Watershed Profile:

East Kitsap

The Place and the People

The East Kitsap watershed's sinuous shorelines form the eastern portion of Kitsap County, including Bainbridge Island. East Kitsap harbors countless small streams that empty into the marine waters of Puget Sound. Quiet and easy-paced compared to the cities of Tacoma and Seattle less than 20 nautical miles away, small-scale and hobby farms still dot the landscape in Kitsap, helping to maintain the area's rural heritage.

The Kitsap Peninsula as a whole is 400 square miles in size, surrounded by 360 miles of saltwater shoreline. In fact, the shorelines account for nearly half of the nearshore habitat in south and central Puget Sound and provide vital habitat for threatened Chinook and bull trout populations from watersheds throughout those areas. The East Kitsap plan addresses the eastern portion of Kitsap Peninsula and nearshore, which includes the City of Bainbridge Island. It does not address any part of the Kitsap peninsula that is within the jurisdiction of Pierce County. The Nearshore and streams on the west side of the peninsula flow into Hood Canal and are included in the recovery strategy developed through the Hood Canal Coordinating Council.

Photo by Dan Kowalski

The East Kitsap basin includes numerous separate lowland streams entering the saltwater, with quiet, shallow waters that provide ideal foraging and rearing habitat for juvenile and adult salmon returning to spawn from populations across the Puget Sound. Because water access was the only way early settlers could reach the Peninsula, nearly every community in Kitsap has a water view, marina or stretch of beach to enjoy.

The hydrology of the streams in East Kitsap is unique compared to other watersheds in Washington. Stream flows in East Kitsap are dependent on precipitation and groundwater contribution, as the drainages do not receive snowmelt runoff from either the Olympic or the Cascade mountains. Maintaining this system is imperative in order to keep salmon habitat intact. The soils throughout much of the basin are comprised of a thin veneer of pervious topsoil over a deep deposit of densely compacted glacial till. This allows precipitation to be retained, held in wetlands, and naturally released out to the streams which provide surface flows even through the dry summer months.

East Kitsap has a strong history of building partnerships to forge collaborative solutions on a variety of natural resource issues such as stormwater management as well as numerous salmon habitat protection and restoration projects. Conserving and restoring salmon habitat in the East Kitsap watershed is primarily being approached through locally coordinated and implemented programs. The Suquamish Tribe, the City of Bainbridge Island, Kitsap County, and state agencies are providing the support and technical expertise necessary to develop a recovery plan and help the community move forward with a strategy to safeguard salmon in the basin.

To contribute to the recovery of threatened Chinook, technical folks and policy decision-makers will continue to work with the Kitsap community to gain support for habitat protection and restoration actions, provide landowner incentives for habitat protection and restoration on private lands, and continuously search for solutions that balance the needs of both fish and people.

