

Protect and Restore Floodplain Function

The Challenge

Floodplains play a vital, often unrecognized role in the health of the Puget Sound ecosystems and watersheds. Floodplains support a variety of key ecological functions: they slow and store flood waters, filter our water, generate economically and culturally valuable fisheries, produce fertile soils for farming, recharge our aquifers, create a variety of recreational opportunities, and provide critical habitat and sustenance for a diverse array of terrestrial and aquatic life. Floodplains are one of the most productive ecosystems in Puget Sound, yet they are also one of the most degraded portions of the Puget Sound ecosystem, and these impacts have significant consequences for people and nature. Several factors have impeded floodplain recovery (and related salmon recovery and water quality goals) to date. These factors include a lack of public support, high costs associated with restoration, and the existence of divergent and uncoordinated agency goals. Despite the tens of millions of dollars spent on ecosystem recovery and flood risk reduction, habitat remains in decline and flood risks continue to mount.

Local, state and federal agencies employ a variety of programs to address floodplain management issues—sometimes in contradictory ways. Flood risk reduction projects developed in ways that don't take fish and wildlife needs into account get caught up in ESA conflicts that prevent or delay construction and add mitigation costs. Habitat restoration projects developed as single-purpose projects are opposed by communities concerned with maintaining farmland or water management infrastructure. Progress on both sides has been too slow and arguably outweighed by the increased costs associated with continued development. The net result has been a continued decline of ecosystem functions and increase in human flood risks. Yet divergent floodplain management goals—flood control, clean water, salmon—are not inherently at odds with one another. Those portions of the river corridor that present the greatest risks to people (i.e., incur the most flooding and erosion) are often the same areas where salmon habitat, water filtering wetlands, groundwater recharge and flood storage are most likely to occur.

To protect and restore floodplains in Puget Sound and address the issues described above, this section outlines a series of six comprehensive sub-strategies. Throughout these sub-strategies, two

