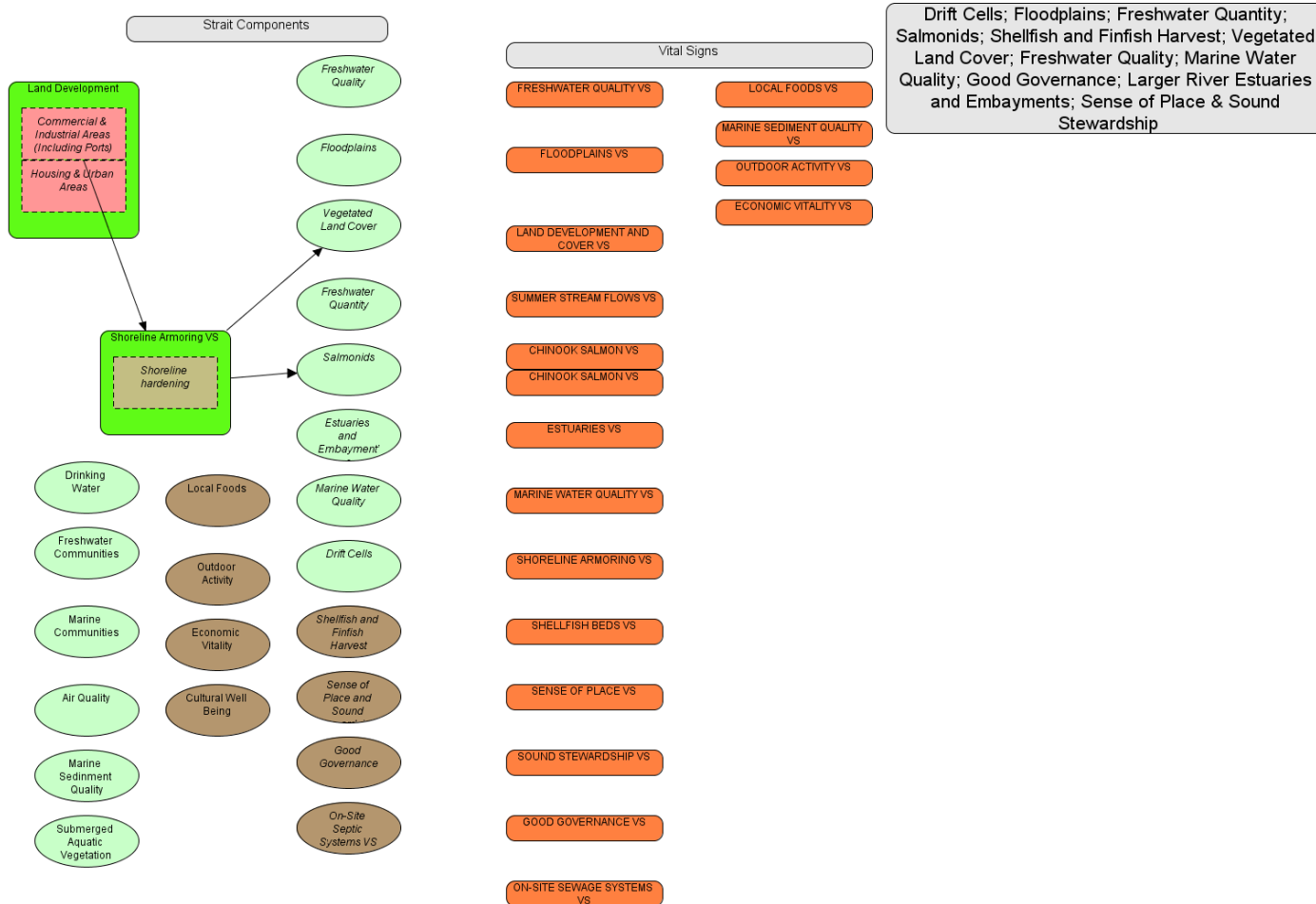
The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.

Figure 1. Conceptual Model - Oct. 8, 2015  
Strait ERN



# DESCRIPTION OF CONTRIBUTING FACTORS RELATED TO SOURCE-STRESSOR-VS RELATIONSHIPS - VS SIGNS AND STRAIT COMPONENTS

The diagram below illustrates our assumptions about the current context in the LIO and some of the factors underlying the existence and persistence of some of the critical pressures on ecosystem and human wellbeing components.



## D. RESULTS CHAINS

In this section, we use the following terminology to describe our theories of change:

A strategy is a bundle of actions that, when combined, are intended to achieve a common goal. Strategies are intended to mitigate pressures or their underlying conditions and root causes, restore ecosystems or species populations, or provide capacity to achieve goals. Strategies include one or more actions (capital projects, programs, etc.) and are designed to achieve specific outcomes, objectives, and goals.

Actions focus on delivery of a specific outcome or output associated with a desired result. Actions include capital projects (e.g. restoration and acquisition), program development or implementation, education and outreach, research, etc. Actions can be completed on a near-term (i.e. 2 years or less) or longer-term time scale.

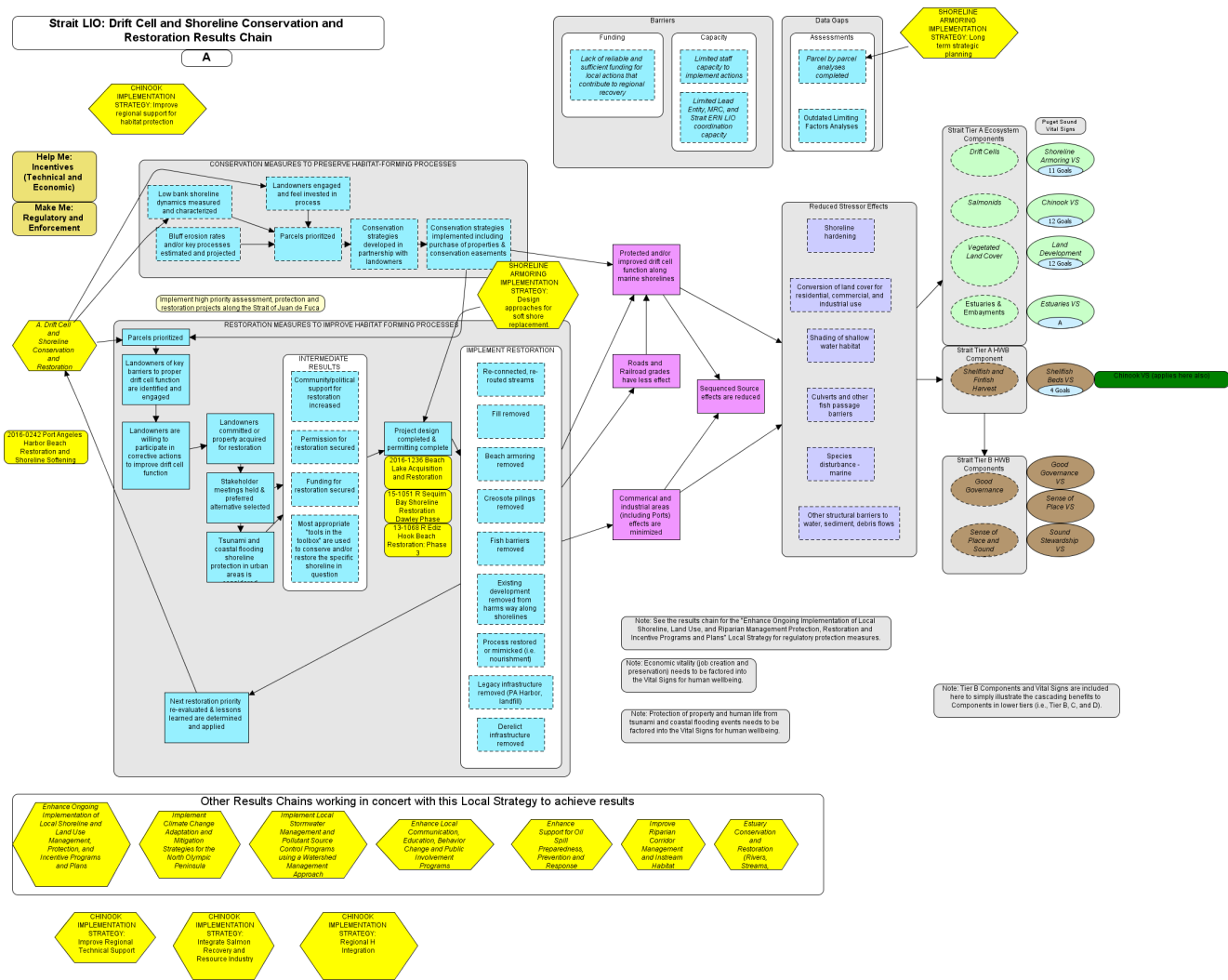
Intermediate results are the expected changes following the implementation of a strategy or action that are necessary steps toward achieving a desired future status or goal. Within a results chain, intermediate results may be identified for results boxes (blue) as well as pressure reduction boxes (purple).

Objectives are the desired outcomes for a subset of intermediate results, most often those which are easily monitored or those which provide the most useful information about effectiveness of a specific course of action.

Effectiveness indicators are most often developed for critical intermediate results within a results chain, or those that can provide the most information about whether actions are having the desired effects. They can include indicators of implementation, effectiveness, or validation and are used to assess whether progress is being made toward specific objectives and goals. In the *Measuring Effectiveness* tables in the following section, indicators are rated as follows: 4 = Very High Priority, 3 = High Priority, 2 = Medium Priority, 1 = Low Priority, blank = Priority Not Specified.

