APPENDIX B
PROTECTION STRATEGY UPDATES FOR THE 2005 SNOHOMISH RIVER BASIN SALMON CONSERVATION PLAN
EXECUTIVE SUMMARY

Snohomish Basin Salmon Conservation Plan Update

The primary goal of the 2015 *Snohomish Basin Protection Plan* (SBPP) and protection strategy updates is to identify protection strategies that prevent the degradation of hydrologic processes that support salmon or salmon habitat. In 2005, the Snohomish Basin Salmon Recovery Forum (Forum) members approved the *Snohomish Basin Salmon Conservation Plan* (Forum 2005; referred to as the 2005 Plan in this document) and laid out a 50-year road map for multi-species recovery. The 2005 Plan was based on historical records, the best available science, and social and economic conditions. The 2005 Plan recognized that it was critical to use adaptive management to increase the chances of success by incorporating new data, information about successes and failures, and new opportunities provided by changing context in the Snohomish River Basin.

Since 2005, there have been many site-scale successes on restoration projects in the mainstems, estuaries, and tributaries. However, many environmental indicators continue to decline, according to local data and the 2009 and 2013 State of the Sound reports (Puget Sound Partnership 2010, 2013). The continued decline calls for greater protection measures.

This 2015 update recommends a suite of strategies and actions focused on the protection of hydrology. Through the protection of hydrology, the update aims to ultimately protect habitat quality and quantity and provide resilience in the face of expected climate change. Solid policy, regulatory, and programmatic actions are necessary to protect hydrology and help achieve the 50-year salmon recovery goals. The recommendations in this document are intended to be guidance for local governments, non-profit organizations, tribes, and other partners to identify alternatives necessary to protect hydrology. As such, they do not imply a commitment, mandate, or intent on the part of any local governments to adopt these ideas outright. Local governments and planning entities working in the Basin have the final decision-making authority to choose and implement policies that work for their jurisdictions within the context of their broader responsibilities. The caveats that were associated with the original letters of commitment to the 2005 Plan from jurisdictions still stand.

This 2015 update is the first formal adaptive management action and coincides with the 10-year anniversary of the 2005 Plan. The update focuses on the protection of hydrology...
and seeks to be as specific as possible. The recommendations are not materially different from those recommended in 2005; however, they provide specificity on which geographic areas should be prioritized, the specific actions needed for implementation, and how to measure success. These recommendations would also allow the effectiveness of protection to be evaluated, in tandem with restoration, in the next 10-year benchmark review.

New Data, Information, and Opportunities

Though the 2005 Plan was approved by the National Marine Fisheries Service, the approval was caveated with a note that habitat protection needed further detail. The 2005 Plan was developed on the assumption that current protection tools were sufficient to “hold the line” and prevent further loss; however, there were few specifics of how this would be deployed. This update seeks to clarify which subset of the available protection tools should be implemented first and how and where these tools could be implemented.

Information on climate change and water processes has improved significantly since 2005. Climate models now show that shifting temperatures and precipitation regimes would result in more rain in the winter and less in the summer, with a shift in the timing of annual floods. The Washington State Department of Ecology released the Puget Sound Watershed Characterization model, which shows how water moves through the watershed with areas of particular importance highlighted. These two new sources of data and information drove Forum members to target the protection of hydrology, a critical watershed process that creates and maintains salmon habitat and cues salmon life stage behavior.

There has also been increased focus on integrating the needs of Basin residents and different populations of salmonids. Neither interest can be managed in a vacuum. There is a growing understanding of ecosystem services, the benefits provided to humans through the natural environment. In the Snohomish Basin, an intact hydrologic regime supports drinking water supplies, irrigation rights, recreation opportunities, and safety from floods and drought, in addition to supporting fish. As conditions change in the watershed, there is a need to protect hydrology for humans and fish, leading to greater opportunity to implement protection strategies across a wide range of beneficiaries.
Technical Approach to Assessing Hydrology and Protection Needs

This update used the technical assessment approach suggested in the 2015 SBPP. The SBPP proposed that a number of factors be considered in the assessment of hydrology and protection opportunities, including watershed characterization results, zoning, land use, current protections in place, fish use, and expected flow regime shifts due to climate change. This approach allows for analysis at a range of scales, ranging from basin-wide, to fish populations, and finally, sub-basins. The SBPP also provides an extensive description of protection tools that could be applied across the landscape in the categories of regulatory mechanisms, incentives, acquisitions, and new models and assessments, as well as other useful tools and strategies.

Results from the SBPP technical assessment indicate that forest cover, recharge zones, natural drainage networks, storage features, and pervious surfaces would all support intact hydrologic processes. The strategies proposed in this update are focused on maintaining these characteristics while encouraging compatible land uses.

Recommended Protection Strategy Updates

The protection strategy updates are organized by basin-wide tools and key land use areas. The basin-wide approach suggests a variety of tools that can be applied to many landscape types or river reaches. The specific land use category recommendations seek to recognize and improve existing protection efforts where possible and suggest new approaches based on opportunities that have emerged in the last decade. These specific strategies include recommendations for urban areas, rural residential areas, forest lands, and agricultural lands.

It is important to note that the recommendations are not a comprehensive listing of all protection tools that could be used in the Basin. Instead, these are the tools that are most likely to result in measurable change over time and can be implemented in the next 10 years.

The success of suggested protection strategy updates depends on the Forum partners’ strong commitment to salmon recovery. The recommendations are intended as guidance for local governments, non-profit organizations, tribes, conservation districts, and private partners. As such, they do not imply a commitment to adopt any of these ideas wholesale. All partners must consider these recommendations in the context of their broader responsibilities. The
protection strategy recommendations from this update are briefly summarized in the following lists.

**Basin-wide Recommendations**
- Develop information on hydrologic importance in local jurisdictions
- Transfer and purchase of development rights
- Protect instream flows
- Acquire lands with high hydrologic value

**Urban Recommendations**
- Augment practices to meet National Pollutant Discharge Elimination System requirements with low impact development green infrastructure
- Improve tree ordinances and other relevant codes that require planting in urban areas

**Rural Residential Recommendations**
- Improve outreach and technical assistance to rural residential landowners
- Explore Public Benefit Rating System (PBRS) in Snohomish County and target outreach of PBRS in King County

**Agriculture Recommendations**
- Permanently preserve farmland
- Provide technical assistance to farmers
- Support technical innovations that have conservation and economic benefits in agricultural areas
- Develop water banks or similar mechanisms to promote conservation and best use of irrigation rights

**Forestry Recommendations**
- Permanently conserve working forestland
- Increase coordinated outreach, incentives, and technical assistance to small forest landowners
- Collect high resolution LiDAR throughout the entire basin and coordinate data collection and sharing efforts
- Expand water typing efforts and resources
With the adoption of the protection updates, the Forum signals a renewed commitment to improving conditions for fish, residents, foresters, and farmers who depend on intact hydrologic processes. The Forum, supported by staff and other partners, would continue to reflect on the progress of recovery strategies and improve the chances of salmon recovery in the Snohomish Basin.
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<td>2005 Plan</td>
<td>Snohomish Basin Salmon Conservation Plan</td>
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<tr>
<td>BAS</td>
<td>Best Available Science</td>
</tr>
<tr>
<td>BMP</td>
<td>best management practice</td>
</tr>
<tr>
<td>CUT</td>
<td>Current Use Taxation</td>
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<td>DNR</td>
<td>Washington State Department of Natural Resources</td>
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<td>EASC</td>
<td>Ecological Analysis for Salmonid Conservation</td>
</tr>
<tr>
<td>Ecology</td>
<td>Washington State Department of Ecology</td>
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<td>ESA</td>
<td>Endangered Species Act</td>
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<tr>
<td>Forum</td>
<td>Snohomish Basin Salmon Recovery Forum</td>
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<td>GMA</td>
<td>Growth Management Act</td>
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<td>LID</td>
<td>Low Impact Development</td>
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<tr>
<td>LiDAR</td>
<td>Light Distance and Ranging</td>
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<td>National Marine Fisheries Service</td>
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<td>NMFS Supplement</td>
<td>Final Supplement to the Shared Strategy’s Puget Sound Salmon Recovery Plan</td>
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<td>National Oceanic and Atmospheric Administration</td>
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<td>National Pollutant Discharge Elimination System</td>
</tr>
<tr>
<td>NRCS</td>
<td>Natural Resource Conservation Service</td>
</tr>
<tr>
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<td>Public Benefit Rating System</td>
</tr>
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<td>PDR</td>
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<td>Puget Sound Watershed Characterization</td>
</tr>
<tr>
<td>RCW</td>
<td>Revised Code of Washington</td>
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<tr>
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<td>Puget Sound Chinook Recovery Plan</td>
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<tr>
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<td>Snohomish Basin Protection Plan</td>
</tr>
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<td>SFLO</td>
<td>small forest landowner</td>
</tr>
<tr>
<td>TDR</td>
<td>Transfer of Development Rights</td>
</tr>
<tr>
<td>USDA</td>
<td>U.S. Department of Agriculture</td>
</tr>
<tr>
<td>USEPA</td>
<td>U.S. Environmental Protection Agency</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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</tr>
<tr>
<td>USFS</td>
<td>U.S. Forest Service</td>
</tr>
<tr>
<td>WAC</td>
<td>Washington Administrative Code</td>
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<tr>
<td>WDFW</td>
<td>Washington Department of Fish and Wildlife</td>
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<td>WSU</td>
<td>Washington State University</td>
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</table>
Section 1

PROTECTION APPROACH APPLIED TO SNOHOMISH BASIN SALMON RECOVERY

This appendix presents detailed information on the application of the Snohomish Basin Protection Plan (SBPP) to salmon recovery. It is the intention of the SBPP partners to have the Snohomish Basin Salmon Recovery Forum (Forum) adopt this appendix as the first formal adaptive management action for the 2005 Plan. This protection update would not change existing restoration recommendations and habitat goals from the 2005 Plan.

Recommendations for updated salmon recovery protection strategies (packages of specific tools) for specific land uses in the Basin are detailed in Sections 2 through 7.

1.1 Protection in the Context of Salmon Recovery

In 1999, Puget Sound Chinook salmon and bull trout were listed as threatened under the federal Endangered Species Act (ESA). The 2005 Plan was adopted by the National Marine Fisheries Service (NMFS) in January 2007 as a chapter in the regional Puget Sound Chinook Recovery Plan (NMFS 2007), referred to as the Recovery Plan in this document. NMFS concluded that the Recovery Plan (including the regional Volume 1 and the watershed-specific chapters in Volume 2) met the requirements of ESA Section 4f, which requires adoption of a species recovery plan for those species listed as “threatened” or “endangered” under ESA. However, NMFS provided additional conditions in the Final Supplement to the Shared Strategy’s Puget Sound Salmon Recovery Plan (NMFS 2006), referred to as the NMFS Supplement in this document.
The NMFS Supplement outlines concerns about the 2005 Plan in the following three key areas:

- **Habitat protection** – Volumes 1 and 2 of the Recovery Plan were developed on the assumption that current protection tools were sufficient to “hold the line” and prevent further loss. However, there were few specifics of how this would be deployed. The NMFS Supplement includes water quantity and land use as important elements for a habitat protection strategy.

- **Adaptive management and monitoring** – NMFS requested the development of a monitoring plan connected to an adaptive management process.

- **H-integration** – The region subsequently identified a six-step process to address H-integration for salmon recovery, which was developed by an H-integration work group.

After the listing of Puget Sound Chinook salmon, the salmon recovery structure in the Snohomish Basin was formalized, following the lead entity requirements as described in Revised Code of Washington (RCW) 77.85.

The Forum is the citizen’s committee. The 41-member committee includes high-level decision-making representatives from federal, state, and local governments; the Tulalip Tribes; seven special purpose districts; and 11 special interest groups including four farmers and three citizens. The Forum provides a means for coordinating and responding to the ESA listings at the local level and promotes the implementation of the 2005 Plan.

The Snohomish Basin Salmonid Recovery Technical Committee includes scientific and restoration implementation staff from agencies and organizations working in the Basin. The Technical Committee reviews actions and projects and makes recommendations to the Forum. The group of scientists
provides support for the protection and enhancement of the abundance, productivity, diversity, and spatial structure of all salmonids in the Basin.

The Forum has been working since 2005 to respond to the gaps identified in the NMFS Supplement. The H-integration Plan was provided to the Forum in 2008 (Kaje et al. 2008), and salmon recovery partners have been working on adaptive management and monitoring, with the development of a draft monitoring plan (2011) and a draft adaptive management framework (2014). There was recognition in 2010 that work was progressing on adaptive management and monitoring and H-integration; however, the Basin had yet to address habitat protection in a comprehensive way.

### 1.2 Summary of 2005 Plan Strategy and Implementation Progress

The 2005 Plan proposed a scientifically based suite of actions intended to recover local salmon populations in the Skykomish and Snoqualmie rivers. The 2005 Plan was written as a multi-species plan and identified actions to recover Chinook salmon, bull trout, and coho salmon as a proxy for all salmonids in the watershed. Actions were focused on habitat, hatchery, and harvest with a strong emphasis on H-integration. All actions related to habitat restoration and protection called for in the 2005 Plan are voluntary; however, jurisdictions provided letters of commitment to implement the 2005 Plan.

The Forum membership reflects the interests of many of the local governments, resource managers, and organizations that have direct influence on local habitat conditions and the land uses and regulations that affect the habitats.
The 2005 Plan presented an ambitious number of capital project types and land-use-based protection strategies that could be implemented to reach scientifically sound habitat gain benchmarks. These actions were predicated on a policy of net gain in the hope that the watershed partners in the Basin—those who had restoration capacity and land management authority—would adopt this approach. With the partners implementing the 2005 Plan, Basin habitat would be gaining along a trajectory that model outputs said was necessary for recovery.

The majority of the 2005 Plan focused on the habitat restoration strategy. Strong scientific underpinnings for the habitat strategy were developed in the Ecological Analysis for Salmonid Conservation (EASC). The EASC reviewed habitat conditions and predicted future conditions based on a “current path” scenario. EASC assessments then determined the amount of habitat needed to reach recovery targets set by co-managers. The EASC determined the primary bottleneck for recovery of Chinook salmon was juvenile rearing. As a result, emphasis on habitat gains was placed on the nearshore, estuary, and mainstem areas of the Snohomish watershed.

Quantitative goals, or “benchmarks,” were developed for a variety of habitats types in various locations throughout the Basin. These benchmarks were written to be additive above 2005 condition. The key assumption for habitat protection was net gain in tandem with restoration; any degradation was assumed to be mitigated or replaced with restoration above levels described by the quantitative benchmarks.

Hydrology was considered in the EASC, and peak flows were used as a proxy to describe the level of hydrological degradation in the sub-basins. Sub-basins were rated as degraded,
moderately degraded, or intact, as a function of 2005 peak flows relative to historical peak flows. Peak flows were modeled as a function of effective impervious area. Though the coarse rating was provided in the EASC, there were no benchmarks developed for either peak flows or impervious areas in any of the sub-basins.

Since 2005, there have been many site-scale successes on restoration projects in the mainstems, estuaries, and tributaries. However, many environmental indicators continue to decline, according to local data and the 2009 and 2013 State of the Sound reports (Puget Sound Partnership 2010, 2013). The continued decline calls for greater protection measures watershed-wide, reaching beyond the regulatory framework.

The last 10 years have produced a number of valuable tools and innovative approaches to protection that maximize multiple benefits. In order to provide a full accounting of progress, and protect against future known threats such as climate change, this update presents an array of technical information and protection tools that reflect baseline conditions. Restoration efforts can then build upon this baseline and gain the required lift to both restore conditions for the species that use the Basin and benefit the people who live in it.

1.3 Protection Strategies and Gaps in the 2005 Plan

In the 2005 Plan, protection strategies were organized by land use type, consistent with the arrangement of sub-basin strategy groups (see Section 11 of the 2005 Plan). The protection strategies were broad and contained a mixed arrangement of acquisition, incentive, education, and regulatory improvement. Protection strategies did not specifically address hydrologic
function, though it is mentioned as a way to focus or direct protection resources.

Throughout the 2005 Plan protection strategies, there was a consistent gap related to which geographic areas should be prioritized, the specific actions needed for implementation, and how to measure success. The descriptions below broadly outline the 2005 strategies, along with the identified gaps that formed the basis for this plan.

**Protection in the Nearshore**

The 2005 Plan recommended that undeveloped portions of the Snohomish nearshore be targeted for acquisition and programmatic regulatory protection. With the recognition that the railroad impacts a majority of the south end of the nearshore, the 2005 Plan put special focus on areas north of Everett. The strategy included protecting forest cover and prohibiting fill and dredging in the photic zone. The strategy intends to protect nearshore sediment processes, large woody debris recruitment, and shading.

