Snohomish County Alternative Mitigation Pilot

Final Report

August 3, 2008

Produced Cooperatively By:

Washington Governor's Office of Regulatory Assistance

Washington Department of Fish and Wildlife

Washington Department of Ecology

Army Corps of Engineers

Snohomish County

City of Everett

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Background

In 2006, the Washington State Legislature allocated funds to the Governor's Office of Regulatory Assistance (ORA) to pilot several approaches to advance alternative mitigation strategies in a watershed context[1]. Such alternative mitigation strategies were first explored by the Transportation Efficiency and Accountability Committee (TPEAC) established by the Legislature in 1991. TPEAC included partners from local, state, federal and tribal governments and private industry, and sought ways to improve the efficiency and environmental effectiveness of permitting processes for transportation and other large capital infrastructure projects. Since the sunset of TPEAC in 2006, the ORA has continued to focus on increasing regulatory predictability, improving the environmental outcomes of regulatory programs, and promoting the efficient use of regulatory resources.

In the Snohomish County Alternative Mitigation Pilot, the Washington State Departments of Ecology (Ecology) and Fish and Wildlife (WDFW) worked on behalf of the ORA and in partnership with Snohomish County, the Army Corps of Engineers, and other relevant local and regional entities. This pilot was designed to contribute to the Governor's regulatory improvement strategy by demonstrating the potential of a watershed-based alternative mitigation approach to both increase the effectiveness of compensatory mitigation and improve the efficiency of permit decision-making. To do so, pilot partners focused on these questions:

- Where are important areas on the landscape for the protection and restoration of watershed processes?
- Where are important areas on the landscape for maintaining or enhancing habitat for wildlife?
- What are important areas on the landscape for achieving salmon recovery?
- How can we use our understanding of these sources of watershed-based information to direct mitigation activities on the landscape?

The watershed-based analyses integrated here can help us understand how to identify strategic sets of actions that address multiple resource needs. Often, our approaches to resource management and recovery are fragmented by topic: aquifer recharge areas, species recovery, wetland and habitat critical areas, and mitigation. Examining how existing scientific data, planning documents, and analytical tools can be used to develop a watershed-based alternative mitigation program is a first step toward the cooperative management of natural resources in Snohomish County/ Water Resources Inventory Area (WRIA) 7. This report summarizes the methods and results of the Snohomish County Alternative Mitigation Pilot and offers suggestions about how to continue working together to incorporate watershed-based information into environmental regulations and ordinances, land use plans, and resource conservation and restoration approaches.

Pilot Description

WDFW and Ecology collaborated with Snohomish County Public Works Surface Water Management Division (SWM Division), Public Involvement/Environmental (PIE), and Planning

[1] Per the 2006 Washington State Supplemental Budget, ESSB 6386, Sec. 128. (9)

and Development Services (PDS); a representative from the Army Corps of Engineers; and a landscape architect from the City of Everett to develop a watershed-based alternative mitigation framework for the area of the WRIA 7 Snohomish River Basin that is below 2500 feet in elevation. The study area is depicted in Figure 1. Pilot participants applied three types of watershed-based information to this watershed-based approach: characterization of watershed processes, wildlife habitat assessment, and salmon recovery planning.