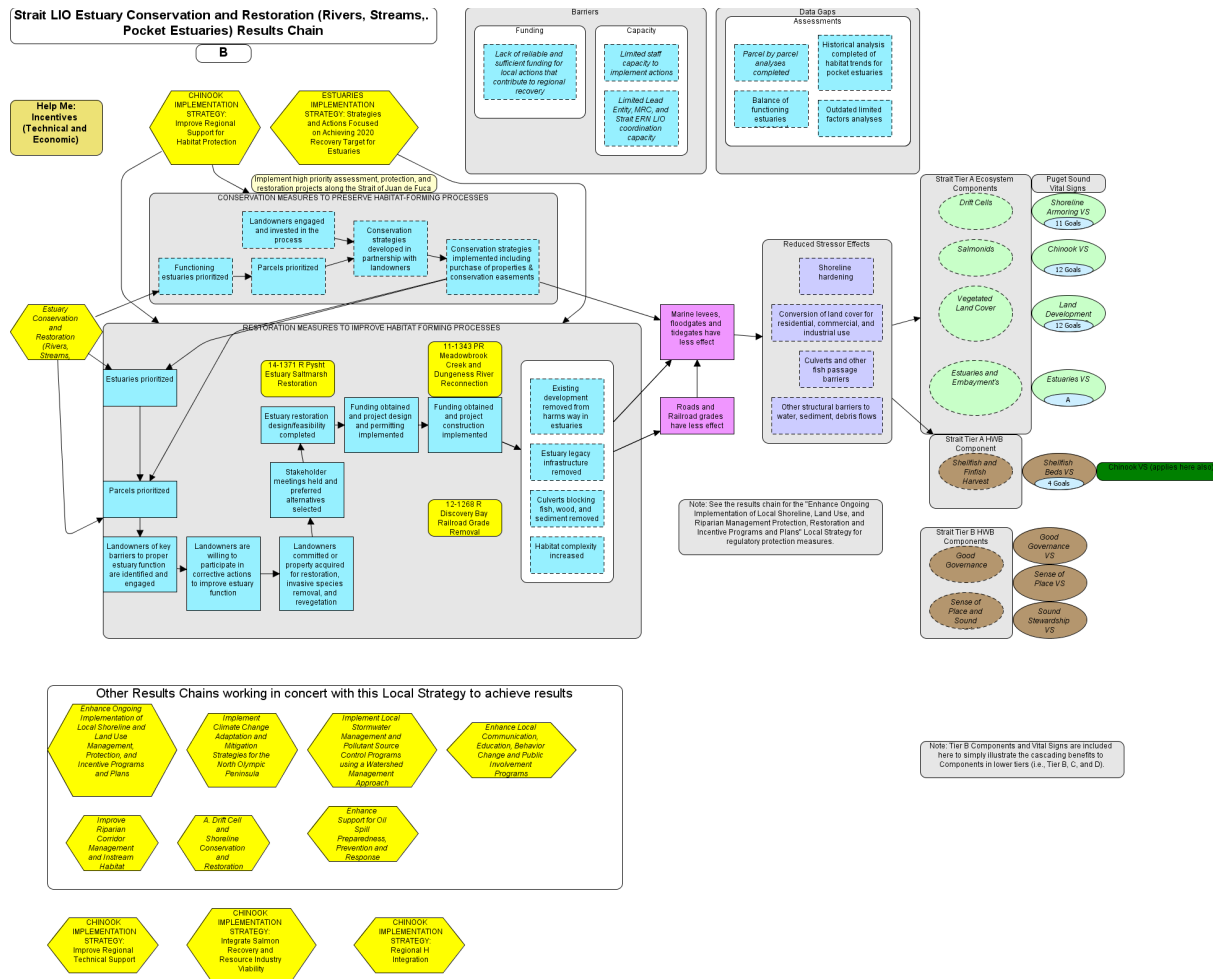
# THEORY OF CHANGE: A. DRIFT CELL AND SHORELINE CONSERVATION AND RESTORATION

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.



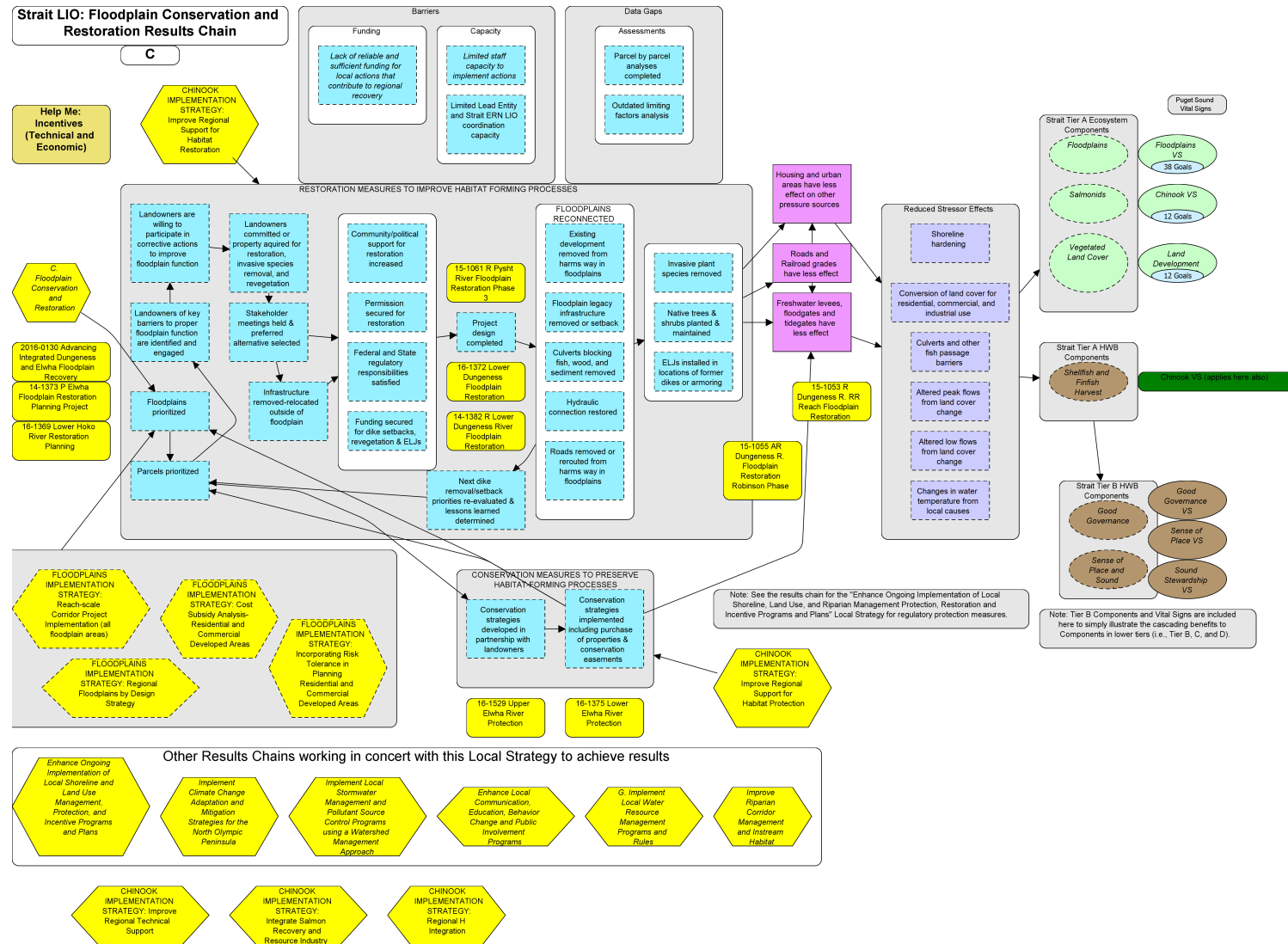
# THEORY OF CHANGE: B. ESTUARY PROTECTION AND RESTORATION (POCKET AND NATAL)

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.