**Nearshore 2005 Gaps**

None identified through this project.

**Protection in Agriculture Lands**

Agriculture and working lands have long been identified as a key resource to protect in the Basin. However, many salmon recovery protection and restoration actions focus on land that is currently being farmed, creating a situation of conflicting goals. Since 2005, much effort in the Basin has focused on working with the agriculture community to better meet agriculture and salmon needs. Many new strategies are in development (i.e., the Sustainable Lands Strategy and the Fish Farm Flood group) and have been included in the 3-year work plans since 2009.
Agriculture 2005 Gaps

- Identification of priority floodplain areas for protection of watershed process
- Development of specific strategies for working with the agricultural community to ensure, and hopefully enhance, the health of local farms and the overall farming economy where restoration activities are occurring

Protection in Forest Lands

Forestry is a key resource in the Basin and is highly valued for the open space that it conserves. The Recovery Plan speaks to intact habitat on forestry lands. Forest areas are also recognized as having an important role in protecting the Basin’s hydrologic flows. Programs currently exist to protect forestry areas from conversion. These programs can provide funding, incentive, securing easements, and technical assistance to land owners. Funding to apply these programs and tools needs to be more readily attainable and available.

Forest Lands 2005 Gaps

- Further identification and clarification of the role of forests in hydrologic protection in the Basin
- Protection of working forests vulnerable to change in land use
- Increased description of incentive tools and the resources needed to implement them
- Development of specific strategies for how to offer technical assistance and incentives to small forest landowners (SFLOs)

Protection in Rural Residential Areas

The goals of the 2005 Plan are the protection of forested lands and wetlands as well as managing rural residential areas for the highest protection of salmon. The 2005 Plan discusses the
protection of rural residential land use areas in Section 9.0 and encourages actions such as stewardship, outreach, and enrollment in Current Use Taxation (CUT) programs.

*Rural Residential 2005 Gaps*

- Description of specific strategies that are most acceptable to rural residents
- Description of flexible tools to reach all types of rural residential land owners
- Education of rural residential owners on what they can do to maximize function on their properties
- Consideration of consistency across Basin jurisdictions

*Protection in Urban Areas*

The 2005 Plan speaks to the importance of urban areas in the context of salmon recovery, as urban areas are slated to absorb future planned growth in accordance with the Washington State Growth Management Act (GMA), thereby preserving intact habitat and open space in rural areas. Recommended strategies in urban areas suggest that growth should be focused in urban areas but that techniques should use Low Impact Development (LID) and green building techniques in order to protect remaining habitat and water quality. Funding for programs that promote salmon recovery (e.g., integrative plans, policies/regulations, and outreach/stewardship) is limited.

*Urban 2005 Gaps*

- Thorough description or consideration of water quality and stormwater management
- Sophisticated understanding of green infrastructure tools and incentives
- Description of the highest priority protection areas within urban basins
1.4 Status of the Resource: 2005 to Present

Building on the long-term vision and recovery approach, in 2005 the Forum recommended significantly improving habitat conditions by 2015. The Forum agreed to pursue quantitative 10-year habitat improvement milestones for the nearshore, estuary, mainstem, and rural stream sub-basin strategy groups, shown in Tables 1 and 2. For the mainstem primary restoration sub-basin strategy group, the Forum recommended the milestone of restoring 60% of the original riparian forest levels in both the King and Snohomish County portions of the Basin, an overall increase of about 4%. In addition to these targets, the 2005 Plan recommends improving other habitat conditions across the Basin: fish passage, forest roads, forest cover, riparian forest, impervious surfaces, and water quality, coupled with regulatory and policy actions as well as technical assistance.

The “gains” needed in Tables 1 and 2 represent the sum of gains from capital restoration, gains from natural processes, and losses from habitat degradation.

### Table B-1: 10-year Habitat Gains Needed in Key Sub-basin Strategy Groups

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<thead>
<tr>
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<tbody>
<tr>
<td>Nearshore Beaches and Shoreline</td>
<td>8.4 miles</td>
<td>At least 1 mile</td>
<td>At least 9.4 miles</td>
</tr>
<tr>
<td>Estuary: Tidal Marsh</td>
<td>1,483 acres</td>
<td>1,237 acres</td>
<td>2,720 acres</td>
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<tr>
<td>Mainstem Primary Restoration:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Restored Edge Habitat</td>
<td>236 miles</td>
<td>10.4 miles</td>
<td>246.4 miles</td>
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<tr>
<td>Restored Riparian Forest</td>
<td>5,991 acres</td>
<td>256 acres</td>
<td>6,247 acres</td>
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<tr>
<td>Restored Off-Channel Habitat</td>
<td>350 acres</td>
<td>167 acres</td>
<td>517 acres</td>
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<tr>
<td>Large Woody Debris</td>
<td>N/A</td>
<td>41 new log jams</td>
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See Table 1.1 of 2005 Plan
### Table B-2: Riparian Forest and Off-Channel Habitat Gains Needed in Other Sub-basin Strategy Groups

<table>
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<tr>
<th>Sub-basin Strategy Group and Sub Basins</th>
<th>Riparian Forest (acres)</th>
<th>Off Channel Habitat (acres)</th>
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<tr>
<td></td>
<td>50 year</td>
<td>10 year</td>
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<tr>
<td>Mainstem – Secondary Restoration</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>Rural Streams – Primary Restoration</td>
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<td>13</td>
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<td>Rural Streams – Secondary Restoration</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Urban Streams</td>
<td>379</td>
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### 1.5 Information Developed Since the 2005 Plan

#### 1.5.1 Protection Progress

There have been varying protective actions taken in the first decade of the 2005 Plan implementation. The following are some examples of protection tools implemented in the Basin:

- The 2005 King County Critical Areas Ordinance and subsequent Critical Areas Ordinance Effectiveness Study show the regulations may be sufficient to protect hydrology (Lucchetti et al. 2014).

- In the 2009 Raging River Headwaters Protection, King County authorized the use of $3.7 million to support a Washington State Department of Natural Resources (DNR) conservation effort to acquire and protect an estimated 4,000 acres of a 7,000-acre purchase in the upper Raging River watershed. This would protect lands from conversion.

- In 2008, the Wild Sky Wilderness was designated, protecting 2.6 million acres of forested headwaters in the North Fork Skykomish Basin.

- The monitoring and regulation update to the Snohomish County critical areas regulations provided information on the effectiveness of existing regulations.

However, across the Basin, there has been no effort to uniformly track or report on the amount of land protected, including those...
areas permanently protected (e.g., designated as federal Wilderness) or temporarily protected (acquired as a conservation easement) across different land use categories. Table B-3 shows an effort by the project team to summarize the status of protection efforts. It is possible to report on a handful of efforts, but without system-wide monitoring, there is no way to connect those efforts to current conditions and associated trends in hydrology or salmon habitat. Efforts such as the Washington Department of Fish and Wildlife (WDFW) High Resolution Change Analysis indicate that there continues to be an overall slow loss of riparian habitat, even when accounting for restoration gains. WDFW found that between 2006 and 2009, 73 acres within 100 meters of fish-bearing streams were lost to permanent development and 163 acres were cleared but not converted to permanent development. This is compared to the 163 acres that were planted as part of restoration efforts.
Table B-3: Status and Pace of Habitat Protection

<table>
<thead>
<tr>
<th>Habitat Protection (2012)</th>
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</thead>
</table>
| Nearshore Beaches and Shoreline | Riparian Areas (focus reaches) | 297 acres | Habitat loss is not systematically monitored throughout the Basin. Current status information includes:  
- Mainstem riparian forest loss pilot project (Skykomish River only) 
- High resolution land cover change analysis (Pierce 2011) 
- King and Snohomish Counties critical areas monitoring 
- Acquisition reporting | SBPP:  
- Fully funded USEPA grant 
- Completion of watershed characterization and characterization of reach-scale processes within protection priority sub-basins 
- Tulalip Pilchuck protection pilot project (2011) advances the larger Snohomish USEPA grant |
| | Edge Habitat (focus reaches) | 22 miles | [Notes](#) |
| Estuary: Tidal Marsh | Riparian Areas (focus reaches) | 165 acres | [Notes](#) |
| | Edge Habitat (focus reaches) | 27 miles | [Notes](#) |
| | Forest Cover | 687 acres | [Notes](#) |
| Mainstem – Primary | Riparian Areas (focus reaches) | 5,991 acres | [Notes](#) |
| | Edge Habitat (focus reaches) | 236 miles | [Notes](#) |
| | Forest Cover | 116,633 acres | [Notes](#) |
| Mainstem – Secondary | Riparian Areas (focus reaches) | 2,497 acres | [Notes](#) |
| | Edge Habitat (focus reaches) | 79 miles | [Notes](#) |
| | Forest Cover | 44,935 acres | [Notes](#) |
| Rural Streams – Primary | Riparian Areas (focus reaches) | 709 acres | [Notes](#) |
| | Forest Cover | 18,286 acres | [Notes](#) |
| Rural Streams – Secondary | Riparian Areas (focus reaches) | 258 acres | [Notes](#) |
| | Forest Cover | 36,624 acres | [Notes](#) |
| Urban Streams | Riparian Areas (focus reaches) | 137 acres | [Notes](#) |
| | Forest Cover | 8,558 acres | [Notes](#) |
| Headwaters Primary Protection | Riparian Areas (focus reaches) | 1,318 acres | [Notes](#) |
| | Forest Cover | 61,865 acres | [Notes](#) |

Notes:  
WDFW high-res work is specific to and covers the whole Snohomish Basin.  
SBPP Snohomish Basin Protection Plan  
USEPA U.S. Environmental Protection Agency
1.5.2 Restoration Progress

In comparison to a lack of information about the implementation and effectiveness of protection measures, there is good information on restoration gains that is gathered each year by Snohomish Lead Entity staff. The progress toward 10-year benchmarks is varied with many habitat types not on track to meet needed gains. Others are assumed to have met 10-year gains so long as the assumption that the 2005 habitat status was not degraded is correct. Table B-4 shows implementation—or activity—progress toward the 2005 Plan’s restoration targets as of the 2013 restoration season. Riparian restoration is considered to be more or less on track; therefore, a systematic update was not conducted. Values relating to the other restoration targets were updated based on Habitat Work Schedule-completed projects and staff knowledge. This will be further refined in 2015 and 2016 during the 10-year status update of the Recovery Plan.

Tracking implementation of restoration actions is part of an iterative process in monitoring, reporting, and adaptively managing the strategies and actions outlined in the 2005 Plan and will continue to evolve in the future. Table B-4 neither reflects the effectiveness of the projects implemented (achieving full ecological function), nor does it reflect the overall changes in the watershed landscape (planted riparian areas vs. areas lost due to development or channel migration). Restoration actions are long-term investments toward achieving habitat conditions that will support healthy Chinook salmon populations. Some actions (such as removal of a migration barrier) realize immediate impacts, while others (such as riparian plantings) take decades to reach maturity. While building a mature riparian forest takes time, the actions in Table B-4 are critical to our ultimate goal of restoring natural processes. The values in the table also have a range of confidence associated with them.
Confidence in the figures is eroded where there are less data on exact overlap with focus reaches, more project sponsors implementing projects, a range of restoration methodologies and approaches to measuring outcomes, and issues of how to quantify restoration outcomes where “we let the river do the work for us.” Monitoring these actions and their associated effectiveness will evolve over time, and both project sponsors and the Technical Committee remain supportive of resolving these issues. In addition, Basin partners may choose to refine or revise the metrics being used to measure implementation progress as part of the expected 2015 update.

Table B-4: Pace/Status of Habitat Restoration

<table>
<thead>
<tr>
<th>Habitat Restoration</th>
<th>Needed Habitat Gain in 10 Years</th>
<th>Progress since 2005</th>
<th>Percent 10-year Benchmark</th>
<th>Currently on Target to Meet Benchmark?</th>
<th>Outcome Needed to be on Track</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nearshore Beaches and Shoreline</td>
<td>At least 1 mile</td>
<td>0.39 mile</td>
<td>39%</td>
<td>Progress made</td>
<td>• Howarth Park construction (0.6 mile)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Nearshore nourishment completed (0.73 mile)</td>
</tr>
<tr>
<td>Estuary: Tidal Marsh</td>
<td>1,237 acres</td>
<td>460.6 acres</td>
<td>37%</td>
<td>Yes</td>
<td>• Qwuloolt construction (350 acres); 2015 breach</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Smith Island construction (315 acres); 2016 breach</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Mid Spencer enhancement (74 acres); 2016/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Blue Heron Slough; 2017 breach</td>
</tr>
<tr>
<td>Mainstem – Primary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restored Edge Habitat</td>
<td>10.4 miles</td>
<td>2.9 miles</td>
<td>28%</td>
<td>No</td>
<td>7.5 miles</td>
</tr>
<tr>
<td>Restored Riparian Habitat*</td>
<td>256 acres</td>
<td>191 acres</td>
<td>75%</td>
<td>Yes</td>
<td>*</td>
</tr>
<tr>
<td>Restored Off-channel Habitat</td>
<td>167 acres</td>
<td>31.27 acres</td>
<td>19%</td>
<td>No</td>
<td>135 acres</td>
</tr>
<tr>
<td>Habitat Restoration</td>
<td>Needed Habitat Gain in 10 Years</td>
<td>Progress since 2005</td>
<td>Percent 10-year Benchmark</td>
<td>Currently on Target to Meet Benchmark?</td>
<td>Outcome Needed to be on Track</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------</td>
<td>----------------------</td>
<td>---------------------------</td>
<td>----------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Large Woody Debris</td>
<td>41 logjams</td>
<td>6 logjams</td>
<td>15%</td>
<td>Progress made</td>
<td>Unknown, given lack of information about habitat loss/project performance**</td>
</tr>
<tr>
<td><strong>Mainstem – Secondary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restored Riparian Habitat*</td>
<td>6 acres</td>
<td>0</td>
<td>0%</td>
<td>No</td>
<td>8 acres are identified in the 2014/2015 3-year work plan project list</td>
</tr>
<tr>
<td>Restored Off-channel Habitat</td>
<td>6 acres</td>
<td>0</td>
<td>0%</td>
<td>No</td>
<td>6 acres</td>
</tr>
<tr>
<td><strong>Rural Streams – Primary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restored Riparian Habitat*</td>
<td>13 acres</td>
<td>6 acres</td>
<td>46%</td>
<td>Progress made</td>
<td>Assumed on track*</td>
</tr>
<tr>
<td>Restored Off-channel Habitat</td>
<td>10 acres</td>
<td>5 acres</td>
<td>0%</td>
<td>No</td>
<td>5 acres</td>
</tr>
<tr>
<td><strong>Rural Streams – Secondary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restored Riparian Habitat*</td>
<td>0</td>
<td>14 acres</td>
<td>Met, assuming no habitat loss</td>
<td>Yes</td>
<td>Assumed on track*</td>
</tr>
<tr>
<td>Restored Off-channel Habitat</td>
<td>41 acres</td>
<td>7 acres</td>
<td>17%</td>
<td>No</td>
<td>34 acres</td>
</tr>
<tr>
<td><strong>Urban Streams</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restored Riparian Habitat*</td>
<td>75 acres</td>
<td>26 acres</td>
<td>28%</td>
<td>Progress made</td>
<td>Assumed on track*</td>
</tr>
<tr>
<td>Restored Off-channel Habitat</td>
<td>0</td>
<td>-</td>
<td>Met, assuming no habitat loss</td>
<td>Yes</td>
<td>Unknown, given lack of information about habitat loss</td>
</tr>
</tbody>
</table>

Notes:
* Not systematically updated in 2014 but assumed to generally be on track based on implementation information.
** Six large logjams were installed as part of the Tolt River project, but there have not yet been flows at levels to activate them; therefore, they are not counted in this table. In addition, work to install flood fencing to capture sediment and logs has not had time to develop into mature jams and, therefore, are not counted in this metric.
1.6  Additional Drivers for Updating Protection Strategies in Salmon Recovery

The primary driver for the creation of the update protection strategies was the deficiencies of the 2005 Plan and the Recovery Plan cited in the NMFS Supplement. Since 2005, there have also been a variety of new reports, regional processes, tools, and models that have been developed that further support the need for additional protective actions and a review of protection strategies. The primary drivers for the revisions of the protection strategies are listed below.