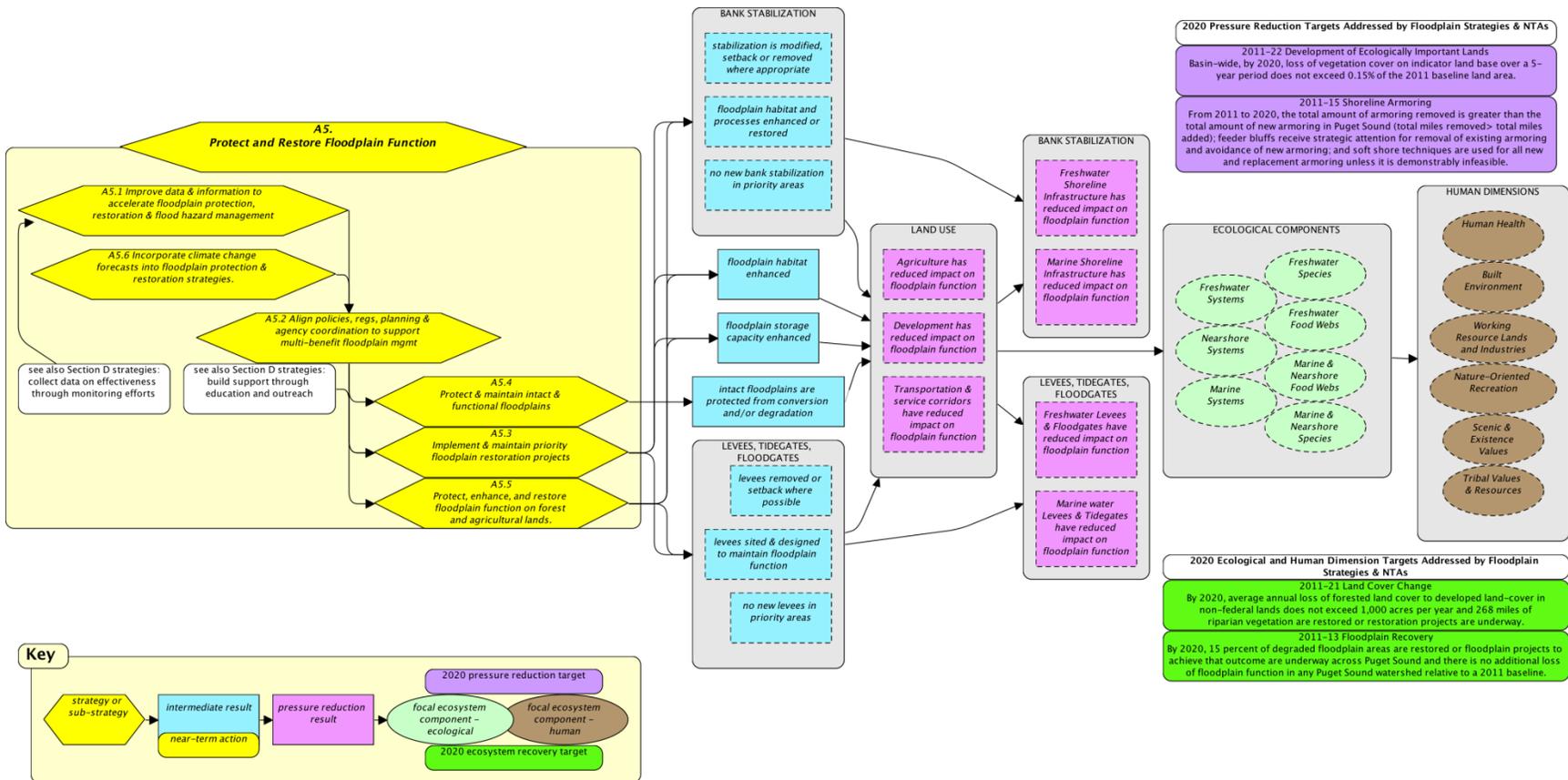
Local Strategies

Floodplains are critically important for all local areas across the Puget Sound. South Central identified restoring floodplains as an integral strategy to restoring Puget Sound and Hood Canal is also considering this as potential priority area.*

** See Local Areas Chapters for more detail on local areas that are in the process of completing strategy and action identification and prioritization.*

predominant themes are (1) floodplains provide myriad functions and services that both benefit and create risks to society, and (2) only through recognizing these services and risks and managing them in a holistic, coordinated fashion will we break through the status quo and put the region on a path to making people safer and the Puget Sound ecosystem healthier (i.e. achieving both the ecosystem and human well being targets that must be a part of Puget Sound Recovery).

The first sub-strategy deals with improving data and information to accelerate floodplain protection, restoration, and flood hazard management. The second involves aligning policies, regulations, planning efforts, and agency coordination in floodplain management. The third involves implementing and maintaining priority restoration projects. The fourth deals with restoration strategies in the region. The fifth sub-strategy addresses the stewardship of floodplains located in agricultural lands. The sixth sub-strategy addresses impacts from climate change and floodplain management. Each of the six sub-strategies has corresponding near term actions (NTAs). NTAs provide specific, actionable directives for federal, state, local agencies and other organizations to protect and restore floodplain function in watersheds throughout Puget Sound.



Relationship to Recovery Targets

The Partnership defines a functioning, resilient ecosystem to include freshwater floodplains that support natural processes and deliver ecological services to keep people and property safe during flood flows, support fisheries production, and provide water filtration and ground water recharge.¹² Given their vital role in maintaining the health and functioning of the Puget Sound, it is important that intact floodplains be protected and that floodplain areas that have been developed are restored or are managed in a way to recapture as much of the affected functions as possible. PSP's Leadership Council set two recovery targets for floodplains in the Puget Sound that it aims to achieve by 2020:

- 15 percent of degraded floodplain areas are restored or floodplain projects to achieve that outcome are underway across Puget Sound
- No additional loss of floodplain function in any Puget Sound watershed relative to a 2011 baseline

A5. Protect and Restore Floodplain Function.