# THEORY OF CHANGE: C. FLOODPLAIN PROTECTION AND RESTORATION

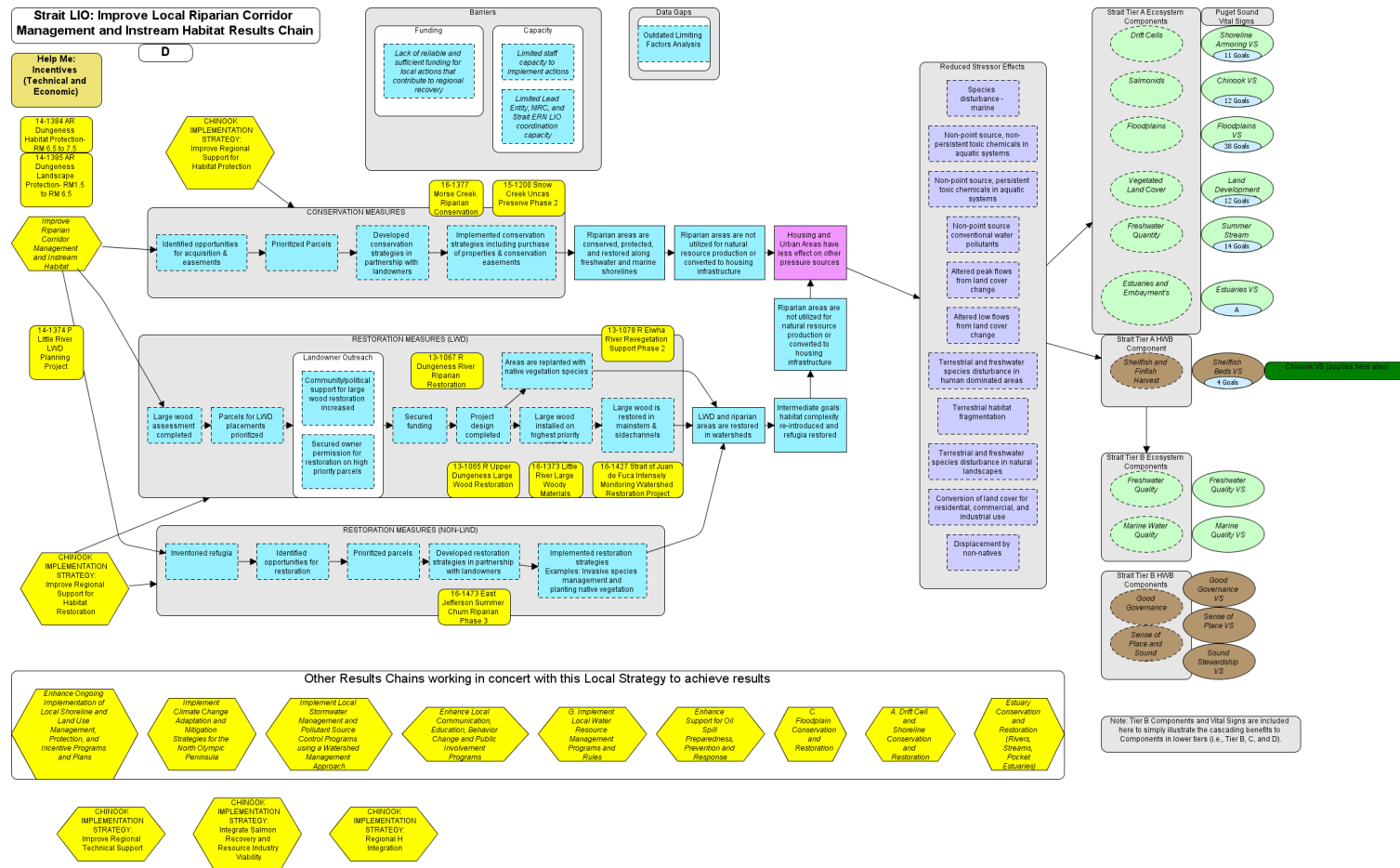
The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.





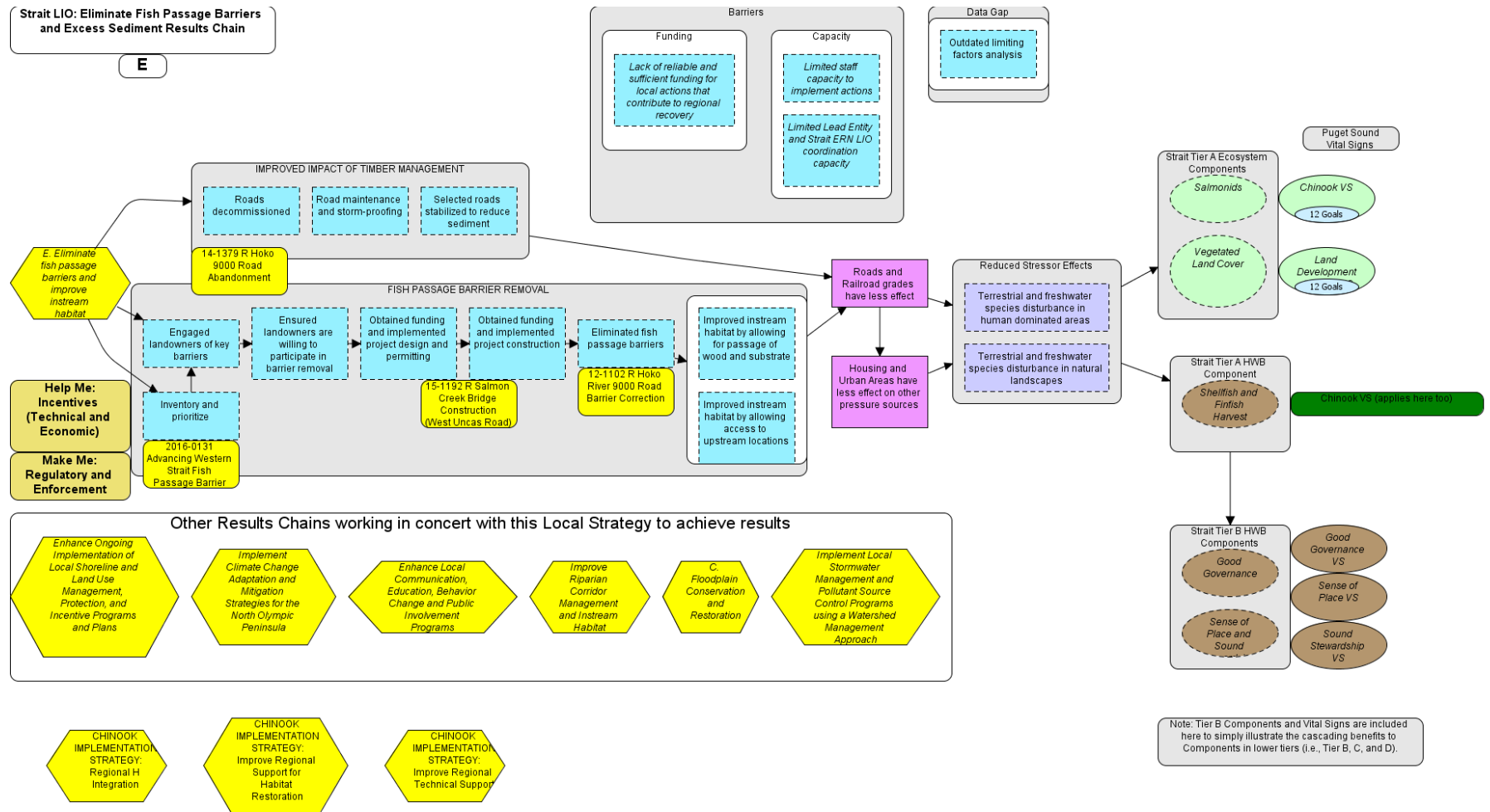
# THEORY OF CHANGE: D. IMPROVE LOCAL RIPARIAN CORRIDOR MANAGEMENT AND INSTREAM HABITAT

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.



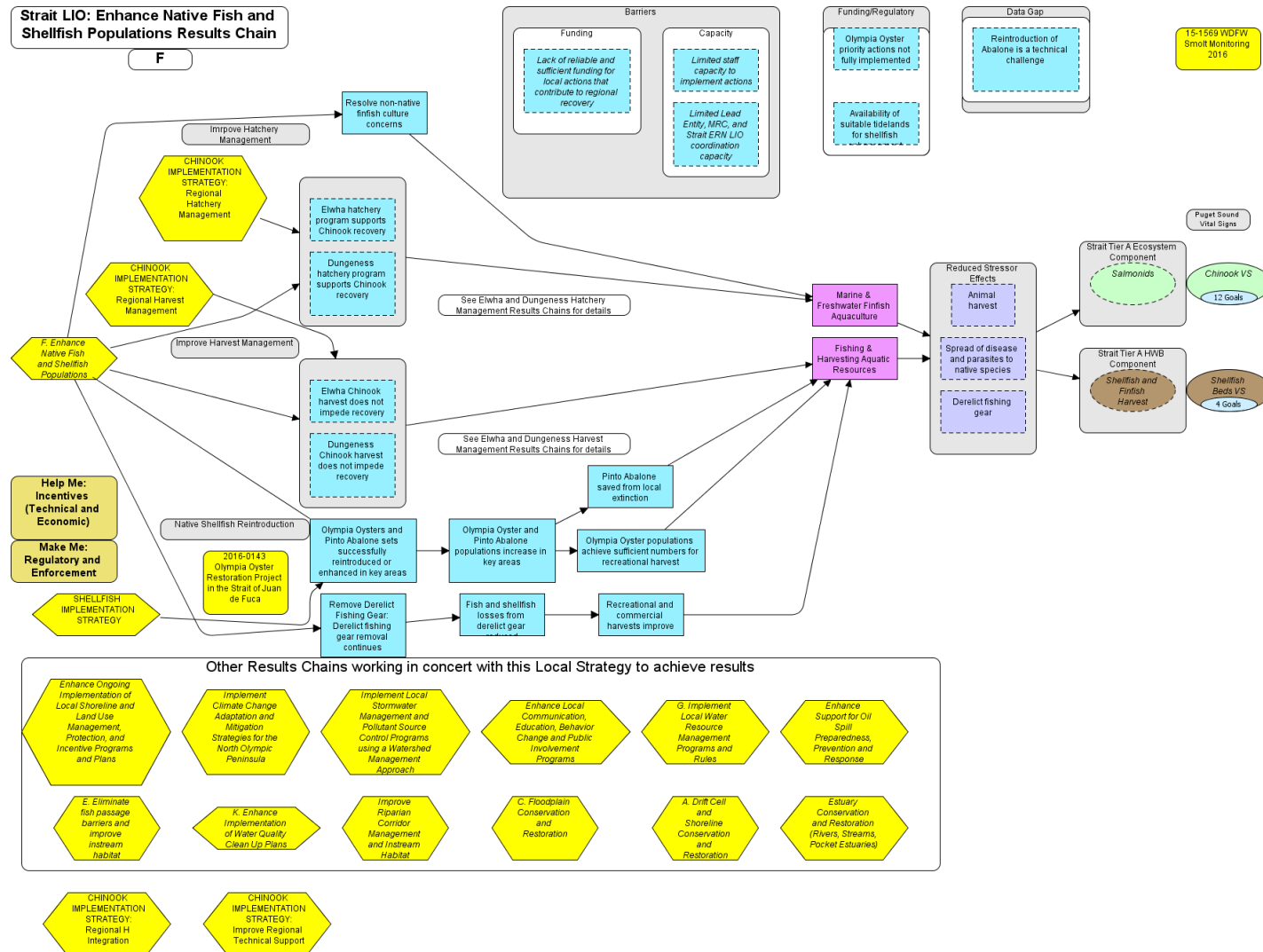
# THEORY OF CHANGE: E. ELIMINATE FISH PASSAGE BARRIERS AND EXCESS SEDIMENT

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.



