

CHAPTER 9: ACTION STARTLIST

Chapter 9: Action Start-list

Introduction to Action Start-list

This chapter provides the action start-list for Chinook conservation in the WRIA 8 watershed, followed by cost estimates for these actions. The start-list attempts to compile the land use, site-specific habitat protection and restoration projects, and public outreach and education recommendations into a single strategy list which focuses watershed priorities yet also provides a manageable number of actions. With the exception of the four actions added in response to the public review process, the Service Provider Team generated the start-list by applying the criteria approved by the Steering Committee to the comprehensive lists. The comprehensive lists are provided in Chapters 10 through 15. The criteria used to develop both lists are provided in Appendix D-1.

The start-list consists of 170 actions, and focuses primarily on Tier 1 subareas, with a small number of Tier 2 subareas. Land use, site-specific, and public outreach and education actions are grouped under the technical hypotheses for each geographic subarea.

Caveats related to land use actions summarized in this chapter:

- Land use actions are voluntary – jurisdictions can choose whether or not to apply them
- Additional analysis of land use actions by criteria, and suggested references about low impact development, critical areas and other land use topics are in Appendix D, Parts 5 and 6.

Caveats related to site specific habitat protection and restoration projects summarized in this chapter:

- Please note that most of the potential site specific habitat protection and restoration projects described in this chapter still need feasibility analysis and detailed design work before implementation can begin.
- For potential habitat restoration projects calling for addition of large woody debris, particularly in the Cedar and Sammamish Rivers, placement of the wood should be done in a way that minimizes any risk to river users such as boaters and swimmers. Placement of large woody debris should be planned and supervised by a licensed engineer. The location of large woody debris should be chosen so that river users are not inadvertently swept into the wood. Consultation with river user groups will bring insight into the affect of water and obstacles on river users.

The action start-list and cost estimate information are provided in the following order:

ACTION START-LIST

Cedar River Population

- Tier 1 subareas (mainstem - Lower and Middle Cedar River)
- Tier 2 subareas (Upper Cedar River, Rock Creek, and Taylor Creek)

North Lake Washington Population

- Tier 1 subareas: (Bear, Cottage Lake/Cold Creeks)
- Tier 1 migratory: (Sammamish River)
- Tier 2 subareas (Little Bear Creek and North Creek)

Issaquah

- Tier 1 subareas: (Lower, Middle, East Fork, North Fork Issaquah Creek; Carey and Holder Creeks; Fifteen Mile Creek)

Migratory and Rearing Corridors (used by all three populations)

- Lake Washington (including Union Bay) and Lake Sammamish
- Lake Union, Ship Canal and Locks
- Estuary and nearshore (starts west of Locks)

(Note: Sammamish River is located with the North Lake Washington population)

COST ESTIMATES

Preliminary Cost Estimates of Site-specific projects and Programmatic actions
Table 9-1- Ballpark Cost Estimates

ACTION START-LIST FOR CEDAR RIVER CHINOOK POPULATION

Technical priorities from WRIA 8 Conservation Strategy are listed in bold. Land use, public outreach, and site specific actions are listed for each technical priority. Technical priorities are interrelated, and many actions address multiple technical priorities.

CEDAR MAINSTEM RECOMMENDATIONS (TIER 1)

Protect and restore forest cover and soil infiltrative capacity, and minimize increases in impervious surfaces, to maintain watershed function and hydrologic integrity and protect water quality.

Basinwide recommendations:

- Enlist help of builders practicing sustainable development to promote benefits of forest cover in protecting water quality. (C706, C707, C720, C722)
- Employ basinwide stewards to work with property owners, land trusts, and agencies in order to identify and secure forested, wetland, and riparian areas, and to encourage the best management practices for those held in private ownership. Encourage neighborhood and community protection associations to foster the ethic of voluntary stewardship and build bridges between property owners, agencies, and local governments. (C703, C716, C720, C721)

Within Urban Growth Area:

- Consistent with Growth Management Act, Renton and potential annexation areas should absorb most growth so that rural habitat resources can be protected; growth should be managed to minimize impacts on forest cover, water quality, and flows. (C1)
- In urban areas, protect remaining trees and encourage reforestation through street tree and urban forestry programs, tree protection regulations, landscaping incentives, and redevelopment. (C3)

Outside Urban Growth Area:

- Protection of forest cover in Tier 1 and Tier 2 subareas is a high priority land use action, so that existing levels of forest cover are not further degraded. King County should strictly enforce the clearing restrictions for rural areas adopted in 10/04 as part of the critical areas ordinance update, pursue acquisition and incentives, and provide forest stewardship plans. Forest cover protections should account for site geology, soils, topography, and vegetation to maximize retention and infiltration. (C2)

Protect and restore riparian vegetation to provide sources of large woody debris that can contribute to creation of pools.

Basinwide:

- Offer regulatory flexibility and incentives to encourage property owners to restore riparian function and remove impervious areas during redevelopment of public or private properties. (C6, C7)
- Expand outreach to streamside property owners about shoreline landscape design, maintenance, and streambank armoring alternatives. Convey through direct mailing of brochures (e.g., *Streamside Savvy*, *Going Native*); videos (*Natural Lawn Care*); shoreline homeowners kits given when home purchased; or, through workshops, including expansion of Natural Yard Care Program to include guidelines specific to shoreline residents. (C701, C702, C709, C714, C716, C722)

- Offer educational opportunities to landscape designers/contractors on riparian design/installation, alternatives to invasive species, and use of compost. (C705, C706, C707)
- Encourage neighborhood garden tours of salmon-friendly gardens to help residents visualize alternatives to traditional, less eco-friendly landscape treatments. Offer neighborhood organizers assistance with publicity, signage, and volunteer docents. (C722, C707)

Within Urban Growth Area:

- Protection of remaining riparian vegetation within Urban Growth Area is high priority; encourage replanting of riparian vegetation through incentives, and strictly enforce aquatic buffers and limit variances where vegetation still exists in sensitive areas. (C5)
- Much of the riparian land in lower reaches of the Cedar River is publicly owned. Emphasize restoration such as conifer underplanting and long-term maintenance of these properties. (C213, C209)
- Reach 2 of the Cedar River has very little riparian vegetation. Restore riparian vegetation where possible in Reach 2. (C204)

Outside Urban Growth Area:

- Protect intact riparian buffers in Tier 1 and Tier 2 subareas through strict enforcement of buffer regulations, and offer incentives to restore degraded habitat buffers, recognizing that majority of riparian corridor is privately owned. Support King County forestry and agriculture programs including technical and financial assistance to landowners. Protection and restoration of riparian buffer on publicly owned lands is also a priority. (C5, C7)
- In particular, protect riparian buffer behind Scott-Indian Grove levee in Reach 8. (C229)

Protect floodplain connectivity by limiting road crossings and bank armoring. Restore floodplain connectivity by removing structures from the floodplain, setting back or removing dikes and levees. Protect channel complexity and add large woody debris to create pools and riffles.

