San Juan Action Agenda Oversight Group

Ecosystem Protection and Recovery Plan

SAN JUAN LOCAL INTEGRATING ORGANIZATION

June 29, 2017

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- Puget Sound Partnership Leadership Council
- Lummi Nation
- Lummi Natural Resources Department
- Swinomish Tribe
- Tulalip Tribes
- San Juan Marine Resources Committee
- Salmon Recovery Lead Entity
- San Juan County Council
- San Juan County Community Development and Planning Department
- San Juan County Health and Community Services Department
- San Juan County Public Works Department
- San Juan Islands Conservation District
- San Juan Stewardship Network/ECO Net
- Town of Friday Harbor
- UW Friday Harbor Laboratories
- Water Resources Management Committee

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Executive Summary

The key goals of long-term planning for ecosystem protection and recovery are to:

- Ensure that funding is targeted at the highest priority local actions; and
- Coordinate protection and recovery actions across local areas and the region.

To advance these goals, the U.S. Environmental Protection Agency is supporting the Puget Sound region's Local Integrating Organizations in developing Five-year Ecosystem Recovery Plans and associated Two-year Implementation Plans. This focused, strategic recovery planning will achieve the following:

- Provide a roadmap for local ecosystem strategic efforts that focus protection and recovery planning and actions on the highest priority protection and recovery needs;
- Build on and work in coordination with existing related protection and recovery efforts including salmon recovery planning;
- 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 protection and recovery actions;
- Result from a rigorous, defensible process that will identify the highest priority protection and 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 to help develop local Near Term Actions for the Puget Sound Action Agenda; and
- Provide accounting of existing work underway to improve the health of the LIO area, and identify gaps where work is needed.

Recognizing that ecosystem protection and recovery requires local actions to best motivate change, San Juan County and federally-recognized local tribes, in cooperation with a state agency called the Puget Sound Partnership, established a Local Integrating Organization. The San Juan Action Agenda Oversight Group is one of nine such organizations and brings together numerous existing committees, governmental and non-government organizations, county departments, tribes, and local watershed groups that coordinate actions to protect and restore the San Juan Islands' ecosystems. Since 2011, these representatives have set priorities and designed local actions that have become a part of the Action Agenda for Puget Sound which serves as a "road map" to Puget Sound recovery.

The Action Agenda Oversight Group has developed this Ecosystem Protection and Recovery Plan as a five-year

strategic plan to focus and coordinate local efforts to mitigate and reduce the identified priority threats to the most valued components of the San Juan ecosystems. The purposes of the Plan are to:

1. Communicate the strategy and approach to ecosystem protection and restoration in the San Juan Islands.
2. Inform our communities, the Puget Sound Partnership Leadership Council, and other decision-makers throughout the region of the importance of the local ecosystem to the region's health, productivity, biodiversity, protection and recovery.
3. Integrate and leverage strong local expertise and historical ecological protection and restoration work.
4. Guide progress on local habitat protection and recovery.
5. Support the transboundary protection and recovery efforts of regionally significant species, including Orca and Chinook salmon

The Plan's strategies build on implementation of local Near Term Action in the 2012 and 2014 Action Agenda, scope of the 2016 Near Term Actions consistent with local priorities, and refinement of the Group's vision, goals and objectives over the past two years.

Located at the nexus of the Strait of Juan de Fuca, the Strait of Georgia, and Puget Sound, the 428 separate islands (at high tide) that make up San Juan County are considered by many to be the crown jewels of Puget Sound. San Juan County has the smallest land mass of any county in Washington State, but with 408 miles of marine shoreline, it has more shoreline than any other county in the contiguous United States. Much of this shoreline is adjacent to commercial shipping lanes within and adjacent to County waters.

The quality of life in San Juan County is based on the unique and high quality environment. The economy is driven in large part by tourism that is highly dependent on clean marine and fresh water, spectacular views, and opportunities for boating, bird watching, whale watching and cycling. In addition to economic vitality, the residents, visitors and area tribes rely upon and value these elements of their wellbeing:

- Well-managed, abundant fisheries
- Healthy local food
- Clean water and drinking water
- Open space natural areas

San Juan Action Agenda Oversight Group Vision

Community stewardship sustains healthy and productive ecosystems.

- Forested land protected from wildfire
- Air quality
- Effective governance across jurisdictions

The strategies have been developed within four groups toward achieving these goals important both locally and critically to Puget Sound Recovery:

Shoreline Hardening

- Increase the amount of restored or protected nearshore habitat in high priority habitat areas.
- Maintain abundance of existing healthy kelp habitat.
- Reduce the rate of declining coverage of eelgrass on beaches and embayments.
- Increase the marine riparian native forest in high priority habitat areas.

Stormwater Management

- Reduce sources of contaminants to stormwater.
- Reduce sediment transport to freshwater bodies and the marine environment.

Freshwater Restoration

- Increase summer stream flow and establish physical habitat for native anadromous salmonids in up to nine priority watersheds.
- Reduce sources of contaminants to stormwater.
- Increase biodiversity and disease resistance, and reduce wildfire risk in mature forest.

Large Oil Spill/Vessel Traffic Impacts

- Reduce the risk of a large oil spill.
- Reduce vessel traffic impacts to marine habitat and threatened and endangered species.

This Plan may not be fully implemented due to the many gaps and barriers existing regionally and globally. Substantial resources are required to address these gaps and barriers that include:

- Lack of historical and current baseline data on environmental health
- Insufficient monitoring programs and access to data
- Lack of consistent State and Federal funding
- Deficiencies in compliance and enforcement
- Environmental, cultural, social and economic consequences of a large oil spill are unknown
- Capacity to implement actions is reduced by the Puget Sound Recovery program's focus on planning processes

Through the implementation of this plan, the San Juan Action Agenda Oversight Group seeks to continue its efforts to address these challenges and ensure that ecosystem protection is recognized throughout the region as equally and often more important to Puget Sound Recovery as restoration.

Participants

The San Juan Local Integrating Organization first met in July of 2010 and actively participated in the update of the San Juan Action Agenda. The Implementation Committee has generally met monthly in Friday Harbor between October 2010 and December 2016, and bi-monthly in 2017. The Accountability Oversight Committee has met quarterly or as needed with meetings held in Friday Harbor, Anacortes and Mount Vernon. Participants in the process included the following:

Accountability Oversight Committee

- San Juan County Council
- Lummi Nation
- Swinomish Tribe
- Tulalip Tribes
- Puget Sound Partnership Leadership Council

Implementation Committee

- Lummi Natural Resources Department
- Swinomish Tribe/Skagit River System Cooperative
- Tulalip Tribes
- San Juan Marine Resources Committee
- Salmon Recovery Lead Entity
- San Juan County Community Development and Planning Department
- San Juan County Public Works Department
- San Juan County Health and Community Services Department
- San Juan Islands Conservation District
- San Juan Stewardship Network/ECO Net
- Town of Friday Harbor
- University of Washington (UW) Friday Harbor Laboratories
- Water Resources Management Committee

Project Team

The project team members who took the lead in developing the San Juan Ecosystem Protection and Recovery Plan consist of many of the Group's participants and technical consultants.

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San Juan Ecosystem Protection and Recovery Plan Review and Approval

ACTION AGENDA OVERSIGHT GROUP	REVIEWED	CONSENSUS APPROVAL TO SUBMIT
Implementation Committee	☒	
Accountability Oversight Committee	☒	☒

1.0 LOCAL INTEGRATING ORGANIZATION OVERVIEW

Recognizing that ecosystem protection and recovery requires local actions to best motivate change, San Juan County and federally-recognized local tribes in cooperation with a state agency called the Puget Sound Partnership (PSP) established a Local Integrating Organization (LIO). San Juan County Resolution 23-2010,"San Juan County recognizes the value of its citizens and the good stewardship of the marine resources that comes from prioritized, organized and coordinated actions that reflect the needs of the local people and the demands for and on local resources, together with a regional strategies to restore and protect the Puget Sound and Salish Sea. The San Juan Local Integrating Organization (SJ-LIO) known as the Action Agenda Oversight Group (AAOG) consists of an Implementation Committee and an Accountability Oversight Committee that serves as the executive policy body. It is one of nine LIOs recognized by the PSP with the goal of "overseeing the restoration of environmental health of Puget Sound by 2020" under RCW 90.71.210. The group works closely with the Water Resource Inventory Area 2 Lead Entity to gain current understanding of salmon recovery and habitat protection/restoration goals for the San Juan Islands Action Area and the region.

The San Juan AAOG brings together numerous existing committees, governmental and non-government organizations, county departments, tribes, and local interests that coordinate actions to protect and restore the San Juan Islands' ecosystems. Together, representatives from these entities set priorities, design local Near Term Actions (NTAs), contribute to regional NTAs, and help source and coordinate funds to implement those actions. The actions then become a part of the PSP's Action Agenda, which serves as a "road map" to Puget Sound recovery.

For a glossary of the terms used throughout this plan, see Appendix A.

VISION FOR THE SAN JUAN ACTION AREA

San Juan Action Agenda Oversight Group Vision

Community stewardship sustains healthy and productive ecosystems.

Our vision that community stewardship sustains healthy and productive ecosystems is rooted in the San Juan Islands' long history of scientific research, ecological protection, and local engagement. The first Marine Resource Committee was formed here in 1996, the Water Resources Management Committee was formed in 1998, and the Islands have been identified as a potential National Marine Sanctuary. The San Juan Islands are a designated Marine Stewardship Area and the Marine Stewardship Area Plan was adopted by San Juan County in 2007. The University of Washington's Friday Harbor Laboratories have long been a center for marine research relevant to the region. All of the shorelines within the County are designated as Marine Shorelines of Statewide Significance under the State Shoreline Management Act. This long history of environmental awareness and protection has educated the local community and informed local protection and recovery efforts.

The AAOG's focus is protecting existing intact ecosystems. All 22 stocks of Puget Sound Chinook salmon migrate through San Juan County's nearshore habitats during some portion of their lifecycle. Accordingly, the Group seeks to protect both habitat and species through a combination of regulatory, non-regulatory, educational, outreach, and financial assistance measures.

ECOSYSTEM PROTECTION AND RECOVERY PLAN DEVELOPMENT AND DECISION MAKING PROCESS

In 2011, the San Juan AAOG developed a prioritization framework to guide local input to the Action Agenda. The AAOG identified key local Pressures thought to significantly impact the health and recovery of the San Juan Islands' ecosystems using a threat rating process based on the Open Standards for the Practice of Conservation. Three key Pressures identified through this process included: large oil spills, runoff from the built environment (including septic systems), and shoreline development (including shoreline armoring). These Pressures were rated as "highly significant" based on their scope, severity, and irreversibility. The AAOG developed NTAs for the 2012 and 2014 Action Agenda

updates to direct funding and actions toward reducing the impacts of these Pressures to the ecosystems throughout the County, the boundary of which coincides with the designated recovery Action Area.

Beginning in 2015, the San Juan AAOG utilized *The Guidance for Structuring, Selecting and Prioritizing Near Term Actions for Improved Ecosystem Outcomes for 2016* (Anderson, et al. 2014) as a framework for the Two-year Implementation Plan and the FY2016 NTA development process. Through a series of monthly meetings, workshops, consultations with technical core teams of advisors, and online surveys, the Implementation Committee followed this guidance to select the Pressures, Vital Signs, Ecosystem Components, and Goals for the 2016 planning and NTA development process. The AAOG incorporated interdisciplinary experience by soliciting technical experts from relevant fields to develop Ecosystem Component recovery goals and objectives for the San Juan Action Area and to guide development of NTA proposals.