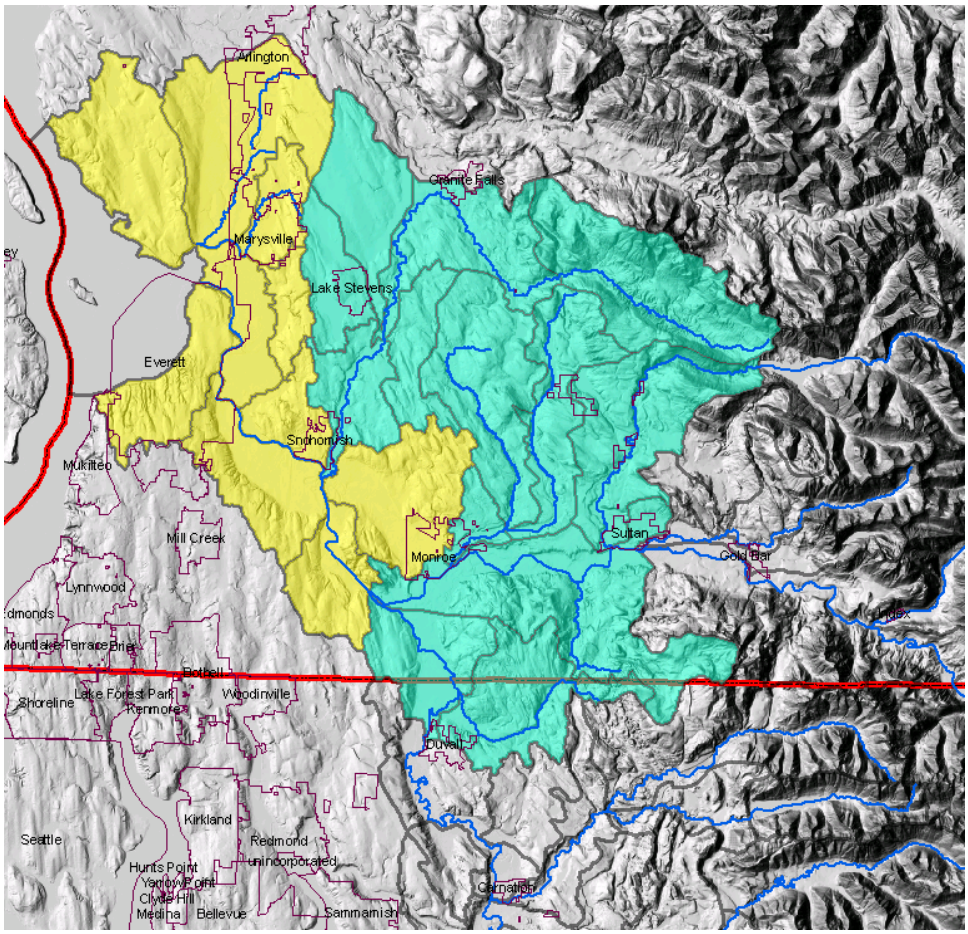

Figure 1. The study area includes coastal (yellow) and upland (green) drainages in WRIA 7 that are below 2500 feet in elevation.

The geographic information outputs of these analyses were used to identify subbasins within WRIA 7 that are priorities for protection and restoration and contribute to the health of multiple regulated resources. Mitigation can then be directed to these areas when appropriate. This approach 1.) provides a science-based foundation for effective and sustainable mitigation within a watershed context, and 2.) may offer efficiencies for the permit applicant by directing them to areas that have the potential to meet multiple permit needs at one site. For example, this approach could identify the most suitable locations for wetland, stream, and riparian restoration/mitigation (including wetland mitigation banks) within a watershed.

This framework is designed to be used to address the mitigation needs of infrastructure development projects or private development projects under various state, local, and federal permits. Land use planners and natural resource recovery planners can also use this framework

to inform the balance of protection and restoration of watershed processes and habitats with future growth, development, and infrastructure in the county.

What Was Done? What Are The Results?

This section briefly describes the methods and results of each of the independent resource analyses, as well as the synthesis of the three analyses.

Watershed Characterization

Methods. The Washington Department of Ecology conducted a watershed characterization of the WRIA 7 study area. Three processes were characterized for Snohomish County: hydrologic, nutrient (Denitrification) and pathogen processes. The characterization identifies areas that are more important in maintaining each process, and the areas that have been most altered. The central assumption to this characterization approach is that the health of aquatic resources is dependent upon intact watershed processes. Scientific studies have shown that watershed processes interact with landscape features, climate, and each other to produce the structure and functions of aquatic ecosystems that society is interested in protecting. For example, flooding by streams can create off-channel habitat that is important for fish. Much of the research concludes that protection, management, and regulatory activities could be more successful if they incorporated an understanding of watershed processes.

In general, this watershed characterization evaluates and compares two attributes of each sub-basin: relative importance of the area for supporting natural processes and relative level of human alteration of those processes. Variables (such as forest cover and percent of impervious surface in the sub-basin) are assigned maximum values of 1, 2 or 3, representing the low, medium, or high importance of a watershed characteristic. Similar ranking is conducted for the level of alteration of a watershed characteristic. The models are constructed so that higher total scores represent sub-basins or basins of greater importance for supporting a process in a watershed, or one with a higher degree of alteration to that process. The scoring is standardized to conditions specific to that watershed or basin. Thus, in general, the models provide a *comparison* of the *relative level of importance and alteration* of process components. The scores do not represent a specific rate (e.g., rate of removal of sediment or nitrogen) or specific level of alteration of a process that can be compared to scores outside of the analysis area, and so the results of the methodology cannot be compared among different watersheds.

The qualitative description for analyzing watershed processes is presented in appendices B through G of Ecology's publication #05-06-027 (Volume 1).

Results. A matrix similar to that presented in Figure 2 is used to synthesize the relative importance and level of alteration of each sub-basin. The matrix is not intended to provide a detailed framework for the protection and restoration of functions at the site scale. Rather, the synthesis map presented in Figure 3 is intended to provide an initial watershed protection and restoration framework at the watershed scale to assist in creating a general watershed-based mitigation framework and to assist in land use planning efforts within the WRIA 7 study area. This map allows decision makers to develop regulatory plans in a framework that focuses first on maintaining or restoring watershed processes.

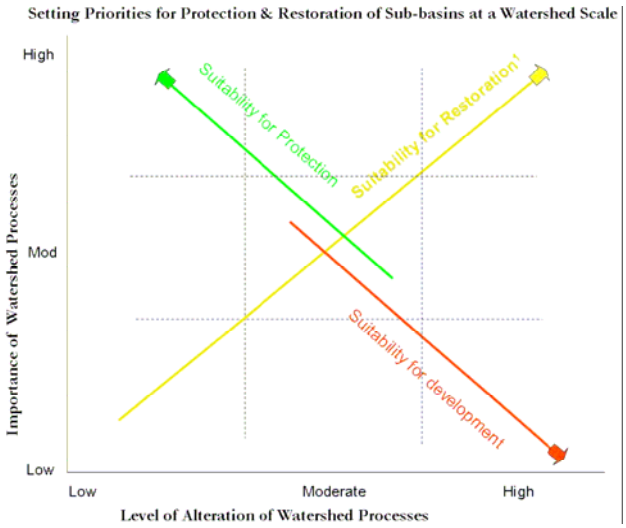

Figure 2. The Analysis matrix is used to identify priority areas on the landscape for restoration and protection.