Basinwide:

- Limit new development in floodplains and channel migration zones; develop and apply standards which minimize impacts to salmon. State and local transportation plans should minimize new road crossings. (C17, C18)
- Do a demonstration project in publicly accessible area with riverfront property owner(s) willing to replace bulkheads, levees, or stream bank armoring with more ecologically friendly design. Project should contain elements doable by average property owner and illustrate costs and benefits. (C715)
- Conduct study to identify locations where large woody debris should be added to Cedar mainstem and to explore feasibility of passing large woody debris over the Landsburg dam. (C601, C260)
- Increase public awareness about the value of large woody debris and native vegetation for flood protection, salmon habitat, and healthy streams. Convey through media (e.g., local papers, community newsletters); signage along publicly accessible “model” shoreline; brochures such as King County’s *Large Woody Debris and River Safety*; and other outreach venues such as festivals, local cable channels, and the Cedar River Naturalists program. (C716)

Within Urban Growth Area:

- Explore redevelopment and restoration options in Reach 2 and 3, particularly in area of industrial use in Reach 3 that is likely to be redeveloped in the near future. Jurisdictions could

offer regulatory flexibility or other incentives to encourage buffer and floodplain improvements during redevelopment. (C204, C206)

- Study options to protect in-stream habitat in Reach 4 (which has extensive large woody debris) and reduce flooding and erosion in Ron Regis Park (such as adding setback levee and large woody debris for bank stability). (C213, C214)
- Explore opportunities to remove impervious surface area and bank hardening, and restore riparian buffer in area of multi-family residential use in Reach 3. (C207)
- Explore opportunities for flood buyout in the Maplewood neighborhood in Reach 3 and restore floodplain. (C208)

Outside Urban Growth Area:

- Continue Cedar River Legacy Program to protect best remaining habitat:
 - Protect Jones Reach - 29 acres, 16 parcels targeted in Reach 8. (C228)
 - Protect Belmondo Reach - 71 acres, 10 parcels with no levees, numerous side-channels, braided channel in Reach 9. (C232)
 - Protect 5-acre parcel including 218th Place side-channel across from Taylor Creek confluence in Reach 11. (C244)
 - Protect Mouth of Taylor Creek Reach - acquire ~40 acres of forested riparian floodplain associated with both the Cedar mainstem and the lower Taylor Creek in Reach 11. (C245)
 - Protect Landsburg Reach - 87 acres, including forested floodplain and areas of unarmored, steep bank in Reach 18. (C263)
 - Protect Royal Bend - protect ~7 parcels, riverfront and floodplain (spans Reach 12-13). (C247, C249)
 - Cedar Rapids Reach - acquire ~15 acres, remove levee and restore floodplain in Reach 7. (C222, C224)
- Continue Bucks Curve buyouts and restore floodplain in Reach 5. (C215)
- Restore side-channel on Renton Lions Club in Reach 10. (C233)
- Carry out Dorre Don area flood buyouts and floodplain restoration in Reach 14. (C252)

Protect and restore water quality from fine sediments, metals, low dissolved oxygen, and high temperatures.

Basinwide:

- Jurisdictions should adopt and enforce stormwater regulations and best management practices, consistent with Washington Department of Ecology's 2001 Stormwater Management Manual (or beyond), as part of the NPDES Phase 1 and Phase 2 permit requirements. These regulations and BMPs should reduce sediment inputs from bed-scouring high flows and from non-point sources, including roads, development, agriculture, and other activities. Water quality problems should be addressed through stormwater programs (including low impact development BMPs), current and future TMDLs, livestock programs, and upgrade of stormwater facilities (where possible). (C12)
- Explore options to improve stormwater management in developed areas, e.g., through development of regional stormwater facilities and natural drainage systems (e.g., SEA Streets). Promote stormwater best management practices related to parking lot cleaning, storm drain maintenance and road cleaning. (C13)
- State/local transportation departments should address runoff from all roads and retrofit existing roads as part of major maintenance, expansion or upgrade projects; road maintenance actions should be consistent with Tri-County guidelines. Stormwater impacts from major transportation projects (for new and expanded roadways proposed during the next ten years) should be

addressed. Washington Department of Transportation should improve stormwater management on SR 169. (C14, C15, C16)

- Coordinate with local business community and non-profits to encourage the use of commercial car washes and carwash kits. Reprint and distribute water quality poster series depicting impacts of everyday practices: washing car, driving car without maintenance, leaving pet wastes unattended, and improperly using lawn chemicals. (C710)
- Publicize emergency call numbers for public to report water quality and quantity problems, non-permitted vegetation clearing, and non-permitted in-stream grading and wood removal incidents. (C713)

Provide adequate stream flow to allow upstream migration and spawning.

Basinwide:

- Work with Washington Department of Ecology and local health departments on regulations, incentives, and education related to impact of surface and groundwater withdrawals, including illegal withdrawals and exempt wells. Determine where illegal surface water withdrawals are occurring and follow-up with enforcement to ensure withdrawals do not continue. (C22)
- Work with City of Seattle, Cedar River Instream Flow Commission, and other stakeholders on policies, procedures and research related to effects of flow on habitat restoration. (C23)
- Address flow issues through other regulations/programs including: critical aquifer recharge area protections, land use regulations, groundwater management plans, stormwater regulations, and best management practices for infiltration, low impact development, etc. (C19, C21, C20)
- Promote availability of water conservation education and incentive programs (e.g., rebates for efficient toilets, free landscape irrigation audits) to decrease household, commercial, and landscaping irrigation water consumption throughout WRIA 8. (C24, C708)

Additional action approved by the Steering Committee in response to public comment:

- Protect Dorre Don Meanders Reach – acquire ~71 acres in Reach 13 and 14 (C250, C253).

NOTE: South Lake Washington actions have been identified as important to the Cedar population. Please see the Action Start-List for Migratory Areas.

TIER 2 SUBAREAS

Availability of high-quality habitat in Tier 2 subareas is necessary to reduce the risk of natural disturbances that could impact spawning areas in the mainstem Cedar. In addition, the Upper Cedar provides increased spatial distribution for spawners.

Upper Cedar River:

- Study where and how to add large woody debris to upper Cedar River mainstem and implement program. Must address dam safety in large woody debris placement. (C607)

Rock Creek:

- Provide enhanced flows for pre-spawning migrants - Work with the City of Kent to establish instream flows that are protective of Chinook through their Habitat Conservation Plan process. Investigate and address other impacts to flows through stormwater management (e.g., low impact development), education and enforcement (e.g., for illegal and exempt withdrawals), etc. (C73, C75, C76, C80, C351)

- Floodplain restoration near mouth – Buy out house on right bank, remove bank hardening, add large woody debris, and restore riparian vegetation (remove non-native plants and replant with native vegetation). (C341)

Taylor Creek:

- Adopt and enforce stormwater regulations and best management practices to reduce stormwater flows that have increased bed scour and deposition of fine sediments. Flashy flows should be addressed through forest cover retention, low impact development techniques, erosion control during construction, improved stormwater management on new and existing roads. (C64)
- Lower Taylor Creek floodplain restoration (Reach 2) - Relocate 800 feet of stream away from Maxwell Road, restore floodplain wetlands and off-channel habitat, place large woody debris, and restore riparian vegetation. (C333)

ACTION START-LIST FOR NORTH LAKE WASHINGTON CHINOOK POPULATION (INCLUDES SAMMAMISH RIVER)

Technical priorities from WRIA 8 Conservation Strategy are listed in bold. Land use, public outreach, and site specific actions are listed for each technical priority. Technical priorities are interrelated, and many actions address multiple technical priorities.