1.6.1  Implementation Progress Reports

3-year Work Plans
In 2010, the halfway mark toward the restoration 10-year benchmarks, it became increasingly clear that restoration in the Basin, and Puget Sound as a whole, was not being achieved at the expected pace and that 10-year benchmarks likely would not be met. Impediments listed in the 3-year work plans included shortfalls in funding, difficulties securing landowner willingness, and cumbersome permitting processes. The lag in restoration implementation stressed the importance of protecting intact habitat and processes, as demonstrated in the previous tables.

Treaty Rights at Risk
In 2011, the Treaty Indian Tribes in Western Washington also produced a white paper called *Treaty Rights at Risk: Ongoing Habitat Loss, the Decline of the Salmon Resource, and Recommendations for Change* (Treaty Tribes 2011). The white paper asserted that restoration in the Puget Sound watersheds was not keeping pace with ongoing systematic loss of habitat, resulting in an overall degradation of conditions. While some stakeholders question some data and conclusions, the paper
highlighted that the implementation and efficacy of habitat protection measures continues to cause consternation.

As part of the Treaty Rights at Risk Initiative, the Tribes also released the *State of Our Watersheds Report* in 2012 (NWIFC 2012). The watershed-specific chapters highlighted concerns related to habitat loss since the ESA listing of Chinook salmon. The Tulalip Tribes authored the chapter on the Snohomish River Basin. Concerns included specific examples of ongoing degradation and an overall lack of faith in the 2005 base assumption that no further habitat losses would occur.

**2011 NOAA Implementation Report**

Five years after the creation of the regional and watershed salmon recovery plans, the National Oceanic and Atmospheric Administration (NOAA) conducted a review to assess progress of the implementation of habitat, hatchery, and harvest actions. The report concluded that there were demonstrable successes with hatchery, harvest, and habitat restoration actions; however, it was difficult to assess progress on habitat protection work. Additionally, the NOAA report points out that, according to the 2009 State of the Sound report (Puget Sound Partnership 2010), habitat continued to decline. Specifically, the report points out that the protection strategies called out in the Recovery Plan (NMFS 2006, 2007) were still largely non-existent. These strategies included:

- Protection of existing physical habitat and habitat-forming processes
- Protection and restoration of the nearshore, Puget Sound, and Pacific Ocean
- Water quantity strategies for achieving and protecting instream flows
- Water quality strategies
- Commercial forestry strategies
• Commercial agriculture strategies
• Research, monitoring, and adaptive management

1.6.2 New Planning Frameworks

Puget Sound Partnership and the Action Agenda

The Washington State Legislature established the Puget Sound Partnership as a state agency in 2007 with the goal of achieving and sustaining a healthy human population, a vibrant quality of life, a thriving species and food web, protected and restored habitat, abundant water quantity, and healthy water quality.

To lead the region’s collective effort to restore and protect Puget Sound, the Partnership works closely with hundreds of partners representing local, state, federal, and tribal governments, as well as science, non-profit organizations, business, and other members of our communities. The Partnership creates and manages the infrastructure needed to enable and encourage partners to come together to develop and implement the priority actions needed to accelerate recovery. The agency does this by mobilizing partners around a common agenda, tracking progress and improving systems through common measures, and supporting partners in advancing Puget Sound investments.

The Partnership serves a coordinating role for the Puget Sound National Estuary Program and as the regional salmon recovery organization to coordinate Puget Sound salmon recovery efforts. The Partnership also convenes a number of other state priority workgroups that impact Puget Sound.

The Puget Sound Action Agenda is the region’s shared roadmap and provides the organizing framework guiding Puget Sound restoration efforts, based on a vision for recovery that supports the people, species, and ecosystems necessary for a thriving
region. The first Action Agenda was created in 2008 through a multi-stakeholder processes and is updated every 2 years. The Action Agenda contains hundreds of near-term actions intended to be implemented within 2 years and make progress on specific Puget Sound vital sign indicators.

The Action Agenda is organized around the following three strategic initiatives that drive resources and investment:

- Preventing pollution from urban stormwater runoff
- Protecting and restoring habitat
- Recovering shellfish beds

The Action Agenda development process is science-based; derived through a region-wide process that includes participation from federal, state, local, tribal, non-profit, private, and other interests; and is managed by the Partnership through an adaptive management framework.

**Local Integrating Organizations**

Local communities around Puget Sound are working to integrate local efforts to advance the Action Agenda. Local governments, tribes, and non-profit organizations—along with watershed, marine resource, and salmon recovery groups, and various business, education, and citizen interest groups—are collaborating to develop and coordinate local integrating organizations that foster implementation of Action Agenda priorities.

These local integrating organizations enable communities to guide the implementation of Action Agenda priorities and prioritize local actions for investment. One of the nine local integrating organizations in Puget Sound is the Snohomish-Stillaguamish Local Integrating Organization. This group

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Adaptive management is a decision-making tool to help measure progress and success and allow strategies to be adjusted accordingly. New data, information about a project’s successes and failures, and flexibility are incorporated into a long-term management program.
focuses on developing high-priority actions for ecosystem recovery in the Snohomish and Stillaguamish watersheds.

**Regional Chinook Salmon Monitoring and Adaptive Management**

When NOAA Fisheries approved the Puget Sound Chinook Salmon Recovery Plan in 2007, it noted that the plan lacked a comprehensive adaptive management and monitoring component, and it required that the Puget Sound region address this gap. Without a robust monitoring program, it is difficult to assess or quantify changes in Chinook salmon populations and supporting habitats.

In order to fill this gap, the Chinook Monitoring and Adaptive Management Project engaged all 16 watersheds and the Puget Sound Salmon Recovery Council in developing technically rigorous, logical, and regionally consistent monitoring and adaptive management processes so that the Puget Sound region can assess and respond to the status of Chinook salmon populations and their habitats.

The watershed teams translated existing watershed plans into the Common Framework. The Common Framework, developed by the Recovery Implementation Technical Team, uses the Open Standards for the Practice of Conservation (Open Standards) method to organize information from each watershed plan into a consistent set of terms and relationships. This translation process has assisted each watershed with the following:

- Establishing monitoring metrics and priorities.
- Assessing the status of Chinook salmon populations and associated habitats.
- Developing logic models illustrating why they believe the strategies and actions in their plans would lead to Chinook salmon recovery.
- Identifying gaps in existing watershed plans.

The Puget Sound Salmon Recovery Council would use the newly available consistent watershed-scale information to look at the status of Chinook populations and their habitat across Puget Sound. The Salmon Recovery Council would also use this information to refine its action and funding priorities, including monitoring priorities.

In addition to Chinook Monitoring and Adaptive Management using Open Standards, the Puget Sound Partnership also adopted the approach for its Action Agenda and Ecosystem Recovery reporting. As the Monitoring and Adaptive Management work provides a mechanism by which to update significant changes to strategies and is a stated regional priority, King County, Snohomish County, and the Tulalip Tribes (as leaders in salmon recovery) were motivated to update protection strategies following the methodology which could easily be translated into the Open Standards approach to link with the region and other watersheds.

### 1.7 New Models, Tools, and Information

#### 1.7.1 Climate Change

Climate change was not explicitly addressed in the 2005 Plan, though there was early recognition that effects would likely include increases in the magnitude of peak flows, prolonged and persistent low flows, reductions in spawning flows, and increased stream temperatures. These conditions would place a greater strain on water resources, threatened salmon
populations, and working farms and forests. Information on the predicted effects of climate change has been refined since 2005.

Several science-based organizations, including the University of Washington Climate Impacts Group and the Pacific Northwest National Laboratories, have released model results that provide greater detail on potential changes in water temperature, flow volume, and flow timing. For an example, refer to the following projections:

The 2013 Snow Caps to White Caps report provided information and modeling of water resources in the Basin that are affected by climate change and increased development pressures (PNNL and University of Washington 2013).

The 2005 study of climate change effects on salmon recovery in the Basin by the Climate Impacts Group and NOAA predicted a 5% to 23% decline in average Chinook salmon abundance even after the 2005 Plan is implemented.

Projected Change in Snohomish Weekly Snow Water Equivalent for the 2020s, 2040s, and 2080s

Adapted from CIG 2009
1.7.2 Watershed Characterization

In 2009, the Washington State Department of Ecology (Ecology) released the Puget Sound Watershed Characterization (PSWC) model. This model combines information for assessments from land uses and landforms to present information on the relative importance and degradation of four different components of hydrology: storage, delivery, recharge, and discharge. The model is intended for land use planners to guide decisions in areas that are important for restoration and protection. The PSWC tool has been used to take a landscape-scale approach to new hydrology-focused protection strategies with geographic specificity.

1.7.3 Ecosystem Services

In the last decade, there has been an emerging understanding of ecosystem services. Ecosystem services are benefits that humans derive from the environment. They can include regulating services such as flood control and water quality, provisioning services such as water supply, supporting services such as nutrient cycling, and cultural services such as recreation. The concept of ecosystem services provides the Basin with a new framework and language that allows for a better understanding of how salmon recovery provides multiple benefits.

Traditionally, recovery efforts only considered provisioning services (salmon to support economies) and cultural services (salmon as a spiritual component of tribal culture). Considering ecosystem services helps relate salmon recovery protection efforts to other benefits. Farmers depend on water for irrigation in summer and can suffer production losses during floods. Communities require drinking supplies and safe areas to build. Recreational river users depend on clean rivers for swimming and fishing, and flow levels to support boating.
In December 2006 alone, the Snohomish County Emergency Management Department estimated $5.3 million worth of damage from floods to farms along the Skykomish and Snohomish Rivers (HeraldNet 2011). In addition, the City of Snoqualmie is one of the most flood-prone cities in Washington and has produced the highest number of flood claims of any city in the state (City of Snoqualmie 2014).

In 2002, Snohomish County farms sold more than $126 million in agriculture products, and King County had comparable sales (USDA 2009). Many of these products depend on the availability of existing water rights. Ecology is currently not issuing new irrigation rights in the majority of the Basin’s agricultural areas.

The City of Everett depends on the upper Sultan watershed forests to provide natural water purification for its Spada Lake water supply. This source provides clean, safe water for more than 570,000 people and 80% of the businesses and residents of Snohomish County through a network of local water providers (City of Everett 2015). Snohomish County residents receive water captured and largely filtered by natural systems. When the City’s filter system was compromised, the U.S. Environmental Protection Agency allowed the City to continue providing drinking water because the forest-filtered water met clarity parameters and there was no threat to public safety (Earth Economics 2010). The City of Seattle maintains a similar system in the Cedar River Watershed and estimates that management of its forests has avoided construction of a water filtration plant and the estimated cost of $200 million (Earth Economics 2010).

Recreation provides a boost to the entire Puget Sound economy. Nearly 80% of the state’s revenue from tourism occurs in Puget
Sound, with Snohomish and King Counties within the top four counties (OFM 2007). According to the recreation surveys and public records used in a recent Earth Economics study (Briceno and Shundeler 2015), there were a total of about 446 million participant days per year spent on outdoor recreation in Washington, resulting in $21.6 billion dollars in annual expenditures. Expenditures were highest for recreation associated with public waters.

By acknowledging the many benefits that are provided by intact watershed processes that support salmon runs, there is opportunity to expand non-traditional partnerships and funding, and improve willingness to protect hydrology and improve implementation.

1.8 Connections between Hydrology and Salmon Habitat

The Snohomish Basin is the second largest drainage in the Puget Sound region and one of the primary producers of anadromous salmon. The Basin contains nine salmonid species including two spawning populations of ESA-listed Chinook salmon and populations of steelhead trout and bull trout. The primary goal of the SBPP and protection strategy updates is to identify protection strategies that prevent the degradation of hydrologic processes that support salmon or salmon habitat, regardless of the existing state of salmon populations or habitat. Since hydrologic processes were identified as proxies for salmon habitat condition and function for the SBPP, a baseline evaluation of hydrology across the Basin was necessary for strategy development and orientation.

The physical-biological connections between hydrology and salmon life history were fundamental considerations in the
development of the SBPP. Through the protection of hydrology, this SBPP and associated Plan update aims to protect salmonid habitat quality, quantity, and heterogeneity, helping to promote the overall resilience of salmon populations. The underlying assumption in this approach is that the protection of hydrologic function and processes would inherently influence salmon ecology, biology, and behavior. Protecting these mechanistic and inferential linkages is predicted to result in support for salmon population performance, productivity, and abundance. This approach is similar to the habitat hypotheses emphasized in the 2005 Plan and employed across regional salmon conservation and restoration efforts.

The clear connections between hydrology and salmon life history (see “Scientific Basis of the Connections between Hydrology and Salmon Habitat” on the next page) lend support to the theory that alteration of hydrology and its constituent attributes would subsequently affect salmon survival, growth, and population performance. Ecosystem and hydrologic processes can be disrupted or degraded by human activities including, but not limited to, dams/diversion structures, urbanization, draining and filling of wetlands and floodplains, removal of riparian vegetation, levees and channelization, excessive loading of sediments, forest clearing, and groundwater pumping (Poff et al. 1997; Stanley et al. 2012). Additionally, the influence of climate change would likely have a significant impact on the hydrologic regime as well as related salmon life-history dynamics. These climate change impacts would likely result in alterations in flow, temperature, and habitat quality/quantity across salmon life cycles.
Scientific Basis of the Connections between Hydrology and Salmon Habitat

Aquatic ecosystems are influenced by broad physical, chemical, and biological processes including fluxes of water, nutrients, sediment, organic material, and biota. These processes and attributes interact to form structural features that influence habitat occurrence and function (MacIsaac 2010). Specifically, hydrology acts as a major determinant of physical habitat formation processes by building and sustaining landform features and influencing habitat-specific characteristics.

The attributes of hydrologic regimes—including magnitude, frequency, duration, timing, and rate of change—govern the quality and quantity of water and influence energy sources, physical-biotic relationships, and biotic interactions (Poff and Ward 1989; Richter et al. 1996; Walker et al. 1995; Poff et al. 1997). Through these linkages, variation and patterns in hydrology end up characterizing the relative abundance, composition, and diversity of fish assemblages (Meffe and Sheldon 1988; Pusey et al. 1993, 1998, 2000; Bunn and Arthington 2002). Hydrologic flow regimes have a profound role in the life history of fishes, since critical life events such as phenology of reproduction, spawning behavior, larval survival, growth patterns, and recruitment are dependent on specific flow conditions (Welcomme 1995; Junk et al. 1989; Copp 1989, 1990; Sparks 1995; Humphries et al. 1999).

These ecological and physio-biological connections support the theory that variation and trends in salmonid life history (e.g., body length, upstream migration timing, spawning age and timing, and outmigration age and timing) are likely adaptive responses to specific ranges and seasonal patterns of water and flow conditions (Smith 1969; Beacham and Murray 1987; Quinn et al. 2001; MacIsaac 2010).
Since anthropogenic modifications and climate change impacts will influence flow regimes, and subsequent diversity and functional organization of fish communities, it is essential to understand how flow regimes have been altered and are changing, what the apparent stresses and pressures are, and how different aspects of hydrology are characterized across the landscape. Similarly, since natural seasonal variations in streamflow are primarily driven by local climate and precipitation, and moderated by the hydrologic and geomorphic characteristics of the watershed (MacIsaac 2010), it is important to understand the spatial arrangement of hydrologic function and the condition of related attributes across the landscape. Evaluation of these hydrologic attributes, landscape pressures, and the related salmon habitats provides the context needed to evaluate potential hydrologic protection strategies relevant to salmon habitats.

1.9 Salmon Recovery Protection Strategy Recommendations

Sections 3 through 6 recommend packages of tools for each land use type in the Snohomish Basin, along with basin-wide recommendations in Section 2. These recommendations are intended to update the protection strategies in the 2005 Snohomish Basin Salmon Conservation Plan. Throughout the 2005 Plan protection strategies, there was a consistent gap related to which geographic areas should be prioritized, the specific actions needed for implementation, and how to measure success. The presentation of protection strategies by land use type in this update is consistent with the 2005 Plan.

Solid policy, regulatory, and programmatic actions are necessary to protect hydrology and help achieve the 50-year salmon recovery goals. The recommendations in Sections 2 through 6
are intended to be guidance for local governments, non-profit organizations, tribes, and other partners to identify alternatives necessary to protect hydrology. As such, they do not imply a commitment, mandate, or intent on the part of any local governments to adopt these ideas. Local governments have the final decision-making authority to choose and implement policies that work for their jurisdictions within the context of their broader responsibilities. The caveats associated with the original letters of commitment to the 2005 Plan from jurisdictions still stand.

There are many existing programs and regulations intended to protect salmon habitat and watershed processes, including intact hydrologic processes. State and federal regulations are implemented differently by local jurisdictions throughout the Basin. The strategies in Sections 2 through 6 are intended to suggest policy and planning within those frameworks to encourage the alignment of existing regulations with the protection of hydrology. The strategies also intend to recognize, support, and suggest improvement to existing outreach, technical assistance, and incentive programs that are already in place.