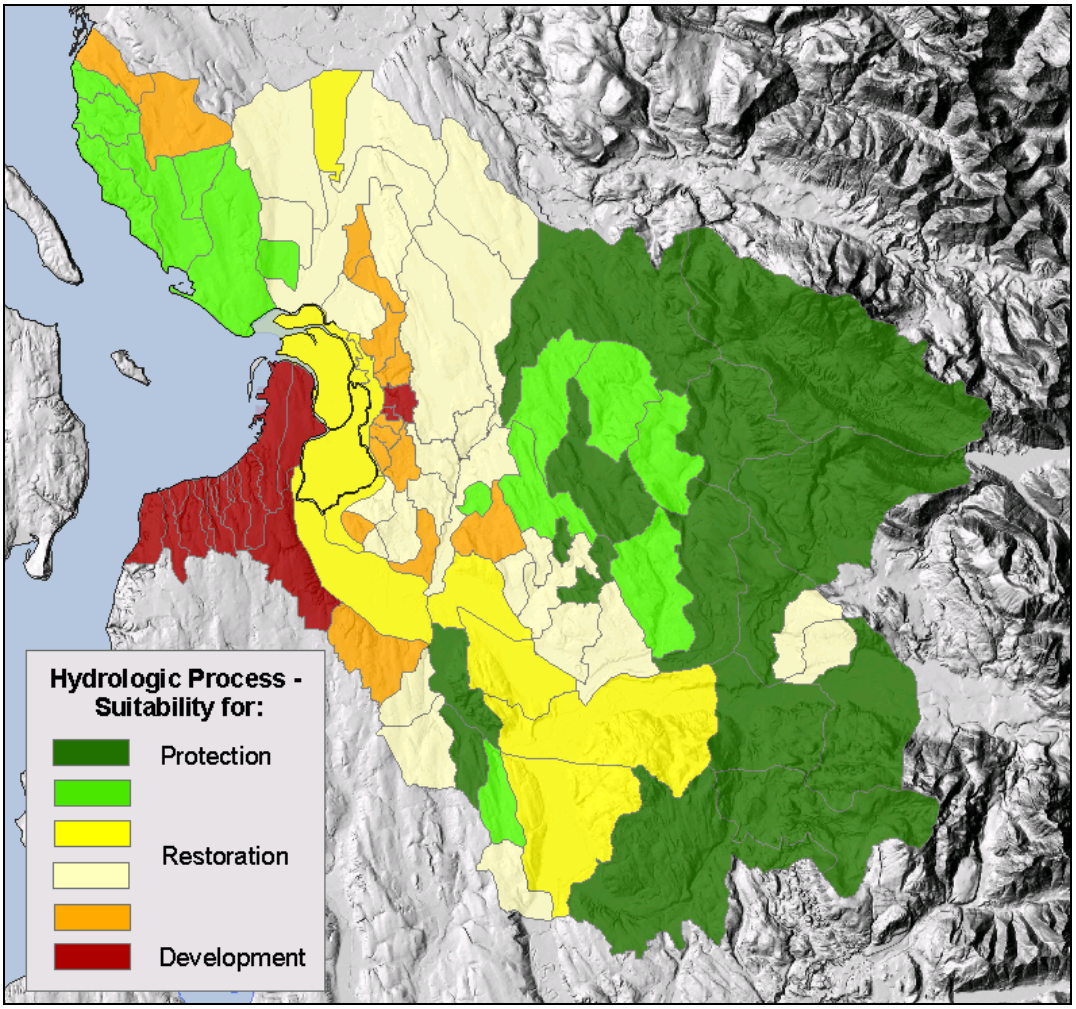

Figure 3. Areas within the WRIA 7 study area that are suitable for protection, restoration, or development.

Local Habitat Assessment

Methods. The Washington Department of Fish and Wildlife conducted a Local Habitat Assessment (LHA) for the WRIA 7 study area. The LHA is a geographic information system (GIS) analysis that uses readily available data layers to examine patterns of development and green space on the landscape and indicate the relative value of the land for wildlife habitat. Several kinds of data are used to create these relative habitat values.

Perhaps the strongest indicator of habitat value is when animals use or have recently used an area, especially areas used by many different species or large numbers of a single species. The primary source of current or recent animals use is the WDFW Priority Habitats and Species database. Priority habitats have unique or significant value to species based on high density or diversity of fish and wildlife, important breeding habitat or seasonal ranges, important movement corridors, or support unique or dependent species (e.g., shrub-steppe habitat supports the Pygmy Rabbit). Another source of data is Ecoregional Assessments, which provide comprehensive, coarse scale rankings of the relative importance of specific areas for maintaining biodiversity.