BEAR/COTTAGE LAKE/COLD CREEKS RECOMMENDATIONS (TIER 1)

Identify and protect headwater areas, wetlands, and sources of groundwater to maintain natural hydrologic processes and temperatures that support Chinook.

Basinwide recommendations:

- Protect headwater wetlands, seeps, and groundwater recharge areas through critical areas ordinances, critical aquifer recharge area protections (CARAs), incentives, and acquisition. Support with appropriate public outreach to convey reasons behind regulations to protect groundwater sources, consequences of not employing them, and ultimate benefits to environment and people. (N1, N722, N723)
- Determine source of the Cold Creek groundwater springs in Cottage Lake Creek and develop protective measures to adequately protect them. Cold Creek headwaters cross the Urban Growth Boundary; growth within Woodinville should be managed to minimize impacts. (N4)
- Expand groundwater protection outreach messages to include the relationship between ground and surface water and inter-connectedness of all hydrologic systems. Include messages in water utility billings, newspaper articles, and school curricula; explore opportunities to partner with business such as local bottled water company. (N722, N723, N724)

Protect and restore forest cover, soil infiltrative capacity and wetlands, and minimize increases in impervious surfaces, to maintain watershed function and hydrologic integrity.

Basinwide recommendations:

- Continue approach taken in King County during past decade to protect forest cover and riparian buffers, including: enforcing existing regulations, providing a range of incentives and a basin steward working with streamside landowners, and providing forest stewardship plans. Support Snohomish County's incentive programs such as Transfer of Development Rights for farmlands and Reduced Drainage Discharge Demonstration Program. Properties protected through acquisition, easements, etc. must be maintained over long term. (N7, N701, N702, N704)
- Promote low impact development throughout Tier 1 and 2 subareas, to accommodate additional growth in urban and rural areas, while protecting ecological functions. Enlist help of builders practicing sustainable development to promote benefits of forest cover in protecting water quality. Provide recognition through media and professional awards to those using pervious paving, grass/green roofs, and other low impact development techniques. Work with the Snohomish Sustainable Development Task Force and other public and private stakeholders to plan and implement low impact development techniques. (N6, N91-93, N719, N720, N721)
- Increase outreach concerning the benefits of trees and basinwide forest coverage to protect water quality and maintain instream flows. Coordinate with nurseries, home improvement centers, and arborists to develop a marketing campaign promoting the benefit of trees to salmon and watershed health.
- Employ basinwide stewards to work with property owners, land trusts, and agencies in order to identify and secure forested, wetland, and riparian areas. Encourage neighborhood and

community protection associations that foster the ethic of voluntary stewardship, enlist community support to purchase forest tracts and build bridges between property owners, agencies, and local governments. (N702, N704)

Within Urban Growth Areas:

- Continue to absorb majority of growth in urban areas, while protecting and restoring forest and promoting low impact development, to maintain and improve water quality and flows. (N5)
- Protect undeveloped forested parcels in Bear Reach 6. (N216)

Outside Urban Growth Areas:

- There is considerable growth pressure in Bear/Cottage Lake creeks outside the Urban Growth Area (UGA), as urban-type development and related infrastructure continue to expand (e.g., Maltby UGA, Redmond Ridge UPD, city parks). Jurisdictions should not move the UGA boundary unless such change is beneficial to salmon; they should encourage low impact development, clustering, low density livestock or garden enterprises with appropriate best management practices, and other measures to protect environmental functions in rural areas. It may be necessary to acquire high quality rural properties to insure their long-term protection. (N6)
- Adopt and strictly enforce stream/wetland buffers and forest cover protections through King and Snohomish counties' critical areas ordinance updates. Forest cover protections should account for site geology, soils, topography, and vegetation to maximize retention and infiltration. (N10)
- Protect and restore forest cover throughout unincorporated area. In particular, protect large, undeveloped forested parcels in Lower Bear Reach 7 and Upper Bear Reaches 15/16 and 12. Restore forest cover on cleared, undeveloped properties in Lower Bear Reach 7 and Upper Bear Reaches 9 and 8. (Note: Reaches listed in EDT priority order). (N224, N277, N256, N220, N235, N228)

Protect and restore riparian vegetation to improve channel stability, provide sources of large woody debris that can contribute to creation of pools, and reduce peak water temperatures that favor non-native species.

Basinwide:

- Implement regulations and incentives to protect and restore riparian buffers, through critical areas ordinances and Shoreline Master Program updates; limit impacts of trails and other facilities in buffers. Implement riparian restoration by streamside landowners through King County Livestock Program, farm plans, and cost share. (N12)
- Expand outreach to streamside property owners about shoreline landscape design, maintenance, and streambank armoring alternatives, through direct mail brochures, videos, shoreline homeowners kits (including expansion of "Streamside Living Welcome Wagon"), and workshops (including expansion of Natural Yard Care Program). (N703, N707, N708, N709, N725)
- Offer educational opportunities to landscape designers/contractors on riparian design/installation, alternative to invasive species, and promote use of compost. (N714, N721)

Within Urban Growth Areas:

- Carry out riparian restoration of publicly owned properties in Bear Creek Reach 3. (N206)

Outside Urban Growth Areas:

- Remove invasive plants and plant riparian buffers along Bear Creek throughout Paradise Valley Conservation Area (Reach 16). (N276)

- Work with private property owners upstream of Native Growth Protection Easements in Cottage Lake Creek Reach 3 to restore riparian buffers. (N298)

Protect and restore floodplain connectivity and increase off-channel habitat by minimizing road crossings, reducing channel confinement, and removing floodplain structures. Protect and increase channel complexity, including large, woody debris, which contribute to channel stability and development of pools, trap sediment, and reduce water temperature.