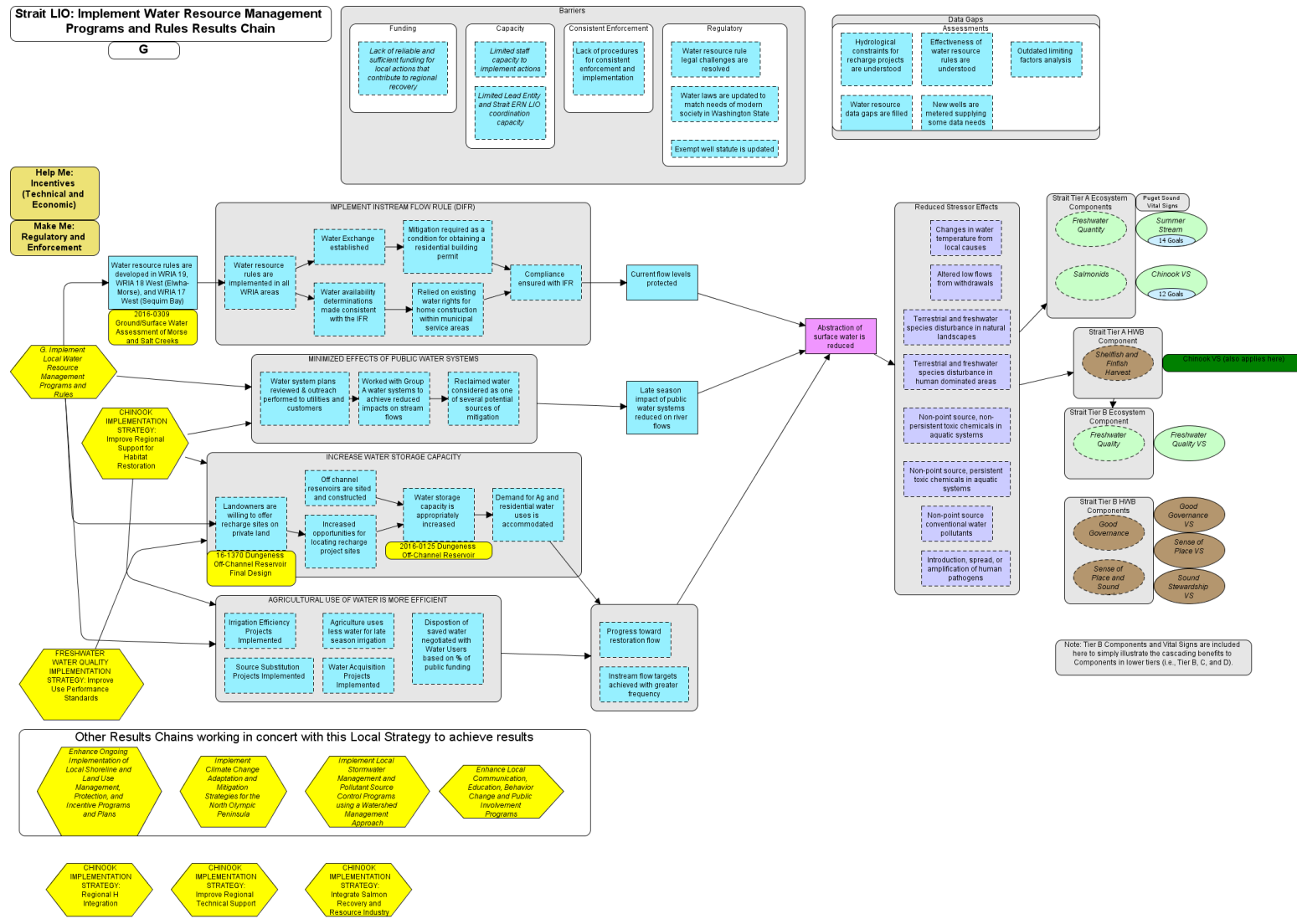
# THEORY OF CHANGE: F. ENHANCE NATIVE FISH AND SHELLFISH POPULATIONS

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.



# THEORY OF CHANGE: G. IMPLEMENT WATER RESOURCE MANAGEMENT PROGRAMS AND RULES

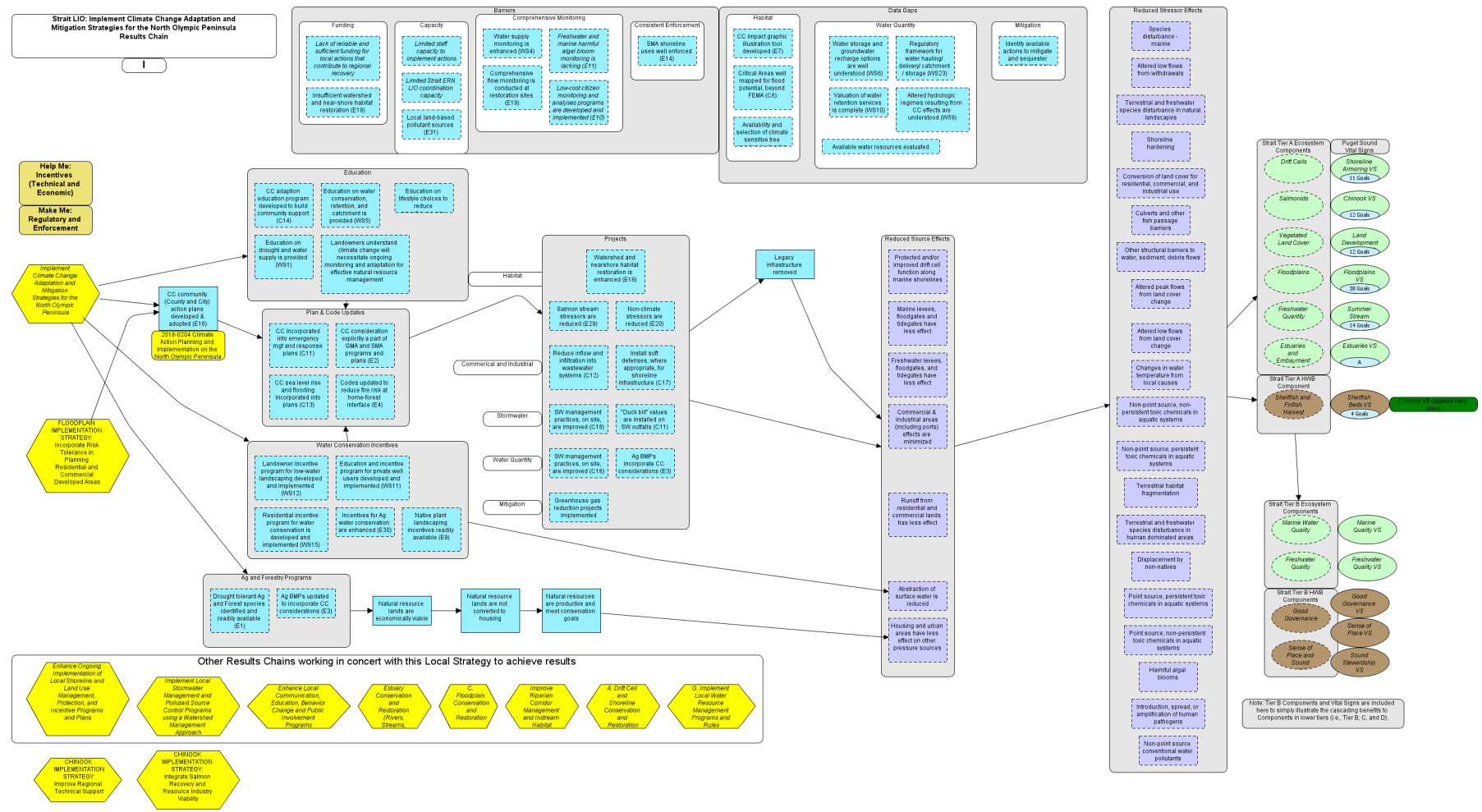
The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.