Each strategy package contains guidance for why the strategy is important, who could implement the strategies, where the strategies should be applied first, and how salmon recovery partners could measure the implementation and effectiveness of the strategies over time. Additionally, a “results chain” graphic is provided for each strategy package, which details the logic of how changes in protection context can result in a successful hydrological outcome.

Results chains are a tool to describe a theory of change and are used throughout the Puget Sound region for efforts related to Chinook salmon recovery as well as the Puget Sound
Partnership’s Action Agenda. Results chains help make assumptions explicit about how protection interventions contribute to the reduction of pressures and support the conservation of hydrology. Results chains also serve as a framework to build activities, implementation indicators, and effectiveness indicators. The framework gives managers the ability to make corrections mid-strategy in order to address cases in which intermediate outcomes are not realized. Additionally, results chains help to test assumptions about the pressures that are most harmful for hydrology and other priority habitats, species, and ecosystem processes.

Although there are many monitoring efforts taking place across the Snohomish Basin, the information is neither centralized nor is much of it specifically being collected to evaluate progress toward salmon recovery and the protection of hydrology (e.g., regulatory effectiveness monitoring and water quality monitoring). The suggested metrics in this section are largely unfunded and not mandated. In the 2005 Plan, monitoring and adaptive management needs were estimated to cost $5.6 million for the first 10 years of implementation.

Objectives related to implementation and effectiveness indicators are not explicitly detailed in the strategies in Sections 2 through 6. The effectiveness indicators identified can continue to be developed at the Basin scale by the Policy Development Committee once status and trends information is updated, and at the local scale by implementing jurisdictions. The 2005 Plan presented a number of benchmarks for status and trends of different habitat types including riparian forest, total forest cover, off-channel habitat, edge habitat, and large woody debris, all with the assumption that habitat losses would not continue to occur. Additionally, the EASC supporting technical analyses rated the condition of peak flows at the reach scale.
Future monitoring efforts should evaluate whether or not protective actions are contributing toward the habitat benchmark goals and whether peak flow and low flow conditions are changing over time.

### Table B-5: Intact Habitat by Sub-basin Strategy Group

<table>
<thead>
<tr>
<th>Sub-basin Strategy Group</th>
<th>Habitat Condition</th>
<th>Percent Intact for Sub-basin Group</th>
<th>Intact Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainstem – Primary Restoration</td>
<td>Riparian area (focus reaches)</td>
<td>56</td>
<td>5,991</td>
</tr>
<tr>
<td></td>
<td>Forest cover</td>
<td>50</td>
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</tr>
<tr>
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<td>Pervious surface</td>
<td>97</td>
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<td>Mainstem – Secondary Restoration</td>
<td>Riparian area (focus reaches)</td>
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<td>Forest cover</td>
<td>59</td>
<td>44,935</td>
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<td>Rural Streams – Primary Restoration</td>
<td>Riparian area (focus reaches)</td>
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<td>Forest cover</td>
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<td>Rural Streams – Secondary Restoration</td>
<td>Riparian area (focus reaches)</td>
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<td>Forest cover</td>
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<td>Rural Streams – Urban Restoration</td>
<td>Riparian area (focus reaches)</td>
<td>20</td>
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<td>Forest cover</td>
<td>13</td>
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</tr>
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<td>Headwaters – Primary Protection</td>
<td>Riparian area (focus reaches)</td>
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<td>Forest cover</td>
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<td>Headwaters – Secondary Restoration</td>
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<td>Forest cover</td>
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<td>Pervious surface</td>
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<td>Headwaters – Secondary Protection</td>
<td>Riparian area (focus reaches)</td>
<td>84</td>
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<td>Pervious surface</td>
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<td>Headwaters – Protection above Natural Barriers</td>
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<td>Forest cover</td>
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<td>Pervious surface</td>
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### Sub-basin Strategy Group

<table>
<thead>
<tr>
<th>Sub-basin Strategy Group</th>
<th>Habitat Condition</th>
<th>Percent Intact for Sub-basin Group</th>
<th>Intact Acres</th>
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</thead>
<tbody>
<tr>
<td>Headwaters – Restoration above Falls and Dams</td>
<td>Riparian area (focus reaches)</td>
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<td>N/D</td>
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<tr>
<td></td>
<td>Pervious surface</td>
<td>99</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Notes:
- **N/A** not applicable
- **N/D** no data

Sections 2 through 6 present the strategy packages, organized by land use category. Once approved, the metrics can be folded into ongoing salmon recovery monitoring efforts. The long-term effects of the strategy would be captured by ongoing status and trends monitoring. If metrics indicate that the strategy is not proceeding as expected, salmon recovery partners would be able to adaptively manage accordingly.

It is important to note that although the recommendations are presented by land use category, there are many strategies that affect more than one land use type. For example, water typing is important for the proper application of regulations in a working forest environment but is also critical in rural residential areas where critical areas ordinances are based on the type of stream and the presence of fish. Likewise, the recommendations stress beaver management in rural residential areas, but landowners in agricultural areas also regularly deal with the effects of beaver dams. Additionally, rural residential landowners with small areas of crops or limited livestock would benefit from much of the technical assistance that is currently recommended for farmers. As entities look to implement recommendations, focus should remain on where there is need for the protection of hydrology.
Section 2
BASIN-WIDE STRATEGY RECOMMENDATIONS

This section provides Basin-wide recommendations for action in the following four areas: 1) using hydrologic information to improve local planning and development; 2) using TDR to preserve local resource lands; 3) protection of instream flows; and 4) acquiring lands with high hydrologic value.

Develop Information on Hydrologic Importance in Local Jurisdictions

In recent years, there has been a greater focus on modeling hydrological importance and degradation in order to produce information that can be used by local planners to make land use decisions and to guide the development of local programs. This effort would provide valuable mapping that should be included as Best Available Science (BAS) as local jurisdictions make decisions about where to direct future growth, designating allowable uses and associated development regulations, how to implement protective incentive programs, and where best to focus efforts on improving infrastructure and acquiring or protecting open space lands.

King and Snohomish Counties, as well as all cities contained within the Snohomish Basin, are required to plan for population growth and its impacts under the GMA. The GMA requires jurisdictions to designate and protect critical areas and to designate natural resource lands. The GMA also imposes requirements on jurisdiction planning under the GMA, including identification and protection of critical areas; identification and conservation of agricultural, forest, and mineral resource lands; and adoption of county-wide planning policies to coordinate comprehensive planning among counties.
and their cities. Comprehensive plans, updated periodically, set a policy framework and articulate goals for jurisdictions that shape development of regulations as well as other local programs. These plans include elements focusing on land use and the environment, which, by extension, affect hydrology. Land use designations are important in that they identify the primary function of lands, which is then codified by land use regulations, including density limits, impervious surface limits, and the like. Critical Area Ordinance and Shoreline Master Program updates are required to use BAS.

Land use regulations control development patterns and functions, thereby affecting hydrology by limiting the constraints and pressures on hydrologic attributes. While the specific regulations differ significantly across jurisdictions, the following programs are also required to use BAS:

- Critical area regulations, which restrict development in ecologically sensitive areas such as wetlands or areas unsuitable for development, such as steep slopes or other geologically hazardous areas
- Shoreline master programs, which control what structures and uses are appropriate along state-designated waterbodies, including large lakes, larger streams, rivers, and marine shorelines

Development regulations affect the form and location of buildings and can define maximum heights, design guidelines, setbacks, and whether or not structures may be built in floodplains. In order to ensure compliance with comprehensive plans, local governments update development regulations periodically.

Additionally, jurisdictions are continually evaluating programs—including incentives, LID, public education, and
acquisitions—that seek to protect and restore features that can protect hydrology. The decisions on where and how to deploy these programs should be based on the best information available on where hydrology and associated features are most important, as well as where there is opportunity for the program to succeed.

An updated assessment of hydrological importance, including a set of watershed characterization maps, in each Snohomish Basin local jurisdiction would ensure that land use decisions and specialty programs include an understanding of how hydrology works in the area and how best it can be protected.

**Action 1: Support the development of watershed characterization information by Ecology and continue to update local data and information for every local jurisdiction in the Snohomish Basin**

Watershed characterization, developed and supported by Ecology, generally prioritizes protection actions in watersheds that are highly important and are relatively less degraded for watershed processes. This should not indicate that protection should not be applied across other degraded areas that are indicated as less important. Rather, given limited resources, these might be the first place a planner would want to focus on to increase the likelihood of improving watershed processes in key areas.

Improved information, through watershed characterization, would also give smaller jurisdictions with limited staff resources a higher degree of technical capacity to propose the best policies and regulations. Ecology’s support of model development at the local scale and training on how to incorporate the results would be critical in ensuring that the information is used.
**Effectiveness Indicators:**

- Local jurisdictions are provided with watershed characterization maps and training by Ecology by the end of 2016
- Local jurisdictions cite watershed characterization findings in proposed changes to policies and regulations
- New BAS (such as expanded aquifer mapping) is cited in updates

**Action 2: Align regulations to limit the variances and exceptions available in hydrologically sensitive areas that result in loss of function**

Local jurisdictions continually revisit their land use regulations, including the Shoreline Master Program, Critical Areas Ordinances, and zoning. Jurisdictions should work to align definitions and application across the various land use regulations to ensure that hydrologically sensitive areas, as defined by watershed characterization and other evaluations, are not degraded. Specifically, jurisdictions should work to limit the exceptions, exemptions, and variances that can result in decreased function of features such as shorelines, wetlands, forest cover, and riparian zones. Regular implementation and compliance monitoring, currently assessed by both counties in the Snohomish Basin, would be useful to understand where variances, exemptions, or failed mitigation measures have resulted in decreased function.

**Effectiveness Indicators:**

- Number of variances, exceptions, and exemptions resulting in loss of function that are issued in wetlands, on shorelines, and in riparian zones
• Changes in impervious cover, forest cover, and shoreline armoring associated with variances, exceptions, and exemptions

**Action 3: Direct incentive programs, open space acquisitions, and other resource conservation efforts to areas with important hydrological features using watershed characterization analysis**

Jurisdictions currently have programs focused on incentivizing landowners to manage their lands for conservation and acquiring open space. As jurisdictions prioritize where to implement the programs within their jurisdiction, their efforts should consider the most recent information available from watershed characterization.

**Effectiveness Indicators:**

- Number of landowners reached in hydrologically important areas that receive direct outreach for incentive program
- Number of new/revised programs that target specific areas
- Number of landowners that participate in incentive programs

**Focus Areas:**

All local jurisdictions in the Snohomish Basin (both counties and cities) are the focus of this strategy. Smaller jurisdictions with limited technical staff and capacity would especially benefit from updated information. The City of Duvall provides an excellent example\(^1\) of how watershed characterization and other local overlays could provide for recommendations ranging from Comprehensive Plan updates (specifically new Urban Growth Area boundaries) to incentive programs.

\(^1\) See http://www.duvallwa.gov/DocumentCenter/Home/View/2402
Align regulations

GMA comp plans, SMPs, and development regulations analyzed
Local plan implementation/effectiveness and regulatory inconsistencies understood

Regulations improved and aligned for protection
Exemptions resulting in degradation are reduced

Direct efforts to areas with important hydrological features

Jurisdictions consider important hydrology in growth planning and zoning changes
Jurisdictions plan areas of new growth in the least harmful areas
Jurisdictions direct incentive programs to most important areas

Runoff from residential and commercial development reduced
Impact from housing and urban areas reduced

Altered flows from land cover change reduced
Features that support intact hydrology not degraded
Water withdrawals reduced

Key:
- Strategy recommendation
- Recommended action
- Expected outcome
- Pressure reduction outcome
- Ecosystem component
- Effectiveness indicator

1 Local jurisdictions are provided with watershed characterization maps and training by Ecology by the end of 2016
2 Local jurisdictions cite watershed characterization findings in proposed changes to policies and regulations
3 New BAS (such as expanded aquifer mapping) is cited in updates
4 Number of variances, exceptions, and exemptions resulting in loss of function that are issued in wetlands, on shorelines, and in riparian zones
5 Changes in impervious cover, forest cover, and shoreline armoring associated with variances, exceptions, and exemptions
6 Number of landowners reached in hydrologically important areas by direct outreach for incentive program
7 Number of new/revised programs that target specific areas
8 Number of landowners that participate in incentive programs
Transfer and Purchase of Development Rights

Transfer and Purchase of Development Rights (TDR/PDR) is a voluntary, market-based real estate tool that gives landowners the option to sell development potential in the form of credits to buyers who may, in turn, use the credits to build to higher densities in designated areas than zoning otherwise allows. The goal of TDR is to preserve resource lands and low-density rural lands by transferring development potential (via subdivision) to specific (usually urban) areas. Land protection is permanent and enforced through a conservation easement, which entails monitoring and enforcement.

PDR is a voluntary real estate tool in which landowners may sell or donate the development potential from resource lands. The chief distinctions from TDR are that the tool is publicly funded, development potential is extinguished (rather than transferred), and easements are typically more restrictive. Like TDR, permanent easements require monitoring and enforcement. PDR can operate as a standalone program or can be modified to work in conjunction with TDR. Both counties have used TDR and PDR to varying degrees as a means to permanently protect resource lands.

Considerations influencing a more extensive use of TDR in the Basin include the dependency of local programs on market conditions, and the breadth of program adoption and credit absorption. As more cities participate in the county and regional programs, they would absorb more credits and, by extension, create more conservation.

Considerations influencing a more extensive use of PDR include (but are not limited to) public funding/sources and staffing and support. With existing programs in place, the ability to expand
PDR likewise relies on an ability to update county policies and conservation priorities.

**Action 1: Encourage and expand TDR policies in additional jurisdictions**

The two counties already have prioritized sending sites for TDR programs. The key to increasing the use of TDR programs and protecting resource lands is to increase the demand side of transactions. As the Snohomish Basin’s population continues to grow, there should be an increased market demand for TDR. Counties, non-governmental organizations, and others should encourage cities to develop TDR policies that allow for them to take advantage of future demand.

*Effectiveness Indicators:*

- Number of TDR transactions and associated acreage and land use categories
- Number of new jurisdictions that adopt TDR policies

**Action 2: Encourage and expand PDR usage**

PDR has been funded at radically different levels across the counties in the past, but in recent years, both have shared a dearth of new funding. Consequently, as of 2015, neither are as active. Given the reliance on public funding, a first step is capitalizing PDR programs to the extent feasible—which would differ by county. Subsequent steps would require providing adequate resources to administer the program, as well as consider opportunities for conservation target prioritization and program expansion.

*Effective Indicator:*

- Number of PDR transactions and associated acreage and land use categories
**Action 3: Encourage the use of TDR and PDR with a focus on aligning the two efforts**

Both counties have TDR programs. Both programs include all designated and certain non-designated farmland and forests as conservation targets; however, King County’s program also makes certain properties eligible that provide habitat, trail connections, or urban separation.

Likewise, both counties have PDR programs in place, each of which is focused on farmland preservation.

Opportunity exists to dedicate more resources to these programs for both funding and outreach to landowners. Opportunity also exists to generate synergy between PDR and TDR activities by making publicly acquired development rights eligible for sale through the TDR program. The King County TDR Bank effectively does this, as could a similar bank under consideration in Snohomish County; however, this model could be expanded to the PDR programs. Program and easement revisions would be required.

**Effectiveness Indicators:**

- Number of TDR and PDR transactions in Snohomish and King Counties
- Number of transactions and acreage of properties that are located in areas of high hydrologic importance

**Focus Areas:**

In Snohomish County, agriculture areas in floodplains are a high-priority policy. This coincides with many of the areas identified by watershed characterization as the most important for hydrological function. In King County, many transactions have been put toward both agricultural and forested areas. In
the future, both counties should integrate new climate change information and resilience strategies with PDR programs.
Strategy recommendation: Encourage and expand TDR and PDR

- Demand for growth in dense attractive communities
- TDR/PDR mechanism approved as policy
- Buyers and sellers identified and linked

Expected outcomes:
- Programs reduce ecological harm outside of UGAs
  - Rural landscapes, forest cover, and agriculture is maintained
  - Growth occurs in UGAs

Pressure reduction outcomes:
- Runoff from residential and commercial development reduced
- Impact from housing and urban areas reduced
- Altered flows from land cover change reduced
- Features that support intact hydrology not degraded

Key:
- Yellow hexagon: Strategy recommendation
- Light blue: Recommended action
- Dark blue: Expected outcome
- Purple: Pressure reduction outcome
- Green: Ecosystem component
- Triangle: Effectiveness indicator

1. Number of TDR/PDR transactions and associated acreage and land use categories
2. Number of new jurisdictions that adopt TDR policies
3. Number of TDR and PDR transactions in Snohomish and King Counties
4. Number of transactions and acreage of properties that are located in areas of high hydrologically important
Protect Instream Flows

In 1988, Ecology set minimum instream flows for several locations in the Snohomish Basin through 173-507 Washington Administrative Code (WAC). Partners, including those interested in salmon recovery, assisted in adopting these rules. In addition, several sub-basins have been closed to further consumptive rights since the 1940s and 1950s. However, because administrative instream flows have no bearing on rights that are senior to the date of the flow rule, the majority of the minimum instream flow levels are routinely unmet, and low flows continue to adversely affect salmonids, prey species, and adjacent wetland habitats.