In 2015, the 2014 Puget Sound Pressure Assessment (PSPA) was utilized to evaluate gaps in the 2012 and 2014 Pressures associated with ecosystem vulnerability. Using an Open Standards approach, the AAOG Implementation Committee rated 48 Pressure-stressors based on their impacts to the local ecosystem (ranked on scope, severity, irreversibility - scope and severity were double-weighted based on Open Standards practice). The ratings were summed and normalized based on responses. The Pressures-stressors were then divided into thirds and labeled high, medium, and low. The Implementation Committee reviewed and discussed the ranked list and re-ordered it based on local knowledge. Based on this ranking, the Committee identified 17 priority Pressure-stressors. Pressure-sources for each of the priority stressors were then selected by identifying relationships between stressors and sources. The list of Pressure-sources was then further refined by rating each source-to-stressor relationship (high/medium/low impact).

The Implementation Committee also reviewed an initial list of 16 Vital Signs associated with the priority Pressures and from that list identified six key Vital Signs on which to focus recovery efforts based on technical knowledge and experience in the San Juan Islands ecosystems. The priority Pressures, Vital Signs and proposed 2016 NTAs were documented in the Five-Year Ecosystem Recovery Plan - First Elements, presented to the Strategic Initiative Transition Teams in October 2015.

Since that time the AAOG has continued to further refine and focus its protection and recovery strategies by identifying additional Ecosystem Components of local importance but not identified in the PSP's list of Vital Signs. The components were further identified as either Focal Ecosystem Components or Other Priority Components Benefiting from the Strategy. The Focal Components are those for which goals have been developed and actions have and will continue to be developed to directly benefit the components. Other Priority Components are those that should indirectly benefit from achieving the goals. Additionally, the Group identified a number of Human Well Being Components that contribute to the residents' quality and life, tribal cultures, and visitor experience.

Miradi software was utilized to develop conceptual models based on the established foundational information on priority Ecosystem and Human Well Being components, Pressure-sources, Pressure-stressors, goals, and objectives. The dialogue in developing the conceptual models identified the underlying causes and contextual relationships contributing to the highest priority Pressures in the San Juan Islands. The model also helped outline objectives, many aligning with 2016 NTAs that will be useful in tracking trigger points for decisions to adaptively manage implementation. Mapping out possible approaches for the priority Pressures highlighted gaps that existed in the 2014 recovery strategies and created a better understanding of the current ecological and socio-political context in the Action Area and means by which to measure progress over the next five years. Approaches fell into four groups: Shoreline Hardening, Stormwater Management, Freshwater Restoration, and Large Oil Spill/Vessel Traffic Impacts. The AAOG has developed multiple priority strategies within each of the four groups which, if implemented, will ameliorate conditions affecting Focal Ecosystem Components and progress toward achieving the goals.

Of the strategies, the AAOG has consistently ranked oil spill prevention as its highest priority and significant efforts have gone in to further refining this strategy at all levels of government and non-governmental organizations, both within and outside of the County waters. Over the last five years, the San Juan AAOG and members including the San Juan County Marine Resource Committee have spent a significant amount of time and energy to raise awareness of the risk of oil spills within the region. Because of the significance of this issue, and its regional nature, the San Juan AAOG convened a workshop on the topic in September of 2016, in collaboration with the Strait and Island LIOs. At this workshop, held September 13, 2016 in Oak Harbor, LIO members collaborated and tribal representatives provided key input on the significance of their tribal treaty rights[1] to commercial vessel traffic concerns.

The draft San Juan Ecosystem Protection and Recovery Plan (EPRP) was submitted to the PSP on September 29, 2016. Significant work has since been completed to produce this final EPRP. The AAOG is committed to an adaptive management approach to protection and recovery through which its priority strategies and the EPRP will be adjusted based on performance monitoring.

LESSONS LEARNED

The AAOG welcomes the emphasis recently placed on identifying human well being components of great importance to local communities. An understanding of the social, cultural and economic development interests of ecosystem protection is necessary for sustained community support and resources.

[1] "Treaty Rights At Risk". *Northwest Indian Fisheries Commission*. 2011. Print. Available online at: http://treatyrightsatrisk.org

PURPOSE OF THE ECOSYSTEM PROTECTION AND RECOVERY PLAN

The purposes of this Ecosystem EPRP are to:

1. Communicate the strategy and approach to ecosystem protection and restoration in the San Juan Islands.
2. Inform our communities, the Puget Sound Partnership Leadership Council, and other decision-makers throughout the region of the importance of the local ecosystem to the region's health, productivity, biodiversity, protection and recovery.
3. Integrate and leverage strong local expertise and historical ecological protection and restoration work.
4. Guide progress on local habitat protection and recovery.
5. Support the transboundary protection and recovery efforts of regionally significant species, including Orca and Chinook salmon.

GEOGRAPHIC AND CULTURAL CONTEXT IN THE SAN JUAN ACTION AREA

Located at the nexus of the Strait of Juan de Fuca, the Strait of Georgia, and Puget Sound, the 428 separate islands (at high tide) that make up San Juan County are considered by many to be the crown jewels of Puget Sound. San Juan County has the smallest land mass of any county in Washington State, but with 408 miles of marine shoreline, it has more shoreline than any other county in the contiguous United States. Much of this shoreline is adjacent to commercial shipping lanes within and adjacent to County waters.

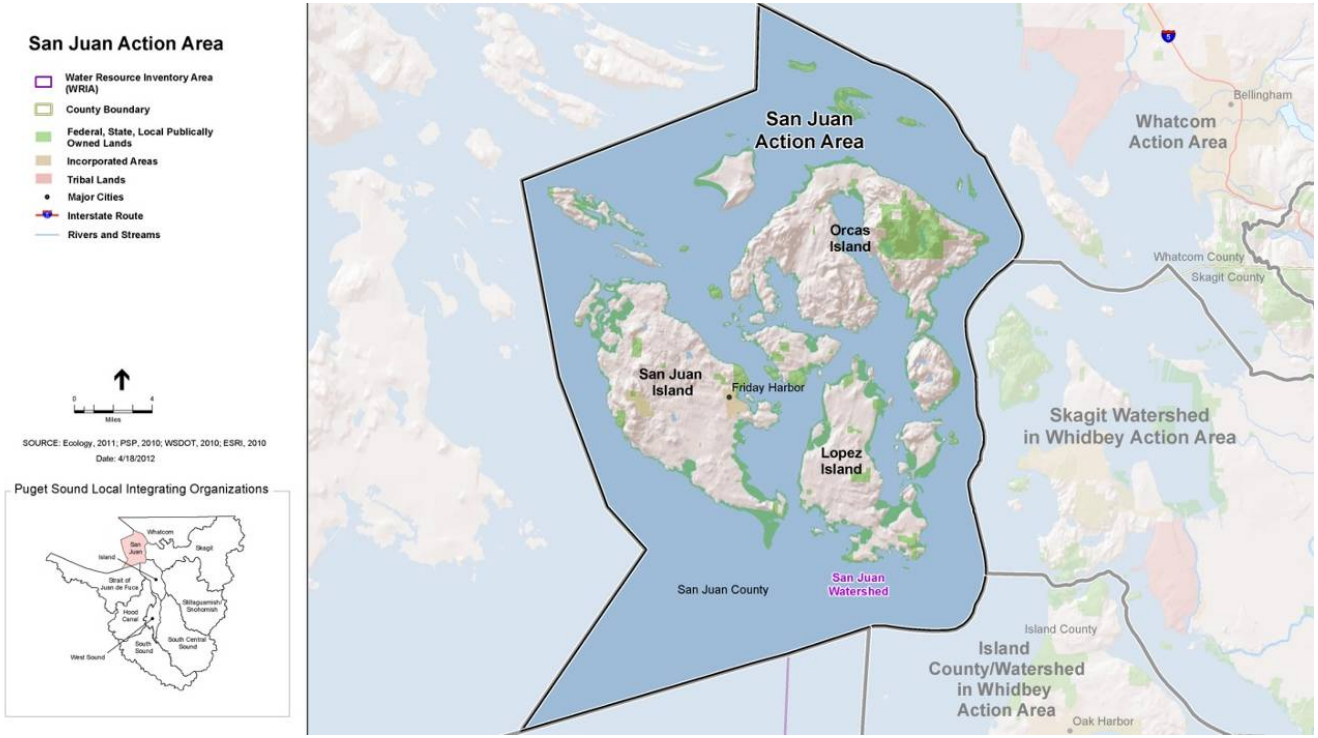
Geologically, the San Juan Islands are distinctly different from mainland Washington and Vancouver Island, and are dominated by bedrock and thinner glacial deposits relative to other parts of Puget Sound. Their unique location in the crossroads of the Salish Sea gives the San Juan Islands a wide diversity of flora and fauna. High-energy tidal flows and turbulent mixing throughout the Islands' channels are dominated by the surface outflows from the Strait of Georgia and the deep water inflow from offshore Pacific waters. The Islands' straits and channels link the Strait of Georgia to the Strait of Juan de Fuca, and to a lesser extent to the south Puget Sound. These water sources mix and contribute to the distribution of nutrients, plankton, sediment, and pollutants throughout the Islands, creating a marine environment unique to the San Juan Islands. This environment includes not only turbulent straits and channels but also some quiet and protected bays.

San Juan County is affected by the rain shadow of the Olympic Mountains, and receives 20 to 30 inches of annual rainfall,

with significant variation of rainfall patterns among the Islands' microclimates. There are no major rivers on the San Juan Islands, but several small creeks flow on a year-round basis. Additionally, the Fraser River in British Columbia influences the temperature and sedimentation in San Juan County waters. Only one percent of the land is paved, and 61 percent is forested. Lakes and freshwater wetlands cover over seven percent of the landscape.

The economy of the San Juan Islands has shifted along with the culture, technology, and natural resources in the region. The Coast Salish peoples' fishing activities were sustainable in the San Juan Islands for generations, and traditional knowledge includes areas where salmon skirted Orcas Island's shoreline as vast runs returned to the Fraser and Skagit rivers. The Coast Salish also knew where to find the best clam, mussel, and oyster beds near shore for ready harvest in season.

Figure 1. San Juan Islands Action Area



Agriculture, logging, fishing, and lime kiln operations later became the main economic drivers for the Islands. In the late nineteenth century, the economy boomed with fruit, canned salmon and peas, and lime exports to the mainland. These industries began to collapse as mainland infrastructure improved and it became cheaper to deliver goods overland from the eastern part of the state rather than across waters. It also became much easier to can or freeze salmon and ship it from the mainland, contributing to the decline of the fishing industry and associated canning operations by the mid-1900s. The cannery in Friday Harbor was canning peas when it closed in 1966.

Today, the San Juan Islands are an extremely popular summer destination, and the number of residents swells from 16,180 who live there year-round to approximately double that in the summer. In addition, over 750,000 visitors camp, moor, or stay in area lodging. Most of the county is rural, with 75 percent of the population living outside the "urban" areas of Friday Harbor, East Sound, and Lopez Village. Population growth in the San Juan Islands was 6.6% from 2005 to 2015, lower than the 12.1% growth rate observed for Washington State over the same period.[2] There are 5,700 shoreline parcels in San Juan County, of which approximately 50 percent have already been developed. Some islands have no public access and few accommodate automobiles. Public access to the water is extremely limited on many islands.

The current economy is driven by residential and commercial construction, tourism, and government (including schools). Tourism is highly dependent on clean marine and fresh water, spectacular views, and opportunities for boating, bird watching, whale watching, and cycling. These characteristics are also highly valued by the residents and second-home owners. There is significant marine-oriented commerce including marinas, fishing, boat building and repair.

Representative marine education and research are conducted by organizations including the UW Friday Harbor Laboratories, SeaDoc Society, and Seattle Pacific University marine labs. High quality shellfish farming occurs in San Juan County and there is a growing sustainable agricultural movement. The islands are important to the cultural heritage of the Coast Salish tribes that retain treaty-reserved rights to hunt, fish and gather, and are attached to many cultural heritage sites.