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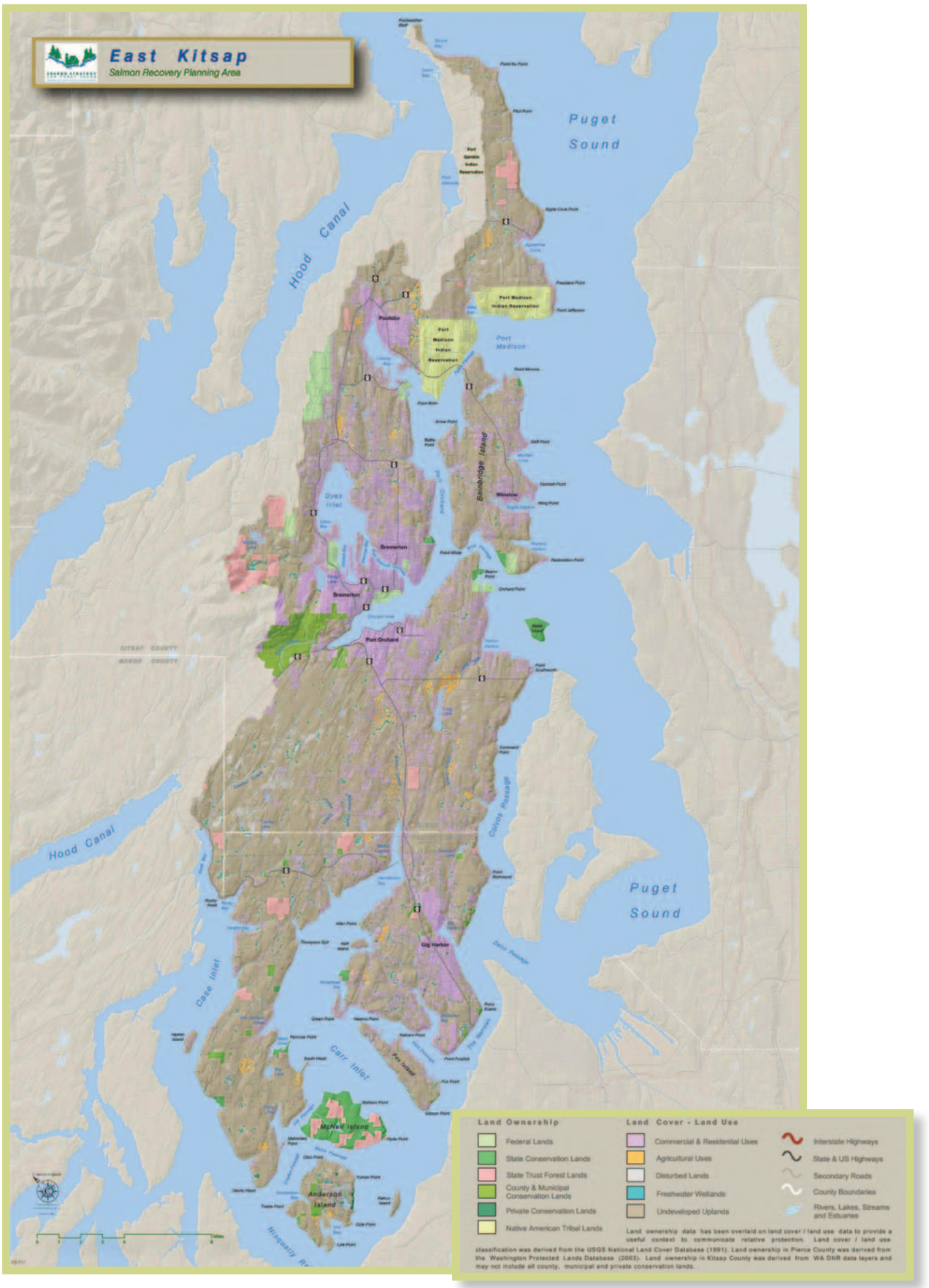
East Kitsap Salmon

While the Technical Recovery Team (TRT) did not identify independent Chinook populations originating from East Kitsap streams, there are numerous streams entering saltwater in East Kitsap that are known to support salmon originating from East Kitsap and other watersheds.

Chum, coho, steelhead and cutthroat trout regularly use streams in East Kitsap. Most of the Chinook that use East Kitsap streams appear to be from the Suquamish Tribe's hatchery program or from Minter Creek Hatchery, White River Hatchery and other hatcheries. During years of strong salmon runs in Puget Sound, wild Chinook are likely to stray into the streams. The Suquamish Tribe marks all hatchery Chinook to identify them in their out-migration studies and estuarine and nearshore beach


East Kitsap
Salmon Recovery Planning Area
Puget Sound
Hood Canal
Port Madison Indian Reservation
Port Madison
Poulsbo
Bainbridge Island
Dyes Inlet
Sinclair Inlet
Bremerton
Port Orchard
Agate Passage
Colvos Passage
Gig Harbor
Case Inlet
Carr Inlet
McNeil Island
Anderson Island
Nisqually R.
Land Ownership
Federal Lands
State Conservation Lands
State Trust Forest Lands
County & Municipal Conservation Lands
Private Conservation Lands
Native American Tribal Lands
Land Cover - Land Use
Commercial & Residential Uses
Agricultural Uses
Disturbed Lands
Freshwater Wetlands
Undeveloped Uplands
Interstate Highways
State & US Highways
Secondary Roads
County Boundaries
Rivers, Lakes, Streams and Estuaries
Land ownership data has been overlaid on land cover / land use data to provide a useful context to communicate relative protection. Land cover / land use classification was derived from the USGS National Land Cover Database (1991). Land ownership in Pierce County was derived from the Washington Protected Lands Database (2003). Land ownership in Kitsap County was derived from WA DNR data layers and may not include all county, municipal and private conservation lands.

seining studies. Grovers Creek Hatchery Chinook are coded wire tagged as one of the Pacific Salmon Treaty Puget Sound indicator stocks. More recently, a double index coded wire tag program has been initiated for the Grovers Creek Hatchery Chinook.