Water rights in the Snohomish Basin are already over appropriated, and Ecology is not permitting new water rights. However, residents continue to be issued building permits, which results in the installation of new exempt wells on those properties. This allows residents to use up to 5,000 gallons per day for household use. There is no consideration for whether or not the well is placed in areas that are hydrologically connected to streams or rivers or basins closed by rule to further withdrawals.

Ecology currently has limited resources for enforcement of instream flow rules that relies primarily on a complaint-driven system to address illegal diversions or impairments of senior water rights. Ecology is unlikely to adopt more instream flow rules due to ongoing litigation. Short of reporting illegal uses, the Forum lacks jurisdiction to enforce against illegal use. The recommendations below address one aspect of the proliferation of exempt wells, as well as an ongoing conservation levels.
Action 1: Improve guidelines for what constitutes an “adequate water supply” for new development

One action is to encourage Ecology to create development guidelines for counties that add specificity around the GMA requirements for proving the existence of adequate water supply before permitting new development. Currently, new development is allowed to cite a prospective exempt well as evidence of adequate water supply without assessing whether the development is in a basin closed to further water appropriations or if the well site is in hydrologic continuity with closed or flow-limited surface waters. Development guidelines that prohibit impairment of instream flows by requiring mitigation can assist in restoring regulatory flows. The new policy should be applied first in basins that have high densities of exempt wells and watersheds that are closed to further appropriations or are not meeting regulatory flows.

Effectiveness Indicators:
- Creation of Ecology guidelines for approving a legal source of water supply for development applications
- Number of new development applications approved that use exempt wells for water supply
- Number of new exempt wells in sub-basins with known low flow issues

Action 2: Improve residential water conservation measures

The second recommended action to directly affect instream flows is to improve and expand water conservation measures, particularly in areas that are either supported by small water purveyors or single-family exempt wells. Improved water conservation efforts have resulted in a marked decrease in household use. There are several ways to encourage lower water use, including public education and housing covenants that require low water landscaping techniques and encouraging
conservation through variable rate structures in areas supported by small utilities.

*Effectiveness Indicators:*

- Number of new land use regulations or residential covenants addressing low water landscaping techniques
- Number of new variable rate structures dependent upon water usage adopted by small utilities
- Water use (as tracked by water meters)

*Focus Areas:*
The focus areas for improving and expanding water conservation measures are basins closed to further appropriations: Griffin, Harris, Patterson, Raging River, Little Pilchuck, May Creek, Quilceda, and Unnamed (Bodell) tributary to the Pilchuck.
Basin-wide Protection Strategy

1. Creation of Ecology guidelines for approving a legal source of water supply for development applications
2. Number of new development applications approved that use exempt wells for water supply
3. Number of new exempt wells in sub-basins with known low flow issues
4. Number of new land use regulations or residential covenants addressing low water landscaping techniques
5. Number of new variable rate structures dependent upon water usage adopted by small utilities
6. Water use (as tracked by water meters)

Key:
- Strategy recommendation
- Recommended action
- Expected outcome
- Pressure reduction outcome
- Ecosystem component
- Effectiveness indicator
Acquire Lands with High Hydrologic Value

Currently, there are two forms of acquisition taking place in the Basin: conservation easements and outright purchase.

A conservation easement allows a qualified private land conservation organization or government to constrain land uses on private or public properties to achieve certain conservation or preservation purposes. Landowners can sell conservation easements or donate them for tax benefits. They are typically permanent. Some involve restoration of portions of the protected property, and all involve monitoring to enforce easement terms.

Public or private entities may protect land by purchasing it outright (also referred to as “in fee”). This is an appropriate mechanism for when a landowner has no further interest in a property and it may otherwise face conversion pressure or if conservation of a property creates a compelling public benefit. An example of this could be purchase of land for a public park, or the acquisition of frequently flooded properties in floodplains. Depending on the ultimate use of land protected through outright purchase, monitoring and stewardship may be part of the long-term management plan and would require funding.

*Action: Acquire conservation easements or properties with high hydrological importance through outright purchase*

Both acquisition approaches have been successfully used in a variety of applications and are proven protection mechanisms. Hydrologic benefits include maintaining pervious areas in a multitude of locations across the Basin.
Effectiveness Indicators:

- Number of acres acquired in areas with high hydrological importance as determined by BAS or watershed characterization

Focus Areas:
Watershed characterization provides guidance on where high importance areas are within the Basin as a whole. Areas of high importance generally include features such as wetlands, floodplains, and forested headwaters. Additionally, purchasers can consider watershed characterization results for a smaller-scale understanding of relative importance in an area with special focus or authority.
Acquire lands with high hydrologic value

Acquire areas with high hydrological importance through outright purchase or conservation easements

High priority properties identified

Funding secured

Properties acquired

Properties managed for highest hydrologic benefit

Impact from housing and urban areas reduced

Features that support intact hydrology not degraded

Hydrology

Key:

- Strategy recommendation
- Recommended action
- Expected outcome
- Pressure reduction outcome
- Ecosystem component
- Effectiveness indicator

1 Number of acres acquired in areas with high hydrological importance as determined by BAS or watershed characterization
Section 3

URBAN STRATEGY RECOMMENDATIONS

In the Snohomish Basin, there are 15 cities with Urban Growth Areas. Under the GMA, these areas are intended to assume the majority of the future development. Most of these cities are either in or adjacent to mainstem river floodplains. Due to levels of impervious surfaces, stormwater infrastructure, and decreased forest cover, most urban areas have a higher level of hydrological degradation. However, urban areas are still able to contribute to the protection of hydrology through the suggested approaches below. Managing water resources in a changing climate with shifting hydrologic regimes requires that approaches be adopted to build what may be regarded today as redundancies in stormwater management systems, but this shift would promote hydrologic resiliency in the watershed over time.

Jurisdictions within the Snohomish Basin under permit are either Phase I or II permittees and therefore have different requirements under the National Pollutant Discharge Elimination System (NPDES) permit. For example, King and Snohomish Counties are Phase I permittees, and the City of Everett is a Phase II permittee, along with the cities of Marysville, Mukilteo, Snohomish, Snoqualmie, Lake Stevens, Monroe, and Duvall. Some smaller towns are not regulated under the NPDES permit. For smaller cities and towns, or those with limited staff and capacity, access to technical assistance is particularly significant to the success of implementing LID and, in some cases, the requirements of the permit. Stormwater management practices are evolving to address the requirements of the permit. In addition, LID and alternatives to traditional “pipe and convey” approaches would become necessary in order to match the present and projected challenges of managing...
water resources, including mitigating for extreme events such as drought or flood.

**Augment Practices to Meet NPDES Requirements with Low Impact Development Green Infrastructure**

The NPDES permit system regulates wastewater discharges from industries and municipal wastewater systems as well as stormwater discharges from industries, construction sites, and municipal separate storm sewer systems. The NPDES municipal stormwater permit was issued in 1995 to six Phase I jurisdictions, and when reissued in 2007 and 2012 more than 100 additional cities and counties within Washington were issued Phase II permits. These permits contain requirements for construction and land development affecting both private and public construction. Permittees are required to adopt land development and redevelopment regulations that contain the equivalent of those directly set forth in the NPDES permit. Ecology’s Stormwater Management Manual for Western Washington provides specifications to meet permit requirements and comply with the Clean Water Act. These include LID best management practices (BMPs). Jurisdictions with regulated municipal separate storm sewer systems must follow the Manual or choose to develop and adopt a State-approved manual with equivalent practices to meet permit requirements.

Cities can address NPDES permit requirements by adopting LID approaches where feasible. Key tenets of LID include minimizing site disturbance, conserving native vegetation, and reducing impervious surface; controlling stormwater at or near its source through the use of BMPs is the goal. These decentralized stormwater BMPs, which are commonly referred to as green stormwater infrastructure, are small, distributed
facilities that manage stormwater runoff through infiltration, bio-filtration, storage, evaporation, and transpiration. LID BMPs include site facilities such as rain gardens, bioswales, permeable pavement, and vegetated roofs. It is imperative that these LID facilities are sited and sized appropriately. Further, “the right site, right design, and right team” is a good rule of thumb approach to ensure that these built facilities are effectively meeting design objectives and, in turn, working as part of the stormwater system to meet overall permit requirements.

LID has been criticized as expensive to maintain. Cost-benefit analysis that takes life cycle costs and benefits into account is the key to demonstrating the return on investment. That said, in some areas, it is not clear that private property owners would manage their green stormwater solutions for the long term. Another challenge is the lack of internal alignment across agency divisions; on-the-ground practices sometimes result in the destruction of green infrastructure. Permitting redevelopment has also resulted in the removal of LID stormwater facilities and replacement with traditional conveyance infrastructure. It is important to map and maintain these facilities, particularly if the facilities are being used to satisfy requirements of an NPDES permit.

Incentivizing and facilitating public-private partnerships and private investment of green infrastructure can work toward financing successful redevelopment projects in the region. This approach in partnering has been successful across the region and the nation. One example is the “Swale on Yale” or the Capitol Hill Water Quality Improvement Project in Seattle. In conjunction with a large redevelopment site, public entities have partnered with the developer to retrofit the existing
stormwater system with LID features to protect water quality in Lake Union.

**Action 1: Identify public and private property with legacy stormwater issues that could be improved with LID and other green infrastructure stormwater management techniques**

Local jurisdictions have the most control over land parcels that they own and maintain. Counties, cities, and towns have mainly sited LID facilities in right of ways, public parks, parking lots, and in other publicly controlled areas. This also provides an opportunity to lead by example and demonstrate the potential benefits of LID implementation.

**Effectiveness Indicators:**

- Percent of public retrofit projects using LID BMPs
- Percent of public stormwater projects that are mapped as stormwater infrastructure and maintained
- New or revised maintenance policies reflect proper operations and management of LID facilities

**Action 2: Promote LID and other green infrastructure in development and redevelopment projects appropriate to the lot size in question**

Due in large part to technical assistance and past funding from the State, LID is currently incorporated in most jurisdictions’ codes. As of January 2017, LID will also be required where feasible as part of the NPDES Phase II permits, as it is with Phase I. Jurisdictions should work with developers to partner and share technical support to achieve the most effective level of green infrastructure in order to mimic natural flows. Examples of LID may include permeable pavement, rain barrels, tree planting, and downspout disconnection. On appropriate parcels, additional green infrastructure could include green
roofs, and retention features on property, such as vegetated swales or rain gardens.

Effectiveness Indicators:

- Number of new developments or redevelopments that incorporate LID BMPs where LID was determined to be feasible

Improve Tree Ordinances and Other Relevant Codes that Require Planting in Urban Areas

Benefits provided by urban forests include reduced stormwater runoff, improved water and air quality, attractive communities, stronger property values, greenhouse gas reduction, habitat for native wildlife, and improved quality of life. Currently, tree planting efforts in the big cities are focused on public lands and right of ways. In highly dense areas in Everett, redevelopment often requires some tree planting, mostly as street trees in front of properties. Everett Parks and Recreation and Forterra created the Green Everett Partnership to improve the health of Everett’s forested parks and natural areas, which are in decline. Snohomish County recently rewrote their tree ordinance to incentivize development and redevelopment to maintain as much native tree cover as possible, with a goal of minimum 30% tree cover. This ordinance applies within the urban growth areas but outside of city limits. The counties of the Basin are encouraging and actively pursuing replanting and tree retention. Small cities, such as Duvall, are taking a stronger regulatory approach to tree retention. Climate change adaptation measures may include tree planting in the Basin.
Action: Encourage jurisdictions to strengthen tree retention and landscaping ordinances and codes

Jurisdictions have opportunities to improve their tree ordinances and other relevant codes to both provide incentives and require more planting in urban areas.

Effectiveness Indicators:

- Trees planted
- Percent of new development and redevelopment property owners in compliance with codes and ordinances
- Forest cover in urban areas

Focus Areas:

All urban growth areas with an emphasis on where watershed characterization identifies the most important analysis units for protection.
Urban Protection Strategy

**Key:**
- Strategy recommendation
- Recommended action
- Expected outcome
- Pressure reduction outcome
- Ecosystem component
- Effectiveness indicator

1. Percent of public retrofit projects using LID BMPs
2. Percent of public stormwater projects that are mapped as stormwater infrastructure and maintained
3. New or revised maintenance policies reflect proper operations and management of LID facilities
4. Number of new developments or redevelopments that incorporate LID BMPs where LID was determined to be feasible
5. Trees planted
6. Percent of new development and redevelopment property owners in compliance with codes and ordinances
7. Forest cover in urban areas

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**Encourage jurisdictions to strengthen ordinances and codes**
- Regulations and incentives available
- Tree ordinances require more planting or retention

**Promote appropriate LID and other green infrastructure**
- New development and redevelopment uses LID techniques to meet stormwater regulations
- LID implemented during new construction

**Identify public and private property with legacy stormwater issues**
- Public properties with legacy stormwater problems identified
- Jurisdictions choose appropriate LID approaches

**Ongoing management**
- Cross division alignment for maintenance
- Public green infrastructure mapped

**Runoff from residential and commercial lands have less impact**
- Altered peak flows from land cover change minimized
- Altered flows from land cover change minimized

**Hydrology**

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**Augment practices to meet NPDES requirements with LID green infrastructure**

**Improve tree ordinances and other relevant codes**
Section 4
RURAL RESIDENTIAL STRATEGY RECOMMENDATIONS

The rural residential areas in the Snohomish Basin are located outside of the Urban Growth Areas, Agricultural Production Districts, areas zoned for forestry, and areas zoned for commercial and industrial use. Land use within rural residential areas varies from multiple housing densities to small hobby farms to small forestry production. Much of the rural residential area is located in the Snohomish Basin lowlands, proximate to tributaries and mainstem rivers.

As rural residential development occurs, typically forest cover decreases and impervious surfaces increase. These changes occur as houses are built and infrastructure to support residents, such as roads and utilities, is expanded. In the 2005 Plan, the amount of forest cover in rural residential areas was expected to fall below levels needed to recover salmon. The primary goal in the rural residential areas to support intact hydrology is to maintain forest cover, pervious areas, and water detention. This would, in turn, capture and slow water, thereby maintaining functioning delivery and storage.

Currently, rural residential area development is regulated through Snohomish and King Counties’ land use regulations as well as DNR’s Forest Practices Act. These regulations control development of shorelines and development within riparian buffers and wetlands. The regulations also control the amount of land that can be cleared of trees and the percentage of impervious surfaces.

Though the current regulations are protective, other regulatory and non-regulatory protection tools can be layered upon them.
to maximize the potential for intact hydrology on each landowner’s property. The recommendations below are a mix of incentives and direct technical assistance. Both strategies seek to target areas with the most important hydrology and provide residents with additional resources to best protect landscape features, which support intact hydrologic function.

**Improve Outreach and Technical Assistance to Rural Residential Landowners**

Currently in the Snohomish Basin, many players including county staff, conservation districts, and non-profit organizations are working to support stewardship of rural residential lands. These groups access rural residents either through direct requests for assistance (e.g., residents calling to request help with problematic beaver) or through proactive outreach campaigns.

Securing consistent funding for rural residential outreach and technical support is a challenge for most of these players. Several funding sources to support salmon restoration and water quality efforts exist, but these are usually focused directly on the stream corridor, largely seeking to improve riparian zones and stream crossings. There are few funding sources available to work on issues such as increasing tree cover and reducing pervious surfaces at the larger watershed scale, even though these actions support healthy watershed processes that improve habitat and water quality. The Puget Sound Partnership has worked on social marketing outreach campaigns to improve stewardship of natural resources, but these campaigns have focused primarily on water quality in the urban areas.

A regional move toward building climate change resilience through reforestation by King County and others may provide
an opportunity to connect tree planting campaigns for carbon storage with rural residential hydrology protection efforts.