Public involvement in the stewardship of the San Juan Islands is considered by area residents to be one of their foremost ecosystem assets. There are many government and non-governmental efforts devoted to protecting the important natural resources of the San Juan Islands. The San Juan Preservation Trust is the oldest private land trust in Washington State. The San Juan County Land Bank protects natural areas and is the only county-based land bank in the state.

[2] Washington Office of Financial Management. https://fortress.wa.gov/esd/employmentdata/reports-publications/regional-reports/county-profiles/san-juan-county-profile

In 2007, the San Juan County Council adopted the San Juan County Marine Stewardship Area Plan, the culmination of three years of effort by the San Juan Marine Resources Committee, with contributions from numerous scientists, technical advisors, resource managers, community leaders, business owners, and citizens. The Marine Stewardship Area Plan was developed to sustain the many services that the ecosystem provides for the County's residents, fish and wildlife, and the economy.

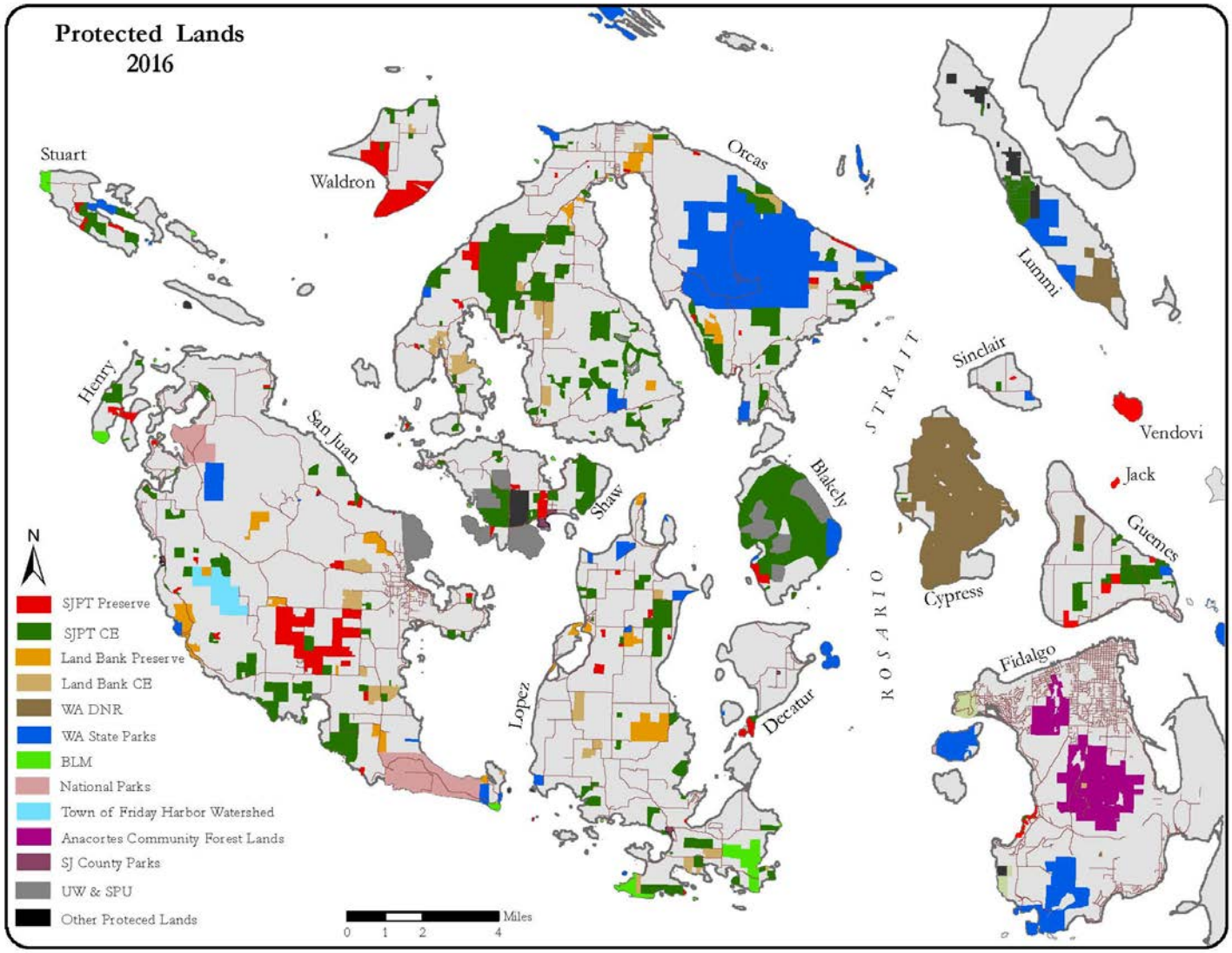
Example assets include sustainable tourism, commercial and recreational fisheries for clams, crab and spot prawns, as well as clean beaches and waters. There are currently no beaches in the San Juan Islands that are closed to swimming. However, public beaches are periodically closed to shellfish harvest due to a naturally-occurring marine biotoxin that can cause paralytic shellfish poisoning.

The US Bureau of Land Management created the San Juan Islands National Monument in 2013 that encompasses a patchwork of approximately 1,000 acres throughout the San Juan Archipelago. Protected upland areas are located at Moran State Park, San Juan Historical National Park, Turtleback Mountain, Lopez Hill, UW Preserves at Friday Harbor Labs and on Shaw Island, and the National Wildlife Refuge with sites throughout the Islands. Yellow Island, protected by The Nature Conservancy, contains an intact prairie, a unique ecological feature on a small island that is approximately one acre in size. Marine resource protection areas include the Marine Preserve, National Wildlife Refuge, Bottomfish Recovery Zone, Whalewatch Exclusion Zone, and Sensitive Eelgrass Area. These lands and others constitute a significant portion of the land base of San Juan County. Protected lands are shown in Figure 2.

The location of the San Juan Islands makes them a way-station for all 22 migrating populations of Puget Sound Chinook salmon as both juveniles and adults. Additionally, Sockeye, Pink, Chum and Coho salmon, Kokanee, Steelhead, and Rainbow and Coastal cutthroat trout have been documented in the County. The San Juan Islands support out-migrating juvenile salmon including: Chinook, Coho, Chum and Pink, and stocks from the Fraser River, Puget Sound and east and west coast Vancouver Island and the Strait of Georgia. Although most of the streams in San Juan County are small and do not support salmon, a small number of Coho have been reported spawning in Cascade Creek as recently as fall 2015, and may be using other streams on Orcas Island. A few creeks support cutthroat and introduced runs of Chum.

San Juan County provides excellent habitat for juvenile and adult salmon with over 5,000 acres of tidal wetlands, inter- and sub-tidal flats, eelgrass meadows along the shorelines and in the bays, and kelp beds. Tidal wetlands are highly valued due to their relative scarcity. At least 80 miles of potential forage fish spawning beaches are present. Eelgrass is found on 20 percent of all shorelines, and the San Juan Islands contain one-third of all of the kelp in Puget Sound. Pacific surf smelt and sand lance have been documented on 11 miles of all shorelines. The geology has created habitat conditions for rockfish that are not replicated anywhere else in Puget Sound. Approximately 74 percent of the shallow dominant rocky reef habitat in Puget Sound, comprised of boulder fields, rocky ledges and outcroppings, is found in the San Juan Archipelago.

Figure 2. Protected Lands



2.0 PRIORITY COMPONENTS AND GOALS

Components are the focus of the regional recovery effort. Each LIO has identified the priority Vital Signs, Human Well Being Components, and Ecosystem Components for their respective Action Area. The strategies and actions comprising the protection and recovery plans are designed to improve or protect the health of components either through (a) restoration strategies, (b) protection strategies, or (c) mitigation strategies that reduce Pressures on the ecosystem.

Specific goals have been identified for components and, where possible and appropriate, LIOs have identified the contribution toward the regional recovery targets.

ECOSYSTEM COMPONENTS AND GOALS

The San Juan EPRP guides the work to achieve goals for ecosystem focal components and other components that indirectly benefit from focal component health as summarized in Table 1.

Table 1. Ecosystem Components and Goals

	Ecosystem Component	Description of Component	Goal
FOCAL COMPONENTS			
SHORELINE HARDENING	Soft Shores	See Whitman et al, PIAT, 2012 for breakdown and prioritization of soft shore types. Soft shores support forage fish spawning. This Component relates to the Shoreline Armoring Vital Sign.	*Increase the amount of restored or protected nearshore habitat in high priority habitat areas.*
	Submerged Aquatic Vegetation	Submerged Aquatic Vegetation includes eelgrass and bull kelp. This Component relates to the Eelgrass Vital Sign.	*Maintain abundance of existing healthy kelp habitat.* *Reduce the rate of declining coverage of eelgrass on beaches and embayments.*
	Marine Riparian Native Forest	The intent is to protect and restore native forest with tree, shrub and herb layer within 200' of Ordinary High Water Mark (OHWM) focusing on highest priority nearshore habitat areas as identified in Pulling It All	*Increase the marine riparian native forest in high priority habitat areas.*

	Ecosystem Component	Description of Component	Goal
		Together (PIAT) 2014 and as supplemented by PIAT version 2, to be completed fall 2016. This Ecosystem Component was also measured as a part of the salmon recovery chapter for the WRIA. This Component relates to the Land Development and Cover Vital Sign.	
OTHER PRIORITY COMPONENTS BENEFITING FROM STRATEGIES			
	Forage Fish	San Juan AAOG interprets this Vital Sign broadly to include all forage fish. This includes surf smelt, sand lance and Pacific Herring. This Component relates to the Herring Vital Sign.	N/A
	Chinook and other salmonids	Salmonids include Chinook, pink, chum, coho, sockeye and cutthroat. See PSP website for documentation of Chinook including Pacific Salmon. All 22 stocks of Puget Sound Chinook use the nearshore environment of the San Juan LIO Area for some portion of their lifecycle. This Component relates to the Chinook Vital Sign.	
	Orcas	The J-pod, comprising 24 individuals of the total 78 Southern Resident Killer Whale (SRKW) population[3], is seasonally resident to the San Juan Islands. This component also includes transients and other regional populations (K & L pods) that also seasonally frequent the waters around the San Juan Islands.	
	Seabirds	The San Juan Islands provide habitat for a wide variety of seabirds. Black oystercatchers and pelagic cormorants are among the species at risk.	
	Rockfish	The unique geology of the San Juan Islands creates valuable rock fish habitat.	