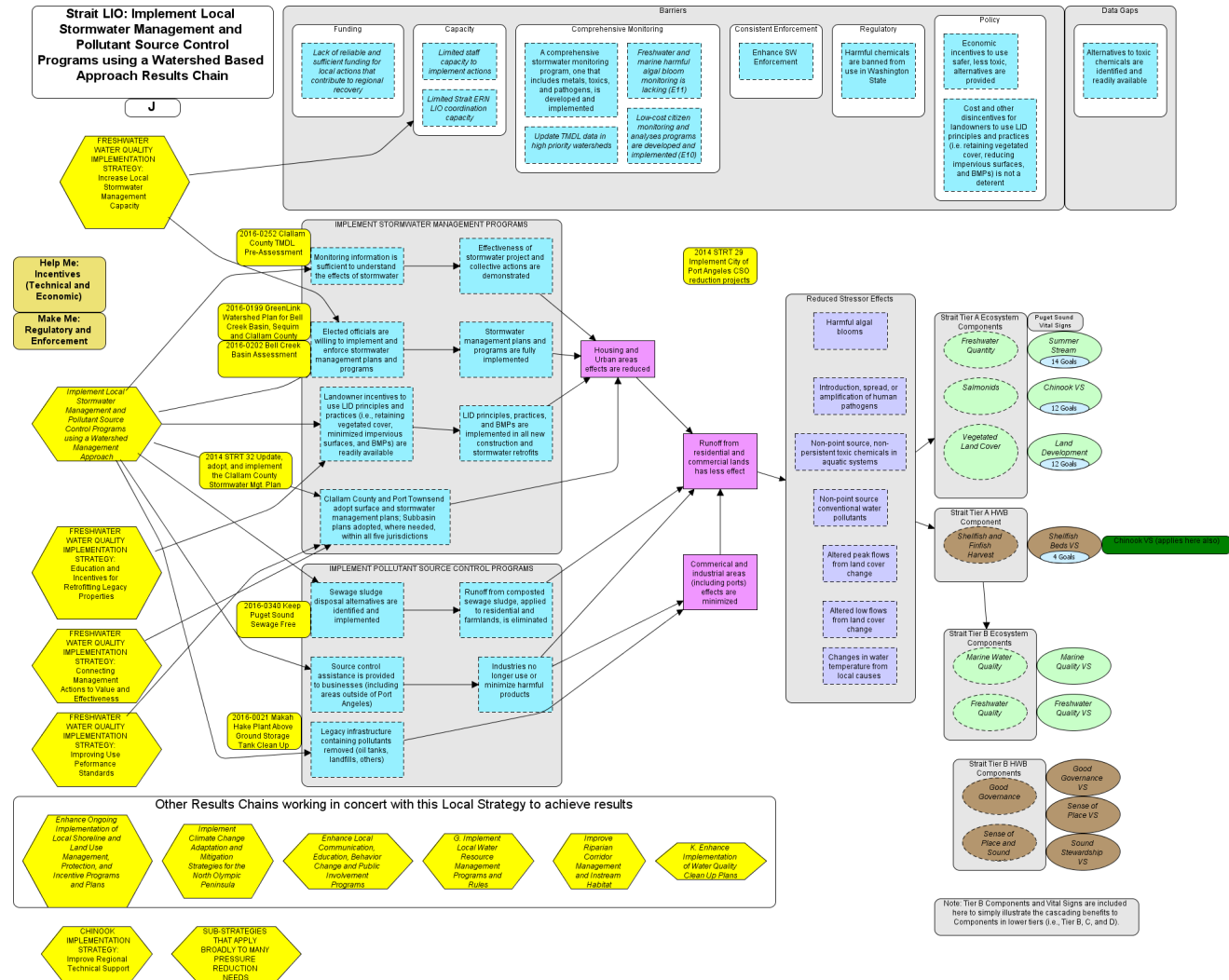
# THEORY OF CHANGE: I. IMPLEMENT HIGHEST PRIORITY CLIMATE CHANGE ADAPTATION AND MITIGATION STRATEGIES FOR THE NORTH OLYMPIC PENINSULA

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.



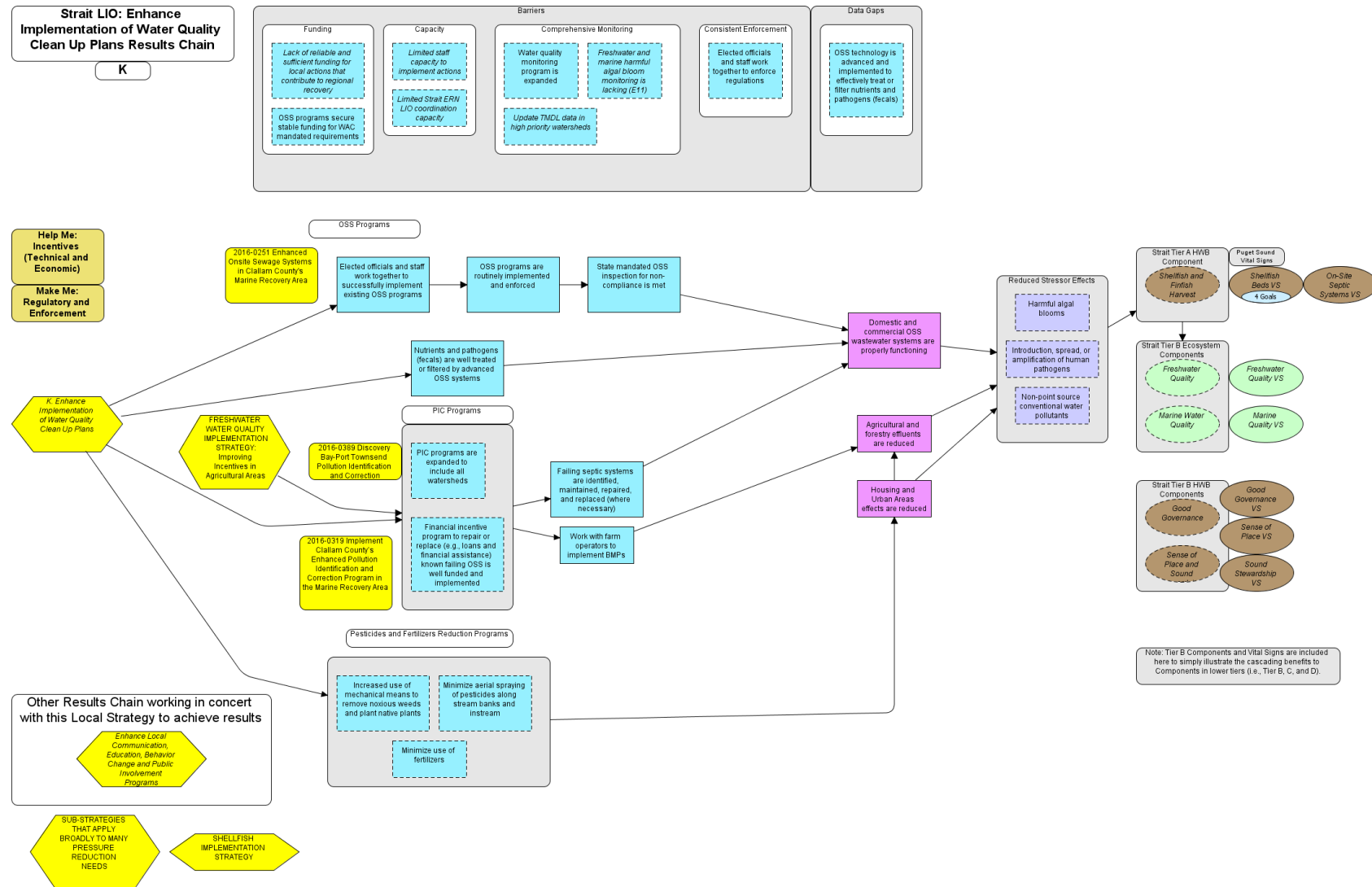
# THEORY OF CHANGE: J. IMPLEMENT LOCAL STORMWATER MANAGEMENT PROGRAMS USING A WATERSHED BASED APPROACH

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.



# THEORY OF CHANGE: K. ENHANCE IMPLEMENTATION OF WATER QUALITY CLEAN UP PLANS

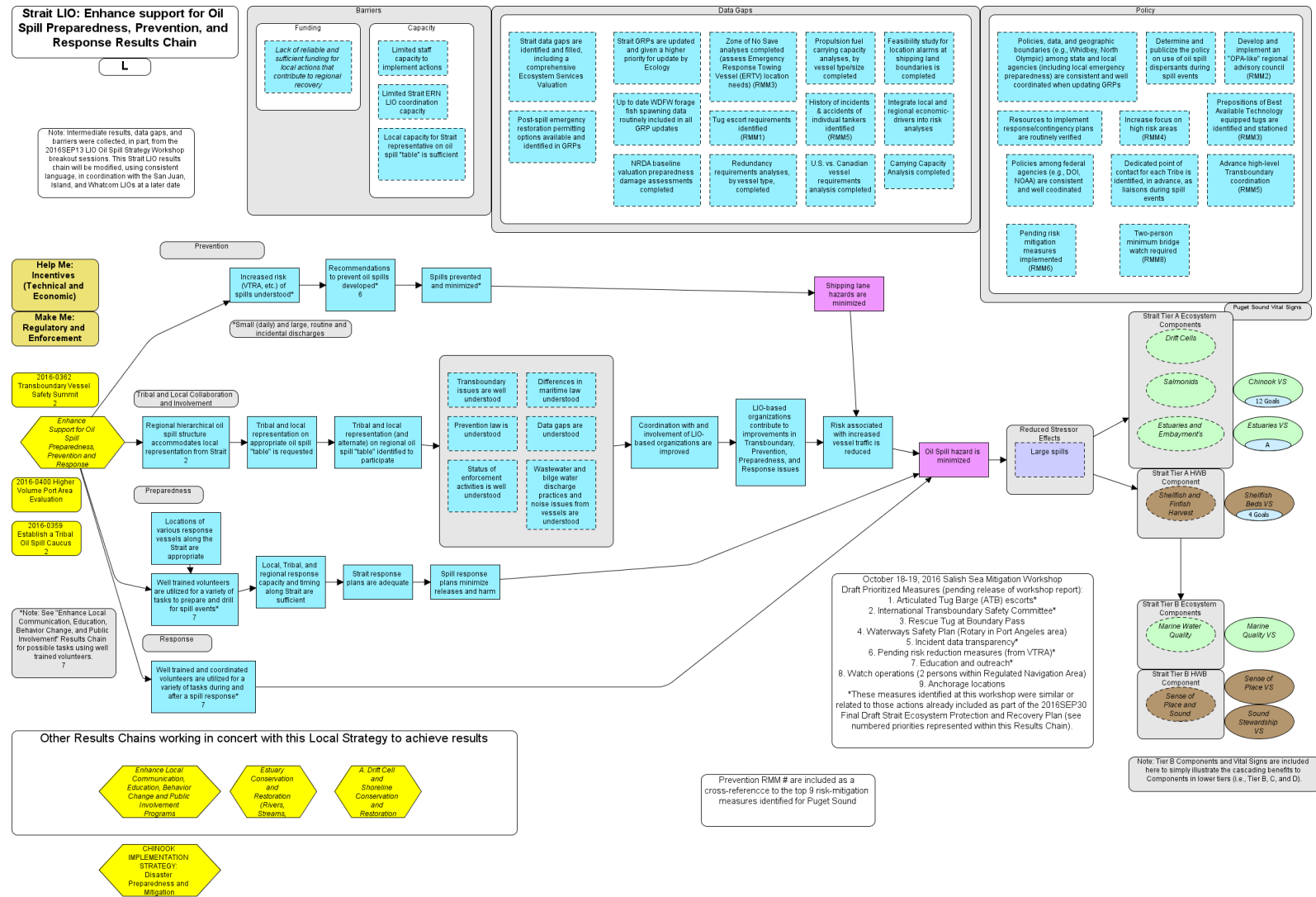
The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.