Basinwide:

- Limit new development in floodplains; develop and apply standards which minimize impacts to salmon. Minimize number and width of new roads through transportation planning and implementation. (N15)
- Increase public awareness about the value of large woody debris and native vegetation for flood protection, salmon habitat, and healthy streams. Convey through media (e.g., local papers, community newsletters); signage along publicly accessible “model” shoreline; brochures such as King County’s *Large Woody Debris and River Safety*; and other outreach venues such as festivals and local cable channels. (N708)

Within Urban Growth Areas:

- Protect former dairy farm in Bear Creek Reaches 4 and 5, and restore riparian conditions, instream channel complexity and increase off-channel habitat. Also reduce inputs of fine sediments into these reaches of Bear Creek. (N211, N208)
- Restore meanders, instream channel complexity, off-channel habitat, and riparian vegetation in lower 3000 feet of Bear Creek (Reach 1), which is currently straightened with armored banks. Enhance mouth of Bear Creek to create cool refuge pool for migrating adults. Work with media to record process and share results with the public. (N201)
- Protect undeveloped, forested properties in Bear Reach 6. (N218)

Outside Urban Growth Areas:

- Continue protection of best remaining habitat through Bear Creek Waterways Program (includes Cottage Lake/Cold creeks). Priority reaches for protection identified through the Waterways program include:
 - Reach A (EDT Reaches in priority order: Bear 15-16, 14) (particularly Stevens, Dolittle parcels) (N272, N268);
 - Reach B (EDT Reaches in priority order: Bear 14, 13, 10, 11, 12) (N264, N246, N253, N257);
 - Reach C (EDT Reaches in priority order: Cottage Lake 4, 5/6) (particularly forested parcels south of NE Woodinville Rd) (N311, N320);
 - Reach D (EDT Reaches in priority order: Bear 7, 8, 9) (particularly parcel near Classic Nursery, Grandstand, Swanson Horse Farm) (N222, N232, N239); and
 - Reach E (EDT Reaches in priority order: Cottage Lake 3, 2, 1) (particularly Nickels Farm) (N303, N293, N286).
- Add large woody debris throughout watershed, but particularly in Bear Creek Reaches 10, 9 and 8 (in EDT priority order). (N242, N235, N226)
- Explore opportunities to improve floodplain connection in Reach 1 of Cottage Creek by removing riprap or artificial constrictions. (N282)

Protect and restore water quality from fine sediments, metals, high temperatures, and bed-scouring high flows.

Basinwide:

- Identify sources and adopt source control of fine sediments and metals in mainstems and tributaries (e.g., from new construction, sand on roads, farms) through stormwater management and clearing and grading ordinances. Jurisdictions should adopt and enforce
- regulations and best management practices consistent with Washington Department of Ecology's 2001 Stormwater Management Manual (or beyond), as part of the NPDES Phase 1 and Phase 2 permit requirements. Water quality problems should be addressed through stormwater programs (including low impact development BMPs), current and future TMDLs, livestock management programs, and upgrade of stormwater facilities (where possible). (N18)
- Work with Washington Department of Transportation and local jurisdictions to pursue opportunities to retrofit existing roadways with stormwater best management practices to improve water quality and flows. Stormwater impacts from major transportation projects (for new and expanded roadways proposed during the next ten years) should also be addressed. (N21-22)
- Coordinate with local business community and non-profits to encourage the use of commercial car washes and carwash kits. Reprint and distribute water quality poster series depicting impacts of everyday practices: washing car, driving car without maintenance, leaving pet wastes unattended, and improperly using lawn chemicals. Promote stormwater best management practices related to parking lot cleaning, storm drain maintenance, and road cleaning. (N726, N727, N729, N731)
- Promote through design competitions and media coverage the use of "rain gardens" and other low impact development practices that mimic natural hydrology. Combine a home/garden tour or "Street of Dreams" type event featuring these landscape /engineering treatments. (N720, N721)
- Publicize emergency call numbers for public to report water quality and quantity problems, non-permitted vegetation clearing, and non-permitted in-stream grading, and wood removal incidents. (N731)

Within Urban Growth Areas:

- Commercial/industrial areas should be investigated for water quality and runoff issues and potential stormwater facilities planned and built. (N23)
- Add water quality treatment for stormwater runoff from freeway in Bear Creek Reach 1. (N202)

Outside Urban Growth Areas:

- Jurisdictions should implement and enforce livestock ordinances, making highest priority those areas that are most susceptible due to fine soils. Work with farmers to adopt and implement farm plans to address water quality and habitat management. Coordinate with other stewardship and education programs, (e.g., Horses for Clean Water). (N19, N702, N713)
- In particular, Swanson Horse Farm property on NE 140th St. in Bear Creek Reach 8 and the Nickels Farm in Cottage Lake Creek Reach 2 need to reduce fine sediment inputs and restore riparian areas. Both farms are targeted for protection under the Bear Creek Waterways program as well. (N236, N289)

Provide adequate stream flow to allow upstream migration and spawning.

Basinwide:

- Adopt stormwater provisions to address high flows, flashiness, and protection of base flows, including forest retention and low impact development best management practices, to improve infiltration. (N20, N27)

- Work with Washington Department of Ecology, local health departments, and water suppliers on regulations, incentives, and education related to impact of surface and groundwater withdrawals, including municipal water withdrawals (e.g., City of Redmond), illegal withdrawals, and exempt wells on flow conditions throughout basin. Determine where illegal surface water withdrawals are occurring and follow-up with enforcement to ensure withdrawals do not continue. (N25-26)
- Increase outreach about illegal water withdrawals, including information about exempt wells (who and what purposes qualify), and maximum quantities that may be withdrawn per day. Clarify distinction between withdrawals taken from wells and diversions taken from the river without a water rights permit. Create citizen-based watchdog groups to watch for people drawing directly from creeks and streams.
- Promote availability of water conservation education and incentive programs (e.g., rebates for efficient toilets, free landscape irrigation audits) to decrease household, commercial, and landscaping irrigation water consumption throughout WRIA 8. (N28, N723)

SAMMAMISH RIVER RECOMMENDATIONS (TIER 1)

Protect and restore cool clean water sources and inflows to the Sammamish River by protecting and restoring large and small tributaries to the Sammamish River, and protecting sources of groundwater.

Basinwide (entire subarea is located within Urban Growth Area):

- Address water quality issues, including temperature and pesticides/herbicides, through stormwater regulations (including NPDES permits), best management practices (including low impact development), education, and incentives targeted at agricultural, commercial, industrial, and residential landowners. (N34-37)
- Work with Washington Department of Ecology, local health departments, and water suppliers to address municipal water withdrawals, illegal withdrawals, exempt wells that impact Sammamish River flows and related high temperatures. Research potential for reclaimed water facilities, shifting of municipal water supply sources to maximize summer flows, and extent of impacts from agricultural, commercial, and industrial sectors. (N29-30, N33)
- Bolster water conservation outreach in Sammamish watershed to increase and maintain summer base flows and reduce summer water temperatures. Carry out through incentive programs (e.g., rebates for efficient appliances, toilets, free landscape irrigation audits); classes on native drought-tolerant landscaping; and waterless carwash promotions. (N733, N734)

In reaches 3 through 6, restore floodplain connections and increase meandering of river by regrading river banks back, creating flood benches at or below ordinary high water mark. (This will concentrate low flows in narrower channel to increase water level and increase shallow habitat for juvenile rearing.) Increasing river meanders will also intercept more sources of groundwater flow.