Records cannot capture animal use every parcel of land, however, and observations of animal use only represent a single point in time. Therefore, the LHA includes factors that affect the *potential* of the land to provide high-quality habitat. A simplified classification of land use and land cover, usually derived from satellite data, characterizes cover vegetation, the size and extent of connections among patches of habitat, and intensity of development. The LHA also includes data about the location, density, size, and traffic intensity of roads. Roads create long lines of interruption in natural vegetation, affecting the ability of animals to move to find foods, mates, and breeding areas.

The WRIA 7 study area was divided into polygons that are 30 meters on a side (roughly one quarter of an acre), and each polygon received a simple, relative numeric rating for each of the data layers described above. The relative ratings for each polygon are then added to provide an overall rating. A polygon of land that receives high values for each data layer will have a high overall rating, while a polygon that receives low values for each data layer will have a low overall rating. This relative rating of polygons of land is the result of the LHA.

Results. The results for the WRIA 7 study area are shown in Figure 4. Generally, sub-basins in the eastern half of the study area provide relatively high value for wildlife. These areas are less developed, and contain larger, connected areas of cover vegetation. The Tulalip Indian Reservation also exhibits relatively high value for wildlife. It too contains larger, connected areas of vegetation, and provides connection to both the Snohomish River estuary and the Puget Sound nearshore. The sub-basins that contain the most urban and suburban development mostly rank low for wildlife value. Such sub-basins include the heavily populated areas around the I-5 corridor, U.S. Route 2, and Lake Stevens. Most of the mainstem of the Snohomish River and a large portion of the Snoqualmie River mainstem show a mixture of wildlife values.

Several details of the LHA deserve particular emphasis. The Snohomish River Estuary receives a relatively high ranking by the LHA. Figure 4 illustrates that, on a broad scale, the Snohomish River Estuary also connects high value habitat on the Tulalip Indian Reservation with medium and high value habitat along the lower and middle mainstem of the Snohomish River. Re-

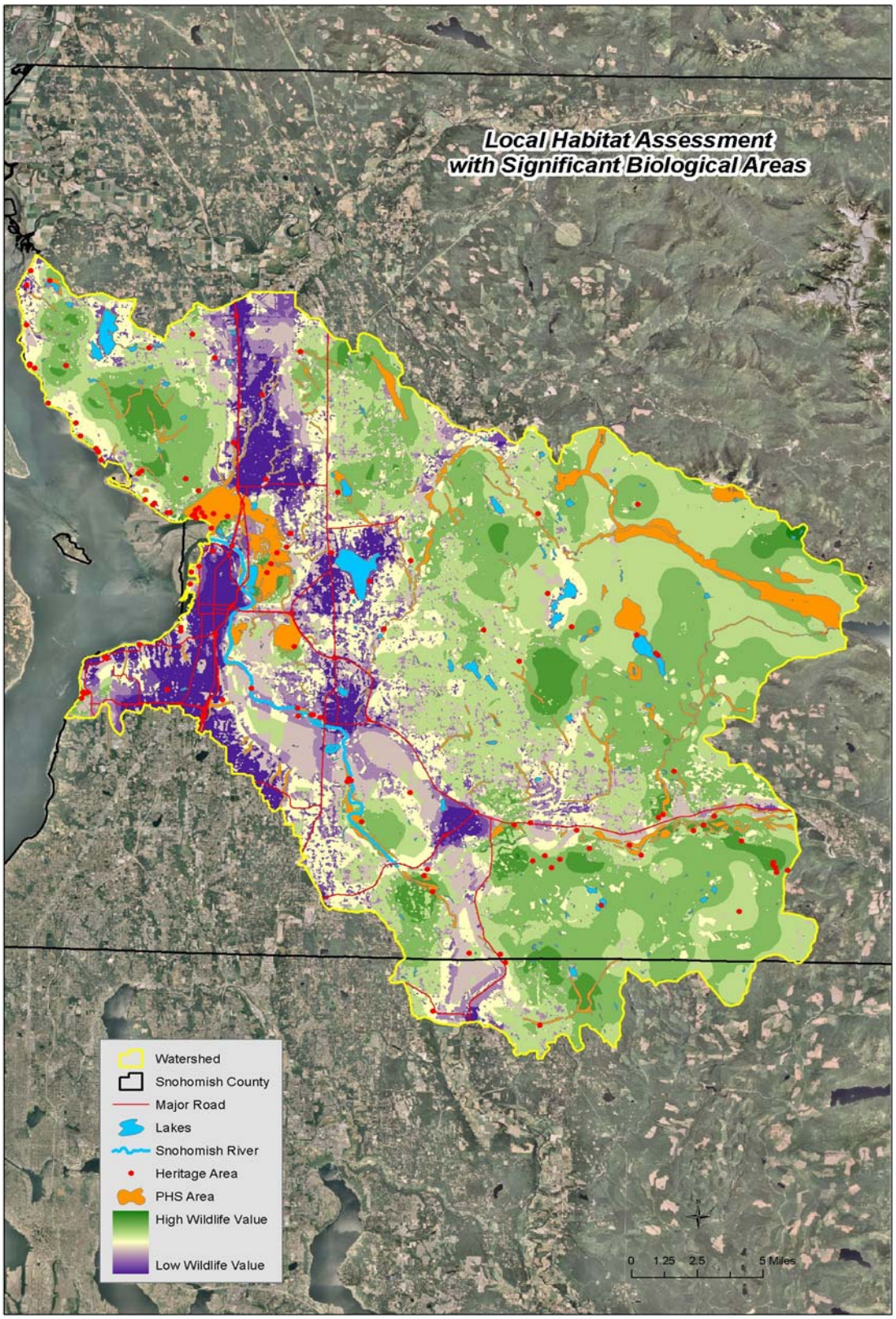

Figure 4. The LHA results in ratings of the relative wildlife value within the WRIA 7 study area.