Threatened Chinook populations from north, south, and central Puget Sound watersheds are believed to use the East Kitsap nearshore habitat for refuge, resting and feeding on the way to and from the ocean. Shallow nearshore waters provide protection from predators and support prey that salmon eat. Recent studies indicate that Chinook occupy the nearshore regions of East Kitsap nearly year-round. Beach seining surveys in the shore zones of Bainbridge Island and throughout East Kitsap County indicate that juvenile Chinook are present from March through December and most numerous from May through August.

The independent tributaries in East Kitsap are not typical Chinook habitat because of relatively small stream size and low flows during the late summer/early fall spawning season. However, spawning adult Chinook are observed on a regular basis in numerous streams. Most of the returning Chinook are believed to be hatchery-origin fish released from the Gorst Hatchery rearing ponds. Despite higher escapements, there appears to be poor natural Chinook production from this system based on adult upstream and juvenile outmigration weir counts on Gorst Creek conducted by the Suquamish Tribe.

Although bull trout are believed to use the nearshore/marine waters as foraging, migrating and over-wintering habitat, no observations have been reported from beach seine studies initiated in 1979 and continued more recently from 2001 to the present.

Recovery goals

The City of Bainbridge Island approaches salmon recovery and conservation in accordance with the vision and timeframe provided by the City Council and the Bainbridge Island Comprehensive Plan, as well as technical guidance. The overall goal is to "restore and conserve self-sustaining and harvestable wild salmon populations on the Island and contribute to regional salmon recovery and conservation in a manner that is ecologically sound and socially equitable; does not jeopardize other species; and enhances our community, our quality-of-life, and our economy."

The goal of the East Kitsap planning group led by Kitsap County is to protect, restore and enhance the nearshore natural processes and habitat that benefit Chinook and bull trout in order to contribute to Puget-Sound wide recovery. In the long term, the overall goal is to restore Chinook, coho, and other salmon species to naturally spawning, sustainable, harvestable levels. The future envisioned by the county is one "in which viable communities, with healthy economies, coexist with and maintain viable salmon populations sustained at harvestable levels."

The Recovery plan for East Kitsap is generally intended to be implemented over a period of 5-10 years through restoration and protection projects funded through SRFB and other habitat protection and programmatic efforts. However, conservation and recovery of salmon is expected to take much longer and therefore, the recovery plan will be

Photo by Dan Kowalski

reviewed and updated periodically based on the knowledge gained from its active implementation.

What are the key factors contributing to the current status of the populations?

Since the East Kitsap role in regional recovery is to focus on nearshore processes and the health of the freshwater, estuarine and marine ecosystems, the plan identifies nearshore related habitat factors that contribute to the status of the salmon populations. These include:

Wave energy

The force of waves can be modified by the composition, encroachment, and design of shoreline armoring structures. Exposure to human-made waves, where naturally there were none, results in turbulence that can displace rooted aquatic vegetation like eelgrass, and can reduce the natural retention of large woody debris that is important for salmon habitat.

Light

The loss of natural shade where it is needed or the addition of artificial shade from over-water structures where it is not desirable can affect water temperature and the growth of vegetation. Shade is lost when riparian vegetation is removed as a result of development. Conversely, structures such as piers, docks, and other floating or overwater structures can reduce the availability of light marine plants need for photosynthesis. Changes in the light regime can affect biodiversity and the presence of salmon prey and predators, water temperature, and can cause fish to avoid certain areas which may in turn alter migratory patterns.

Sediment Supply and Substrate Type

Armoring, or hardening, the shoreline substantially affects the abundance of sediment within that section of shoreline. Built structures such as groins and ramps can also affect sediment supply. Excessive sediment can smother eelgrass beds that are important for salmon refuge and prey production, among other biological affects. Armoring can also involve modifying or replacing the natural substrate, for example when gravel and sand is replaced by solid concrete. Altering substrate can have several affects including reducing the habitat of salmon prey.