Basinwide (entire subarea is located with Urban Growth Area):

- Encourage bank regrading and revegetation of riparian buffers (on mainstem and tributaries) during new construction and redevelopment in exchange for regulatory flexibility and incentives, such as providing expertise, expediting permitting, and tax breaks. (N42-43)
- Pursue opportunities to regrade banks, create flood benches at or below high-water mark, and remove non-native plants and plant banks and benches with native vegetation in Reach 5 from NE 90th to NE 100th and Reach 3. Also consider lowering benches from earlier restoration projects in Reach 5 (e.g., Mammoth Sammamish north of Willows Creek on west side and Willows Creek outfall). (N356, N343)

- Restore Transition Zone in Marymoor Park - Restore the left meander below the weir in Reach 6. Restoration elements could include: excavation of new channel, creation of pools, and an overflow bench with wetland vegetation; placement of gravel substrate in new channel; connection to capture hyporehic flows; and revegetation of riparian and wetland areas with native plants. (N358)
- Given the high public use of the Sammamish River trail, restoration projects on the Sammamish River are highly visible and provide good public outreach opportunities. Enhance interpretive efforts on projects and encourage media coverage. Continue to use citizen volunteers to assist in restoration and maintenance of project sites. (N710, N711)

Increase off-channel habitats, enhance and reconnect riparian wetlands to the river, add large woody debris as cover for juvenile fish and to create backwater pools particularly in reaches 1 and 2 in order to improve habitat for juvenile rearing.

Basinwide (entire subarea is located within Urban Growth Area):

- Enhance and connect wetlands and remnant side channels to the river in Reach 2 adjacent to the 102nd Avenue bridge on both on the right and left banks. (N337, N338)
- Sammamish River mouth wetland restoration in Reach 1 - restore wetlands on King County property near mouth and on island. (N332)
- Enhance and reconnect riparian wetlands to river at Wildcliff Shores in Reach 1, across from Swamp Creek. Restore riparian vegetation. (N334)
- Restore large, publicly owned wetland complex at the confluence of Swamp Creek and the Sammamish River, creating a diversity of wetland elevations and habitats in the floodplain. Purchase parcel to the east of Swamp Creek Regional Park for inclusion in restoration project in Reach 1. (N335, N336)

Protect and restore riparian vegetation along the mainstem and tributaries to the Sammamish River to provide shade and reduce water temperatures as well as future source of large woody debris. Should be coordinated with restoration projects to regrade the river banks and restore floodplain.

Basinwide (entire subarea is located with Urban Growth Area):

- Restore shoreline as part of redevelopment of Lake Pointe Property in Reach 1, a 45-acre property on Lake Washington at right bank of Sammamish River mouth that is targeted for cleanup. (N45, N333)
- Continue and expand projects such as Sammamish Re-Leaf and Redmond River Walk to plant early successional riparian vegetation that provide shade, particularly in Reaches 4 and 6. Support riparian restoration in agricultural areas through King County's agriculture programs. Riparian vegetation restoration projects must be sequenced and coordinated with projects to regrade river banks and create flood benches. (N37, N351, N362, N361)
- Encourage neighborhood garden tours of salmon friendly gardens to help residents visualize alternatives to traditional, less eco-friendly landscape treatments. Integrate native plant salvage opportunities into Naturescaping classes, allowing class participants to take home native plants for immediate use both within and surrounding sensitive areas. (N716)

Increase refuge areas for adult migration. Add large woody debris to enhance existing pools and create new pools, particularly in areas of groundwater upwelling. Enhance mouths of small tributaries to create cool refuge pools (add large woody debris, riparian vegetation).

Basinwide (entire subarea is located with Urban Growth Area):

North Lake Washington Tributaries

- Enhance the mouths of small tributaries to create refuge areas. Projects should include as appropriate correction of fish passage barriers, riparian restoration, placement of large woody debris, and creation of cool-water refuge pool. Opportunities exist in Reach 2 (Tributaries 0057A, 0068, 0069); Reach 5 (Willows, Peters); Reach 3 (Derby, Gold and Woodin Creeks); and Reach 4 (Tributary 0095A, 0095 and 0096). (Note: Reaches listed in EDT priority order). (N339, N357, N342, N346)

NOTE: See also the Action Start-List for Migratory Areas.

NLW TIER 2 SUBAREA RECOMMENDATIONS

Restore and enhance spatial diversity of the NLW Chinook population through actions that protect and restore Tier 2 streams. In North and Little Bear Creeks, protect forest cover, wetland areas and minimize impervious surfaces to maintain watershed function and hydrologic integrity and protect water quality. Due to more limited protection opportunities in North Creek, restoration to reduce sedimentation and increase floodplain connectivity is also a priority.

LITTLE BEAR

- Tremendous growth pressure exists in Little Bear subarea. Jurisdictions should not move the Urban Growth Area (UGA) boundary, unless such change is beneficial to salmon. Jurisdictions should protect remaining watershed function by managing any additional growth in rural areas through incentives and regulations for forest retention, low impact development, clustering to protect natural areas, transferable development rights, etc. and acquisition where regulation and incentives do not provide sufficient protection. (N67)
- Protect headwaters, wetlands and forest cover through acquisitions or conservation easements, particularly in Reaches 10, 11, 12 and 9. (Note: Reaches listed in EDT priority order).
 - Protect undeveloped, forested wetlands (second-growth forest) in Reach 10 covering approximately 110 acres and 10 parcels owned by two landowners. (N424)
 - Protect 88 acres of mature second-growth forest on right bank of Little Bear Creek in Reach 11. Includes 5 parcels. (N427)
 - Protect forested, headwater wetlands north of 180th to 156th, an approximately 2-mile stretch of Little Bear Creek (Reach 12). Includes 3 wetland complexes totaling over 200 acres. (N429)
 - Protect large, undeveloped forested wetland on both Little Bear (Reach 9) and Great Dane (Reach 1) Creeks. Approximately 100 acres including 10 parcels. (N422)

NORTH CREEK

- Inadequate base flows, flooding, and flashy hydrology pose serious problems in North Creek. Address these through stormwater management (e.g., improved retention of high flows and increased infiltration), improved information about and enforcement of surface and groundwater withdrawals, TMDL implementation, more aggressive water conservation, etc. (N107)
- Protect remaining forest cover and wetlands through critical areas ordinances, stormwater regulations and best management practices, incentives (e.g., tax breaks, expedited permitting), and acquisition where regulation and incentives are not sufficient protection. There are undeveloped forested areas and wetlands in the following reaches: Lower North reaches 4, 3, 2

and Upper North reaches 10, 9, 6, 7. (Note: Reaches listed in EDT priority order). (N71, N376, N372, N370, N371, N396, N393, N385, N389)

- Implement restoration projects to reduce sedimentation and increase floodplain connectivity, particularly in Reaches 2, 4 and 5 (Note: Reaches listed in EDT priority order):
 - Explore possible floodplain restoration on unused baseball diamond and privately owned property between 195th and I-405 in Reach 2. Setback levee, increase flood storage, restore off-channel habitat and add large woody debris. (N367)
 - Enhance incised stream channel in Thrashers Corner area in Reach 4, restore riparian vegetation, plant conifers, and add large woody debris. (N375)
 - Expand existing restoration project upstream and downstream of existing area just upstream of 208th in Reach 5. Restore riparian vegetation, add large woody debris, and enhance side channel habitat. (N377, N373)

Additional action approved by the Steering Committee in response to public comment:

- Work with landowners in Reach 5 of North Creek to restore riparian vegetation and to do stream enhancements (N379).