A5.1 Improve data and information to accelerate floodplain protection, restoration and flood hazard management.

Complete and up-to-date information is foundational to achieving floodplain recovery. All the sub-strategies and NTAs associated with floodplain protection and recovery assume that decision makers have access to reliable data on floodplain locations, conditions, and recovery priorities. Prior to the A5.1 NTA 1, the Puget Sound Institute (PSI) will convene a group comprised of representatives from TNC, NWIFC, PSP, FEMA, DOE, NOAA, USGS, USFS, EPA, and UW ESP to establish a working definition of floodplain, floodplain functions, and frequently flooded areas.

Near-Term Actions

A5.1 NTA 1: The PSP will convene a Puget Sound Floodplain Protection and Recovery Policy Team that will:

- › **By 2012, identify the policy and program changes of federal, state and local flood risk reduction, flood mitigation and ecosystem protection and restoration programs to foster multi-objective floodplain management .**
- › **By 2012, work with local levee owners to identify the barriers to implementing levee setbacks and habitat friendly levee management practices and work with key parties to address barriers.**
- › **By 2012, identify a new Floodplain Indicator Champion.**
- › **By 2012, use the definition of floodplain function to identify priority opportunities for floodplain compatible agricultural practices. The Ruckelshaus process will be used to create incentive programs to incentivize these practices.**

¹² Leadership Council Resolution 2011-13, "Adopting a 2020 ecosystem recovery target for floodplains" Available at: http://www.psp.wa.gov/downloads/LC_Resolutions/Resolution_2011-13.pdf

- › By 2013, identify floodplain areas; prioritize those most important for protection, restoration, farmland preservation or other compatible and non-compatible; and identify the implementation steps needed to protect functioning floodplain areas by 2013.
- › By 2013, develop a decision making framework that enables agencies to identify cross-agency floodplain project priorities based on their ability to meet multiple goals and delineates a coordinated funding approach, including cost-share mechanisms, for floodplain-friendly modifications to flood protection infrastructure in a cost-effective manner.
- › By 2013, identify federal, state, local, and private funding to develop 3 case studies that are illustrative of the benefits of a multi-objective approach to floodplain restoration and implement a pilot program to fund projects that leverage the work of the case studies.
- › By 2013, assess the disincentives for reestablishing habitat land on agricultural lands by 2013

A5.1 NTA 2: PSP will gather data on public perception of flood risks, floodplain function, and the relationship between the two and will include the risks and costs of developing in floodplains and the economic and social benefits/services of preserving and restoring floodplain functions as a top messaging priority in its outreach efforts by 2012.

Performance Metric: (status of inclusion of floodplain risks, services and benefits in SP outreach materials) By 2012, all PSP outreach materials related to development includes messaging about floodplain risks and benefits and about services of intact, functional floodplains.

A5.1 NTA 3: By the fourth quarter of 2012, synthesizing the results in the July 2010 "Floodplain Management: A Synthesis of Issues Affecting Recovery of Puget Sound" report¹³ and other relevant and timely information, the PSP will identify and work with relevant state and federal agencies to draft an action plan to address the programs and target programmatic recommendations for legislative change, rule amendments, and administrative changes, needed to achieve the floodplains pressure reduction target.

Performance Metric: (status of action plan development) By Q4 2012, an action plan addressing programmatic, legislative, administrative, and regulatory changes needed to achieve the floodplain recovery target is drafted.

A5.2 Align policies, regulations, planning, and agency coordination to support multi-benefit floodplain management.

Floodplain management policies have been developed over many decades. Some of these policies conflict with Puget Sound recovery goals and present obstacles to achieving the floodplain restoration target. Flood risk reduction and ecosystem recovery are not mutually exclusive goals yet have been historically pursued independent of one another.