connecting the floodplain and restoring wetlands would further improve the wildlife habitat value of the estuary, but would also improve the ability of wildlife to move from high value habitat in the upper portions of the watershed all the way to coastal drainages of the Tulalip Indian Reservation and the nearshore of the Puget Sound.

Snohomish River Sub-basin Strategy Groups

Methods. Unlike watershed characterization and LHA, much of the analysis necessary to identify priority areas for fish habitat was already been done in the context of salmon recovery planning efforts. Snohomish County and WDFW have both invested in the production of comprehensive salmon recovery and nearshore planning and data that describe priority areas and actions for these resources (e.g., Snohomish River Basin Salmon Conservation Plan, 2005; Snohomish River Basin Ecological Analysis for Salmonid Conservation, 2004). These plans, data, and maps are the scientific basis for a watershed-based approach to the restoration and protection of fish habitat in WRIA 7.

In the Snohomish River Basin Salmon Conservation Plan, which was completed in 2005, the nearshore and 62 sub-basins of WRIA 7 were sorted into 12 sub-basin strategy groups based on three characteristics: location in the basin, use and potential use by priority fish species (Chinook salmon and bull trout), and watershed process conditions (hydrology, riparian areas and sediment). For each of these 12 sub-basin strategy groups, areas of high and moderate use by salmonids were identified in conjunction with general watershed conditions and recovery needs. Salmon recovery planners recognized that each sub-basin strategy group plays a unique role in helping to recover Chinook salmon and bull trout, and supporting Coho salmon in the Snohomish River basin. Sub-basins within a given sub-basing strategy group will play a similar role in a basin wide conservation strategy. Salmon recovery planners generated recovery hypotheses for each strategy group and recommended recovery actions and their sequence within and among groups.