# THEORY OF CHANGE: L. ENHANCED SUPPORT FOR OIL SPILL PREPAREDNESS, PREVENTION, AND RESPONSE

The diagram below illustrates our assumptions about how the strategies and actions included in the results chain are intended to help reduce pressures and achieve recovery goals.





## E. GOAL STATEMENTS

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<b>Floodplains (estuarine and freshwater)</b>  <b>PSP floodplain definition: a low-lying area adjacent to a river channel or estuarine embayment that can be inundated by floodwater or channel migration.</b>  <b>PSP degraded definition: the floodplain is disconnected (cut off from river by roads, levees, shoreline armoring, or infrastructure), filled, or has developed/more intensive land use than what is</b>	A. Restore 120 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 0.0 - 3.3).	A. Restore 400 acres of degraded floodplain area to functional floodplain by 2066 within the Dungeness River watershed (RM 0.0 - 3.3).	Data from Dungeness River Floodplains By Design Watershed Vision (2015); [Note: Within reach RM 0.0 -3.3, there were 932 acres of functional floodplain historically; as of 2016 only 216 acres of functional floodplain remain.]	These NTAs list Floodplains as the primary vital sign: 2016-0130. These salmon recovery actions mapped to Floodplain Vital Sign: 14-1382, 14-1373, 15-1053, 15-1055,
	B. Restore 50 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 3.4 - 6.5).	B. Restore 350 acres of degraded floodplain area to functional floodplain by 2066 within the Dungeness River watershed (RM 3.4 - 6.5).	Data from Dungeness River Floodplains By Design Watershed Vision (2015)	
	C. Restore 20 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 6.5 - 8.6).	C. Restore 150 acres of degraded floodplain area to functional floodplain by 2066 within the Dungeness River watershed (RM 6.5 - 8.6).	Data from Dungeness River Floodplains By Design Watershed Vision (2015)	
	D. Restore 30 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 8.6 -10.8).	D. Restore 100 acres of degraded floodplain area to functional floodplain by 2066 within the Dungeness River watershed (RM 8.6 -10.8).	Data from Dungeness River Floodplains By Design Watershed Vision (2015)	
	E. Restore 30 acres of degraded floodplain area to functional floodplain by 2021 within the Dungeness River watershed (RM 10.8 - 12.0).	E. Restore 100 acres of degraded floodplain area to functional floodplain by 2066 within the Dungeness River watershed (RM 10.8 - 12.0).	Data from Dungeness River Floodplains By Design Watershed Vision (2015)	
	F. Data gap: acres of Elwha River functional floodplain that can be restored by 2021?	F. Restore 703 acres of degraded floodplain area to functional floodplain by 2066 within the Elwha River watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<i>naturally occurring.</i>	G. Data gap: acres of Morse Creek functional floodplain that can be restored by 2021?	G. Restore 130 acres of degraded floodplain area to functional floodplain by 2066 within the Morse Creek watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
<b>Floodplains (estuarine and freshwater)</b>  <b>PSP floodplain definition: a low-lying area adjacent to a river channel or estuarine embayment that can be inundated by floodwater or channel migration.PSP degraded definition: the floodplain is disconnected (cut off from river by roads, levees, shoreline armoring, or infrastructure ), filled, or has developed/more intensive land use than</b>	H. Data gap: acres of Hoko River functional floodplain that can be restored by 2021?	H. Restore 81 acres of degraded floodplain area to functional floodplain by 2066 within the Hoko River watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	DUPLICATE D FROM ABOVE FLOODPLAIN CELL BLOCK: These NTAs list Floodplains as the primary vital sign: 2016-0130 These salmon recovery actions mapped to Floodplain Vital Sign: 14-1382, 14-1373, 15-1053, 15-1055,
	I. Data gap: acres of Clallam River functional floodplain that can be restored by 2021?	I. Restore 60 acres of degraded floodplain area to functional floodplain by 2066 within the Clallam River watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
	J. Data gap: Acres of Bell Creek functional floodplain that can be restored by 2021? Need to implement the Bell Creek Basin Assessment (which is contingent upon this NTA being funded) to determine acres of degraded floodplain that can be restored in the short term.	J. Restore 58 acres of degraded floodplain area to functional floodplain by 2066 within the Bell Creek watershed.	Short-term goal based on discussion with Ann Soule (City of Sequim). Long-term goal based on data from Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
	K. Data gap: acres of Pysht River functional floodplain that can be restored by 2021?	K. Restore 34 acres of degraded floodplain area to functional floodplain by 2066 within the Pysht River watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<b>what is naturally occurring.</b>	L. Data gap - acres of Sekiu River functional floodplain that can be restored by 2021?	L. Restore 24 acres of degraded floodplain area to functional floodplain by 2066 within the Sekiu River watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
	M. Data gap: acres of Bagley Creek functional floodplain that can be restored by 2021?	M. Restore 16 acres of degraded floodplain area to functional floodplain by 2066 within the Bagley Creek watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
	N. Data gap: acres of Salt Creek functional floodplain that can be restored by 2021?	N. Restore 2.2 acres of degraded floodplain area to functional floodplain by 2066 within the Salt Creek watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
	O. Data gap: acres of Twin River functional floodplain that can be restored by 2021?	O. Restore 1.9 acres of degraded floodplain area to functional floodplain by 2066 within the Twin River watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
<b>Floodplains (estuarine and freshwater)</b>  <b>PSP floodplain</b>	P. Data gap: acres of Deep Creek functional floodplain that can be restored by 2021?	P. Restore 1 acre of degraded floodplain area to functional floodplain by 2066 within the Deep Creek watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	DUPLICATE D FROM ABOVE FLOODPLAIN CELL BLOCK: These NTAs