¹³ Puget Sound Partnership. July 2010. Floodplain Management: A Synthesis of Issues Affecting Recovery in Puget Sound. Available at: http://www.psp.wa.gov/downloads/LC2010/072010/03b_Floodplain_Management_Report%20Judge%20Final-July%202010.pdf

One of the principle challenges to achieving the 15 percent restoration goal is the sheer cost involved in floodplain restoration projects, most of which will involve expensive infrastructure work. Asking agencies to coordinate their programs to pool funding and achieve greater efficiencies is easy in theory; however, agencies are required to use cost-benefit analyses focused specifically on their programmatic mandate when making decisions about which projects or activities to fund. Developing a more holistic approach to cost-benefit analysis that speaks to multiple agency goals will be critical to enabling a coordinated, multi-agency approach to funding floodplain projects that will make people safer and our ecosystem healthier. Creating a decision making framework that enables agencies to identify projects that meet multiple program goals is a critical step toward being able to coordinate floodplain investments and finance floodplain recovery projects.

SALMON RECOVERY

Protecting and Restoring Floodplains – A Salmon Recovery Plan Priority: Functioning floodplains are critically important for salmon across the Puget Sound and need to be protected and restored. Specific floodplain protection and restoration areas are identified for all the mainstem, natal, watersheds in Volume II. Two key issues that have come out of salmon recovery but are relevant to the greater recovery effort are the Biological Opinion (BiOp) issued by NOAA/NMFS on FEMA’s National Floodplain Insurance Program (NFIP) and the Army Corps of Engineers Levee Vegetation Management Standards.

- NMFS BiOp on FEMA NFIP: BiOp indicated that the development that has been allowed in the floodplains across the Puget Sound has acted as a ‘take’ of salmon and Orcas. This BiOp is an important document in the information related to the need to protect and restore floodplain habitat.
- Levee Vegetation: the allowable amount and size of vegetation along Corps certified levees impacts the riparian habitat for many critical salmon-bearing streams and rivers. Work has been done to reinforce the Seattle variance but more work is needed to ensure this can be used.

How are these priorities integrated: The Action Agenda strategies and actions generally reflect the themes and actions identified in the original salmon recovery plan through the need to protect and restore floodplains into functioning ecosystems. As all Chinook salmon populations need to get to a low risk status, prioritization of floodplain areas for protection, restoration and farmland protection should be considered a sequencing question. In addition, identification of these areas should consider those already important for salmon in the Salmon Recovery Plans. Finally, prioritization efforts should not slow down the existing work to protect and restore floodplain areas known as important per the Salmon Recovery Plan.

This information has been included in these strategies and actions, although more work may be needed between the draft and the final Action Agenda update. As with the integration of working lands priorities, consideration about the flexibility of conservation tools may need to be more clearly articulated. The watershed chapters have specific information about where floodplain restoration gains could be made. In looking across the Action Agenda to see whether the actions will sufficiently help us achieve the targets, the Partnership will use these chapters.

Ongoing Programs

Key Ongoing Program Activity

- PSP is currently leading the development of new regional levee-based vegetation standards; the standards are expected to be complete by 2012.

Near-Term Actions

Many of the actions that support this sub-strategy are located in A5.1. Specifically, work that occurs in A5.1 NTA 1 is the fundamental work that needs to occur to enable alignment of policies, regulations, planning, and agency coordination for multi-benefit floodplain management.

A5.3 Implement and maintain priority floodplain restoration projects.

The target identified for Puget Sound recovery calls for a 15 percent restoration of floodplains. This is an ambitious goal but, because of the importance of floodplains to overall Puget Sound recovery, an absolutely critical one. Achieving it will require overcoming key barriers in order to deliver the necessary (1) public support, (2) funding, and (3) interagency coordination. It will take significant commitment and collaboration from agencies and a new approach that aligns flood risk reduction efforts and programs so that the necessary support and funding is garnered to accelerate recovery actions.