Depth or Slope

Built structures and alterations, such as ramps and dredging activities, can also affect the natural slope of the beach and depth of the water in the intertidal zone. This can result in a reduction in landscape connectivity, and can alter biodiversity and salmon migratory corridors.

Pollution

Pollution, including toxic contaminants, fecal coliform bacteria, excessive nutrients, and altered salinity and temperature regimes, is often associated with proximity to outfalls (areas where contaminants are discharged) or with marinas and fish farms. Extensive development and the associated increase in impervious surfaces and armored shorelines adjacent to upland areas can also lead to an increase in pollution as contaminated runoff flows unobstructed into the water. Riparian areas can act as a filter and a buffer to this affect, thus the removal of riparian vegetation also can lead to an increase in pollution. Pollution can degrade or destroy vegetation that salmon rely on for refuge and prey production, can fragment the landscape, and can result in direct toxicity to the fish and their prey.

Hydrology

The alteration of natural stream hydrology has been identified as perhaps one of the largest impacts/threats to salmon habitat. Hydrology refers to tidal inundation regimes or patterns of groundwater and surface water flow. The East Kitsap Watershed is low elevation, dependent on rainfall, wetland storage, and groundwater infiltration to stream channels. Most of East Kitsap has shallow soils over deep compacted glacial till, resulting in limited groundwater storage potential. Armoring can alter groundwater and surface flows and can disturb slope stability. Alteration of groundwater and surface flows may impact riparian vegetation

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distribution and slope stability and can result in disturbances to plants and animals.

The increase in impervious surfaces associated with development decreases the infiltration of precipitation into the soils and wetlands and also increases the frequency and magnitude of peak stream flows. The result is less water is available to sustain flows through the dry months, and the increased peak flows during the rainy season result in increased bank and streambed instability, channel scour, and loss of instream habitat diversity, all of which adversely affect salmon production.

Physical disturbances

Recurring physical disturbances associated with human activities in marine and riparian shoreline habitats which result from docks, mooring buoys, culverts, dams and human noise and activity can cause stress to vegetation and bottom dwelling organisms that salmon prey upon. Physical disturbances can also directly affect salmon migration patterns.

Growth/urbanization

Kitsap County's population growth from 2000 to 2020 is estimated to be 54%. Pressure to expand urban growth areas (UGAs) to waterfront areas is being experienced in North Kitsap as well as other areas. The City of Bainbridge Island has experienced periods of rapid growth in recent decades, from 4,132 in 1950 to about 20,000 in 2000. The population is projected to increase by 41% by the year 2025.

Overall Approach to Recovery

East Kitsap approaches salmon recovery by planning and implementing salmon habitat restoration projects that address limiting factors through the state salmon recovery laws (the HB 2496 process) and through the state watershed management laws (the HB 2514 process). Planners and biologists from county, city and tribal government agencies collaborate through the 2496 technical and citizen committee process on selection and implementation of habitat protection and restoration projects.

Habitat protection is approached through the use of regulatory and voluntary programs, along with outreach and education activities.

The East Kitsap Salmon Recovery and Conservation Plan emphasizes the value and importance of the nearshore to a variety of Puget Sound Chinook and other salmon populations, especially juveniles. Kitsap County, the City of Bainbridge Island, the Suquamish Tribe and the Washington Department of Fish and Wildlife present a general strategy of protection, restoration, conservation, education, and incentives to achieve their goals. The basic premise of their strategy is that human-induced stressors causing modifications of the estuarine and nearshore/marine environments have altered habitat-forming processes and structures resulting in a decrease in the ability of these habitats to support Chinook populations.

The City of Bainbridge Island and Kitsap County are building their strategy on a variety of existing policy directives and implementing ordinances and non-regulatory programs that give special consideration to salmon and their habitat. These programs are primarily focused on protecting existing habitat from the impacts of development and other land use activities. Comprehensive plans, Shoreline Master Programs, the Critical Areas Ordinances, Stormwater and Zoning Ordinances represent the major policy and implementing regulatory programs in East Kitsap. Existing non-regulatory programs such as Kitsap County's open space land designation under the current use tax benefit rating system provides property owners the opportunity for property tax relief; land owners can enroll properties that contain important fish and wildlife resources. Other programs, like the City of Bainbridge Island Open Space Bond, enable local jurisdictions to work with local land trusts and park districts to purchase fee-title property or conservation easements for conservation purposes, including properties that contain important fish and wildlife resources.