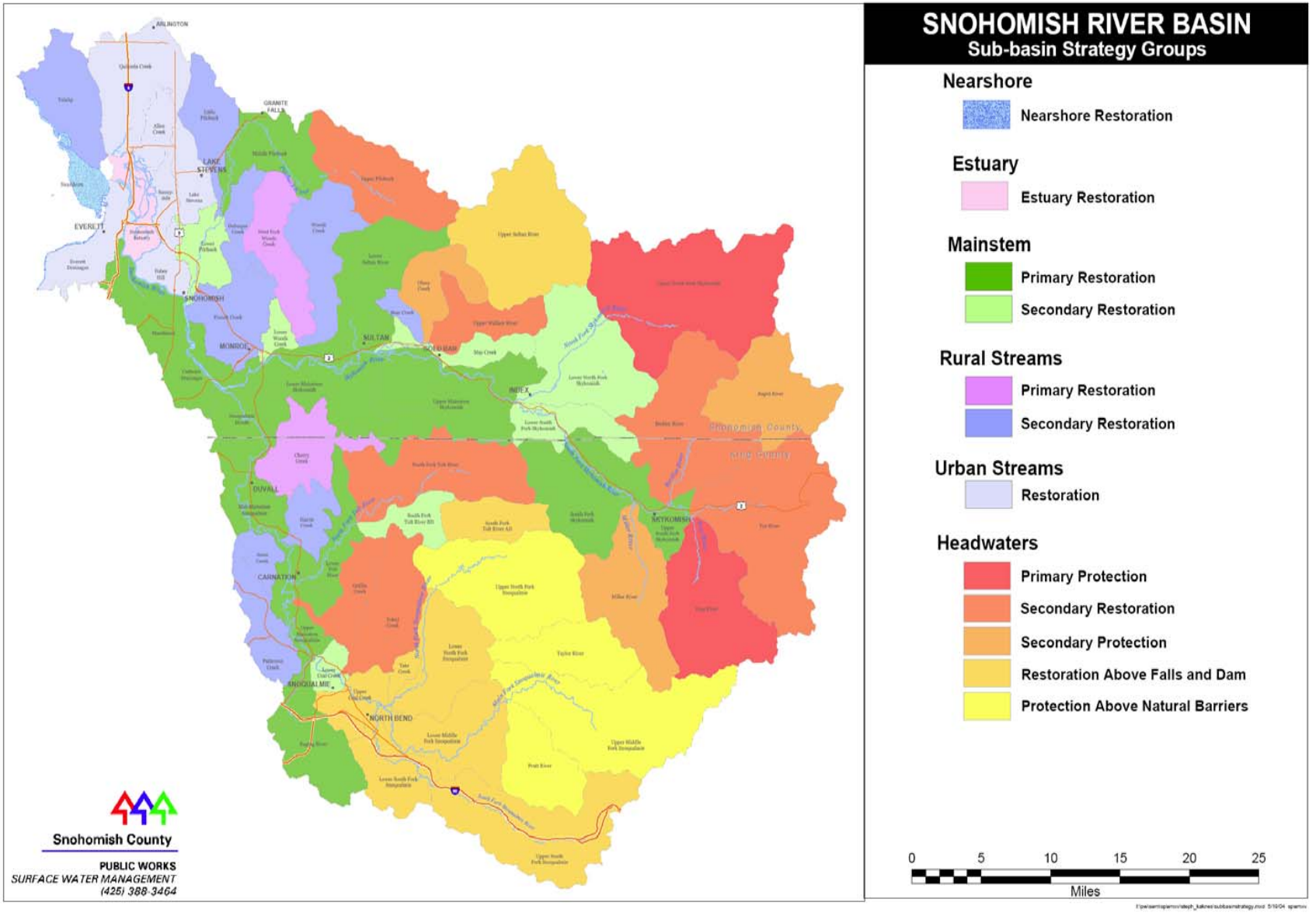

Figure 5. Sub-basin Strategy Groups are categorized according to the role they play in the recovery of salmonids in WRIA 7.

Results. In general, the Snohomish River Basin Salmon Conservation Plan recommends restoration of the Puget Sound nearshore and Snohomish River estuary. Sub-basins are categorized as primary or secondary restoration along the mainstem of the Snohomish River, in urbanized areas, and in some of the rural sub-basins. Protection is reserved for relatively intact areas in the upper part of WRIA 7. Figure 5 shows the sub-basin strategy groups, labeled according to their role in salmon recovery.

Synthesis of Results: A Watershed-Based Management Framework

The results of the preceding analyses were used to develop a general watershed based management framework for the WRIA 7 study area. Figure 6 presents the synthesis of the results of the watershed characterization for hydrologic process, the Snohomish River sub-basin strategy groups, and LHA. This synthesis is discussed in detail in the full technical report attached as Appendix B: Technical Report – Watershed Characterization of Western Portion of Snohomish River Basin. Generally, the following designations and strategies are recommended:

(1) Protection and Restoration (PR). These are the highest priority sub-basins for protection of hydrologic processes and habitat within the study boundaries. Processes and wildlife habitat are performing at relatively high levels with low levels of alteration. Protection and restoration activities should consist of protection of forested areas and reforestation. Restoration activities will have a high probability of success given the relatively intact nature of watershed processes.

(2) Restoration and Protection (RP). These sub-basins were identified as having a lower level of importance for the hydrologic process and a low to moderate level of alteration. Throughout, however, are areas of high habitat value that should receive a greater level of protection. These areas are transitional between higher density urban lands to the west and south and the areas of protection and restoration (PR, above). Activities should include reforestation, restoring hydrology to depressional wetlands and floodplains, and minimizing clearing of existing forest by clustering of new development.

(3) Restoration 1 (R1). This area represents the highest priority lands within the study area for restoring the greatest number of processes (i.e. hydrologic, pathogen and denitrification processes) and having the greatest benefit to fish and wildlife. This area includes the lowland floodplains of the Snohomish, and portions of the Snoqualmie and Skykomish Rivers. Restoration measures consist primarily of re-establishing flooding to the historic floodplain and well-designed restoration of the minimal alterations.

(4) Restoration (R). These areas are of lower restoration importance relative to the R1 sub-basins.

(5) Restoration Urban (RU). The Smokey Point sub-basin has a high level of importance to the hydrologic process but a moderate to high level of alteration. New development should seek to maintain the hydrologic processes within this sub-basin.

(6) Urban Restoration (UR). This grouping includes the Everett peninsula (highly altered with low to moderately important processes) and the Marysville Trough (moderately to highly altered with processes of higher importance). Because the region's new development will be concentrated here, ecosystem processes are likely to continue deteriorating, limiting the effectiveness of site scale restoration activities. Therefore, environmental measures should focus on minimizing impacts to major aquatic resources (e.g. Quilceda, Allen, Pigeon, Japanese Gulch Creeks) and mitigating for impacts to wetlands and streams of lower value in the higher restoration priority areas (R1). The hydrologic processes in the Marysville Trough support the hydrology of Quilceda and Allen Creeks, and should be maintained using low impact development measures that ensure infiltration, percolation and recharge of permeable deposits in the area.