Ongoing Programs

Key Ongoing Program Activity

- RCO, PSP, and Puget Sound lead entities with local and regional partners implement relevant habitat restoration projects identified in Salmon Recovery 3-year workplans

Near-Term Actions

A5.3 NTA 1: By 2013, PSP will work with Tribes, state and federal resource agencies, local governments, WSDOT, and the environmental community to identify and prioritize the most important existing roadways and bridges that have the biggest impacts on floodplain function and floodplain connectivity. The prioritization criteria will include cost/benefit of repair or replacement of the infrastructure. PSP will work with the owners of public infrastructure (local governments and WSDOT) to crosswalk this prioritized list with their repair and replacement plans and schedules for the next 10-20 years.

Performance Metric: (Status of project list) Completion identification of priority projects.

It is important to locate new and replacement public infrastructure (e.g., bridges, roads, rails, treatment plants) outside of floodplains and ensure that the design of new or replacement infrastructure optimizes and enhances floodplain function. Repairs to infrastructure that cannot be relocated should be the least disruptive of floodplain function as possible.

A5.3 LNTA 2: Salmon Recovery Lead Entities implement highest priority salmon recovery habitat protection and restoration recommendations from WRIA 8, 9, and 10 three-year work plans. For Floodplain Restoration:

- › **Develop concept and preliminary strategy**
- › **Conduct economic analysis, including ecosystem goods and services**
- › **Ensure integration with floodplain acquisition and restoration plans.**

(Note: this action is also relevant to Strategy A9.1)

Performance measures: Regional salmon recovery metrics (possible examples include: acres restored, linear feet of stream or shoreline restored, fish passage barriers removed, etc.) To what extent are WRIA plan recommendations being implemented? Monitoring and adaptive management strategies: floodplain acres restored linear feet of levee setback, fish use.

A5.4 Protect and maintain intact and functional floodplains.

In Puget Sound, protection of the remaining intact habitat functions of floodplains and restoration of lost functions is noted as a high priority in many listed species recovery plans and the Action Agenda calls for several near-term actions supporting these outcomes. Most of the intact and functional floodplains are in undeveloped areas—sub-strategy A5.5 focuses on protection and restoration strategies specific to forest and agricultural lands. The focus of this sub-strategy is on ecosystem-level programmatic actions that contribute to maintaining and protecting floodplains.

The Federal Emergency Management Agency (FEMA) implements the National Flood Insurance Program (NFIP). NFIP issues flood insurance to homeowners and greatly influences the type and extent of development in floodplains. In late 2008, the National Marine Fisheries Service (NMFS) issued a Biological Opinion (BiOp) finding that the NFIP jeopardizes the existence of several Puget Sound species listed under ESA. NMFS has identified seven actions for FEMA that would bring the NFIP into compliance with the ESA, the third of which calls for FEMA to modify its implementation of the NFIP minimum criteria to prevent and/or minimize the degradation of channel and floodplain habitat. NMFS set a deadline of September 22, 2011 for work by FEMA and 122 communities in Puget Sound to implement this action.¹⁴ The BiOp and the work it outlines for FEMA and Puget Sound communities is a critical component in achieving the floodplain recovery target.

Ongoing Programs

FEMA and NOAA technical assistance teams are currently working with other local, state and federal governments to implement the BiOp and provide tools and mechanisms to promote consistency with other regulations by 1Q 2012, and on an ongoing basis as needed. A performance metric is the number of NFIP communities with BiOp compliance packages approved by FEMA.

Near-Term Actions

A5.4 NTA 1: By 2012, FEMA completes augmented annual reporting requirements relative to the obligations of the 122 communities in Puget Sound to abide by the NMFS NFIP BiOp.

Performance Metric: (status of FEMA reporting requirements) By 2012, FEMA reporting requirements are complete.