ACTION START-LIST FOR ISSAQUAH CHINOOK POPULATION

Technical priorities from WRIA 8 Conservation Strategy are listed in bold. Land use, public outreach, and site specific actions are listed for each technical priority. Technical priorities are interrelated, and many actions address multiple technical priorities.

ISSAQUAH CREEK AND TRIBUTARIES RECOMMENDATIONS (TIER 1)

Identify and protect headwaters and sources of groundwater to maintain cold water temperatures and hydrological integrity. Carey and Holder Creeks are believed to be important cold water sources and should be protected.

Within Urban Growth Area:

- Support Issaquah's proposed critical aquifer recharge area (CARA) provisions that incorporate groundwater quality protections in well head capture zones and a broader protection area where infiltration will be required for groundwater recharge. (I19)
- Protect the headwater wetlands of North Fork (Reach 2). (I281)

Outside Urban Growth Area:

- Protect headwaters and groundwater through variety of tools: wetland buffers, CARA protections, stormwater infiltration regulations (including low impact development), forest clearing restrictions, recommendations in King County's 2003 *Taylor Mountain Forest Stewardship Plan* and forest stewardship plans. (I16-17)
- Protect existing natural flow regime in the headwaters areas of Carey and Holder creeks, which are in the Tiger Mountain State Forest and Taylor Mountain County Forest vicinity, by acquiring forest property, development rights/conservation easements. Provide enhanced incentives to retain and plant forest area environments (Carey Creek Reaches 3, 4 and Holder Creek Reach 3). (I5-7)

Protect forest cover, soil infiltrative capacity and wetlands, and minimize increases in impervious surfaces, to maintain watershed function and hydrologic integrity.

Basinwide recommendations:

- Encourage low impact development (including low density livestock or garden enterprises) through regulations, incentives, and education/training. Support basin liaison position to set up training and information sharing among planners, developers, and scientists about hands-on aspects of low impact development best management practices, including marketing, permitting, and technical issues. (I3, I715, I719, I720, I722)
- Offer existing and new incentives to continue to protect and restore conditions beyond those which are protected through regulations. Incentives include current use taxation programs (e.g., King County's Public Benefit Rating System and Timberland Program), transferable development rights programs. (I5, I701)
- Sponsor design competitions for innovative low impact development features, including clustered development, greater forest cover, reduced impervious pavement, green roofs. Combine a home/garden tour or "Street of Dreams" type event featuring these landscape/engineering treatments. (I720, I722)
- Employ basinwide stewards and farm planners/livestock stewards to work with property owners, land trusts, and agencies in order to identify and secure forested, wetland, and riparian areas, and to encourage the best management practices for those held in private ownership. (I701, I702)
- Encourage neighborhood and community protection associations that foster the ethic of voluntary stewardship; gain community support for forest land acquisition; and build bridges between property owners, agencies, and local governments. Continue the Issaquah Action Basin Action Team and expand to include more community representation from East Fork communities and the Upper Issaquah Basin. (I711, I716, I717)

Within Urban Growth Areas:

- Consistent with the Growth Management Act, Issaquah will continue to absorb most new residential, commercial, industrial growth. Control new development to minimize impacts on water quality, instream flows, and riparian buffers by encouraging low impact development through 3-tiered approach: 1) revise existing codes; 2) provide technical information to developers; 3) promote demonstration projects through incentives, technical assistance. (I12-13)

Outside Urban Growth Areas:

- Promote comprehensive approach taken in Bear Creek basin during past decade to include: strictly enforced regulations (e.g., clearing restrictions, riparian buffers, and stewardship plans in King County's updated critical areas ordinance), King County basin steward doing targeted outreach to streamside landowners, and a range of incentives (i.e., acquisition, PBRS program, conservation easements). Forest cover protections should account for site geology, soils, topography, and vegetation to maximize retention and infiltration. (I2, I4, I727)

Protect riparian vegetation to provide sources of large woody debris that can contribute to creation of pools.

Basinwide:

- Protect riparian buffers through critical areas ordinances, offer incentives (Public Benefit Rating System, easements) for private property owners to protect buffers and/or revegetate and remove channel confinement. Protect and restore riparian corridors by implementing required fencing/set asides and options for planting and cost share provided by the King County Livestock Program. (I28, I30)
- Continue and expand Creekside Landowner Assistance Program including classes, technical and financial assistance in shoreline landscape design, maintenance, and streambank armoring alternatives. In addition to workshops, convey through direct mailing of brochures, videos, and expansion of "Streamside Living Welcome Wagon" where residents welcome new home owners and provide information concerning salmon-friendly yard care, etc. (I702, I704, I709)
- Offer educational opportunities to landscape designers/contractors on riparian design/installation, alternatives to invasive species, and use of compost. (I713)

Within Urban Growth Area:

- Continue to tighten regulations affecting riparian buffers, including more restricted application of buffer averaging, fewer allowable uses in buffers. However, nonconforming uses will continue to be a great challenge; in order to decrease level of nonconformity over the long term, jurisdictions should encourage/require that development come into conformity, depending on degree of redevelopment. (I25-26)

Protect floodplain connectivity, instream channel complexity and habitat forming features to protect key life stages by limiting road crossings and bank armoring.