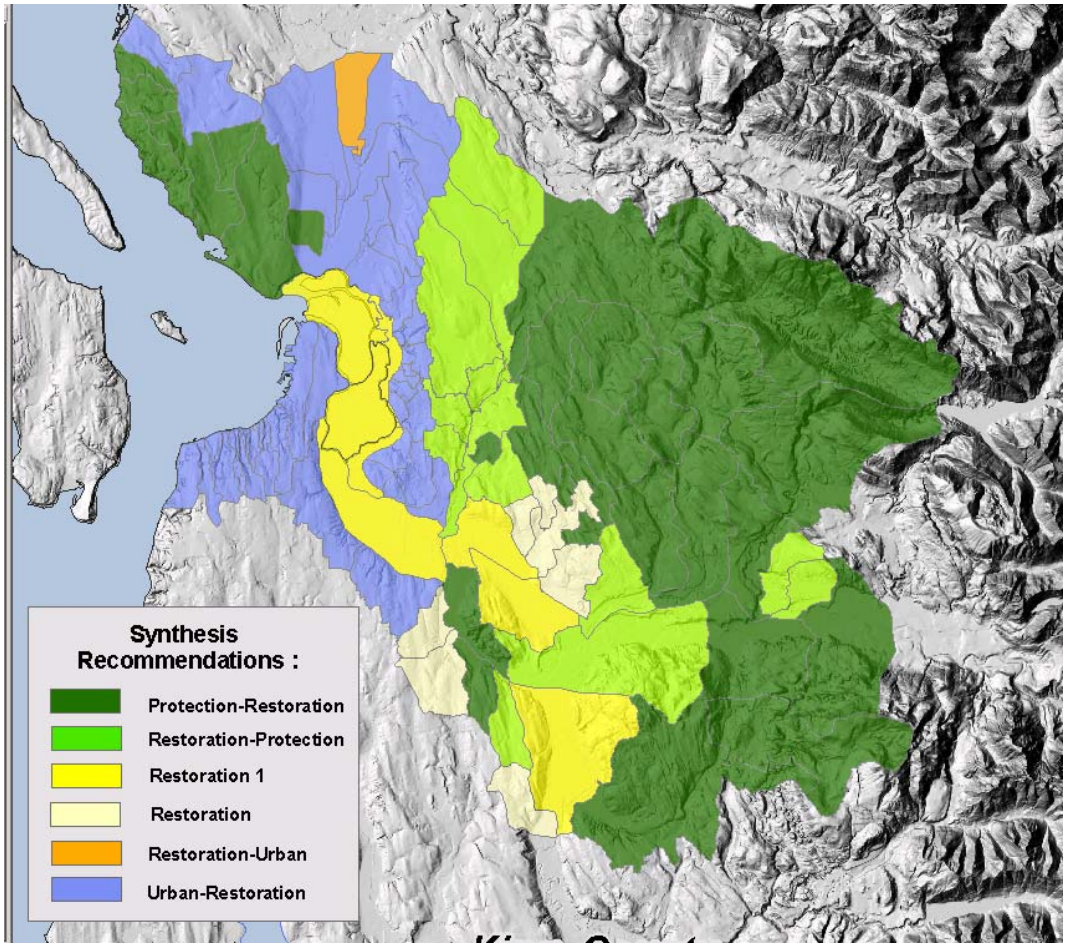

Figure 6. This watershed management framework synthesizes the results of watershed characterization, LHA, and sub-basin strategy groups.

Conclusions

What Worked?

Integrating watershed-based information for multiple regulated resources. Pilot participants were successful in looking at each sub-basin in the study area and considering whether that sub-basin was a priority for multiple resources. Further, the watershed based management framework recommends actions in each sub-basin based on a synthesis of the actions suggested by each of the three analyses (i.e., watershed characterization, LHA, and salmon recovery sub-basin strategy groups).

Designing strategies for natural resource and development planning. In general, pilot participants see value in tying existing data together to inform decisions in the watershed. The three analyses used in this pilot and the watershed based management framework that begins to integrate them provide broad-scale information about the condition of processes and resources within the WRIA 7 study area. As identified by pilot participants, information at this scale is most easily applied to similarly broad issues such as designating the extent of growth and development; planning for the restoration and protection of watershed processes, habitats, or

individual species; and identifying complementary patterns of land uses (e.g., agriculture, mitigation, open space, and development).

The watershed-based analyses integrated here can help us understand how to identify strategic sets of actions that address multiple resource needs. As mentioned in the introduction, our approaches to resource management and recovery are often fragmented by topic: aquifer recharge areas, species recovery, wetland and habitat critical areas, and mitigation. The watershed based management framework could be used to coordinate refinements and updates to comprehensive plans and development regulations, conservation and recovery plans, and capital infrastructure and project planning in order to implement the complementary patterns of land use referenced above.

Associating types of actions with areas in the watershed. There are limitations to applying the watershed analyses directly to site-specific mitigation decisions, but these broad-scale analyses set the context for site-specific and/or smaller areas of analysis by indicating which *kinds* of actions are most important in a particular sub-basin. This context is useful in designating service areas for wetland mitigation banks or other kinds of habitat banks or in creating other strategies that allow regulators to "pool" mitigation for small impacts to achieve larger environmental gains. There are also opportunities to use the approach to help create special standards or best management practices in areas of WRIA 7 that are especially valuable for processes and habitats (e.g., areas designated as R1 or PR). Project participants were concerned about accepting the presumption of growth without the possibility of special standards and best management practices in these high resource and habitat value areas. Emphasis could also be placed on strategies for avoidance and minimization in these areas.

Opportunities For Change

While there is clear value in integrating/coordinating resource needs within the study area, pilot participants identified several opportunities to improve the approach.