[3] Southern Resident Killer Whale population as of January 2, 2017. http://www.orcanetwork.org/Main/index.php?categories_file=Births%20and%20Deaths

	Ecosystem Component	Description of Component	Goal
	Marine Invertebrates	The San Juan Islands include unique invertebrates in the nearshore environment including abalone, basket stars, Tritonia nudibranchs, sea pens, coral reefs, glass sponges, sand dollars, Luidia and other seastars, some jellyfish, Stauromedusea, Phoronids and Kinorhycha.	
FOCAL COMPONENTS			
STORMWATER MANAGEMENT	Stormwater Quality	Stormwater quality is managed to reduce sediments and contaminants to freshwater and marine water resources.	*Reduce sources of contaminants to stormwater.*
	Freshwater Quality	Sources of sediment and contaminants should be identified and reduced to improve freshwater quality.	*Reduce sediment transport to freshwater bodies.*
	Marine Water Quality	Water quality of the county's marine environment is of paramount importance to protect and restore habitat for species of local and regional cultural, sustenance, economic and recreational importance.	*Reduce sediment transport to the marine environment.*
OTHER PRIORITY COMPONENTS BENEFITING FROM THE STRATEGIES			
	Chinook and other salmonids	Salmonids include Chinook, pink, chum, coho, sockeye and cutthroat. See PSP website for documentation of Chinook including Pacific Salmon. All 22 stocks of Puget Sound Chinook use the nearshore environment of the San Juan LIO Area for some portion of their lifecycle. This Component relates to the Chinook Vital Sign.	N/A

	Ecosystem Component	Description of Component	Goal
	Toxics in Invertebrates	The San Juan Islands include unique invertebrates in the nearshore environment including abalone, basket stars, Tritonia nudibranchs, sea pens, coral reefs, glass sponges, sand dollars, Luidia and other seastars, some jellyfish, Stauromedusea, Phoronids and Kinorhycha. There are concerns for a healthy food supply and that toxics in marine invertebrates may adversely affect predator species up the food chain.	
FOCAL COMPONENTS			
FRESHWATER RESTORATION	Summer Stream Flows	Priority Ecosystem Component added to LIO EPRP as both a Vital Sign and Ecosystem Component based on Strategic Initiative Transition Teams (SITTs) review of First Elements, October 2015. Summer stream flows are needed to support freshwater restoration for salmonids (coho and chum) and cutthroat.	*Increase summer stream flow and establish physical habitat for native anadromous salmonids in up to 9 priority watersheds.*
	Stormwater Quality	Stormwater quality is managed to reduce sediments and contaminants to freshwater and marine water resources.	*Reduce sources of contaminants to stormwater.*
	Forest	Forests in the San Juan Islands could be managed to protect water quality, increase biodiversity, thinned to increase forest health and reduce the risk of wildfires. This Components relates to the Land Development and Cover Vital Sign.	*Increase biodiversity and disease resistance, and reduce wildfire risk in mature forest.*
OTHER PRIORITY COMPONENTS BENEFITING FROM THE STRATEGIES			
	Freshwater Quantity	The San Juan Islands' geology is primarily bedrock with very little aquifer recharge or freshwater storage capacity. Precipitation is the primary source of freshwater in the islands. The Islands are in the rain shadow of the Olympic Peninsula and receive between 11 - 30 inches of rain annually, with significant variability between islands and locations within islands. Historic land uses have encouraged impoundment of	N/A

	Ecosystem Component	Description of Component	Goal
		freshwater for farm use. The effects of these impoundments on base flow are unknown, but are under study in some watersheds. Conserving freshwater is a significant issue within the islands. This Component relates to the Summer Stream Flow and Freshwater Quality Vital Signs.	
	Freshwater Quality	Sources of sediment and contaminants should be identified and reduced to improve freshwater quality.	
	Wetlands	Wetlands can provide base flow support for summer stream flows; they can also provide valuable off-channel rearing and refuge habitat for salmonids. Restoring wetlands is a component of restoration within the nine priority watersheds identified within the LIO.	
	Chinook and other salmonids	Salmonids include Chinook, pink, chum, coho, sockeye and cutthroat. See PSP website for documentation of Chinook including Pacific Salmon. All 22 stocks of Puget Sound Chinook use the nearshore environment of the San Juan LIO Area for some portion of their lifecycle. Although most of the streams in San Juan County are small and currently do not support salmon, a small number of Coho have been reported spawning in Cascade Creek as recently as fall 2015. A few creeks support cutthroat and introduced runs of Chum and more are believed to have historically supported spawning of these salmonids. This Component relates to the Chinook Vital Sign.	
FOCAL COMPONENTS			
	Marine Water Quality	Water quality of the county's marine environment is of paramount importance to protect and restore habitat for species of local and regional cultural, sustenance, economic and recreational importance. It is threatened by the risk of a large oil spill and ongoing vessel traffic impacts including discharges.	*Reduce the risk of a large oil spills. Reduce vessel traffic impact to marine habitat and threatened and endangered species.*

	Ecosystem Component	Description of Component	Goal
LARGE OIL SPILL/ VESSEL TRAFFIC IMPACTS			
	Orcas	The J-pod, comprising 24 individuals of the total 78 Southern Resident Killer Whale (SRKW) population[4], is seasonally resident to the San Juan Islands. This component also includes transients and other regional populations (K & L pods) that also seasonally frequent the waters around the San Juan Islands. Vessel strikes are one cause of Orca deaths.	*Reduce the risk of a large oil spill. Reduce vessel traffic impacts to the marine habitat and threatened and endangered species.*
OTHER PRIORITY COMPONENTS BENEFITING FROM THE STRATEGIES			
	Submerged Aquatic Vegetation	Submerged Aquatic Vegetation includes eelgrass and bull kelp. This relates to the Eelgrass Vital Sign.	N/A
	Seabirds	The San Juan Islands provide habitat for a wide variety of seabirds. Black oystercatchers and pelagic cormorants are species at risk in the event of an oil spill.	
	Marine Mammals	Marine mammals in the San Juan Islands include pinnipeds (Pacific harbor seals, Steller sea lions, California sea lions, and Northern Elephant seals) and cetaceans, which include Orcas, Harbor porpoises, Dall's porpoises, Gray whales and Minke whales. Vessel strikes are one cause of death to these mammals.	
	Toxics in Invertebrates	There are concerns for a healthy food supply and that toxics in marine invertebrates may adversely affect predator species up the food chain.	

[4] Southern Resident Killer Whale population as of January 2, 2017. http://www.orcanetwork.org/Main/index.php?categories_file=Births%20and%20Deaths

	Ecosystem Component	Description of Component	Goal
	Submerged Aquatic Vegetation	Submerged Aquatic Vegetation includes eelgrass and bull kelp. This replaces eelgrass as a Vital Sign and Focal Component as of 9/2/16.	
	Toxics in Fish	There are concerns for a healthy food supply and that toxics in fish (chinook salmon) may adversely affect predators up the food chain (orcas), and therefore adversely affect their overall health, resiliency, and ability to survive.	

HUMAN WELL BEING COMPONENTS

The San Juan EPRP seeks to preserve and promote Human Well Being Components that are central to the quality of life and livelihood of our communities as summarized in Table 2.

Table 2. Human Well Being Components

Human Well Being Component	Description of Component	SHORELINE HARDENING	STOREMWATER MANAGEMENT	FRESHWATER RESTORATION	LARGE OIL SPILL / VESSEL TRAFFIC IMPACTS
Economic Vitality	Economic vitality in the San Juan Islands is closely tied to natural resource protection and values. The area sees over 750,000 tourists annually who come primarily for the natural beauty, the peace and quiet, the pastoral rural lifestyle, as well as the fishing, whale watching, boating, and other outdoor activities. The natural resources of the San Juan Islands are integral to their economic vitality.	×	×		×

Human Well Being Component	Description of Component	SHORELINE HARDENING	STOREMWATER MANAGEMENT	FRESHWATER RESTORATION	LARGE OIL SPILL / VESSEL TRAFFIC IMPACTS
Well-Managed, Abundant Fisheries	Historically the San Juan Islands supported healthy and abundant runs of salmonid stocks, as well as the habitat and forage fish that they depend on. During the 20th century all salmonid stocks, as well as forage fish (and their habitat) declined. A return to well-managed, abundant fisheries is a human well-being component of primary local and Tribal importance for this Ecosystem Protection and Recovery Plan.	×	×		×
Healthy Local Food	Healthy local food refers to locally grown food through sustainable agriculture.		×	×	×
Clean Water, Drinking Water	Freshwater in the San Juan Islands is primarily dependent on precipitation. Clean water is a necessity to support human populations, as well as agricultural production, forestry, and fisheries. Clean water, including drinking water, is a limiting factor in the San Juan Islands.		×	×	
Open Space Natural Areas	Open space and natural areas refers to land preserves for recreation and enjoyment. A significant portion of the San Juan Islands is in Open Space or protected land. See Figure 2.			×	×
Forested Land Protected from Wildfire	Wildfires, if they were to occur in the San Juan Islands, would be devastating. There is no infrastructure to respond to wildfires, and much of the forest needs thinning to reduce the risk of wildfires and to improve forest health and resilience under drought conditions. The intent of this human well-being component is to raise the awareness of this issue through outreach and education and to engage forest			×	

Human Well Being Component	Description of Component	SHORELINE HARDENING	STOREMWATER MANAGEMENT	FRESHWATER RESTORATION	LARGE OIL SPILL / VESSEL TRAFFIC IMPACTS
	land owners in management activities, particularly thinning, that will both improve forest health and mitigate the risk of wildfire.				
Air Quality Not Contributing to Climate Change	While there is a recognition that climate change is beyond the control of the San Juan Islands, there is also a recognition that local actions can contribute to climate change. San Juan County has recently begun to change its fleet cars to electric vehicles within the County. Understanding local contribution to climate change - emissions in particular - and taking actions to reduce those emissions is a focal Ecosystem Component within the LIO Area. Air quality also would be adversely impacted from wildfire.			×	
Effective Governance Across Jurisdictions	Effective governance across jurisdictions encompasses the idea that governmental agencies should work together at the local, state, federal, tribal, and international/transboundary levels on issues that affect the region. Effective governance includes not only regulatory programs (and the presumption that rules are followed), but support for outreach, education, as well as voluntary protection measures and programs. In the San Juan Islands, effective governance with respect to oil spills includes coordination and collaboration with many representatives of local, state, federal, and tribal governments, and transboundary organizations focused on oil spill prevention, preparedness, and response.				×

3.0 KEY PRESSURES IN THE ACTION AREA

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, we can better define the context we are working within and where we need to intervene to make progress on recovery. The AAOG utilized *The Guidance for Structuring, Selecting and Prioritizing Near Term Actions for Improved Ecosystem Outcomes for 2016* (Anderson, et al. 2014) as a framework for the Two-year Implementation Plan and the FY2016 NTA development process. The 2014 PSPA was utilized to evaluate gaps in the San Juan LIO 2012 and 2014 Pressures associated with ecosystem vulnerability and to refine the priority stressors on our natural systems and habitats. The priorities upon which the strategies are based are presented in Table 3.

Table 3. Pressures and Their Relationship to Ecosystem Components in the Action Area

	Focal Components	Pressures Sources / Stressors
Shoreline Ecosystem	Soft shores Submerged aquatic vegetation Marine riparian native forest	Marine shoreline infrastructure / Shoreline hardening Conversion of land cover for residential use
Marine Ecosystem	Marine water quality Orcas	Shipping lanes / Oil Spills / Large spills Point-source and non-point source contaminants in aquatic systems Species disturbance – marine
Freshwater Ecosystem	Summer stream flow Stormwater quality Forest	Abstraction of surface water / Abstraction of ground water / Runoff from residential and commercial lands / Altered low flows from withdrawals Altered low flows from land cover change Culverts and other fish passage barriers Altered peak flows from land cover change Changes in water temperature from local causes Poor instream habitat condition Point-source and non-point source contaminants in aquatic systems

4.0 ECOSYSTEM RECOVERY CONTEXT AND CONCEPTUAL MODELS IN THE ACTION AREA

Understanding the current context within which the AAOG operates has contributed to a development of an EPRP that is more likely to be successfully implemented. Conceptual models help build a common understanding of the context within which the AAOG is operating including the ecological, social, economic, cultural, political and institutional systems that affect the things our communities care about. For a complete set of EPRP conceptual models, see Appendix B.

Miradi was utilized to develop conceptual models built with the established foundational information on priority components and Pressures. The dialogue in developing the conceptual models identified the underlying causes and contextual relationships contributing to the highest priority Pressures in the Action Area. The models also helped outline monitoring metrics that would be useful in tracking trigger points for decisions to adaptively manage. Mapping out possible approaches to the priority Pressures highlighted gaps that existed in the 2014 recovery strategies and created a better understanding among partners of the current ecological and socio-political context and the goals to measure progress. The models formed the basis for alternative and complimentary strategies.