The actions below provide a range of options for how to encourage residents to maximize the hydrologic function on their property.

**Action 1: Align free native tree resources with existing programs that service rural residential property owners**

Offering free trees to landowners is a way to increase native tree cover while also building stewardship of existing trees. Currently, many restoration partners in the Basin supply free native trees to landowners through their own nurseries, including Snohomish County, the Tulalip Tribes, conservation districts, and Sound Salmon Solutions. The capacity of these organizations, however, to promote this opportunity at the watershed scale does not currently exist. Building a program that could sustain the demand for trees across the watershed would require building additional partnerships to grow and access native plants, including local community college and university horticulture programs. Also, climate change carbon storage efforts, such as King County’s 2015 announcement to plant 1 million trees as part of their Climate Action Plan and Forterra’s C3 program that seeks to offset business’ carbon footprint, could help to create supply for the programs that have access to private property owners.

Counties, non-profit organizations, and conservation districts already provide rural residential property owners with a variety of technical assistance services that can include site visits to discuss BMPs. Free trees can be an incentive that technical service providers can provide to landowners through these already existing programs. Working through these existing programs ensures that property owners have a site evaluation to
determine appropriate species and make a personal commitment to planting and maintaining the native plants. This added incentive also provides an opportunity for technical assistance providers to educate landowners about the importance trees and shrubs play in maintaining healthy soils and how healthy soils support basin hydrology. Below are examples of how a free trees incentive tool could be incorporated into the various types of technical assistance already provided:

- **Noxious weeds and invasive species control.** Many rural residents contact technical assistance organizations for advice controlling weeds on their property. Partners with native nurseries could work to follow up any invasive species removal with an offer of free trees to plant in the treated areas.

- **Pasture management.** The conservation districts currently assist rural residents with horse and livestock pasture management. Questions related to mud management and promotion of healthy forage grasses are common. Site visits to discuss pastures often include promotion of riparian buffer plantings and exclusion fencing. An offer of free plants, therefore, could increase the likelihood of BMP implementation.

- **“Environmentally friendly” signs and certifications.** Residents are often motivated to change behavior if it results in a sign to post on their property. Programs such as Stewardship Partners’ “Salmon Safe” and Audubon’s “Backyard Habitat” certification have been effective in engaging private citizens. If these programs and others were augmented with free trees and tree requirements, tree cover could be increased.

- **LakeWise certification.** In Snohomish County, property owners can show that they manage their property in a manner that qualifies them to be LakeWise Certified. This certification requires a site visit from County staff. This is an
excellent opportunity for property owners to be consulted on increasing tree cover and offered free trees.

- Outreach with free tree follow-up for easement and tax reduction programs such as CUT, which pays landowners (through property tax reductions) to increase forest cover on their property. Often, however, these payments are not enough to incentivize residents to invest in trees and plant. Landowners could be better engaged through targeted program outreach that couples trees and technical assistance, thereby lowering the barrier for entry into those programs.

**Effectiveness Indicators:**

- Number of partnerships between existing nurseries/tree suppliers and existing programs
- Number of trees planted
- Forest cover in rural residential areas

**Action 2: Continue and expand technical support and education for landowners to maintain beaver on their property**

Beavers are known to increase ponding, slow runoff, and increase infiltration at a site scale. However, beavers often create nuisance or safety issues if flooding affects bridges, roads, septic drain fields, wells, pastures, or other land uses. Currently, there are a few entities that are able to provide technical assistance to landowners concerned about beavers on their property, including the counties, conservation districts, WDFW, and non-profit organizations.

In some cases, a pond leveler device can be constructed to maintain a consistent pond level and reduce beaver/landowner conflict. Encouraging the use of this non-lethal management technique results in less dam removal (requiring a state-issued hydraulic project approval permit and generally ineffective) and/or beaver trapping (and euthanization).
Counties, WDFW, and conservation districts respond to beaver management complaints with a site visit to educate landowners on their options. In both counties, staff cannot address beaver issues directly unless public infrastructure is impacted. In Snohomish County, property owners are often referred to the Snohomish Conservation District for assistance on private property. If the site is appropriate for a device and funding is available, the conservation district would pay for pond leveler materials if the landowner agrees to pay for installation.

If beaver concerns are directed to King County, staff usually refer the property owner to the Adopt-A-Stream Foundation. The beaver complaints are currently spread over a variety of staff in King County, ranging from ecologists to road engineers. It is highly recommended that King County establish one point of contact for property owners with beaver concerns and a response that includes several resources (including non-profit organizations such as Adopt-A-Stream and Beavers Northwest) so that residents are most likely to get the technical assistance that they need.

In order to encourage the maintenance of beaver ponds on private property in appropriate locations that are not causing damage to adjacent properties, groups responding to beaver complaints should continue to educate landowners about the hydrologic benefits of beavers and the technical assistance available to help. In cases where the state or counties cannot provide direct technical assistance for non-lethal beaver management, contact information for non-profit organizations or conservation districts with technical assistance expertise should be provided in person and on websites. A new outreach technique could be a sign or certificate program that would reward landowners who work to maintain dams and beavers on their property. Given the success of other environmental sign
programs, this could be an effective way to spread the word about the benefits to hydrology that beavers provide to the watershed.

**Effectiveness Indicators:**
- Number of devices installed following call for assistance
- Number of permits to trap (and kill) following calls for assistance
- Extent of beaver ponds in areas important for storage and recharge

**Focus Areas:**
Both actions listed above are opportunistic. However, where possible, free tree incentive efforts should focus on areas listed as important for delivery, and beaver retention should be directed to areas where storage and recharge are listed as important.

**Explore PBRS in Snohomish County and Target Outreach of PBRS in King County**
Under the Open Space Taxation Act, counties may choose to adopt a Public Benefit Rating System (PBRS) program (RCW 84.34.055) to establish more specific criteria used to evaluate or rate open space resource value on properties. PBRS offers property owners an incentive (a property tax reduction) to protect or restore open space resources on their land. A PBRS program identifies open space resources and assigns a rating or score to determine the level of property tax savings participating properties are eligible for. Properties with the highest scores, and therefore the greatest conservation values, are eligible for the greatest tax reduction.
King County first adopted a PBRS program in 1992. Over the past 10 to 15 years, an average of 60 to 80 new applications have been received each year (with 500 to 600 acres added to the program annually). Approximately 11,000 acres are currently enrolled in the program. There are 23 possible resource categories under which property owners can qualify, ranging from public access provisions to conservation management. Roughly a third of the point categories relate directly to hydrologic function, including credit for increased buffer widths, tree cover, and wetland protection. Points are awarded for each PBRS resource category that a property qualifies for. The total points awarded for a property’s PBRS resources translate into a 50% to 90% reduction in the taxable land assessed value for the portion of the property enrolled. The average property tax savings is $1,500 annually. The program is maintained by two full-time staff. Given the steady enrollment numbers and limitations on staff time, compliance monitoring is conducted somewhat sporadically, often through utilization of aerial photos and assessment of aerial photos as a result of property sales.

Snohomish County has had a CUT program that includes an Open Space General category for rural residential landowners since 1971, when Chapter 4.28 Snohomish County Code was first adopted by resolution. In order to qualify for the program, landowners must meet one of 20 criteria, including the presence of wetlands, undeveloped natural areas, sensitive wildlife habitat, or unstable slopes. Snohomish County uses a per-acre rate dependent upon the land type. The highest Open Space General reduction rate for the 2016 tax year will be $1,500 per acre (good land) and the lowest will be $100 (waste rate) per acre. There are currently about 7,600 acres enrolled in Open Space/Open Space General and 4,500 acres in Open Space Agricultural Conservation. Applicants must demonstrate
compliance with County code criteria in order to be initially classified; however, ongoing monitoring and enforcement, to establish whether or not the property is in compliance and providing a public benefit, is not regularly conducted. Eligibility is often reassessed when the Assessor's Office conducts audits or requests review from the Planning Department following the sale of an enrolled property.

The recommendations below are intended to improve the effectiveness of the Snohomish County program and target King County’s program on the most important hydrological resources.

**Action 1: Snohomish County institutes a PBRS Program**

Snohomish County has considered the merits of a PBRS program several times in recent years, as the adoption of a rating system has the potential to make implementation of the Open Space CUT classification more effective and equitable. The Department of Revenue suggested adoption of the program after an audit of the CUT program in 2013. However, the County has been reluctant to develop and adopt a PBRS due to staff capacity issues and budget constraints. Additionally, there is the chance that landowners currently enrolled in the CUT program may not be eligible for the PBRS criteria, thereby jeopardizing their property tax reduction.

The recommendation is that Snohomish County seek grant funding to assess the current level of public benefit of properties enrolled in the Open Space General category. Through this assessment, a better understanding of who would remain eligible for some level of PBRS qualification could be developed. This assessment could help justify the program by highlighting issues of tax fairness and public good.
Following the assessment, Snohomish County could seek grant funding to create a point system, to be approved by Snohomish County Council. Based on recent work by the Puget Sound Partnership’s Ecosystem Coordination Board, this implementation effort would be eligible for regional grant funding.

The final recommendation is to implement the PBRS program with dedicated staffing resources. This would require continued funding, at a level of one or two full-time employees, from the County. Implementation would include offering those currently enrolled in the Open Space program who are ineligible for PBRS the opportunity to un-enroll from the program without penalty. The new PBRS program could target areas that are known to be hydrologically important and have features that support intact hydrology. It could also target shoreline restoration issues identified by the Puget Sound Partnership and other local priorities.

**Effectiveness Indicators:**

- Assessment of public benefit provided by parcels enrolled in the Open Space General category in order to transition to PBRS
- Creation of a PBRS point program or improvement of existing criteria
- Number of parcels enrolled in the program

**Action 2: King County targets specific areas for PBRS that are identified as important for hydrology**

In the past 5 years, King County has received grant funding to target the Raging River and Patterson Creek sub-basins for PBRS enrollment. This effort included the development of outreach material and direct solicitation of landowners. The result was an increase in enrollment in these basins.
The recommendation is that King County continues to seek funding to expand direct outreach in areas that are known to be hydrologically important. In addition, King County would need to secure additional funding to process the increased number of applications and conduct program compliance monitoring.

*Effectiveness Indicators:*

- Number of focused outreach campaigns to sub-basins with important hydrology/number of enrolled participants

*Focus Areas:*

PBRS should focus on the following areas that have been identified as important for hydrology and are not currently enrolled in any other easement programs (have no levels of protection above regulations):

- Snohomish County: lower Pilchuck, lower Woods Creek, French Creek, and floodplain parcels on the mainstem Snohomish and Skykomish
- King County: areas in the lower Snoqualmie River floodplain and adjacent to the Agricultural Production District in the lower Snoqualmie, as well as the floodplain areas of the lower Raging River and Tolt River
Rural Residential

**Strategy recommendation**
- Improve outreach and technical assistance to rural residential landowners
- Explore Public Benefit Rating System (PBRS) in Snohomish County and target outreach of PBRS in King County

**Implementation**
- Align free native tree resources with programs
  - Native tree supply identified
  - Programs that could add or augment free native trees identified
  - Audiences and practices identified
- Provide education and technical assistance for landowners to maintain beavers
  - Audiences identified and concerns understood
  - BMPs developed for pond leveling and vegetation protection
  - Local jurisdictions assign point person and coordinate among practitioners
- Implementation
  - Landowners received outreach and free trees incentive
  - Landowners enroll in other incentive programs
  - Property owners plant and maintain
- Hydrology
  - Runoff from residential and commercial land has less impact
  - Beaver ponds provide storage and recharge

**Expected outcome**
- Tree cover and soils improve delivery and infiltration
- Property owners accept and install pond levelers and protect infrastructure
- Beavers provide hydrological benefit of beaver
- Property owners leave beaver on property
- Runoff from residential and commercial land has less impact
- Beaver ponds provide storage and recharge

**Hydrology**
- Runoff from residential and commercial land has less impact
- Beaver ponds provide storage and recharge

**Pressure reduction outcome**
- Landowners receive information on PBRS
- Landowners receive any necessary technical assistance
- Landowners enroll in program
- PBRS implemented

**Ecosystem component**
- PBRS criteria for best management of hydrology are identified
- Priority areas for PBRS outreach are identified
- Private landowners understand PBRS
- Landowners manage for PBRS criteria

**Effectiveness indicator**
- PBRS in Snohomish County assessed

**Key:**
- Improve outreach and technical assistance to rural residential landowners
- Explore Public Benefit Rating System (PBRS) in Snohomish County and target outreach of PBRS in King County

**Notes:**
1. Number of partnerships between existing nurseries/tree suppliers and existing programs
2. Number of trees planted
3. Forest cover in rural residential areas
4. Number of devices installed following call for assistance
5. Number of permits to trap (and kill) following calls for assistance
6. Extent of beaver ponds in areas important for storage and recharge
7. Assessment of public benefit provided by parcels enrolled in the Open Space General category in order to transition to PBRS
8. Creation of a PBRS point program or improvement of existing criteria
9. Number of parcels enrolled in program
10. Number of focused outreach campaigns to sub-basins with important hydrology/number of enrolled participants
Section 5

AGRICULTURE STRATEGY RECOMMENDATIONS

Farming is a critical cultural and economic land use in the Snohomish Basin that defines many of the rural lowlands and provides food and products for local and regional markets. Most agricultural areas are located in mainstem floodplains, adjacent to many of the focus reaches targeted for capital habitat restoration projects, and also in rural areas.

In the 2005 Plan, one of the primary recommendations was to “work cooperatively with the farming community and individual landowners to identify and implement solutions for salmon recovery.” While many agricultural landowners have supported restoration projects on their lands, the tension has increased since 2005, with increasing resistance by the broader agricultural community to the restoration of historically or currently farmed land into aquatic or riparian habitat. In an effort to address these tensions and to forge a collaborative path forward, there are two efforts underway, one in each county, to balance the needs of fish and farmers and to recognize the pressures that affect each.

In Snohomish County, stakeholders representing the agricultural community, the tribes, and environmental interests formed the Sustainable Lands Strategy with facilitation support from Snohomish County Surface Water Management staff. The goals of the Sustainable Lands Strategy include creating actions on the ground that result in “net gain” for both salmon recovery and agriculture viability. Additionally, the Sustainable Lands Strategy seeks to reduce process friction, streamline permitting, develop multi-benefit funding solutions, and create broad-based support for recovery actions.
With direction from the King County Council embodied in Comprehensive Plan Policy R-650, the Water and Land Resources Division convened the Snoqualmie Fish, Farm, Flood Project Advisory Committee that includes farmers, tribes, non-governmental organizations, and other partners. The Snoqualmie Fish, Farm, Flood Project is using a collaborative process to develop multi-objective strategies for salmon recovery, agriculture viability, and flood risk reduction. The Snoqualmie Fish, Farm, Flood Project Advisory Committee will produce specific recommendations in several areas, including capital projects, programmatic actions or changes to policies, and regulations for consideration by the King County Executive and Council.

The recommendations in this document focus on three outcomes:

- Preventing conversion of farmland to other uses that are more harmful hydrologically
- Improving soil condition and other attributes of farmlands through the application of BMPs to strengthen the farming operation while protecting hydrology
- Increasing funding for assistance programs to improve the financial bottom line for farms, which would, in turn, bolster the economic viability of farming

Clearly, there are strong feedback loops between the three outcomes, as improved economic conditions would also reduce the incentive to convert lands to other uses.

The protection recommendations below seek to identify actions that would benefit hydrology as well as ongoing agricultural practices.
Permanently Preserve Farmland

Conversion of farmland often results in more infrastructure and increased impervious surfaces such as rural residential homes or smaller estates. The most important recommendation for agricultural areas is to keep farmers farming by maintaining their business viability.

While transferring development rights and maintaining agricultural zoning are ways of protecting agriculture, they do not solve complex issues that exist between salmon recovery and agricultural viability. Challenges for farms and salmon recovery, such as drainage regulations, the ability to site future restoration projects in large mainstem floodplains, and ramifications of easement programs for salmon habitat, would not be addressed by preventing conversion. Two efforts, the Sustainable Lands Strategy and Fish Farm Flood groups, are exploring solutions that balance all interests.