Applying information at the site scale. The broad scale recommendations in the watershed based management framework are difficult to apply at the site scale, where most mitigation decisions are made. A finer scale analysis is needed to understand the effects and trade-offs of site-specific decisions, particularly in choosing among two or more sites within a single sub-basin. Any maps or outputs must be similarly scaled to enable users to see the results site-by-site.

Coordinating across jurisdictions. The resource goals of tribal governments and/or individual cities need to be included when planning for resources in their jurisdiction.

Conducting the pilot. Pilot participants also identified several practical considerations or improvements for the application of this watershed based management framework.

- Consider several pilot locations and work with local jurisdictions in choosing the pilot location to ensure that the pilot produces useful products for all participants.

- Display data effectively to facilitate group discussion and analysis. This includes using consistent color schemes among maps and spending time considering how to display data in a meaningful way.
- Use the most up-to-date data layers possible (e.g., land use/land cover or PHS polygon data). The resulting analysis is less relevant if the data layers don't reflect the current state of the study area. These analyses would need to be re-run periodically to reflect changes in land use. The timing of these revisions would depend on the rate of development in the study area.
- Make it easy for participants to understand any underlying assumptions in the analysis and use or refine the models or update data in the future.
- Ensure that there is enough time for all participants to work with the data. These are complex issues, and it takes time to synthesize data and conduct the analysis and then consider the results of analyses and identify how to apply them appropriately.

Recommendations

Conduct a finer-scale analysis to enable site-specific application of these principles. This broad scale characterization establishes the initial framework for a comprehensive watershed management plan. It will take additional work with Snohomish County to develop a watershed based mitigation plan that is suitable for site scale application. Pilot participants recommend choosing a smaller geographic area to develop such a plan, and that the area include Restoration 1 sub-basins (i.e. Snohomish Estuary and Marshland, French Creek) and an area slated for urban development (i.e. "Urban Restoration" in Quilceda and Allen watersheds). Ongoing interagency watershed planning work within the Birch Bay watershed provides a template for creating finer-scale analysis and corresponding mitigation and land use plans in the Snohomish.

Pilot participants have extensive knowledge and experience to contribute to a fine scale analysis, as indicated by the results of preliminary discussions about two sub-basin areas. In the Snohomish Estuary, pilot participants noted the area is a high priority across resource types, and that a good framework of restoration, data, and public ownership already exists. Threats include light industrial zoning and restoration may be limited by the protection of existing infrastructure, but the area offers a good opportunity for a coordinated, multi-jurisdictional mitigation/restoration approach.

In the Quilceda/Allen sub-basins, pilot participants observed that the area plays a lesser role in providing wildlife habitat and achieving salmon recovery but is critical for maintaining watershed processes. The area is slated for increasing, dense development, which may not be consistent with the restoration of watershed processes. It may be possible, however, to develop a process maintenance strategy and protect shallow groundwater by combining efforts such as low impact development principles and the City of Marysville's desire for creative stormwater approaches.

Leverage local interest in sustainable, watershed based resource management. Having interested and motivated local partners is critical to the success of any effort to improve the way we manage resources. The Snohomish County/WRIA 7 area is blessed with a number of interested and active groups. The Snohomish River Basin Salmon Recovery Forum is a 39-member group of citizens, businesses, tribal representatives, farmers and elected officials who

have worked voluntarily since 1998 to guide conservation efforts in the Snohomish River Basin. Established in 2002, the Sustainable Development Task Force of Snohomish County is a public/private partnership dedicated to facilitating the adoption of sustainable development strategies and the construction of green building projects throughout the County. Representatives from the Tulalip Tribe, Pacific Northwest National Laboratories, the Northwest Straits Commission, and Snohomish County have begun to scope a Sustainable Future Demonstration Project for Snohomish County that would seek to implement many of the concepts explored in this pilot.

Learn from other efforts to improve permitting and mitigation. In addition to the ongoing interagency planning work within the Birch Bay watershed, state, federal, and local partners are working together in Clark County to improve and integrate project design, permit review, and mitigation tools. This project also builds on ideas from the Transportation Permit Efficiency and Accountability Committee, and will incorporate watershed-based approaches to environmental mitigation. The result will be a web-based tool that aligns and, where possible, integrates environmental review and permitting standards and practices from local, state, and federal agencies. Further efforts in Snohomish County should be able to draw heavily from the regulatory integration aspects of the Clark County project.

Include plenty of time for coordination and collaboration. In general, it is also recommended that sufficient lead-time be built into future joint watershed planning/permitting efforts in order to develop an adequate working relationship with local planners prior to starting the project. This would include sufficient time to develop a clear understanding of what the purpose and products of the watershed planning effort will be, and to develop acceptable methods, joint scope of work and objectives. Additionally, both planning and permitting staff from the local governments should continue to be included in the overall planning process. In particular, implementing future site-scale mitigation recommendations may depend on local ordinances and policies that allow mitigation funding to be spent in another sub-basin or local jurisdiction.

Appendices

Appendix A: Snohomish County Alternative Mitigation Pilot Work Plan

Appendix B: Technical Report – Watershed Characterization of Western Portion of Snohomish River Basin

Appendix C: Snohomish Basin Three-Year Work Program