Basinwide:

- Limit new development and roads in floodplains; develop and apply standards which minimize impacts to salmon. Planning for new roads, and maintenance and retrofitting of existing roads, should minimize impacts on floodplains and water quality. (I38-40, I49)
- Increase public awareness of the value of large woody debris and vegetated areas for flood protection, salmon protection and healthy streams in print (e.g., local papers, community newsletters, signage) and other means (e.g., Issaquah Salmon Days, Sammamish Watershed Festival activities, local cable channels, hatchery docent presentations). (I705)

Within Urban Growth Area:

- Consider flexibility in prescriptive buffer width standards in exchange for stream habitat and buffer enhancement during redevelopment. However, limit buffer width reductions for new development because a key issue for Issaquah Creek is encroachment into floodplain and channel confinement, and revegetation does not improve this riparian function. (I29)

- Continue Issaquah Waterways Program to protect best remaining habitat within urban growth area:
 - Continue South Issaquah Creek Greenway acquisitions in Reach 7 of Issaquah Creek including Fowler Site, Mohl Property and other properties. (I225)
 - Acquire Bush Lane Properties, 12.5 acres of floodplain lying between Issaquah Creek (Reach 2) and North Fork Issaquah Creek (Reach 1). Includes 1200 feet of east bank of Issaquah Creek and 900 feet of North Fork Issaquah Creek. (I208, I274)
 - Protect corridor along Wildwood Blvd Trail, located on west bank of Issaquah Creek in Reach 6 near hatchery intake dam. (I222)
 - Acquire “Guano Acres,” one of the few remaining large undeveloped parcels (8 acres) on lower Issaquah Creek in Reach 6. (I223)
 - Acquire 5 acres for future restoration downstream of Juniper Street on Issaquah Creek in Reach 3. (I210)
 - Acquire one of the few remaining undeveloped parcels (2 acres) on lower Issaquah Creek upstream of Juniper Street in Reach 4. (I214)
 - Acquire Anderson Property, located at confluence of Issaquah Creek Reach 4 and East Fork Issaquah Creek Reach 1. (I215, I285)

Outside Urban Growth Area:

- Continue Issaquah Waterways Program to protect best remaining habitat outside Urban Growth Area:
 - Complete Issaquah Creek/Log Cabin Reach (RM 8.4-10, 155 acres) acquisition in Issaquah Reach 11 and expand to include adjacent undeveloped large parcels in Reach 12 (SE 156th Street to 252nd Avenue SE). (I244, I249)
 - Carey/Holder/Issaquah Creek Confluence Project: 120-acre site proposed for a conservation easement. Plan includes increased fenced buffers (Issaquah Reach 12, Carey Reach 1, and Holder Reach 1). (I250, I252, I259)
 - Protect best remaining habitat in Holder Creek including inholdings on Taylor and Tiger mountains (Holder Reaches 2 and 3). (I263, I261)
 - Protect best remaining habitat in Carey Creek from the confluence with Issaquah Creek to Taylor Mountain in Carey Reaches 1, 2 and 3. (I253, I254, I255)
- Issaquah Reach 9 and 10: Work with private property owners specifically in this reach to develop Public Benefit Rating System or easement to increase stream buffer protection. (I233, I238)

Protect water quality from fine sediments, metals, high temperatures, and bed-scouring high flows:

Basinwide recommendations:

- Identify water quality problems and address through stormwater management programs (including low impact development best management practices), current and future TMDLs, livestock management programs, upgrade of stormwater facilities (where possible), and retrofit of existing roadways to improve water quality and flows (e.g., SR-18, I-90). Jurisdictions should adopt and enforce regulations and best management practices consistent with Washington Department of Ecology’s 2001 Stormwater Management Manual (or beyond), as part of the NPDES Phase 1 and Phase 2 permit requirements. (I31-32, I36, I41)
- King County should implement and enforce livestock ordinance, making highest priority those areas that are most susceptible due to fine soils. Work with farmers to adopt and implement farm plans which address water quality and fish and wildlife habitat management and restoration. Coordinate with other stewardship and education programs, e.g., Horses for Clean Water and Backcountry Horsemen. (I24, I712)
- Run Natural Yard Care Neighborhoods Program and other landscaping education opportunities in communities in the Issaquah Basin. Increase visitation of basin residents to Pickering Farm Community Teaching Garden. (I723)
- Publicize emergency call numbers for public to report water quality and quantity problems, non-permitted vegetation clearing, and non-permitted instream grading and wood removal incidents. (I729)

- Coordinate with local business community and non-profits to encourage the use of commercial car washes and carwash kits. Reprint and distribute water quality poster series depicting impacts of everyday practices: washing car, driving car without maintenance, leaving pet wastes unattended, and improperly using lawn chemicals. (I724)
- Educate and support businesses, property management companies and homeowners associations on stormwater best management practices, specifically related to parking lot cleaning, storm drain maintenance, and road cleaning. (I725)

Provide adequate stream flow to allow upstream migration and spawning.

Basinwide:

- Work with Washington Department of Ecology, local health departments, and water suppliers on regulations, incentives, and education related to impact of municipal water withdrawals, illegal withdrawals, exempt wells on flow conditions throughout basin. Determine where illegal surface water withdrawals are occurring and follow-up with enforcement to ensure withdrawals do not continue. Develop public information about exempt wells, differences between water drawn from wells versus water diverted from streams without water rights permits, and support enforcement through development of citizen-based watchdog groups. (I44-46)
- Adopt and enforce stormwater provisions to address high flows and protection of base flows, including forest retention and low impact development best management practices. Encourage rainwater harvesting and graywater capturing for reuse in landscaping irrigation through demonstration projects, workshops and educational materials. (I47, I723, I728)
- Continue and/or extend availability of water conservation incentive programs (such as rebates for efficient toilets, appliances, free indoor conservation kits, free landscape irrigation audits); outreach on rainwater harvesting, and graywater capturing for reuse in landscape irrigation. Support conservation efforts within the Cascade Water Alliance and work to coordinate the various water policy and decision makers. (I721, I728)

NOTE: See also the Action Start-List for Migratory Areas.

ACTION START-LIST FOR MIGRATORY AREAS
(INCLUDES LAKES, SHIP CANAL, LOCKS, ESTUARY/NEARSHORE)
(ALL TIER 1)

Technical priorities from WRIA 8 Conservation Strategy are listed in bold. Land use, public outreach, and site specific actions are listed for each technical priority. Technical priorities are interrelated, and many actions address multiple technical priorities.

NOTE: Actions for Sammamish River are located in the North Lake Washington Tributaries Action Start-List.

**LAKE WASHINGTON (INCLUDING UNION BAY) AND LAKE SAMMAMISH
RECOMMENDATIONS**

Reduce predation to outmigrating juvenile Chinook by: reducing bank hardening, restoring overhanging riparian vegetation, replacing bulkheads and rip-rap with sandy beaches with gentle slopes, and use of mesh dock surfaces and/or community docks.