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<p><b>definition: a low-lying area adjacent to a river channel or estuarine embayment that can be inundated by floodwater or channel migration.</b>  <b>PS P degraded definition: the floodplain is disconnected (cut off from river by roads, levees, shoreline armoring, or infrastructure), filled, or has developed/more intensive land use than what is naturally occurring.</b></p>	Q. Data gap: acres of Lyre River functional floodplain that can be restored by 2021?	Q. Restore 1 acre of degraded floodplain area to functional floodplain by 2066 within the Lyre River watershed.	Data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	list Floodplains as the primary vital sign: 2016-0130 These salmon recovery actions mapped to Floodplain Vital Sign: 14-1382, 14-1373, 15-1053, 15-1055,
	R. Data gap: acres of McDonald Creek functional floodplain that can be restored by 2021?	R. Remove a dam and restore approximately 1 acre of degraded floodplain area to functional floodplain by 2066 within the McDonald Creek watershed.	Long-term goal based on 2016 conversation with Robert Knapp (Jamestown S'Klallam Tribe). [Note: It is very difficult to find funding for these smaller scale but very important projects; they don't compete well in the traditional SRFB, ESRP, NEP funding world]. [Note: PSP floodplain delineation did not include McDonald Creek].	
	S. Protect through fee-simple acquisition an estimated 69.5 acres of functional floodplain (5 acres Morse Creek, 7 acres Pysht, 57.5 acres Lyre). Protect through conservation easements an estimated 34 acres of functional floodplain (11 acres Elwha, 15 acres Salt Creek, 8 acres South Bagley Creek).	S. Protect and maintain the estimated 17,228 acres of "not degraded" floodplain within the Strait watersheds relative to a 2016 baseline.	Short-term goals based on data from Michele Canale (North Olympic Land Trust). Long-term goal based on data from Jennifer Burke (PSP), 2016; based on a 'beta' GIS floodplain delineation and degraded layer; data sources = FEMA 500-year floodplain maps and USGS "Low Floodplain" maps; <b>PSP data not locally groundtruthed.</b>	
	T. Data Gap: Need funding to locally groundtruth the PSP floodplain data and to extend the GIS floodplain analysis to Snow Creek, Salmon Creek, McDonald Creek, Siebert Creek, and other Strait LIO watersheds which were not included in the 2016 beta (Future NTA?) .	T. No long-term goal identified.	The PSP floodplain GIS analysis was not locally groundtruthed and the 2016 beta did not include all of the Strait LIO watersheds (e.g., Snow Creek, Salmon Creek, McDonald Creek, Siebert Creek, and toher Strait LIO watersheds).	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<b>Land Development &amp; Cover (vegetated land cover)</b>  <i>(Note: The report titled "Nature's Value in Clallam County: Policy Implications of the Economic Benefits of Feeder Bluffs and 12 Other Ecosystems", developed by Earth Economics for Clallam County in 2013, may contain some relevant information to complete some of these Goal Statements. A webpage link</i>	A. Data Gap: Need to know acres of ag and forestland we had historically and acres we want to restore vs. protect. (Future NTA?)	A. Data Gap: Need to know acres of ag and forestland we had historically and acres we want to restore vs. protect. (Future NTA?)	Does PSP have data to make these calculations? Is State of Our Watersheds (2016) a potential source of data? The Clallam County SMP contains land cover data. However, it is not currently in a form that will directly translate to establishing these goal statements. Need funding to allow staff to conduct this analysis. Hood Canal Coordinating Council is currently developing habitat recovery goals watershed by watershed through an EDT-based exercise (Larry Lestelle)--this study will overlap the Strait LIO for Snow Creek, Salmon Creek, and Jimmycomelately Creek.	These NTAs list Land Development & Cover as the primary vital sign: 2016-0280, 2016-0204, 2016-0107, 2016-0202, 2016-0199. These salmon recovery actions mapped to the Land Development and Cover Vital Sign: 14-1384, 14-1385, 13-1067, 13-1078, 14-1379
	B. Data Gap: Determine acres of prime farmland required to sustain local food supply.	B. Data Gap: Determine acres of prime farmland required to sustain local food supply.	Talk to Nash Huber, other local farmers, and NOLT.	
	C. Ensure the average annual loss of forested land cover to developed land cover in non-federal lands does not exceed _____ acres per year, as measured with Landsat-based change detection.	C. Ensure the average annual loss of forested land cover to developed land cover in non-federal lands does not exceed _____ acres per year, as measured with Landsat-based change detection.	Between 2001 and 2011, 890 acres in the Strait LIO were converted from "forested" to "developed" based on the USGS Coastal Change Analysis Product (CCAP) data provided by Jen Burke (PSP, 9/13/16). If future data allows, the Strait LIO would like to develop goal statements for each watershed in the Strait LIO (as was done for floodplain goals).	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<i>to that report is available within the Reference section of this Plan.)</i>	D. Restore ____ miles of riparian vegetation within the Strait LIO by 2021.	D. Restore ____ miles of riparian vegetation within the Strait LIO by 2066.	Waiting on data from Jennifer Burke (PSP); not likely available until 2017. Other possible data sources: State of Our Watersheds (2016) <a href="https://geo.nwifc.org/SOW/SOW2016_Report/SOW2016.pdf">https://geo.nwifc.org/SOW/SOW2016_Report/SOW2016.pdf</a> ; Point No Point Treaty Council Assessment of Marine and Floodplain Riparian Vegetation in the Hood Canal and Strait of Juan de Fuca	
	E. Protect and maintain ____ miles of riparian vegetation within the Strait LIO by 2021.	E. Protect and maintain ____ miles of riparian vegetation within the Strait LIO by 2066.	Waiting on data from Jennifer Burke (PSP); not likely available until 2017	
	F. Protect and maintain ____ acres of prime farmland within the Strait LIO by 2021.	F. Protect and maintain ____ acres of prime farmland within the Strait LIO by 2066.	Waiting on data from Jennifer Burke (PSP); not likely available until 2017	
	<i>G. No short-term goal identified</i>	<i>G. Ensure that forest management practices in non-federal working forests (e.g., sustainable timber harvest; perpetual thinning; multi-age and proper multi-species selections; etc.) measurably increases the amount of precipitation that is retained as groundwater; improves water quality in streams by reducing siltation from runoff; and is ultimately resilient to Climate Change effects</i>	<i>Waiting on data from Jennifer Burke (PSP) to see if their work can inform this goal statement; not likely available until 2017</i>	
<b>Shoreline Armoring (drift cell function)</b>	A. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 422 linear feet of the Dungeness Drift Cell by 2021.	A. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 1.5 miles of the Dungeness Drift Cell between Lees Creek and Morse Creek by 2066.	Goals based on 2016 recommendations from Robert Knapp (JST) and the Dungeness Drift Cell Parcel Prioritization and Conservation Strategy (July 2016); Dungeness Drift cell is defined as Lees Creek to tip of Dungeness Spit (~10.5 miles; Figure 5). The long-term goal of 1.5 miles is primarily rip-rapped railroad grade between Lees Creek and Morse Creek.	These NTAs list Shoreline Armoring as the primary vital sign: 2016-1236, 2016-0197, 2016-0080, 2016-0242. These salmon



Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
	B. Protect and maintain Dungeness Drift Cell function with no (zero) new shoreline modification from Lees Creek to Dungeness Spit.	B. Protect and maintain Dungeness Drift Cell function with no (zero) new shoreline modification from Lees Creek to Dungeness Spit.	Goals based on 2016 recommendations from Robert Knapp (JST) and the Dungeness Drift Cell Parcel Prioritization and Conservation Strategy (July 2016); Dungeness Drift cell is defined as Lees Creek to tip of Dungeness Spit (~10.5 miles; Figure 5).	recovery actions mapped to Shoreline Armoring Vital Sign: 15-1051, 13-1068, 12-1268,
	C. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 450 linear feet of Sequim Bay.	C. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 3,000 linear feet of Sequim Bay.	450 feet is the expected gain from the Dawley Shoreline Restoration Project. 3,000 feet is the expected gain from multiple private properties that have hard armoring that could be removed.	
	D. Remove armoring, overwater structures, or shoreline modifications to restore drift cell function along 2,900 linear feet of the Elwha Drift Cell by 2021.	D. Protect and maintain Elwha Drift Cell function with no (zero) new shoreline modifications from Dry Creek to the Elwha River.	2,100 feet is the expected gain from the Beach Lake Project. 800 feet is the expected gain from removing rip rap from private property immediately to east of Beach Lake Project.	
	E. Port Angeles Harbor (Inside Ediz Hook to Lees Creek) - Remove 200 feet of hard armoring on the inside of Ediz Hook as part of the mitigation for the new Navy Pier.	E. Port Angeles Harbor (Inside Ediz Hook to Lees Creek) - Remove 100% of hard armoring, pilings, and overwater structures associated with the former Rayonier Site.	Goals suggested by Ian Miller (Washington Sea Grant) and the Strait LIO technical task force.	
	F. No short-term goal identified.	F. Develop a long-term strategy for the Three Crabs/Seashore Lane/Jamestown Beach Lane/Jamestown Road communities for dealing with flooding and sea level rise without additional or enhanced armoring.	Goals suggested by Ian Miller (Washington Sea Grant) and the Strait LIO technical task force.	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<b>Shoreline Armoring (drift cell function)</b>	G. Protect and maintain drift cell function along the entire Strait to ensure shoreline modification does not exceed the 2013 baseline of 19% total shoreline modification (Coastal Geologic Services 3-25-16).	G. Reduce shoreline modification along the entire strait, with the exact target to be determined by a parcel-by-parcel assessment (see #6 below).	Data Source = Coastal Geologic Services (3-25-16) with updates by Jennifer Burke (PSP, 6-6-16). [Note 1: "shoreline modification" includes bulkheads or highly modified shoreline features such as boat ramps or cement stairs; docks and piers are not included; soft armored shorelines are also not included.] [Note 2: the Cumulative Impacts Analysis and No Net Loss Report (2013) for the Clallam County Shoreline Master Program Update identified 83 parcels with potential for new armoring and 657 parcels with potential for new docks. The SMP prohibits armoring of feeder bluff shorelines.][Note 3: WDFW (2016) data indicate that Clallam County had a net increase (new minus removed) of 2,000 linear feet of shoreline armoring between 2005 and 2015. Jefferson County had a net increase of 750 linear feet. All of Clallam County is within the Strait LIO but not all of Jefferson County is within the Strait LIO. The 2016 WDFW data are only for armoring and do not include other forms of shoreline modification; <b>the key point is that the trajectory is going in the wrong direction--toward net increase in armoring rather than decrease]</b>	DUPLICATE D FROM ABOVE SHORELINE ARMORING CELL BLOCK: These NTAs list Shoreline Armoring as the primary vital sign: 2016-1236, 2016-0197, 2016-0080, 2016-0242. These salmon recovery actions mapped to Shoreline Armoring Vital Sign: 15-1051, 13-1068, 12-1268,

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
	H. Remove armoring, overwater structures or shoreline modifications to restore drift cell function along 200 feet of Discovery Bay.	Remove armoring, overwater structures or shoreline modifications to restore drift cell function along 750 feet of Discovery Bay.	Goal statements are based on 2016 report from Coastal Geologic Services to Northwest Straits Foundation about "best of the best" armor removal projects along feeder bluffs in Jefferson County using a parcel by parcel assessment. Total linear feet for highest ranking parcels in Discovery Bay is 734 feet with another 410 total linear feet for second tier/very feasible parcels, based on GIS analysis and boat-based field verification.	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
	I. Data Gap: There is a pressing need to conduct a parcel-by-parcel assessment of drift cells <u>for the entire Strait LIO</u> . (Future NTA?)	I. Long-term targets for RESTORATION <u>and</u> PROTECTION would be an outcome of the parcel-by-parcel assessment.	Data Gap identified by Strait LIO technical task force. Our current state of knowledge is based on drift cell analysis for the Dungeness and Elwha Drift Cells and Discovery Bay. We need a better understanding of drift cell function and impairment <u>for the entire Strait LIO</u> , including along WRIA 19, Dungeness Bay, and Sequim Bay. The proposed parcel-by-parcel analysis <u>for the entire Strait LIO</u> would also help prioritize areas where rip rap has been used to protect lightly used or legacy shoreline infrastructure such as Pillar Point boat ramp, Whiskey Creek, Low Point, Coho Estates, etc. Larger shoreline modifications, such as the Port Angeles landfill, the Port Angeles cemetery, the Port Angeles water line, the outside of Ediz Hook, the Coast Guard runway, Point Wilson shoreline, etc. also need a parcel-by-parcel analysis. Note: <i>When prioritizing shoreline modifications for removal using a parcel-by-parcel (or other) analysis, it's important to consider that those areas which include only a few hundred feet could have a larger positive effect than another action that removes twice that amount, or two smaller projects that are spatially linked.</i>	
<b>Estuaries</b>	To be determined.	To be determined.	To be determined.	To be identified.