¹⁴ http://www.psp.wa.gov/downloads/LC2010/111910/05e_FEMA_BiOP_Memo.pdf

A5.4 NTA 2: Ecology , Commerce, and other interested state agencies will develop a strategy for and lead effective state engagement with local governments in the next round of CAO updates on frequently flooded areas .

Performance Metric: TBD

A5.4 NTA 3: [Placeholder for an NTA on effectiveness monitoring related to status & trends of floodplains.]

Performance Metric: TBD

A5.5 Protect, enhance, and restore floodplain function on forest and agricultural lands.

Floodplain forested lands are critically important habitat and provide several indispensable ecosystem services. The ecosystem services include rainfall diversion and storage to stem the flow of water to reduce downstream flood damage; surface water quality protection; groundwater recharge; and they mitigate erosion and sedimentation deposit.

The production of arable soils is one of the most valuable ecosystem services society gets from floodplains. The result is that the majority of farmland in Puget Sound is located in floodplains because of the rich, fertile soil. However, agricultural land use can significantly alter the functionality of floodplains. In their rating of existing floodplain function in Puget Sound, the NMFS found that agriculture-dominated water resource inventory areas (25 percent or greater agricultural use) had “poor” or “poor-fair” conditions.¹⁵ Farmers also experience the direct social and economic costs of floods when they occur. As we look to the future there is an opportunity to change agricultural management practices to make it more compatible with recovering floodplain functions.

Ongoing Programs

There are several grant programs and other finance mechanisms to incent protection, enhancement, or restoration of floodplain function on forest and agricultural lands.

The **Family Forest Fish Passage Program** (FFPP) is a cost-share program that helps small forest landowners renovate barriers on their land to allow fish passage in small waterways. Artificial barriers in streams can prevent many fish from reaching miles of upstream habitat, and can be devastating to species such as salmon. As a public resource, fish are protected by state Forest Practice Rules which require landowners to restructure fish barriers by 2016 in a way that allows unobstructed fish passage. The program provides 75–100 percent of the cost of constructing the barrier, with the funding provided varying based on the quality of the habitat, number of salmon and trout species benefiting from the correction, and project cost. This program allows working forest lands to remain viable while supporting ecosystem function.

¹⁵ Smith, C.J. 2005. Salmon Habitat Limiting Factors in Washington State. Prepared for the Washington State Conservation Commission, Olympia, Washington. In http://www.psp.wa.gov/downloads/LC2010/072010/03b_Floodplain_Management_Report%20Judge%20Final-July%202010.pdf

The **Forestry Riparian Easement Program (FREP)** compensates eligible owners of small forest lands in exchange for a 50-year conservation easement on qualifying timber. Landowners agree to leave timber unharvested during the easement period, while still maintaining property rights and full access. The riparian benefits of the forested lands are maintained by the state. This program allows landowners to benefit from helping to preserve local waterways, thereby improving rural communities while helping to restore flood protection in these areas.

The **Riparian Open Space Program (ROSP)** provides benefits for owners of forest lands that fall within unconfined sections of river channel migration zones (CMZs). Landowners who qualify for this program, which is funded by the Washington state legislature, may donate or sell a permanent easement on their land and/or their timber in designated forest land that exists along migrating stream channels. These landowners are prohibited from harvesting timber on riparian land isolated by river channels that have migrated over time; this program provides compensation to landowners affected by these restrictions. Open to owners of both small and large forested land areas, ROSP provides financial benefits to rural communities, helping landowners to remain viable while supporting the ecological restoration of valuable floodplain areas.

The **Washington Wildlife Recreation Program (WWRP)** provides funding for habitat conservation and farmland preservation, in addition to recreational facilities. The goal of the program is to acquire as soon as possible the most significant lands for wildlife conservation and outdoor recreation purposes, before they are converted to other uses, and to develop existing public recreational land and facilities to meet the needs of present and future generations. Typical projects include protecting wildlife habitat, building and renovating community parks, building waterfront parks, restoring state lands, and protecting farmland from development. Funded by the sale of general obligation bonds, these grants are available to local agencies, special purpose districts, state agencies, Native American Tribes, salmon recovery lead entities, and nonprofit organizations.