Conceptual Model: Shoreline Hardening

Shoreline hardening disrupts natural beach nourishment cycles and adversely affects forage fish spawning habitat. Shoreline hardening is also widely perceived as a way to protect private property from damage due to wind and wave action. There is a lack of knowledge and awareness of nearshore natural erosional processes, and how they contribute to habitat for forage fish, which are primary prey for Chinook and other salmonids.

The model identified the need for approaches that provide education, financial, and technical assistance to remove shoreline hardening from residential properties where appropriate. Education and outreach to shoreline property owners and realtors is part of the overall strategy. Regulatory changes to the county's Shoreline Master Program update include avoidance and minimization, but Shoreline Administrative Exemptions are still allowed, subject to conditions. Enforcement of shoreline violations is complaint driven in the county. Also supporting avoidance is a strategy to manage stormwater in the nearshore environment to protect the shoreline from excessive erosion.

Conceptual Model: Stormwater Management

Managing stormwater to protect both freshwater and marine water quality continues to be a priority for the AAOG. The Islands are composed of primarily rural and residential lands. In addition the County's stormwater basin plan includes recommendations to improve stormwater infrastructure and management. Previous NTAs have included managing on-site septic systems - this activity continues through San Juan County Public Health and Community Services Department. The needs include ditch and pond inventories, ditch and pond retrofits, treatment systems in Friday Harbor and Urban Growth Areas, on-going monitoring, and collecting flow data. These actions are underway in False Bay Creek Watershed

and, if implemented throughout the priority watersheds, all of these actions would contribute to the goal of reducing stormwater contaminants and sediment transport to both the freshwater and marine environments.

Conceptual Model: Freshwater Restoration

Nine priority watersheds have been identified for restoration of native salmonid and cutthroat trout freshwater habitat. Hydrologic modeling is underway in the False Bay watershed to determine historic conditions, existing flow, and flow augmentation potential to restore salmonid habitat for Coho and Chum as well as cutthroat. Hydrologic modeling in all the priority watersheds would inform restoration strategies. Supporting strategies include structural restoration such as riparian habitat restoration, instream habitat restoration, improving connectivity by restoring off-channel habitat and floodplain connectivity, including floodplain wetland restoration. Hydrologic modeling is expensive and there is not currently funding to model hydrology in all nine priority watersheds. Ditch and pond networks, both of which can adversely affect and alter flow, need to be inventoried and mapped. Barriers to fish passage including ponds exist on private property and access (and removal) can be challenging. Base flows are affected by surface water withdrawals and on-going development which exempts private wells.

The San Juans are composed primarily of bedrock geology, with very limited aquifer recharge. The geology also affects forest productivity; much of the forest in the San Juans requires thinning both to allow for better growth and health of the forest and to reduce the risk of wildfires. Local stakeholders could work with DNR and private forest owners to develop Best Management Practices to manage forests to protect water quality, reduce the risk of wildfire, and increase biodiversity and disease resistance.

Conceptual Model: Large Oil Spill/Vessel Traffic Impacts

Transboundary vessel traffic issues are of critical importance to the San Juan AAOG. The AAOG will not, however, engage is transboundary vessel traffic processes as an LIO. The Tribal governments that participate in the AAOG will engage in transboundary vessel traffic issues directly with their federal trustees, Centennial Accord agencies, and First Nations as they deem appropriate. San Juan County will participate with the Islands Trust and other transboundary forums the County Council deems appropriate. San Juan County and the tribes may coordinate on transboundary vessel traffic issues on a government to government basis.

The San Juan AAOG is concerned about the current risk of a large oil spill, which is expected to increase given the projections of increasing vessel traffic through the regional marine waters. Figure 3 illustrates shipping lanes around the San Juan Islands. The highest priority strategy is to prevent a large spill. Related strategies include spill preparedness and response, on-going participation in regulatory/transboundary initiatives, and understanding the impacts of current and future vessel traffic including noise, discharges, introduction of invasive species, and marine mammal strikes.

Figure 3. "Salish Sea Carbon Corridor" Shipping Lanes

There are serious concerns that the spill response capability for sinking oils is inadequate. The National Academy of Sciences has reported[5] numerous findings, conclusions and recommendations including:

- The lack of knowledge and lack of experience in responding to spill of nonfloating oils is a significant barrier to effective response.
- Planning for spills of nonfloating oils is inadequate at the local level.
- The U.S. Coast Guard (USCG) should improve its knowledge base, education, and training for responding to spills of nonfloating oils. Tests of area contingency plans and industry response plans for spills of nonfloating oils should be required parts of training and drill programs.

San Juan County has established a Transborder Island Agreement with the Islands Trust to coordinate on these and other transboundary concerns. The Department of Ecology's Vessel Traffic Risk Assessment 2015 update recommends nine preventative measures be instituted including establishing a transboundary safety forum, which San Juan County may choose to participate in but the AAOG will not participate in, an additional emergency response towing vessel in the vicinity of San Juan County, and tug escorts for certain barges transporting oil through Rosario Strait.

In November 2016, environmental groups submitted a petition to the National Marine Fisheries Service requesting a Whale Protection Zone in the Haro Strait along the west side of San Juan Island. This is an area frequented by the Southern Resident Killer Whale within the County and is bordered by public lands popular with residents and tourists for whale watching from the shoreline. Lime Kiln Point State Park is considered one of the best places in the world to view whales from land and includes an orca research facility. The County has previously supported voluntary measures to exclude boats from the nearshore waters when whales are present in this area, adopted within the 2007 Marine Resources Committee's San Juan County Marine Stewardship Area Plan.

The San Juan County Marine Resources Committee submitted recommendations to the County Council on March 27, 2017, which included that the Council recommend to the National Marine Fisheries Services that they move forward with the petition. On April 11, 2017, the Council members notified the National Marine Fisheries Service that the County rejects this petition. Members agree that a more comprehensive set of measures should be identified that the County can drive forward and implement locally.

[5]National Academy of Science, 1999. *Spills of Nonfloating Oils: Risk and Response*. https://www.nap.edu/catalog/9640/spills-of-nonfloating-oils-risk-and-response

5.0 OUR STRATEGIES AND ACTIONS

Based on the current situation and what we want to achieve, our AAOG members have considered the types of actions that need to occur. Good strategic planning involves determining where and how our group 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, the AAOG 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 protection and recovery occurs. They help explain the logic behind protection and recovery strategies to determine if 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, we can use the results chains to identify how future development of local NTAs for the Puget Sound Action Agenda align with regional priorities.

Strategies and descriptions of associated theories of change are summarized below. The suites of strategies are described in four groups: Shoreline Hardening, Stormwater Management, Freshwater Restoration, and Large Oil Spill/Vessel Traffic Impacts. Results chains are provided in Appendix C.

EPRP STRATEGIES

Table 4 lists the protection and recovery strategies for this EPRP. ID* indicates the source of the strategy: PSP Action Agenda substrategy (##.#), or new LIO strategy (SJ-xx-##). Within each of the four groups, strategies are listed first by an over-arching strategy, as defined by PSP, followed by the related local strategies.

Table 4. Strategies Included in the San Juan Ecosystem Protection and Recovery Plan

ID*	Recovery Strategy	Description
SHORELINE HARDENING		
16.1 (B2.1)	Protect priority intact nearshore physical & ecological processes & habitat	B2.1 Permanently protect priority nearshore physical and ecological processes and habitat, including shorelines, migratory corridors, and vegetation particularly in sensitive areas such as eelgrass beds and bluff backed beaches
SJ-SL-01	Promote avoidance of shoreline hardening and maintenance of native riparian vegetation	This strategy includes outreach to residents and the real estate and construction communities. The county's Shoreline Master Plan supports avoidance, which may be enhanced with a focus on permittee pre-application consultation with the Community Development and Planning department.
16.3 (B2.3)	Remove armoring, use soft armoring replacement or landward setbacks	B2.3 Remove armoring, and use soft armoring replacement or landward setbacks when armoring fails, needs repair, is non protective, and during redevelopment
SJ-SL-01	Encourage bulkhead removal for private residential properties where appropriate	Local stakeholders have successfully worked with shoreline residential property owners in removing bulkheads and constructing soft shores through outreach and technical assistance programs. The current strategy focuses on priority habitat areas and creating multi-property stretches of soft shore habitat.
10.1 (C2.1)	Manage urban runoff at the basin and watershed scale	See Stormwater Management strategies 10.1 (C2.1)
SJ-SL-03	Manage stormwater runoff to protect shoreline from erosion	Assess actual and potential nearshore stormwater erosion and proactively manage in consultation with property owners.

ID*	Recovery Strategy	Description
STORMWATER MANAGEMENT		
10.4 (C2.4)	Control sources of pollutants	This sub-strategy includes local pollution and control programs, inspections, technical assistance, and enforcement. This sub-strategy is intended to identify, address, and reduce toxics, nutrients and pathogens. • Promote source control and technical assistance programs at the local level. • Reduce pollutants from on-site septic system sources; agriculture operations; and/or toxics from residential and commercial uses. • Promote enforcement and compliance related to pollution source control.
11.1 (C3.1)	Target voluntary and incentive-based programs that help working farms contribute to Puget Sound recovery	This sub-strategy addresses programs, guidelines, and technical assistance opportunities that help farmers identify potential pollution impacts from farming activities and implement best management practices (BMPs) to reduce, control, or eliminate pollution. Working farms are places, both large and small, where agricultural activities occur.
10.1 (C2.1)	Manage urban runoff at the basin and watershed scale	Derived from Item I. from 12.9.10 draft stormwater vision document -- includes activities: 1. Support the development of watershed plans based on watershed characterization data that integrate land use planning with stormwater planning (management) by either: a. reactivating and funding CWA 208 planning for the Puget Sound basin to include all major land uses (urban, agricultural/rural, and forestry) and all water resource elements such as stormwater, combined sewers, wastewater, water supply, reuse and non-point sources; orb. supporting and funding the development of stormwater plans, watershed plans, and/or WRIA plans that address the full spectrum of water resource elements and land use on a regional basis 2. Use watershed plans to prioritize and fund water quality and water quantity retrofits, protective property rights acquisition, and non-point source programs; and fund them 3. Align regulations with watershed plans, including municipal, industrial and construction NPDES permits, non-point source control programs, and the Growth Management Act if warranted.