**Action: Permanently extinguish development rights in agricultural areas through TDR and PDR**

TDR and PDR may provide the best opportunities to permanently protect farmland from conversion to residential housing or other uses that would degrade hydrologic function, at least in areas outside of floodplains that may otherwise be vulnerable to conversion. In floodplain areas, these same tools can be used strategically to prevent subdivision of large blocks of farmland into “estate” farms, while recognizing that having smaller blocks of farm land on the market can make it easier for new farmers to get started. Both King and Snohomish Counties currently have TDR and PDR programs in place. These efforts could be expanded through partnerships and additional funding. For PDR, which is a relatively expensive protection mechanism when applied in areas with residential or commercial development potential, emphasis should be placed on securing a
stable, adequate level of funding to acquire permanent conservation easements on commercially and hydrologically important farmland. For TDR, emphasis should be placed on encouraging market demand for TDR credits through local development codes and identifying/designating sending areas where the land has significant conservation value and landowners are willing to sell permanent easements at fair market price.

*Effectiveness Indicators:*

- Number of acres of farmland with permanently extinguished development rights

*Focus areas:*

Effort should be placed on developing a strategy that identifies priority agricultural lands to preserve based on hydrologic value, agricultural value, risk of conversion, and impact of climate change.

*Provide Technical Assistance to Farmers*

There are many groups already providing technical assistance to farmers, including the Snohomish Conservation District, Snohomish County, the King Conservation District, King County, the Natural Resource Conservation Service (NRCS), and Washington State University (WSU) Extension. These groups conduct site visits and provide technical expertise on soil management, pasture management, nutrient application and management, invasive species control, buffers and filter strips, drainage assistance, and other BMPs.

The Washington State Conservation Commission and Puget Sound Partnership have worked with interested and affected stakeholders to evaluate the effectiveness of voluntary incentive
programs in Washington (ICF 2014), and these recommendations build off their regional recommendations for next steps.

**Action 1: Support development of farm plans and cost-share programs**

Technical assistance offered, in part, through farm plans results in the application of BMPs that support stewardship of natural resources, most of which benefit hydrologic processes. Farm plans, in particular, provide a comprehensive plan for a property that addresses multiple resource concerns. A property owner may have identified one issue they need help with, but technical assistance providers engage a landowner in a broader discussion of their property. In addition to recommendations that improve water quality and wildlife habitat, these plans focus on practices that improve soil health, which can reduce compaction and provide improved infiltration.

In King County, the adoption of a farm plan provides the landowner with increased flexibility in certain farm-related regulations. Many farmers seek out farm planning support voluntarily. However, property owners in both counties are also referred to conservation districts by regulating agencies to encourage BMP implementation as a non-regulatory pathway to achieving compliance. If property owners choose not to work with conservation districts to implement measures voluntarily, they may be subject to compliance enforcement.

Inadequate funding for farm planning and technical assistance limits organizations’ ability to provide these services more broadly. There are several funding sources that provide cost-share for project implementation, but these do not provide the staff time necessary for outreach to and education of these landowners in the process leading up to project implementation.
King Conservation District was recently able to increase its tax assessment dollars that enable it to provide this technical assistance more consistently and comprehensively. If Snohomish Conservation District is able to increase its assessment amount, it would significantly increase the ability to provide much needed technical assistance and farm planning and also cost-share funding for project implementation.

There are also capacity issues in processing farmers’ applications, resulting in long wait times to enroll in programs and some loss of interest in participation due to timelines. Regularly used cost-share programs include Farm Bill programs through NRCS and the Farm Service Agency, such as the Agricultural Conservation Easement Program, the Conservation Stewardship Program, the Environmental Quality Incentives Program, and the Conservation Reserve Enhancement Program. Additional local and state dollars are also available through grants, conservation districts, the Washington State Conservation Commission, and county programs.

Cost-share funding sources can be extremely competitive in the state and are often prioritized by impact to water quality or salmon habitat. For this reason, projects to manage pollutants, install exclusion fences, and plant buffers on properties located along streams receive a large portion of the funding. Away from streams and riparian areas, conservation districts often recommend implementation of BMPs on properties but may or may not be able to secure cost-share funding to help the landowner complete them. This could be one major reason BMPs are not installed as often in sites located away from waterways, even though those sites also contribute to properly functioning hydrology. In addition, because many BMPs can be extremely costly and cost-share funding sources rarely cover
100% of expenses, farmers usually cannot afford to pay their portion of project installation costs.

*Effectiveness Indicators:*

- Number of farmers who request site visits
- Number of farmers who implement farm plans
- Number of farmers who implement BMPs
- Number of BMPs implemented
- Length of time in backlog for enrolling in cost-share programs

**Action 2: Educate and assist farmers in qualifying for easement and tax reduction programs**

Both King and Snohomish Counties, both conservation districts, the U.S. Department of Agriculture Farm Service Agency, American Farmland Trust, PCC Farmland Trust, Stewardship Partners, the Mountains to Sound Greenway Trust, and Forterra work with landowners to identify tax reduction and easement programs for which farmers could qualify. These programs could include King County’s Farmland Preservation Program, the federal Conservation Reserve Enhancement Program, Agricultural Conservation Easement Program, Wetlands Reserve Program, Open Space Taxation, and the state Farm and Agriculture CUT Program. By supporting farmers in qualifying for these programs, the features on farm properties that support intact hydrology would be protected and improved.

*Effectiveness Indicators:*

- Acres enrolled in easement programs
- Number of acres enrolled in the Farm and Agriculture CUT Program
- Number of farms (and acres) where development rights have been extinguished
Focus Areas:
The biggest gaps for technical support and easement programs currently are agricultural lands with no riparian areas outside of the floodplain. Many of these areas support smaller farms and livestock pastures. These property owners are the most difficult to access due to the large numbers of properties, lack of regulatory oversight, and lack of water quality infractions. However, the properties play an important role in drainage and infiltration and water quality.

Support Technical Innovations that Have Conservation and Economic Benefits in Agricultural Areas

Improving the protection of hydrology would take innovation as well as traditional protective action. Farmers are faced with having too much water in the winter and drought conditions during the summer, resulting in drainage and irrigation challenges. Innovative approaches may be the key to managing water in a way that allows for drainage and storage solutions. There are few examples of projects that have tested new technologies and have resulted in gains for fish and farms. These projects are testing creative solutions and technologies that benefit all interests.

An example of a win-win innovative project focused on water quality is the Qualco Digester project. This project resulted in both environmental and economic gains. In the early 2000s, the lower Snoqualmie was suffering from poor water quality, due in part to local dairy operators. In an unusual partnership, a non-profit organization was formed by Northwest Chinook Recovery, the Tulalip Tribes, and the Sno/Sky Agricultural Alliance, which is directed by five local dairymen and one cattle farmer. Qualco’s aim was to solve the water quality problem in a collaborative way where farmers and fish profited. The result
of the partnership was the installation of an anaerobic digester that received dairy waste, processed it into compost, and generated electricity to sell back to the grid. Local farmers who participated in the project were able to resolve their waste management issues while improving point source water quality in adjacent streams. These types of creative solutions should be expanded in the Basin.

**Action: Seek funding and support pilot innovation projects**

One example of a possible pilot innovation project is the working buffers approach being promoted by the Snohomish Conservation District in which agroforestry practices are incorporated onto farms as a way to expand riparian buffer function and diversify income sources for farmers. An alley cropping system, for example, could involve rows of trees that are harvested for nuts/fruit or timber with a traditional crop grown in-between. A more densely forested area could be thinned for timber while also growing high-value shade crops such as medicinals, spices, and mushrooms. Incorporating trees into an agricultural landscape increases soil organic matter and infiltration rates while also increasing soil moisture in times of drought.

Water drainage is a persistent issue for farmers and productivity. There are several innovative ideas that could help farmers drain water from their properties efficiently with the best practices for hydrology in mind. An example involves increasing water storage on farmland by placing valves at the end of drain tiles and the downstream end of ditches. Farmers would be able to lower water levels in the spring to allow for planting but would continue to hold and/or release additional water throughout the summer low flow months. This could provide benefits to both farmers and instream flows. The operations of pump stations could also be investigated to improve hydrological outcomes.
while still allowing farmers to manage their lands for productive crops.

None of the techniques described above have been piloted with salmon recovery goals in mind in the Snohomish Basin, so their environmental benefits have not yet been demonstrated. However, this type of creative thinking could encourage win-win solutions in the future, which benefit hydrologic function for salmon and water availability for farmers, namely drainage and irrigation.

Effectiveness Indicators:

- Number of innovative pilots
- Adoption of new techniques that improve hydrology in agricultural areas

Focus Areas:
Focus areas depend heavily on the types of issues that are being solved for farmers and hydrologic function. Working buffers could be applied to many different agriculture areas while issues involving drainage solutions would likely be limited to floodplains.

Develop Water Banks or Similar Mechanisms to Promote Conservation and Best Use of Irrigation Rights

Water banks are a mechanism developed at a watershed level in order to facilitate the legal transfer and market exchange of various types of surface, groundwater, and storage water rights. A water bank purchases water from willing sellers and then holds, transfers, and exchanges water rights on behalf of willing buyers. The seller can be anyone who holds a water right, and the buyer can be anyone who needs to mitigate for a new water use or restore instream flows. A bank can also facilitate
transactions to place water rights in trust to benefit stream flows without risking the loss of the right to the owner due to lack of use. Perhaps most importantly, water banks create the place to have conversations at a community scale about current rights and the needs of irrigators and instream conditions.

Water banks can be formed by districts or privately. Water banks have to follow all Ecology processes associated with making changes to existing rights, such as changes in the type of beneficial use, the area of use, or the point of diversion. These banks can work with landowners to put rights into trust through the state, in order to avoid the disincentive of “use it or lose it.”

**Action:** Develop water banks and facilitate conservation discussion within

Currently, one water bank program has been initiated in the Basin, in an effort led by the proposed new Snoqualmie Valley Watershed Improvement District, facilitated by the Snoqualmie Valley Preservation Alliance. The program has had several pilot water transfers. Each transfer starts with validation of the legal water right. New users of the right are subject to stricter use conditions, including compliant fish screens, hydraulic project approvals from WDFW, and metering of water use. The proposed water transfers in the Snoqualmie are expected to improve irrigation efficiencies, allowing farmers to either reduce their water usage for current crop production or to maintain the same water usage while increasing production.

Although the goal of this water bank is to support agricultural out-of-stream uses, it is conceivable that water banks could provide a framework to have conversations about conservation goals as well. Water banks could create the mechanism for water rights to be leased or purchased for conservation purposes.
in years of drought when instream flows are critically low. In addition, they could generally encourage water conservation by assigning value and/or monetizing irrigation water use.

Water banks could also facilitate movements of device points (points of diversion and withdrawal) to locations that benefit the ecology of the stream (e.g., moving from surface to ground, where it is deemed beneficial to fish). This has been done successfully elsewhere in the state.

Effectiveness Indicators:
- Number of transactions through water banks
- Number of transactions intended to augment instream flows

Focus Areas:
All areas with hydrologically connected floodplains in agriculture: lower Pilchuck, lower Snohomish, lower Skykomish, and lower Snoqualmie.
Agriculture Protection Strategy

Permanently preserve farmland

- Agricultural owners willing to sell development rights in high hydrologic values are identified
- Buyers in TDR/PDR market identified
- Transaction completed
- Development rights extinguished
- Runoff from residential and commercial lands have less impact

Provide technical assistance to farmers

- Farmers in areas with high hydrologic value identified
- Easement and tax reduction opportunities identified
- Farm planning assistance offered
- Cost share opportunities identified and applied for
- Farmers enroll in tax reduction and easement programs
- BMPs implemented

Support technical innovations that have conservation and economic benefits in agricultural areas

- Hydrologic conditions (e.g., flooding or drought) that affects both fish and farms were identified
- Pilot solutions developed (e.g., drain tiles, pump improvements)
- Successful pilots expanded
- Annual and perennial non-timber crops have less impact
- More water is permanently designated for instream use

Develop water banks or similar mechanisms to promote conservation and best use of irrigation rights

- Water rights holders are educated
- Water rights holders are aware of water banking, water rights acquisition, and water trust programs
- Water rights holders understand they do not have to use it or lose it in those programs
- Water rights transactions
- Efficiencies in water appropriation are identified
- Water rights are identified for lease or purchase
- Water withdrawals decreased

Key:
- Strategy recommendation
- Recommended action
- Expected outcome
- Pressure reduction outcome
- Ecosystem component
- Effectiveness indicator

1. Number of acres of farmland with permanently extinguished development rights
2. Number of farmers who request site visits
3. Number of farmers who implement farm plans
4. Number of farmers who implement BMPs
5. Number of BMPs implemented
6. Length of time in backlog for enrolling in cost-share programs
7. Acres enrolled in easement programs
8. Number of acres enrolled in the Farm and Agriculture CUT Program
9. Number of innovative pilots
10. Adoption of new techniques that improve hydrology in agricultural areas
11. Number of transactions through water banks
12. Number of transactions intended to augment instream flows
Section 6

FORESTRY STRATEGY RECOMMENDATIONS

In 2005, approximately 75% of the Snohomish Basin land base was forested. More than half of this acreage was in federal ownership with the remaining acreage owned by a variety of individuals and entities, including private small forest landowners, private industrial timber companies, DNR, counties, and cities. Today, commercial forestry is still an important economic engine in both Snohomish and King Counties. Many of the communities in the upper watershed have a strong cultural connection to the Basin’s logging history as well as current operations.

Forests play a crucial role in hydrology. Areas high in the Basin have large areas of aquifer recharge zones, and wetlands, and are virtually free of impervious surfaces. Tree cover helps support interception and slow water flowing into stream networks. Current regulations provide protection for aquifer recharge areas, wetlands, unstable slopes, riparian buffer, and contiguous cover. However, protection provided by these regulations is only as effective as the information that is used to implement them.

In the last 15 years since the 2005 Plan was written, there have been notable changes in Snohomish Basin forestry. In 2004, King County acquired development rights from more than 90,000 acres of commercial forest in the Snoqualmie Basin. The Roads Maintenance and Abandonment Plan, led by DNR, tasked forested landowners to map and treat all forest roads subject to Forest Practice Rules by 2016. Many agencies and organizations, including the Counties, DNR, the Family Forest Fish Passage Program, WSU Extension, and others, have worked...
to assist SFLOs with timber stewardship in order to implement BMPs and keep land from being converted.

In King County, the County Council and Executive formed the Rural Forestry Commission. This 13-member Commission is tasked with advising King County government on policies and programs that affect rural forestry, ranging from industrial owners to SFLOs. The Commission helps those working in King County to coordinate efforts and address issues facing forestry with input from a broad range of forestry stakeholders. In Snohomish County, the Executive’s Economic Development Office is working to develop a “Focus on Forestry” forum. This group would support ongoing needs assessment for forestland owners, and explore solutions to help keep forestry economically viable.

Even with ongoing work, forestry is declining in the Snohomish Basin and between the years 2005 through 2012, 2,152 acres were converted from forest lands to other purposes incompatible with continued forestry (measured by formal forest practices permit applications). During the recession, development slowed considerably; with the end of the recession, there will likely be additional pressures on forested areas. Between 1988 and 2004, more than 100,000 acres of forestland in King and Snohomish Counties were converted to either developed land or agriculture (Earth Economics 2010). A 2009 study by the University of Washington’s School of Forest Resources found that more than 150,000 acres of private forestland in the Snohomish Basin were at “high risk” of conversion (University of Washington School of Forest Resources 2009).

The recommendations below support the development of better information in forested areas and propose increased support to
SFLOs who are often most vulnerable to the rising risk of conversion as the economy improves.

**Permanently Conserve Working Forestland**

Due to declining forest cover and the increasing threat of conversion, the first recommendation is to use existing tools to extinguish development rights and keep a majority of the watershed in a healthy forest condition.

*Action: Permanently extinguish development rights in forested areas through the TDR, PDR, or acquisition programs such as the U.S. Forest Service Community Forest Programs*

TDR/PDR programs have already been successful in areas of the Snoqualmie Basin and in Snohomish County (the recent Hidden Valley Camp transfer). The TDR/PDR market should continue to be encouraged, particularly in areas adjacent to existing development. The Community Forest Program is a grant program that authorizes the U.S. Forest Service (USFS) to provide financial assistance to local governments, tribal governments, and qualified non-profit entities to establish community forests (through fee simple acquisition) that provide continuing and accessible community benefits.

*Effectiveness indicators:*

- Number of forested parcel TDR/PDR transactions

*Focus areas:*

Industrial landowners who are willing to sell development rights on large tracts of lowland forest (e.g., Hancock property in Snohomish County), SFLOs adjacent to existing development, and properties with high hydrological value.
Increase Coordinated Outreach, Incentives, and Technical Assistance to SFLOs

SFLOs in the Snohomish Basin are located in areas zoned for forestry, rural residential areas designated for forestry, and in rural residential areas that simply have larger parcels with forest cover. Often, in areas designated for rural residential, there are several land uses on forested properties, including housing, forestry, and in some cases, agriculture.