The **Aquatic Lands Enhancement Account (ALEA)** program is targeted at re-establishing the natural, self-sustaining ecological functions of the waterfront, providing or restoring public access to the water, and increasing public awareness of aquatic lands as a finite natural resource and irreplaceable public heritage. Typical projects include removing bulkheads to restore natural beach function, restoring estuaries, and restoring shoreline for salmon habitat. Funded by revenue generated from DNR's management of state-owned aquatic lands, these grants are available to local agencies, state agencies, and Native American Tribes.

The **Land and Water Conservation Fund (LWCF)** provides funding to preserve and develop outdoor recreation resources, including parks, trails, and wildlife lands. Project goals typically involve protecting wildlife habitat or renovating parks. Funded by revenue from federal sales and leasing of off-shore oil and gas resources, these funds are available to local agencies, park and recreation districts, school districts, special-purpose districts, state agencies, and Native American tribes.

The **Salmon Recovery Funding Board (SRFB)** funds riparian, freshwater, estuarine, near-shore, saltwater, and upland projects that protect existing, high quality habitats for salmon. It also funds projects to restore degraded habitat to increase overall habitat health and biological productivity of the fish. Funds come from the sale of state general obligation bonds and federal Pacific Coastal Salmon Recovery Funds (PCSRF). These funds are available to state and local agencies, conservation districts, Native American tribes, non-profit organizations, private landowners, regional fisheries enhancement groups, and special purpose districts.

The **Estuary and Salmon Restoration Program (ESRP)** provides grants to protect and restore the Puget Sound near-shore. The program was created by DFW to support the emerging priorities of the Puget Sound Nearshore Ecosystem Restoration Program. Typical projects include protection of nearshore and wetland habitat, restoration of salmon habitat and estuaries, and removal of bulkheads. Funding comes from the State Building Construction Fund. Federal funding also has been received from the NOAA's Community Based Restoration Program and USFWS. Federal funding for projects in Puget Sound is expected from EPA. Funds are available to local, state and federal agencies, Native American tribes, academic institutions, private institutions and non-profit organizations.

Puget Sound Acquisition and Restoration (PSAR) funds were requested by the Governor as part of her initiative to protect and restore Puget Sound by 2020 to accelerate implementation of the Puget Sound Salmon Recovery Plan. Funding has been provided by the legislature through the capital budget to protect and restore habitat in Puget Sound with a focus on acquiring and protecting critical habitat and restoring habitat function. These funds are available to state and local agencies, conservation districts, Native American tribes, non-profit organizations, private landowners, regional fisheries enhancement groups, and special purpose districts. In 2011, the program was revised to prohibit state agencies from using PSAR funds to acquire land.

Key Ongoing Program Activity

- DNR, DFW and other state agencies, tribes, local governments, and non-governmental entities use applicable federal and state grants, local government funds, and private funds to purchase development rights from working forest and farm landowners for lands at risk of conversion in key Puget Sound watersheds.

Near-Term Actions

A5.5 NTA 1: By 2013, Conservation Districts and Watershed Groups implement three pilot projects that demonstrate ecosystem services markets associated with flood hazard prevention and agricultural lands in floodplains.

Performance Metric: (status of three pilot projects) By 2013, three pilot projects demonstrating ecosystem service markets for floodplains are in place.

A5.5 NTA 2: The conservation districts, agricultural community, watershed planning groups, and local jurisdictions will use the outputs from the characterization work (A5.1 NTA 1) to identify potential land swaps (i.e., county land use and conservation districts) and identify candidate areas available to expand for agriculture outside of priority floodplain areas by 2012.

Performance Metric: (Status of list) By 2012, potential land swaps and candidate areas available to expand for agriculture are identified.