ID*	Recovery Strategy	Description
		4. Provide incentives to NPDES permittees who by interlocal agreement have created a structure sufficient to take responsibility for regional or watershed scale NPDES implementation 5. 5. Support EPA Clean Water Act rule making that assigns the Puget Sound basin sensitive status
SJ-SW-01	Manage stormwater to protect water quality	The local strategy for stormwater management extends to the predominantly non-urban areas in the county. The scope includes BMPs throughout the drainage network as well as installing treatment in the Town of Friday Harbor and Urban Growth Areas.
FRESHWATER RESTORATION		
2.2 (A2.2)	Implement and maintain priority freshwater and terrestrial restoration projects	This sub-strategy supports the continuation, expansion, and further coordination of programs to effectively encourage private landowners and industrial/commercial landowners to undertake and maintain restoration projects. It includes support for incentives and assistance, such as direct and indirect financial incentives, technical assistance, recognition/certification for products or operations, and conservation leasing. Structural barriers include culverts, dikes, dams, and similar structures. • Improve data and information to prioritize and accelerate riparian restoration and protection. • Implement restoration of riparian areas. • Improve data and information to prioritize and accelerate removal of structural barriers. • Implement prioritized structural barrier removals.
SJ-FW-01	Augment summer low flows	This is process-based restoration. The driving ecological process that supports salmonid habitat is sufficient flows during all life history stages important to salmonids in the region. For the San Juan Islands, restoring hydrologic flows sufficient to support salmonid habitat (primarily Coho and Chum, but also including cutthroat trout) is the priority.
SJ-FW-02	Restore instream physical habitat	The primary strategy is to focus on process-based restoration - i.e. understanding and re-establish hydrologic flow to support the development of salmonid habitat, including

ID*	Recovery Strategy	Description
		habitat for cutthroat trout. However, freshwater restoration projects may target enhanced structure and instream habitat creation, as well as native riparian re-vegetation, invasive species management, floodplain connectivity and wetland restoration that are supportive of the primary strategy and may be implemented.
SJ-FW-03	Restore native riparian vegetation (secondary)	Implementation of secondary strategy dependent upon successful implementation of stream flow and physical habitat strategies. Restoring native riparian vegetation relies on invasive species management with in coordination with the County's weed board.
SJ-FW-04	Restore floodplain connectivity and wetlands (secondary)	Implementation of secondary strategy dependent upon successful implementation of stream flow and physical habitat strategies
10.3 (C2.3)	Fix problems caused by existing development (structural upgrades; regular and enhanced maintenance)	This sub-strategy includes fixing problems from existing development through structural retrofits; ongoing regular maintenance and enhanced maintenance (e.g.: high efficiency street sweepers and system cleaning to remove legacy pollutants); and redevelopment policies and activities. Urban Centers are designated by cities and counties within the urban growth area in comprehensive land use plans to accommodate population growth under the Growth Management Act. The Puget Sound Regional Council has also identified urban centers in VISION 2040, the regional growth strategy for the four central Puget Sound counties and associated cities. • Prioritize where retrofits occur. • Provide infrastructure and incentives to accommodate re-development within designated Urban Centers in an urban growth areas (UGAs). • Assess the maintenance needs and life-cycle strategies for existing stormwater infrastructure, and prioritize infrastructure replacement needs. • Research, create and/or implement innovative approaches to promote retrofit programs on private property • Research, study and/or pilot legacy pollutant removal programs with the intent of filling data gaps.
10.1 (C2.1)	Manage urban runoff at the basin and watershed scale	See Stormwater Management strategies 10.1 (C2.1)

ID*	Recovery Strategy	Description
11.1 (C3.1)	Target voluntary and incentive-based programs that help working farms contribute to Puget Sound recovery	This sub-strategy addresses programs, guidelines, and technical assistance opportunities that help farmers identify potential pollution impacts from farming activities and implement best management practices (BMPs) to reduce, control, or eliminate pollution. Working farms are places, both large and small, where agricultural activities occur.
SJ-FW-05	Reduce contaminant sources	Reducing contaminant sources from residential, commercial and agricultural stormwater runoff including fine sediment is essential due to the limited stream flow. Also reducing contaminant sources from agricultural practices by instituting BMPs including separating livestock from streams is a priority.
SJ-FW-06	Manage forests to reduce wildfire risk and protect water quality	This local strategy is deemed critical for priority watershed with densely wooded uplands. A wildfire would contribute considerably to long-term soil erosion potentially impacting stream physical habitat.
LARGE OIL SPILL/VESSEL TRAFFIC IMPACTS		
20.1 (C8.1)	Prevent and reduce the risk of oil spills	This sub-strategy supports state programs to systematically analyze regional and industry-specific patterns in oil spill risk by regulated industries and subsequently target prevention efforts. Deep draft vessel traffic in the waters of Puget Sound and the Salish Sea will increase by more than 25% if proposed estimates come to pass, elevating the risk of accidents and oil spills.
SJ-VT-01	Promote additional oil spill prevention measures	This strategy includes promoting preventative measures in the Department of Ecology's Vessel Traffic Risk Assessment 2015 Final Report. Substantiates increased prevention with a comprehensive consequence assessment (environmental, cultural, social, economic).
20.3 (C8.3)	Respond to spills and seek restoration using the best available science and technology	This sub-strategy supports improvements to the state's spill response capacity and access to the best achievable technology and training for safe, prompt, and appropriate response to a worst-case oil spill scenario. It also supports strengthening coordination with Canada in response to transboundary spills. The sub-strategy scope also includes the following:

ID*	Recovery Strategy	Description
		• Collect data on the quality of marine waters, sediments, and organisms to establish the baseline for "no net loss" of environmental quality in the event of a spill. • Increase local volunteer knowledge and capacity to assist in a spill response.
SJ-VT-02	Seek effective spill response planning and capacity	Assesses actions to address key findings of the San Juan County Oil Spill Response Capacity Evaluation (Nuka, 2015). Supports increased capacity of the Islands Oil Spill Association.
SJ-VT-03	County government may participate in a transboundary safety forum but the San Juan LIO itself is not a participant	This is one of the recommended preventative measures in the VTRA 2015 Final Report. Local representation and input at such a forum is a priority to inform San Juan County of incidents and emerging issues, and provide the opportunity to influence decisions.
SJ-VT-04	Support increased protection of marine water quality and habitat for threatened and endangered species from vessel traffic impacts	Impacts to the marine environment are ongoing including those from discharges. Threatened and endangered species are impacted by vessel noise as well as death of marine mammals from vessel strikes.

THEORIES OF CHANGE

This section describes theories of change documenting our assumptions about how strategies and actions are intended to help reduce Pressures and achieve our ecosystem and human wellbeing goals. Results chains illustrating the cause and effect relationships linking action implementation to desired intermediate and long-term results are provided in the diagrams in Appendix C.

Theory of Change: Shoreline Hardening

Encouraging bulkhead removal on private properties should be focused on those areas which are of highest habitat value to forage fish. On-going education and outreach to shoreline property owners regarding the value of nearshore processes, which are interrupted by hard armoring, will continue. There are current programs which provide technical and financial assistance for bulkhead removal including the Greenshores Program. Local regulations (Shoreline Master Program) have been modified to discourage bulkheads and focus on avoidance and minimization of impact. There are some legacy shoreline erosion issues in the shoreline due to existing stormwater management; these should continue to be corrected by San Juan County Public Works. The education and outreach process should lead to implementation of projects which will result in bulkhead removal on private residential properties.

The theory of change to achieve the Action Area's Shoreline Hardening goals is based on three general approaches:

- **Promote avoidance** of hardening and maintenance of native riparian vegetation
- **Encourage bulkhead removal** for private residential properties where appropriate
- **Manage stormwater** runoff to protect shoreline from erosion

The path to achieving the goals defined in Section 2.0 may follow a sequence of interim results and objectives resulting in the desired habitat benefits, as summarized in Table 5 and further detailed in C.

Table 5. Summary of Theory of Change for Shoreline Hardening Strategies

Results Chain	Approach	Key Elements of the Strategy--Interim Results	Interim Objectives	Habitat Benefits Achieved
SHORELINE HARDENING	Promote avoidance	• Shoreline management program supports avoidance • Pre-application consultation with the County Community Development and Planning occurs • Acquisition and conservation easements protect shoreline	• Permanent protection via conservation easement is secured at five locations	Nearshore habitat process restored Forage fish spawning habitat restored Salmonid migration pathway restored Migration success improved
	Encourage bulkhead removal	• Education and outreach is ongoing • Consultation and technical assistance provided • Shoreline management program supports bulkhead removal • Removal projects implemented and results communicated among neighboring properties	• Conduct 4 shoreline landowner workshops on shoreline protection and restoration • Cost-share provided for 4 interested waterfront property owners • A minimum of 2 bulkheads are removed • Workshops educate at least 150 residents of the need and means for sea level rise adaptation	
	Manage stormwater	• No new bulkheads constructed due to stormwater erosion		

Table 6 describes the San Juan LIO's NTAs included in PSP's 2016 Action Agenda. Their implementation will contribute to achieving the Shoreline Hardening strategic goals.

Table 6. San Juan Action Area 2016 Near Term Actions Related to Shoreline Hardening Strategies

ID	Near Term Action	Cost Estimate	Description
2016-0139	Permanent Marine Shoreline Protection in San Juan County	$300,000	The marine shoreline protection NTA provides outreach, technical assistance, and funding assistance with shoreline protection projects with willing waterfront homeowners in priority areas.
2016-0145	Shoreline Stewardship Technical Assistance Program	$400,000	Promote naturally functioning marine shorelines through outreach, technical assistance, site assessments, design, and cost-share with shoreline restoration and protection projects to interested waterfront homeowners.
2016-0144	Updating the San Juan Salmon Recovery Chapter	$45,000	Identify indicators that are suitable for monitoring, create a local monitoring plan that ties into the regional recovery plan, create an adaptive management plan, update the 2005 San Juan salmon recovery chapter to NOAA.
2016-0140	Advancing Sea Level Rise Adaptation in San Juan County	$50,000	The project will increase capacity to address the impacts of rising sea levels and improve resiliency through community engagement, technical assistance, and facilitation of efforts that advance on-the-ground multi-objective adaptation projects. *Note: This NTA has been funded by Habitat Strategic Initiative Lead and work is underway.*

Theory of Change: Stormwater Management

The priority strategy is to manage stormwater to protect water quality. San Juan County Public Works Department identified eight priority watersheds in the 2015 Basin Stormwater Planning report. Basin plan recommendations to be accomplished include ditch and pond inventories to understand flows and the effects of surface water withdrawals on flows and sedimentation within the watersheds. There is limited data on the effects of agriculture and forestry on water quality within the Action Area. The Voluntary Stewardship Program will provide data regarding agriculture and is scheduled to be implemented starting in 2017.

Existing stormwater infrastructure can be retrofitted, though funding would need to be available. Additional stormwater protection measures, such as managing ferry terminals at all islands and maintaining BMPs for sweeping ferry lots, may be

developed and implemented. Onsite septic system (OSS) Operation and Maintenance continues. On-going management of stormwater and implementation of BMPs and stormwater retrofits will result in a reduction of contaminants and sediment to freshwater bodies and the marine environment.

The theory of change to achieve the Action Area's Stormwater Management goals are based on County's Basin Stormwater Planning Report and installation of a stormwater treatment filtration vault in Friday Harbor, comprising these general approaches:

- **BMP retrofits** implemented for ditches and ponds
- **Treatment retrofits** completed in Friday Harbor and urban growth areas
- **Contaminant sources identified and managed**

The proposed path to achieving the goals defined in Section 2.0 follows a sequence of interim results and objectives resulting in the desired habitat benefits, as summarized in Table 7 and further detailed in Appendix C.

Table 7. Summary of Theory of Change for Stormwater Management Strategies

Results Chain	Approach	Key Elements of the Strategy—Interim Results	Interim Objectives	Habitat Benefits Achieved
STORMWATER MANAGEMENT	BMP retrofits	• Infrastructure inventoried • Basin Stormwater Planning projects prioritized • Ditch BMPs implemented • Pond BMPs implemented	• Construct 2500 feet of ditch retrofit • Design all priority pond retrofits • Construct pilot pond retrofit	Stormwater, freshwater and marine water quality improved
	Treatment retrofits	• Stormwater treatment retrofits completed in Friday Harbor and UGAs	• Complete design and construction of two priority treatment projects in UGAs • Complete construction of Friday Harbor Spring Street vault	
	Contaminant sources identified and managed	• Effects of agriculture are actively managed	• Implement at least 25 BMPs to manage runoff and reduce	

		• New development incorporates low impact features • OSS inspection and maintenance is on-going • Ferry parking/holding areas cleaned and runoff managed (and assess measures needed in other higher volume vehicle areas and travel routes)	contaminants at a minimum of 20 agricultural sites • Implement Voluntary Stewardship Program and/or BMPs by landowners in coordination with local implementers • Contaminant levels reduced downgradient of BMP actions completed	

Table 8 describes related San Juan NTAs included in PSP's 2016 Action Agenda. Their implementation will contribute to achieving the Stormwater Management interim objectives and five-year strategic goals.