Key Strategies and Actions Supporting the Overall Approach to Recovery

Assessments

The City of Bainbridge Island has completed a nearshore assessment and a subwatershed assessment will be conducted which will be updated every 7 years. The subwatershed assessment will inventory and characterize habitat, fish passage, hydrology, and land use and identify actions in these areas to achieve their goals. An additional shoreline roads study will evaluate alternative solutions to shoreline roads with erosion, slide and flooding problems.

Kitsap County will begin a nearshore assessment during 2005, which will result in an inventory and characterization of nearshore functions and attributes.

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Fish passage barriers

High priority activities on Bainbridge Island include land acquisition and projects addressing fish passage restrictions in streams that provide important salmon refugia, productive capacity, and habitat. Kitsap Conservation District expects to complete an inventory of privately owned fish passage barriers in Kitsap County soon. Proposals for culvert replacements and barrier removals have also been submitted for funding.

Protection and Restoration

Protecting and restoring marine nearshore areas is considered a priority based on benefits to all salmon stocks using these waters. Restoration activities are also occurring in Gorst Creek and include the placement of gravel, large woody debris, revegetation along 1.5 miles of stream, and restoration of 1,200 feet of shoreline.

Stormwater runoff

Kitsap County is currently exploring how to best achieve compliance with NPDES Phase II requirements that regulate stormwater discharge. County staff members discuss the impacts of increased total impervious surface areas during presentations, at community planning workshops, and other public education and involvement programs.

Regulatory Tools

Kitsap County recently initiated its Comprehensive Plan compliance review which is scheduled for completion in late 2004. Bainbridge Island initiated the revision process for the shoreline management master plan in the fall of 2002. The process includes workshops for the community concerning effects of marine/nearshore modifications and possibilities for alternatives to bank armoring, revegetation, and related best management practices.

Harvest and Hatchery Management:

The Suquamish Tribe and Washington Department of Fish and Wildlife conduct salmon harvest under the guidance of the Harvest Management Plan for Puget Sound Chinook, part of the Comprehensive Chinook Management Plan to guide recovery of Chinook in Puget Sound. State and Tribal hatchery operations are governed by Resource Management Plans which include Hatchery Genetic Management Plans, the State/Tribal Fish Health Policy, and other elements. Both Hatchery and Harvest elements are presently covered by a 4(d) exemption issued by NOAA-Fisheries.

Adaptive Management

Kitsap County is currently developing an adaptive management and monitoring and plan.

The City of Bainbridge Island provides for near-term (5 year), mid-term (5-10 year) and long-term (beyond 15 year) evaluations of progress in protecting and restoring habitat functions and values. The city's monitoring program gives consideration to specific monitoring goals, scale (effort in time and space), timing, sampling design and replication, reference site designation, attribute selection, sampling methods, and costs. Monitoring efforts link processes to the nearshore habitat structure, integrate a multitude of nearshore habitats that support a variety of functions, establish relationships between structure and function, and link local processes to the broader Puget Sound ecosystem. The table above provides key monitoring attributes.

Key Nearshore Monitoring Attributes (COBI monitoring program)	
Controlling factors	Land use-land cover assessment, nearshore riparian cover, shallow water aquatic habitats
Habitat structure	Fish assemblages, exotic species
Ecological functions	Due to clearing and development

Potential actions include education and outreach programs, forage fish and other surveys, development of tools and methods. Examples are develop-

ing long range planning tools to address potential impacts to surf smelt and sand lance spawning areas and development of incentive programs to encourage removing unnecessary shoreline armoring and use of soft bank protection; and revegetation of public lands "wherever possible."

The City of Bainbridge Island salmon plan is tied to iterative updates to the Comprehensive Plan, CAO and Shoreline Master Plan. Accordingly, nearshore assessments, watershed assessments and the salmon plan will be updated and evaluated two years prior to the scheduled updates, i.e., in 2009 for the 2011 updates, and 2016 for the updates scheduled to occur in 2018.