A5.5 NTA 3: PSP, DFW, NOAA, NRCS and others will work with farming communities to implement the Skagit Tidegate Fish Initiative, the Snohomish Sustainable Lands Strategy and other multi-benefit approaches that enable agricultural infrastructure improvements and/or provide regulatory certainty in exchange for restoration actions.

Performance Metric: Acres of restoration projects for which there is farm community support.

A5.6 Incorporate climate change forecasts into floodplain protection and restoration strategies.

Projected changes in weather patterns are expected to cause an increase in the frequency and magnitude of flooding, increased sediment delivery to our rivers, and a rise in the Puget Sound sea level. These changes have significant implications for infrastructure and other land uses in floodplains and near-shore environments. Restoring floodplain functions can help mitigate this impact while creating more resilient communities. At the same time, our floodplain ecosystems will need to adapt to these changing conditions. Incorporating climate change forecasts into floodplain management strategies implies having a deeper understanding of what the potential is for localized impact to climate change, identifying how these impacts can be accounted for in existing planning processes, and most importantly appropriately reflecting the value of floodplain protection and restoration into decision making. The strategies delineated in this section represent the long-term solution and the NTAs represent only the beginning of a much longer conversation needed to identify the full set of actions to achieve the sub-strategy.

Near-Term Actions

A5.6 NTA 1: By 2012, a representative from Climate Impacts Group will be a member of the PSP Science Panel.

Performance Metric: (Status of appointment of representative) By 2012, a member of the Climate Impacts Group serves on the PSP Science Panel

A5.6 NTA 2: EPA with collaboration from the PSP will work with research study authors, floodplain managers, and other affected parties to distill the current state of knowledge of climate change impacts pertinent to floodplains; identify, assess and prioritize risk factors, and develop adaptations strategies by 2013. Findings will be documented in a published report.

Performance Metric: (Status of published report) By 2013, findings are documented in published report.

A5.6 NTA 3: PSP and Ecology will work with EMD, and other interested agencies, to change state comprehensive flood management planning and project funding policies to ensure that plans and projects supported with state funding fully incorporate projected changes to sea level rise, flood frequency and volumes, sediment regimes and other issues that could be a major threat to human safety and floodplain ecosystem health.

Performance Metric: TBD

Target View: Floodplains

A functioning, resilient ecosystem requires freshwater floodplains that support natural processes and deliver ecological services to keep people and property safe during flood flows, support fisheries production, and provide water filtration and groundwater recharge. Floodplains are lush regions that provide food and fresh water, as well as good agricultural land through soil and habitat formation. We also know that improving riverside and floodplain habitat is a key part of virtually all recovery plans for endangered salmon.

Unfortunately, many floodplains in Puget Sound have been lost through a combination of shoreline armoring and levees, as well as residential, commercial, industrial and agricultural development. Better management of floodplains is essential for recovering salmon and Puget Sound.

The 2020 target for floodplains is:

1. Restore, or have projects underway to restore, 15 percent of Puget Sound floodplain area.
2. Have no net loss of floodplain function, in any watershed (for example, due to conversion for development).

The three Action Agenda strategies most related to achieving the recovery target for floodplains are:

- Improve data and information to accelerate floodplain protection, restoration, and flood hazard management (A5.1)
- Incorporate climate change forecasts into floodplain protection and restoration strategies (A5.6)
- Align policies, regulations, planning, and agency coordination to support multi-benefit floodplain management (A5.2)

In the following results chain, or logic model, yellow polygons identify strategies and actions from the Action Agenda that we believe will contribute significantly towards meeting the target. Arrows to the blue boxes describe the intermediate results the strategies and actions are expected to achieve. The purple boxes show the reduced pressure on the ecosystem that is expected to occur, the green ovals show the areas of the ecosystem where the change will be observed, and the dark green square shows the recovery targets.

Puget Sound Recovery -- Floodplain Target View
v. Nov 15, 2011