Table 8. San Juan Action Area 2016 Near Term Actions Related to Stormwater Management Strategies

ID	Near Term Action	Cost Estimate	Description
2016-0223	Stormwater Ditch Best Management Practices Retrofits	$97,400	This NTA will field test new permeable mix designs and new material testing procedures, to further pavement durability, develop permeable pavement standards, and increase confidence in permeable pavements.
2016-0225	Stormwater Pond Best Management Practices Retrofits	$85,000	Improve the performance of created ponds to improve stormwater treatment and detention. The goal of this NTA is to inventory problem ponds, perform field assessments, prioritize and design retrofits, and construct stormwater pond BMP retrofits.
2016-0227	Stormwater Treatment Retrofits for Urban Growth Areas	$657,000	Provide treatment for existing stormwater discharged from UGAs. The goal of this NTA is to complete two priority projects identified in the San Juan County Basin Plan (2015). Priority projects are in areas of the UGA where there is little or no stormwater treatment.
2016-0228	Pilot Testing a Stormwater	$490,000	Recent stormwater sampling revealed two primary contaminates of concern in San Juan County are E.coli and BOD. This NTA would pilot a project that augments a

ID	Near Term Action	Cost Estimate	Description
	Treatment Facility With Mycological Fungi		stormwater treatment facility with mycological fungi to improve treatment for these 3contaminates.
2016-0158	Spring Street Waterfront Storm Water Filtration Vault	$911,000	Construction of a waterfront vault containing cartridge filters to clean storm water that drains from the Friday Harbor urban environment. The vault is designed to filter 100% of the "first flush" of rainwater entering the storm sewer system.
2016-0137	Improving Soil Health to Reduce Runoff and Conserve Water	$250,000	SJICD will acquire a no-till drill and share it with agricultural operators to improve soil health, sequester carbon, retain moisture, and reduce runoff through implementation of practices such as no till agriculture.
2016-0188	Stormwater Assessment and Effectiveness Monitoring Program	$160,000	Based on the completed pilot study, implement a program to further define the sources of contamination that were identified, conduct assessment monitoring for detection of changes to general water quality, and measure effectiveness of retrofits.

Theory of Change: Freshwater Restoration

Nine priority watersheds have been identified for hydrologic and habitat assessment and restoration. The focus of restoration is on Coho and Chum as well as Cutthroat Trout habitat. Hydrologic analysis needs to be undertaken for all priority watersheds, and should include an analysis of the effects of climate change on flows and habitat. The potential for flow augmentation should be assessed. Habitat restoration should occur in a connected way, moving from the mouth/estuary upstream. Barriers to fish passage including certain ponds need to be identified and removed. From a landscape perspective, forests, which cover 61% of the San Juan Islands, could be better managed to protect water quality, reduce wildfire risk, and increase riparian functions.

Sources of contaminants (such as ditches/roads and ponds) can be identified and retrofitted or modified with BMPs to control sediment and contaminant transport to freshwater and the marine environment. Agricultural practices that may contribute sediment or contaminants should be managed under the Voluntary Stewardship Program, and by property owners in coordination with local implementers, to enhance agricultural viability and protect streams and wetlands. Sites are identified and currently are being further prioritized for restoration.

The theory of change to achieve the Action Area's Freshwater Restoration include these general approaches:

- **Augment summer low flows** in surface water
- **Restore instream physical habitat**
- **Reduce contaminant sources**
- **Restore other watershed processes**
- **Manage forests** to reduce wildfire risk and protect water quality

The proposed path to achieving the goals defined in Section 2.0 follows a sequence of interim results and objectives resulting in the desired habitat benefits, as summarized in Table 9 and further detailed in Appendix C.

Table 9. Summary of Theory of Change for Freshwater Restoration Strategies

Results Chain	Approach	Key Elements of the Strategy—Interim Results	Interim Objectives	Habitat Benefits Achieved
FRESHWATER RESTORATION	Augment summer low flows	• Historical and projected stream flow data analyzed • Actions to restore sufficient flow to support salmonid life history identified	• Watersheds and strategies for restoration and protection identified by December 2018 • Three projects permitted • Construction of two projects underway • Fish barrier removal implemented per Fish Barrier Removal Board	Adequate flow to support salmonid habitat restored Pools restored for spawning adults and rearing juveniles Freshwater temperatures support salmonid habitat Riparian habitat improved with added structure Connected riparian habitats restored Mature native forest duff layer controls erosion and improves water quality Fuel in forest reduced
	Restore instream physical habitat	• Physical habitat analysis conducted and condition determined to be amenable to restoration • Projects planned, designed and constructed • Critical areas protected		
	Restore other watershed processes	• Hydrologic modeling conducted • Effects of ditches and ponds understood • Native riparian revegetation identified		
	Reduce contaminant sources	• Agricultural BMPs implemented under Voluntary Stewardship Program	• Implementation at least 25 BMPs to manage runoff and reduce contaminants at a minimum of 20 agricultural sites • Implement Voluntary Stewardship Program	

Results Chain	Approach	Key Elements of the Strategy—Interim Results	Interim Objectives	Habitat Benefits Achieved
			• Contaminant levels reduced downgradient of BMP actions completed	Access improved to facilitate wildfire response
	Manage forests	• Forest management plans developed • Education and outreach provided • Firewise program expanded • Wildfire risk is reduced	• Fire reduction BMPs implemented in prioritized watersheds	

Table 10 describes related San Juan LIO's NTAs included in PSP's 2016 Action Agenda. Their implementation will contribute to achieving the Freshwater Restoration interim objectives and five-year strategic goals.

Table 10. San Juan Action Area 2016 Near Term Actions Related to Freshwater Restoration Strategies

ID	Near Term Action	Cost Estimate	Description
2016-0136	Recovery of Select Freshwater Salmonid Habitat in the San Juan Islands	$50,000	Prioritize the protection and restoration of freshwater salmonid fish habitat in San Juan County. *Note: This NTA has been funded by Habitat Strategic Initiative Lead and work is underway.*
2016-0223	Stormwater Ditch Best Management Practices Retrofits	$97,500	This NTA will field test new permeable mix designs and new material testing procedures, to further pavement durability, develop permeable pavement standards, and increase confidence in permeable pavements.
2016-0225	Stormwater Pond Best Management Practices Retrofits	$84,000	Improve the performance of created ponds to improve stormwater treatment and detention. The goal of this NTA is to inventory problem ponds, perform field assessments, prioritize and design retrofits, and construct stormwater pond BMP retrofits.
2016-0157	Targeted Livestock Best Management Practice Implementation	$250,000	SJICD will provide targeted outreach to livestock managers in known areas of water quality concern to promote implementation of best management practices to control sources of bacterial contamination and excess nutrients and improve water quality.

Theory of Change: Large Oil Spill/Vessel Traffic Impacts

The threat of a large oil spill impacting San Juan County's marine environment and shorelines is the AAOG's highest priority Pressure. Additionally there is significant concern for the ongoing current and increasing impacts of commercial vessel traffic in the shipping lanes surrounding the Islands. Impacts include vessel noise, discharges, marine mammal strikes, and introduction of invasive species that are detrimental to marine water quality and threatened and endangered species including the Southern Resident Killer Whale.

Protecting San Juan County and the region from a large oil spill and vessel traffic impacts is among the most complex issues for Puget Sound Recovery. The regulatory frameworks both domestically and internationally are complex and involve all levels of federal and state government, tribal governments, industry, and countless stakeholders. Tribes address these issues directly with their federal trustees including the US Environmental Protection Agency, the US Army Corps of Engineers, NOAA and the US Coast Guard. The AAOG also wants the County to have better access to information and a strong, local government voice in a transboundary setting regarding evolving issues and decision-making. Important to protecting shorelines in the event of a spill is the Islands Oil Spill Agency with equipment and trained responders positioned within the County. This asset currently is the means for the initial spill response to all county waters with the 4-6 hour window and needs continued support to sustain and increase their capabilities.

The theory of change to achieve the Action Area's Large Oil Spill/Vessel Traffic Impacts is based on these general approaches:

- **County government may participate in a transboundary safety forum but the San Juan LIO itself is not a participant**
- **Promote additional oil spill prevention measures**
- **Seek effective spill response planning and capacity**
- **Support increased protection from vessel traffic impacts to marine water quality and threatened and endangered species**

The proposed path to achieving the goals defined in Section 2.0 follows a sequence of interim results and objectives resulting in the desired habitat benefits, as summarized in Table 11 and further detailed in Appendix C.

Table 11. Summary of Theory of Change for Large Oil Spill/Vessel Traffic Impacts Strategies

Results Chain	Approach	Key Elements of the Strategy—Interim Results	Interim Objectives	Habitat Benefits Achieved
LARGE OIL SPILL/VESSEL TRAFFIC IMPACTS	San Juan county may participate in a transboundary safety forum but the San Juan LIO itself is not a participant	• Transboundary engagement strategy developed by the County • Transborder maritime regulatory frameworks and authorities are understood by the County • Transborder vessel traffic information is shared and coordinated actions with the County follow all incidents • Intergovernmental coordination increases transparency and develops consensus recommendations that the County supports to promote urgent transboundary action	To be developed	Risk of a large oil spill further reduced Consequences of oil spill reduced Vessel traffic impacts to high value habitat reduced
	Promote additional oil spill prevention measures	• Preventative measures to reduce current spill risks identified including proximal emergency response towing vessel • Consequences of a large oil spill are assessed (ecological, cultural, social and economic) and justify improved preventative measures		
	Seek effective spill response planning and capacity	• National Academy of Science recommendations incorporated into contingency planning for sinking oils • Response resources provide improved reliability and capability for 4-6 hour response time		
	Support increased protection from vessel traffic impacts	• The public and policy makers are educated on best practices for the protection and care of sensitive marine habitat and threatened and endangered species • Impacts from vessel traffic to marine habitat and threatened and endangered specific are documented and understood		

Table 12 describes related San Juan NTAs included in PSP's 2016 Action Agenda. Though tribal partners do not support work related to a regional citizen advisory council going forward, implementation of the other two NTAs will contribute to achieving the Large Oil Spill/Vessel Traffic Impacts five-year strategic goals.

Table 12. San Juan Action Area 2016 Near Term Actions Related to Large Oil Spill/Vessel Traffic Impacts Strategies

ID	Near Term Action	Cost Estimate	Description
2016-0149	Vessel Traffic Risk Consequences in the Salish Sea	$200,000	San Juan County Marine Resources Committee develops an analysis of vessel traffic risk consequences for the San Juan County resources—ecological, cultural, social and economic-- and recommendations to prevent significant harm to resources and communities that rely on them. *Note: Tribes develop their own assessment of consequences to treaty rights and resources upon which tribes rely. This NTA requires revision before implementation and for the 2018 Action Agenda update to clarify in the title and scope that the analysis is limited to San Juan County and excludes treaty rights and resources.*
2016-0151	Policy on Dispersant Use in San Juan County Waters	$50,000	Preparation of a literature review and draft policy statement on the environmental consequences of dispersant use following an oil spill in cold waters. Having this information in hand would allow an informed decision in the event of an oil spill. *Note: This NTA has been funded by the Habitat Strategic Initiative Lead and work is underway.*
2016-0153	Feasibility Study for Vessel Traffic Regional Citizen Advisory Council	--	*Note: This NTA will no longer be pursued within the LIO.*

6.0 GAPS, BARRIERS AND NEEDS

LIOs were asked to identify barriers, gaps and resource needs as they relate to ecosystem recovery planning and implementation. These include both local and regional gaps, barriers and needs as summarized in the Table 13.