Due to growing populations and expanded development, many small forested properties are increasingly vulnerable to conversion to other land uses. This has raised concerns that the continuity of knowledge on how to manage stands may be lost, increasing the chances that forest stewardship would cease and land use would change.

The actions below are intended to prevent conversion of forested lands to other uses. They are also intended to help property owners actively manage for healthy forests, which in turn would support intact hydrologic functions.

Action 1: Coordinate and target outreach to SFLOs

WSU Extension, DNR, and King County have created outreach materials that describe options and programs that SFLOs may be eligible for. Although there is coordinated outreach in King County, there is currently no coordinated approach to engaging forest landowners throughout the entire Snohomish Basin.

Most of the contact with SFLOs comes after landowners reach out to the counties for help. In order to better focus on the SFLOs who need the most assistance, outreach should be targeted to: 1) specific areas, such as basins with hydrologic importance; 2) categories of SFLOs, such as those who have had recent ownership changes; or 3) those that are at high risk of conversion. The target areas could be recommended through
the Rural Forest Commission in King County and Focus on Forestry in Snohomish County. Outreach efforts could be expanded and improved through coordination with WSU Extension and the Conservation Districts.

**Effectiveness Indicators:**
- Development of criteria for where outreach should be targeted
- Identification of SFLOs properties for outreach

**Action 2: Support development of expanded education, technical training, Forest Stewardship Plans, and cost-share programs**

The SFLOs in Snohomish Basin are currently underserved. Although King County, King Conservation District, Snohomish Conservation District, DNR, and WSU Extension are conducting outreach and providing technical assistance, there is opportunity to increase the coordinated approach to help interested SFLOs access education resources and technical training, develop Forest Stewardship Plans, or apply for cost-share opportunities. Building on Action 1, the groups working to provide assistance should help landowners with available resources.

Forest Stewardship Plans help SFLOs assess the condition and health of their forests, identify potential problems, and develop management approaches to meet future goals. DNR currently lacks the funding necessary to provide a free advisory site visit for forestland owners who have 10 or more acres, which is a critical step in SFLO outreach. Forest Stewardship Plans and education often help SFLOs qualify for cost-shares and other incentive programs.
Cost-share programs can help SFLOs cover expenses associated with implementing Forest Stewardship Plans. The Environmental Quality Incentives Program through the NRCS is a current example of a cost-share program that offers many opportunities for forest owners. The Environmental Quality Incentives Program can help to offset costs for restoring buffers and managing soil health.

Effectiveness Indicators:

- Number of Forest Stewardship Plans developed and implemented through DNR’s SFLO office
- Number of SFLOs participating in cost-share programs

Action 3: Educate and assist SFLOs in qualifying for easement and tax reduction programs

In addition to technical assistance and cost-share programs, SFLOs can qualify for easement and tax reduction programs. In Snohomish County, SFLOs are able to reduce their property tax under the Open Space Timberland Program. In King County, SFLOs can apply to the Open Space Timberland program, the PBRS, or the Forestland program. Each has different tax reduction implications and management requirements. Once enrolled in these programs, the landowner would be required to keep land in active commercial management to qualify and would be penalized with back tax payments if they withdrew.

Easement programs include the Forest Riparian Easement Program, and Rivers and Habitat Conservation Easements administered by DNR. DNR also manages the Family Forest Fish Passage Program, a program that provides small landowners with 75% to 100% of the cost to replace fish barriers on their property. Finally, the USFS Forest Legacy Program works specifically to protect private timberlands. To maximize public benefits, the program acquires conservation and recreation
easements. The above programs could provide more benefit to SFLOs if funded to a level that allowed broader availability.

**Effectiveness Indicators:**

- Number of SFLOs enrolled annually in tax reduction programs
- Number of SFLOs enrolled annually in easement programs

**Focus Areas:**

Focus areas need to be developed as part of Action 1.

**Collect High Resolution LiDAR throughout the Entire Basin and Coordinate Data Collection and Sharing Efforts**

Light Distance and Ranging (LiDAR) is an active remote sensing technology that creates highly accurate distance measurements. These horizontal and vertical measurements can provide precise spatial resolution (within 3 feet) and information on features such as specific trees. With high quality LiDAR, it is possible to see stream networks and drainage patterns on areas proposed for harvest. This information can help regulators and land managers better understand what features need to be verified on the ground, in order to apply the appropriate regulations. LiDAR also provides the ability to evaluate forest stand structure, possible unstable slopes, and basic wetland features. In areas that have already been harvested, compliance with regulations can be evaluated. LiDAR can provide information that supports models that can be used to predict future conditions caused by climate change in the forested landscape. Finally, LiDAR has many applications outside of the protection of hydrology, including timber inventory assessments, floodplain mapping, road construction and decommissioning, and wildlife habitat identification.
**Action: Develop high quality LiDAR for the entire Basin and coordinate data collection efforts and data sharing**

The different resolutions of LiDAR information across the Snohomish Basin limit the ability of managers to remotely assess on-ground information. With better resolution, local managers and regulators could better assign limited staff resources to on-ground reviews and verification. The primary cost of collecting LiDAR is to pay for the airplane flight and data processing. If agencies, such as counties, the state, and USFS, could coordinate to pool resources for one flight, the cost would be greatly reduced to each. This coordinated approach could also result in cooperative sharing of information, as with the Puget Sound LiDAR Consortium.

*Effectiveness Indicators:*

- LiDAR obtained

*Focus Areas:*

Much of Snohomish County’s LiDAR coverage is relatively high quality, though it is incomplete in the upper federally-owned portion of the watershed. King County, while complete, currently has lower quality/resolution LiDAR data in the majority of the forested landscape, which limits the usefulness of the data.

*Expand Water Typing Efforts and Resources*

Water typing is the state-sanctioned process by which the locations of streams and waterbodies, and fish habitats within them, are mapped; it is described in WAC 222-16-031. DNR’s regulatory water-typing maps show stream reaches classified as “fish bearing” (F) or “non-fish bearing” (N). Reach classification is used to determine the type of streamside buffer required to protect waterbodies from impacts from adjacent forest practices.
Stream reaches typed “F” receive larger protective buffers than stream reaches typed “N.” Most local governments throughout Puget Sound use the same or a similar water type classification system to determine the amount of protection that streams receive through critical areas ordinances.

DNR acknowledges that their modeled water type maps are inaccurate and advises against using them without field verification. Field data demonstrate that in some western Washington watersheds, more than half of the streams are misclassified, mismapped, or unmapped (Wild Fish Conservancy 2007). This is significant as inaccurately mapped or typed stream reaches may not receive the protection they warrant under existing regulations.

WDFW has cautioned against the use of DNR water type maps outside of regulated forest practices because of their demonstrated inaccuracies (Knight 2009). Similarly, the Washington Department of Commerce adopted WAC 365-190-130, which states “Counties and cities … should not rely solely on DNR maps of these stream types for purposes of regulating land uses or establishing stream buffers.” Still, DNR water type maps are widely used in some local and state government planning efforts, as they are often the only tool available and agencies often lack the capacity to consistently review and correct them. Low-relief landscapes like those found throughout the Puget lowlands are precisely where DNR modeled water-type map errors are greatest; this is true because the model relies in part on a coarse digital elevation model, not LiDAR.

Proactively performing field surveys to ground truth and correct DNR’s regulatory water type maps is fundamental to responsible growth and resource management planning. Accurate water
type data would improve state and local governments’ ability to use existing environmental regulations at the site scale to effectively protect intact watershed habitats and processes.

**Action 1: Expand ground truthing of current water types in areas not regulated by DNR**

Groups, such as Wild Fish Conservancy, currently have priority areas in the Snohomish Basin that should have water types validated. The continued updates should be supported in the Basin. Additionally, through the course of permit applications, in the case where the water type is found to be wrong, counties should work through the DNR process to formally update maps to help with accuracy in future land use decisions.

*Effectiveness Indicators:*

- Sub-basins with updated stream type layers

**Action 2: Connect local jurisdictions with robust stream typing resources**

Another way to ensure that streams are properly typed is to add capacity to local jurisdictions’ planning departments. It is important for qualified personnel to do the typing, and use of DNR’s regulatory water type maps that have not been validated should be discouraged. Tribes and non-profit organizations, such as Wild Fish Conversancy, could be connected to planning departments directly and serve as an “on-call” technical resource.

*Effectiveness Indicators:*

- Sub-basins with updated stream type layers
- Number of agreements between small jurisdictions and water typing experts
**Action 3: Increase organizational capacity for water typing in the Snohomish Basin**

There are many situations in the Snohomish Basin where staff are asked to make determinations of water type and subsequent regulatory decisions without proper training. Local government staff should seek protocol training if they intend to review or use water type maps.

**Effectiveness Indicators:**

- Sub-basins with updated stream type layers
- Number of local government staff qualified, with proper training credentials, to determine water types

**Focus Areas:**

Currently, because areas regulated by DNR (Forest Practices Act) have validation requirements, the focus of this strategy should be in rural residential areas and local jurisdictions.
### Forestry Protection Strategies

1. **Permanently conserve working forestland**
   - Forest landowners willing to sell development rights in high hydrological value areas are identified
   - Buyers in TDR/PDR market identified
   - Transaction completed
   - Development rights extinguished

2. **Increase coordinated outreach, incentives, and technical assistance to small forest landowners**
   - Privately owned small forested areas with high hydrologic value identified
   - Targeted and coordinated outreach conducted
   - Easement and tax reduction opportunities identified
   - Forest owners enroll in easement and tax reduction programs
   - SFLOs do not convert land
   - BMPs implemented
   - Runoff from residential and commercial lands have less impact
   - Altered flows from land cover minimized

3. **Collect high resolution LiDAR throughout the entire basin and coordinate data collection and sharing efforts**
   - Coordination reduces cost of collection
   - Areas with low quality data are improved
   - Information about sensitive hydrologic features is improved
   - Information used for modeling future conditions is improved
   - Better information exists for decision making
   - Logging and wood harvest impact reduced
   - Degradation of features that support intact hydrology minimized

4. **Expand water typing efforts and resources**
   - Stream layer information updated
   - Water typing resources available and used
   - Water typing capacity expanded in basin
   - Stream layer information updated
   - Appropriate regulation applied in harvest and clearing applications
   - More appropriate functional buffers applied to sensitive hydrologic resources (buffers, wetlands)

5. **Support development of programs and coordinate and target outreach to small forest landowners**
   - Forest Plan assistance offered
   - Cost share opportunities identified
   - Forest owners enroll in easement and tax reduction programs

6. **Educate and assist small forest landowners in qualifying for easement and tax reduction programs**
   - Easement and tax reduction opportunities identified
   - Forest owners enroll in easement and tax reduction programs
   - Participants in cost-share programs

7. **Number of Forest Stewardship Plans developed and implemented through DNR’s SFLO office**
   - Number of SFLOs enrolled annually in easement programs
   - LiDAR obtained
   - Stream layer information updated

8. **Number of SFLOs participating in cost-share programs**
   - Sub-basins with updated stream type layers

9. **Number of SFLOs enrolled annually in tax reduction programs**
   - Number of agreements between small jurisdictions and water typing experts
   - Number of local government staff qualified, with proper training credentials, to determine water types

10. **Number of local government staff qualified, with proper training credentials, to determine water types**

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**Key:**
- **Golden Hexagon:** Strategy recommendation
- **Light Blue Hexagon:** Recommended action
- **Dark Blue Hexagon:** Expected outcome
- **Light Purple Hexagon:** Pressure reduction outcome
- **Green Hexagon:** Ecosystem component
- **Orange Triangle:** Effectiveness indicator

1. Number of forested parcel TDR/PDR transactions
2. Development of criteria for where outreach should be targeted
3. Identification of SFLOs properties for outreach
4. Number of Forest Stewardship Plans developed and implemented through DNR’s SFLO office
5. Number of SFLOs participating in cost-share programs
6. Number of SFLOs enrolled annually in tax reduction programs
7. Number of SFLOs enrolled annually in easement programs
8. LiDAR obtained
9. Sub-basins with updated stream type layers
10. Number of agreements between small jurisdictions and water typing experts
11. Number of local government staff qualified, with proper training credentials, to determine water types
Section 7
CONCLUSIONS AND PATH FORWARD

It has been 10 years since the 2005 Plan was adopted by the Forum, with broad support of jurisdictions operating in the Basin. Much has been accomplished in the realm of habitat restoration, yet landscape-scale indicators—such as total forest cover and water temperature—continue to show degradation.

The intent of the SBPP process is to provide an update to the 2005 Plan and to serve as planning guidance to achieve greater protection of hydrology and, in turn, salmon habitat. The SBPP and these 2005 Plan updates were developed with the recognition of the need to create watershed and ecosystem resilience in the face of a growing population and changing climatic conditions. Just as restoration relies on partnerships and collaboration, protection of hydrology and habitat cannot be undertaken in isolation or by one entity, group, or agency. As stated by the original chairs of the Forum, “we know that to recover salmon in Puget Sound, we must succeed in the Snohomish Basin.”

Through the SBPP and 2005 Plan update, protection strategies and approaches are offered that can be used to promote the protection or enhancement of hydrology and ecosystem function. The recommendations are consistent with the overall protection approach offered in the 2005 Plan. These recommendations add specific actions and suggested geographic focus in an attempt to make protection more immediately actionable. Many of the protection recommendations and specific actions identified in this document are already utilized in the Basin but could be improved. It is hoped that by tracking protection actions and projects as they are implemented, an
assessment can be made of protection gains or losses so that land use decisions can be better informed.

Alongside this planning guidance, there are several considerations and associated actions that will be needed to ensure the implementation of the SBPP. First is the recognition that the guidance is not considered a mandate and that jurisdictions must consider their broader responsibilities and work plans when considering the recommended approaches. Jurisdictions and recovery partners may adjust the recommendations to best accommodate and complement their existing work. Additionally, all commitments, along with stated caveats, that were made in 2005 continue to hold true in the face of protection updates.

As the Forum and partners move forward with the protection guidance, there are several necessary steps and supporting processes to consider. In the near-term, there are two planning tools to be used to advance strategies. The first, used by the Lead Entity program, is the 4-year work plan. This process has traditionally laid out the 3-year approach, complete with an identified sponsor, goals, and associated costs of large capital restoration projects. The actions laid out in this guidance were developed with an eye toward detail associated with the 3-year work plan. This will allow Lead Entity staff and other partners to track the protection actions, implementing groups, and needed funding in a manner consistent with restoration.

The second process to be considered for implementation is the near-term action list that is developed every 2 years by the Snohomish-Stillaguamish Local Integrating Organization. These actions are eligible for funding through the National Estuary Program and are expected to be advanced in a 2-year timeframe. The protection update recommendations are particularly well
suited to be considered as near-term actions, as they address
habitat and stormwater; two of the region’s three primary
strategic initiatives.

The 4-year work plan and the local integrating organization
process provide immediate vehicles for the implementation of
protection recommendations. However, a longer-term strategic
approach will be necessary to address funding. The effort to
create the best protection recommendations once again
highlighted the need for a comprehensive funding approach that
considers both restoration and protection. Issues such as the
matching of non-traditional sources, increased nimbleness of
funding sources and grant cycles, and incorporating new
information/criteria such as watershed characterization should
inform updated thinking on a funding approach.

The protection recommendations suggest a variety of metrics
that can be used to evaluate the effectiveness of actions over
time. The update does not suggest objectives for these actions
related to participation in programs, protection of a certain
amount of acreage, or goals for the overall condition of
hydrologic status and trends over time. These objectives and
ecosystem goals are related to both protection and restoration
and must be revisited with a larger effort that assesses progress
toward recovery. Currently, the Snohomish Basin (and all
Puget Sound watersheds) are engaged in the Chinook
Monitoring and Adaptive Management Project. This effort will
result in a framework that monitors actions and environmental
outcomes over time. The framework will also identify triggers
for revisiting 2005 hypotheses, assumptions, objectives, and
goals. Through the Monitoring and Adaptive Management
Framework, protection strategies can be specified and associated
objectives and hydrologic goals can be set.
The SBPP assumptions include a hope that planning efforts in the Basin will be better informed and tools and strategies will be adopted by jurisdictions to improve the outcomes for hydrologic and ecosystem function. Improved coordination among stakeholders is key; inter-agency and intra-agency collaboration within the Basin is a good starting point. Funding future planning efforts that promote the integration of watershed management and urban planning would promote the understanding of the land-water connection. In addition, it is important to note that stakeholder engagement and political will are imperative to success. In turn, habitat restoration and salmon recovery efforts will be bolstered by protective actions that stakeholders undertake today and in the future.
Section 8
REFERENCES