Results

The watershed plan for the East Kitsap watershed was reviewed by the Puget Sound Technical Recovery Team (TRT: a group of seven scientists) and an interagency committee facilitated by the Shared Strategy staff. The TRT reviewed the plan to determine the degree of certainty that the plan can achieve recovery goals. The conclusions of this analysis are below. For the most part, the issues identified below by the analysis are discussed in the watershed plan to some extent, but the reviewers felt they merited particular attention or additional effort to increase the certainty of achieving plan outcomes. Where the analysis identified key uncertainties, proposals are included for consideration. If implemented along with the watershed plan's other actions, these proposals would increase the certainty of results and achieve the requirements for a recovery plan under the Endangered Species Act.

The plan recognizes that East Kitsap's nearshore and marine areas play an important role in providing support for Chinook salmon from the South/Central Puget Sound region. To protect and restore the nearshore and marine areas, the City of Bainbridge Island and Kitsap County have each developed recovery plans with slightly different approaches and have loosely merged their efforts into a single plan.

The City of Bainbridge Island prioritized areas based on an ecosystem-based conceptual model and has started to incorporate adaptive management into their plan to make sure that their strategies and actions have the greatest benefit for the fish. The city identifies both short-term (10-year) actions and long-term strategies. The city is also the only jurisdiction in the region, as far as reviewers are aware, that has passed an ordinance restricting dock construction to protect the nearshore ecosystem in a specific part of the watershed.

The County's plan focuses recovery planning efforts on ensuring that existing protection measures and voluntary programs are implemented.

The certainty of achieving this plan's outcomes and the resulting contribution to overall ESU recovery will increase if the following issues receive focused attention as described below.

The planned strategies and actions by both the city and county will need to be linked to results for fish, the Viable Salmonid Parameters (VSP: abundance, productivity, spatial distribution, diversity) to describe the expected outcomes from plan imple-

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mentation. Once the linkage between the ecosystem principles, stressors, and geographic priorities are linked to VSP, then these four parameters can be used as a measure for monitoring.

The certainty of achieving plan outcomes will increase if adaptive management is incorporated into the strategy in Kitsap County. Certainty will also be increased by considering completed assessments and assessments yet to be developed by both the city and county and other municipalities that will identify ecological functions more specifically, along with the results of strategies and actions taken in the freshwater and the nearshore.

It will be important to coordinate and reconcile local nearshore actions with the regional nearshore chapter. A nearshore monitoring effort coordinated across the region will allow areas to be prioritized so that efforts in each nearshore watershed have the greatest benefit for fish and contribute to overall ESU recovery.

As in other watersheds across the Sound, it will be important to assess the results for fish from the various protection mechanisms this plan relies upon.

The impact that hatchery programs in East Kitsap have on wild Chinook populations remains uncertain. Hatchery reform and the integration of hatchery, harvest, and habitat strategies must be undertaken with care to avoid unintended impacts on fish that could be detrimental to populations across the region.

The review process also identified a number of issues and uncertainties that are common to many Puget Sound watersheds. Strategies to address these issues that are contained in this local watershed chapter are a good approach, based on the current state of scientific understanding. Nevertheless, because (1) these issues are very important to the success of watershed approaches to recovery and (2) the effects of some of these strategies on salmon populations at watershed scales are relatively untested, these issues deserve particular attention. Reducing the uncertainties in the issues below could come through local and/or regional inclusion in adaptive management and monitoring programs, regional or local pilot studies to explicitly test their effects, or through additional implementation actions. The complexities associated with these issues are discussed in the regional strategy section of this document or in the regional adaptive management and monitoring program. The "cross-watershed" issues identified are:

- The importance of habitat protection strategies and the need to assess the results for fish from the combination of protection tools available,
- The need to develop H-Integration strategies or, where they are included, to move them further along the integration continuum over time,
- The need to reconcile local nearshore strategies and actions with the regional nearshore chapter,
- The need to address water resources, both water quality and water quantity,
- The need to better link the effects of land

use to habitat-forming processes and to habitat conditions. In turn, the effects of these changes in habitat, processes and landscapes on salmon populations need to be estimated,

- The need to develop or complete a robust adaptive management and monitoring program.

If the above uncertainties are addressed, the East Kitsap watershed will support salmon populations using its nearshore and marine waters and provide an important contribution to overall ESU recovery.