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
<b>Summer Stream Flows</b>	A. During critical low-flow periods, reduce irrigation withdrawals from the Dungeness River 1 cfs annually and a total of 5 cfs by 2021.	A. During critical low-flow periods, reduce irrigation withdrawals from the Dungeness River 25 cfs annually. [Note: this goal is contingent upon the proposed storage reservoir being constructed.]	Goals based on 2016 conversation w/ Joe Holtrop (Clallam Conservation District)	These NTAs list Summer Stream Flows as the primary vital sign: 2016-0125, 2016-0309.
	B. By 2021, implement shallow aquifer recharge projects designed to benefit Dungeness River and east WRIA 18 independent stream flows during critical low flow periods by infiltrating 119 acre feet of water annually.	B. By 2066, shallow aquifer recharge projects will contribute 4 cfs annually to the Dungeness River during critical low flow periods, based on the Dungeness Numeric Groundwater Model (Ecology 2008).	Goals based on 2016 conversations w/ Ann Soule (City of Sequim) and Joe Holtrop (Clallam Conservation District); Dungeness Water Exchange Mitigation Plan (2012); Dungeness Numeric Groundwater Model (Ecology 2008)	
	C. No short-term goal identified.	C. Implement projects and programs as specified in the WRIA 17 Watershed Management Plan to augment water supply and to ensure Snow Creek 2009 regulatory instream flows are met during critical low flow periods (July - 17cfs, August - 15 cfs, September 20-cfs).	Instream Flow Rule WAC 173-517-090	
	D. No short-term goal identified.	D. Implement projects and programs as specified in the WRIA 17 Watershed Management Plan to augment water supply and to ensure Salmon Creek 2009 regulatory instream flows are met (July - 9 cfs, August - 9 cfs, September - 9 cfs).	Instream Flow Rule WAC 173-517-090	
	E. No short-term goal identified.	E. Implement projects and programs as specified in the WRIA 18 Watershed Management Plan to augment water supply and to ensure 2005 Morse Creek recommended instream flows are met during critical low flow periods (July - 115 cfs, August - 90 cfs, September 90-cfs).	Elwha-Dungeness Watershed Plan (2005); Note: instream flow <u>rules</u> have not been established for Morse, only regulatory instream flow <u>recommendations</u> .	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
	F. No short-term goal identified.	F. Adopt instream flow rules for WRIA 17 West, WRIA 18 West, and all of WRIA 19 by 2026. [Note: this goal addresses a current data gap.]	Based on Strait LIO Technical Task Force discussion (2016)	
	G. No short-term goal identified.	G. Ensure that a comprehensive and effective water quantity monitoring strategy is funded, implemented, and coordinated for WRIAs 17, 18, and 19 by 2026.	Based on WRIA 17 (2009) and WRIA 18 (2005) Watershed Plans, and Watershed Management Plan and Detailed Implementation Plan for the Quilcene-Snow Water Resource Inventory Area (WRIA 17) (2011)	
<b>Chinook Salmon (ESA and Treaty Rights salmonid populations)</b>	A. Achieve recovery goals (recolonization phase and local adaptation phase) for the Puget Sound Chinook population in the Elwha River ( <a href="https://www.nps.gov/olym/learn/nature/upload/Elwha-River-Fish-Management-Plan.pdf">https://www.nps.gov/olym/learn/nature/upload/Elwha-River-Fish-Management-Plan.pdf</a> )	A. Be on a trajectory to achieve Viable Salmonid Population (VSP) recovery goals (self-sustaining population phase) for the Puget Sound Chinook population in the Elwha River (see <a href="http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/puget_sound/puget_sound_chinook_recovery_plan.html">http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/puget_sound/puget_sound_chinook_recovery_plan.html</a> )	Elwha River Fish Restoration Plan (2008), Puget Sound Chinook Recovery Plan (2007), NOAA Fisheries Supplement to the Shared Strategy's Puget Sound Salmon Recovery Plan (2006). [Note: VSP criteria are: abundance, productivity-survival rate, productivity-fish growth, productivity-population growth, spatial distribution, diversity-life history diversity, and diversity-genetic diversity.] [Note: "Be on a trajectory" means that the data show a positive upward trend (for example, a net increase--over a given time period--in abundance, productivity, spatial distribution, etc.). In practice, if the short-term goal is achieved, then by definition the population will "be on a trajectory."]	These NTAs list Chinook Salmon as the primary vital sign: 2016-0138, 2016-0131, 2016-0252, 2016-0362, 2016-0400, and 2016-0359. These salmon recovery actions mapped to Chinook Vital Sign: 14-1371, 11-1343, 14-

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
	B. Achieve harvest management objectives for Dungeness River Chinook as detailed in the Comprehensive Management Plan for Puget Sound Chinook ( <a href="http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/salmon_steelhead/ps-chnk-rmp.pdf">http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/salmon_steelhead/ps-chnk-rmp.pdf</a> )	B. Be on a trajectory to achieve Viable Salmonid Population (VSP) recovery goals for the Puget Sound Chinook population in the Dungeness River ( <a href="http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/puget_sound/puget_sound_chinook_recovery_plan.html">http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/puget_sound/puget_sound_chinook_recovery_plan.html</a> )	Comprehensive Management Plan for Puget Sound Chinook: Harvest Management Component (2010), Puget Sound Chinook Recovery Plan (2007), NOAA Fisheries Supplement to the Shared Strategy's Puget Sound Salmon Recovery Plan (2006)	1374, 13-1065, 12-1102
	C. Achieve co-manager interim recovery goals for Salmon/Snow Creeks and Jimmycomelately Creek summer chum ( <a href="http://wdfw.wa.gov/conservation/fisheries/chum/">http://wdfw.wa.gov/conservation/fisheries/chum/</a> )	C. Be on a trajectory to achieve Viable Salmonid Population (VSP) recovery goals for the Strait of Juan de Fuca summer chum population ( <a href="http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/puget_sound/hood_canal_summer-run_chum_recovery_plan.html">http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/puget_sound/hood_canal_summer-run_chum_recovery_plan.html</a> )	Hood Canal and Eastern Strait of Juan de Fuca Summer-Run Chum Recovery Plan (2005), NOAA Fisheries Supplement to the Summer-Run Chum Recovery Plan (2007), Summer Chum Salmon Conservation Initiative: Supplemental Report No. 5 Interim Summer Chum Salmon Recovery Goals (2003)	
	D. Stop the overall decline and start seeing improvement in natural origin coho productivity in the Strait LIO by 2021 relative to a 2016 baseline.	D. Stop the overall decline and start seeing improvement in natural origin coho productivity in the Strait LIO by 2066 relative to a 2021 baseline.	Scott Chitwood (JST) has productivity data for coho in the Strait based on index streams (JCL, Bell, Matriotti, McDonald, Siebert). LEK and Makah have coho smolt data for the western Strait drainages. WDFW has data for Snow Creek.	
	E. Stop the overall decline and start seeing improvement in natural origin steelhead productivity in the Strait LIO by 2021 relative to a 2016 baseline.	E. Stop the overall decline and start seeing improvement in natural origin steelhead productivity in the Strait LIO by 2066 relative to a 2016 baseline.	Scott Chitwood (JST) has annual productivity data for steelhead in the Strait based on index streams (JCL, Bell, Matriotti, McDonald, and Siebert). LEK and Makah have steelhead smolt data for the western Strait drainages. WDFW has data for Snow Creek. Note: NOAA revision of steelhead recovery goals is in process now, once these goals are in place this spreadsheet should be revised.	

Priority Vital Sign	Short-Term Goal (5 years, by 2021)	Long-Term Goal (20-50 years, by 2066)	Data Sources & Notes	Actions
	F. Stop the overall decline and start seeing improvement in natural origin pink productivity in the Dungeness by 2021 relative to a 2016 baseline.	F. Stop the overall decline and start seeing improvement in natural origin pink productivity in the Dungeness by 2066 relative to a 2021 baseline.	According to Scott Chitwood (JST), Pete Topping (WDFW) has annual productivity data for Dungeness pink salmon.	
<b>Shellfish Beds</b>	A. Maintain existing open commercial shellfish beds and achieve a net increase of 650 acres by 2021 of commercial shellfish beds where harvest had been "conditionally approved" or "prohibited." [Note: this goal does not include the 689 acres in Dungeness Bay that were upgraded in 2015 from "conditionally approved" to "approved"]	A. Protect and maintain the existing 17,993 acres of commercial shellfish beds in the Strait LIO that are "approved" as of 2016, as well as any additional acres of upgraded beds, to ensure all "approved" commercial shellfish beds remain open for harvest.	Goals based on 2016 conversations with Carol Creasey (Clallam County), Neil Harrington (JST), Liz Maier (DOH), and Lawrence Sullivan (DOH) in addition to the DOH 2020 Restoration Projections Table (July 2015)	These NTAs list Shellfish as the primary vital sign: 2016-0143, 2016-0319, 2016-0251, 2016-0389, 2016-0021, and 2016-0340.
	B. Maintain open and increase recreational shellfish beds and work with DOH and WDFW to increase beach access and recreational shellfish harvest opportunities in the Strait LIO by 2021.	B. Protect and maintain all existing "approved" recreational shellfish beds in the Strait LIO to ensure they remain open for harvest.	Goals based on 2016 conversations with Liz Maier (DOH), and Lawrence Sullivan (DOH).	
<b>Note: All Strait LIO goals were cross-walked with the NOPLE 4-Year Work Plan (2016) to ensure they are consistent.</b>				