Table 13. Gaps and Barriers to Accomplishing Ecosystem Protection and Recovery in the Action Area

Barriers to Implementation of Protection and Recovery Strategies	Description	Resources Needed to Overcome
PHYSICAL / TECHNICAL		
Baseline data and information	Lack of historical information about ecosystem health for all Ecosystem Components.	• Data and technical research needed • Robust baseline data • State/local/tribal/federal coordination and sharing of information and resources
Climate change uncertainties	Numerous variables and methods in use. Need modeling to reflect and bound the uncertainties (probabilistic modeling).	• Complete analysis and probabilistic modeling for all Action Areas
Monitoring of local and regional projects	Monitoring is needed to evaluate progress at different scales—project effectiveness, local environmental impact, and regional recovery progress.	• Support and capacity to conduct monitoring in reference to indicators and target benchmarks • Monitoring of permitted and unpermitted shoreline armoring construction and removal

Barriers to Implementation of Protection and Recovery Strategies	Description	Resources Needed to Overcome
FINANCIAL		
Lack of time/funding to collect and analyze data to inform baselines/numeric goals	Goals require clear baseline data in order to set targets and benchmarks. Many actions are program/policy based and therefore lack quantitative data to measure impact over time.	• Further research, data collection and analysis • State/local/tribal/federal coordination and sharing of information and resources
Full consequences to San Juan County of a large oil spill are undocumented	Environmental, cultural, social and economic consequences to San Juan Couunty of a large oil spill need to be considered and assessed relative to economics of existing and proposed oil transportation projects.	• A comprehensive risk consequence assessment specific to San Juan County for the areas at highest risk of concern to the County's interests *Note: Tribes are developing their own assessement.*
Protection and recovery projects are not prioritized for local funding Lack of consistent funding from State and Federal sources	Because projects share local funding pools, ecosystem protection and recovery projects must often compete for funding with other local projects that focus on health and human safety.	• Increase availability and sustainability of state/federal funds to support ecosystem protection and recovery
LEGAL / REGULATORY / POLICY		
Overall focus on process and planning detracts from the capacity needed to implement actions	For example, the lengthy and prescriptive process required to fund and report NTAs, and protection and recovery planning diverts funds from implementation.	• Minimal procedural requirements for process and planning • Good governance – policy makers focused on recovery as end goal

Barriers to Implementation of Protection and Recovery Strategies	Description	Resources Needed to Overcome
		• Flexibility to use limited funds on local needs and priorities
Deficiencies in enforcement and compliance	Enforcement within the County is complaint-driven	• More resources to enforce Critical Areas Ordnance, Shoreline Master Program, and Voluntary Stewardship Program
Lack of comprehensive ecosystem services valuation	Very high value has not been comprehensively documented Data are managed in disparate manner and cannot readily be analyzed	• Compile existing information from local and regional data sources and identify gaps to be filled
Lack of incentives and disincentives Lack of community support	Landowners are resistant to change.	• Public outreach • Increased public trust of local government • Reduce regulatory/administrative burden and provide incentives for shoreline hardening removal
Regional Pressures are too large for local actions	Local actions have limited ability to mitigate/reduce regional Pressures associated with oil spills, climate change (sea level rise, saltwater intrusion), algal blooms.	• Integrate protection and recovery plans at comprehensive planning level • Legislative priorities should include regional actions for protection and recovery
Lack of transboundary vessel traffic coordination	Incident data in Transport Canada jurisdiction are not made public. WA Department of Ecology has recommended the formation of transboundary safety forum.	• Transboundary safety forum modeled on the Harbor Safety Committee with County representation • Data sharing, including incident data

Barriers to Implementation of Protection and Recovery Strategies	Description	Resources Needed to Overcome
		Note: The San Juan LIO is not participant in this forum. Tribes will address their concerns directly with their federal trustees and with Centennial Accord agencies.

7.0 ADAPTIVE MANAGEMENT

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 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 local and regional Puget Sound protection and recovery program design and implementation. Adaptive management can help address questions about how to make progress and attain our protection and recovery goals, as well as identify and track the effects of proposed actions over time.

The San Juan AAOG uses an adaptive management approach in ecosystem protection and recovery planning and implementation to inform complex decision-making and ensure partners are making most effective and efficient use of funding. Partners are committed to incorporating new, relevant data into ecosystem protection and recovery planning and to effectiveness monitoring to gauge success in current strategies being implemented.

This iterative structured process is depicted in Figure 4 and is intended to:

- Inform the AAOG members regarding the optimum approach for protecting and restoring natural resources and habitat;

Figure 4. Adaptive Management Cycle from Conservation Measures Partnership

- Delineate a pathway to allow flexibility in managing gaps and barriers to evaluate alternative approaches; and
- Incorporate new data, interdisciplinary experience and other relevant information into decision making to improve ecosystem protection and recovery program design and implementation.

Adaptive management has been used by the AAOG to modify and refine elements of the Ecosystem Protection and Recovery Plan, and to evaluate the local goals and targets and the success of NTA project implementation. Looking ahead, the AAOG will continue to use adaptive management to be strategic in planning, policy, and implementation efforts.

Conceptualize Strategies

The San Juan AAOG is the local integrating organization for the San Juan Islands, and was officially recognized by the Puget Sound Partnership's Leadership Council in June of 2010. The Accountability Oversight Committee serves as the executive body for the AAOG, and consists of County Council, tribal, and ex-officio Puget Sound Partnership representatives. The Implementation Committee consists of staff and volunteers from organizations helping to develop and implement the local interests of the Action Agenda for Puget Sound Recovery. This group provides recommendations to the Accountability Oversight Committee. The Participants section above presents the AAOG membership.

Ecosystem protection and recovery planning in the San Juans for the next five has been conceptualized and framed through the AAOG's development of this Ecosystem Protection and Recovery Plan. The plan builds on earlier concepts, the 2012, 2014 and 2016 updates to the Action Agenda, and the 2014 PSPA. The PSPA has been utilized to evaluate gaps in and refine the strategies to reduce pressures on our local natural systems and habitats. The process to develop the vision, goals and current strategy is described in Section 1 Ecosystem Protection and Recovery Plan Development and Decision Making Process. The strategy is based on conceptual models of the direct and indirect causes of the local priority pressures.

Plan Actions and Monitoring

The AAOG has solicited NTAs from their members and all local environmental entities as the basis for planning appropriate actions. The AAOG has approved of these entities' submitting their proposals to the PSP for nomination to Action Agenda updates. The current action planning is represented by 16 NTAs on the 2016 Action Agenda. The next planning step is for the AAOG to support local entities in their development of NTA proposals for the 2018 Action Agenda update. Actions may be identified that address our EPRP objectives but are not consistent with the PSPs regional priorities for the 2018 Action Agenda. In this case the AAOG will encourage entities to pursue funding and implementation of their action through other sources.

Performance monitoring of the EPRP's implementation will be aided by the NTA reporting to the PSP. NTA owners also will asked to provide updates to the AAOG and recommend adjustments if needed to the scope, approach and objectives at least semi-annually.

Performance also may be assessed through our partners' programs monitoring data, which may identify the need and means to adaptively manage the ecosystem protection and recovery work in the San Juan watershed. Table 14 lists monitoring data that is integrated into the EPRP adaptive management process.

Table 14. Sources of Monitoring Data Used for Adaptive Management

Organization	Monitoring Data	How Data Are Used for Adaptive Management
Friends of the San Juans	MacLennan et al. "Strategic Salmon Recovery Planning in San Juan County Washington: The Pulling It All Together (PIAT) Project." *Report to the San Juan County Lead Entity for Salmon Recovery and the Washington State Salmon Recovery Funding Board.* July 2012. Print.	Identifying highest priority nearshore habitat for restoration and protection.
San Juan Islands Conservation District	Stormwater monitoring pilot program	Data will be used in priority watersheds to develop approach and method for monitoring flows and water quality for the purpose of evaluating salmonid habitat restoration.
San Juan County Public Works Department	San Juan County Watershed Basin Plan, volumes 1 & 2, Herrera, 2014, 2015	Plans identify priority near term actions, including ditch inventory, pond inventory, stormwater retrofits in UGAs and in priority watersheds
Friends of the San Juans and San Juan County Lead Entity	Pulling it All Together (PIAT), Volume 2	Building on PIAT Volume 1, prioritize highest priority nearshore habitat for protection and restoration. Report in process.
San Juan County Health & Community Services	On-site septic systems	Status, trends and prioritization
WA Department of Health	Marine water quality	Status, trends and prioritization
	Shellfish harvest (ac)	Status, trends and prioritization
WA Department of Ecology	303 D listed water bodies	Status, trends and prioritization
WA Department of Fish and Wildlife	Shoreline armoring	Status and trends

The conceptual models provide the basis for selection of parameters to monitor for effectiveness, pressure abatement, and status and trends. The current adaptive management system only reports on success related to specific objectives assigned in the NTA development process. The monitoring component of adaptive management in the watershed is limited to the current data sources available for evaluation. Status and trend information is available for the monitoring data, however not all elements are kept current in these analyses which limits the ability to adaptively manage. Integrated data collection, monitoring, and adaptive management related to key Ecosystem Components within the Action Area remains a challenge.

Implement, Analyze and Adapt

San Juan watershed has complex and dynamic habitat and Ecosystem Components. Restoration actions are evaluated for success and failure in an effort to learn and become better stewards of the natural resources in the watershed. The AAOG's partners are engaged in applying the limited resources available for restoration in the most effective and efficient recovery actions. There is a shared interest and responsibility in the watershed to improve our understanding of how to design, build, and manage projects to meet the ecosystem protection and recovery goals. Past mismanaged or failed projects have threatened public support for protection and restoration in the watershed and have, sometimes, left the perception of mismanaged state or federal funding. A transparent and community-engaged adaptive management process will inform improvements and increase public support for ecosystem planning and future protection and restoration projects.

The AAOG will improve the adaptive management process for the 2016 and 2018 NTAs to include project effectiveness as they relate to Ecosystem Component objectives and regional targets identified in the PSP Action Agenda. With improved data on ecosystem indicators, particularly nearshore, the organization will be better equipped to measure progress toward meeting goals and objectives and respond with decision-making on project effectiveness. The Implementation Committee will review monitoring data related to goals, objectives and regional targets and make recommendations, if and when needed, on new indicators or strategies and on impacts of alternative policies and projects.

Capture and Share Learning

The Implementation Committee and Accountability Oversight Committee will jointly meet annually to review project status and success toward goals to facilitate an improved learning cycle. NTA owners also will asked to provide updates to the AAOG and recommend adjustments if needed to the scope, approach and objectives at least semi-annually. Additionally, members will continue to take advantage of the many relevant learning opportunities within the County and the region, and actively network with consult subject matter experts. Changes to new or revised Ecosystem Components, interim and long-term objectives, Pressures, or strategies can then be fully vetted and documented through updates to the EPRP. The adaptive management process will facilitate learning, track accountability, measure performance, and support decision-making to refine strategies accordingly to be most effective and efficient in recovery and protection efforts in the San Juan Action Area.

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ACRONYMS

AAOG	Action Agenda Oversight Group
AOC	Accountability Oversight Committee
BMP	Best Management Practice
EPA	Environmental Protection Agency
EPRP	Ecosystem Protection and Recovery Plan
LIO	Local Integrating Organization
IC	Implementation Committee
NTA	Near Term Action
OHWM	Ordinary High Water Mark
PIAT	Pulling It All Together[6]
PSP	Puget Sound Partnership
PSPA	Puget Sound Pressure Assessment
SITT	Strategic Initiative Transition Team
SJ	San Juan
SRKW	Southern Resident Killer Whale
UGA	Urban Growth Area
UW	University of Washington

[6] MacLennan et al. "Strategic Salmon Recovery Planning in San Juan County Washington: The Pulling It All Together (PIAT) Project." *Report to the San Juan County Lead Entity for Salmon Recovery and the Washington State Salmon Recovery Funding Board.* July 2012.

APPENDICES

A. Glossary
B. Conceptual Models
C. Results Chains