Basinwide recommendations (entire subarea is located with Urban Growth Area):

- Encourage salmon friendly shoreline design during new construction or redevelopment by offering incentives and regulatory flexibility to improve bulkhead and dock design and revegetate shorelines. Increase enforcement and address nonconforming structures over long run by requiring that major redevelopment projects meet current standards. (C27-29, N50, N52-53, I54-56)
- Discourage construction of new bulkheads; offer incentives (e.g., provide expertise, expedite permitting) for voluntary removal of bulkheads, beach improvement, riparian revegetation. (C30, N51, I52)
- Support joint effort by NOAA Fisheries and other agencies to develop dock/pier specifications to streamline federal/state/local permitting; encourage similar effort for bulkhead specifications. (C32-33, N55-56, I57, I66)
- Promote value of light-permeable docks, smaller piling sizes, and community docks to both salmon and landowners through direct mailings to lakeshore landowners or registered boat owners sent with property tax notice or boat registration tab renewal. Offer financial incentives for community docks in terms of reduced permit fees, loan fees/percentage rates, taxes, and permitting time, in addition to construction cost savings. (C734, C735)
- Develop workshop series specifically for lakeshore property owners on lakeside living: natural yard care, alternatives to vertical wall bulkheads, fish friendly dock design, best management practices for aquatic weed control, porous paving, and environmentally friendly methods of maintaining boats, docks, and decks. Related efforts include creation of a website to convey workshop material, an awareness campaign, "Build a Beach," to illuminate impact of bulkheads on development of sandy beaches. (C729, C730, C736)
- Restore shoreline in Lake Washington Section 1: restore Washington Department of Natural Resources property as part of shoreline trail project; work with private property owners to restore shoreline in Section 1. Use interpretive signage where possible to explain restoration efforts. (C269, C270, C272, C738)
- Restore shoreline in Lake Washington Section 2: remove marina and bulkhead at Rainer Beach Lake Park, create shallow-water habitat and restore native overhanging vegetation; remove concrete bulkhead in northern portion of Pritchard Island Beach, create shallow-water habitat and restore native overhanging vegetation. (C275, C276)
- Lake Sammamish State Park Protection: Several proposals exist pertaining to planned park development. Ensure that final park development plan adequately protects floodplain/riparian

processes and mouth of Issaquah Creek. (Issaquah Reach 1, Lake Sammamish Section 1) (I204, I292)

Protect and restore water quality in tributaries and along shoreline. Restore coho runs in smaller tributaries as control mechanism to reduce the cutthroat population. Reconnect and enhance small creek mouths as juvenile rearing areas.

Basinwide recommendations:

- Address water quality and high flow impacts from creeks and shoreline development through NPDES Phase 1 and Phase 2 permit updates, consistent with Washington Department of Ecology's 2001 Stormwater Management Manual, including low impact development techniques, on-site stormwater detention for new and redeveloped projects, and control of point sources that discharge directly into the lakes. Stormwater impacts from major transportation projects (for new and expanded roadways proposed during the next ten years) should be addressed. Encourage low impact development through regulations, incentives, education/training, and demonstration projects throughout subarea. (C39, N63, I72, I74)
- Protect and restore water quality and other ecological functions in tributaries to reduce effects of urbanization and reduce conditions which encourage cutthroat. Protect and restore forest cover, riparian buffers, wetlands, and creek mouths by revising and enforcing critical areas ordinances and Shoreline Master Programs, incentives, and flexible development tools. (C38, N64, I75 C747, C748)
- Promote through design competitions and media coverage the use of "rain gardens" and other low impact development practices that mimic natural hydrology. Combine a home/garden tour or "Street of Dreams" type event featuring these landscape /engineering treatments. (C748)
- Enhance small creek mouths in Lake Washington Segment 1: enhance Mouth of Kennydale Creek in Gene Coulon Park; enhance mouth and lower reaches of Johns Creek. Encourage participation of citizen-based stewardship efforts in these restoration projects (such as Stream Teams). (C268, C267, C719, C721, N716)

Additional actions approved by the Steering Committee in response to public comment:

- Daylight Zacusse Creek and enhance mouth on East shore of Lake Sammamish to benefit Kokanee, juvenile Chinook and other fish species.
- Enhance mouth and protect lower reaches of Ebright Creek on East shore of Lake Sammamish to benefit Kokanee, juvenile Chinook and other fish species. If property in lower reaches of creek is acquired there could be educational outreach opportunities on the site.

LAKE UNION, SHIP CANAL AND LOCKS RECOMMENDATIONS

High water temperatures impede juvenile Chinook outmigration during summer in Ship Canal and lead to increased activity by predators (primarily bass). Options to reduce water temperatures in Ship Canal should be evaluated. In addition, adult migration is affected by high temperatures and low dissolved oxygen at the Locks.

Basinwide recommendations (entire subarea is located within Urban Growth Area):

- Continue to work on improving conditions at the Locks to improve juvenile Chinook outmigration. Actions could include:
 - Add/replace strobe lights to locks to deter smolts and prevent entrainment. (M204)
 - Improve estuary conditions upstream of Locks: Modify the salt water barrier to let salt water in through the Locks to cool water above Locks or move the salt water drain upstream to the west end of the Fremont Cut. (M206)

- Locks Natural Estuary: Construct a more natural, fairly wide and long channel at the Locks facility that would allow fish to move back and forth between warmer lake outflow and cooler tidal water, and allow tidal change to inundate areas designed into the channel where fish could find refuge to hold and choose their preferred salinity. (M205)
- Take advantage of enormous outreach potential at the Locks by working with the Corp of Engineers to expand or enhance educational displays. Include information about ongoing and proposed WRIA 8 conservation efforts being both taken at the Locks and throughout the watershed, as well as actions that citizens can take to improve salmon habitat at home.

Additional investigations are needed to determine habitat characteristics that could provide Chinook with refuge from predators in Ship Canal, including impacts of docks. Riparian vegetation should be restored to provide cover for juvenile migrants.

Basinwide recommendations:

- Explore ways to reduce predation in Portage Bay, Lake Union and Ship Canal. Conduct pilot projects to reduce predator habitat (such as reducing number of docks or removing in-water structures) or increase refuge for juvenile Chinook and apply lessons learned to future actions regarding docks and riparian vegetation. (M216, M214)
- Coordinate with local businesses to sponsor a shoreline revegetation campaign, incorporating environmental stewardship as part of redevelopment occurring within Ship Canal area. Extend message (and sponsorship) through signage along shore, in-store promotions (at business's discretion), and media recognition. (M707)

ESTUARY AND NEARSHORE RECOMMENDATIONS (STARTS WEST OF LOCKS)

Please note: There is scientific uncertainty about Nearshore habitat and Chinook use of that habitat. Due to these uncertainties the Nearshore reaches were not prioritized using the EDT model. Experimental approaches to the protection of functioning habitat and the restoration of ecosystem processes should be implemented.

Protect remaining feeder bluff(s) that supply sediment and support littoral habitat creation. Undertake sediment source study to establish where feeder bluffs were prior to railroad and quantify rates of erosion. Based on study results, work with known feeder bluff locations to open up slide prone areas so that slides make it into nearshore, or start a beach nourishment program.

Basinwide recommendations (entire subarea is located within Urban Growth Area):

- Bluffs on Magnolia and Discovery Park in Seattle are only ones in WRIA 8 that are not armored by the railroad and have some unarmored locations (publicly and privately owned). Prohibit bulkheads or any other form of armoring and development at these locations through Seattle's critical areas ordinance and Shoreline Master Program. (M1)
- Support King County-funded sediment source study to: 1) establish where feeder bluffs were prior to the railroad, and 2) qualitatively assess rates of erosion and sediment contribution of those bluffs. Expect study completion by 3/05. Based on study results:
 - Map those bluffs that are most critical to protect (to preserve future opportunities to restore them to natural function), and protect them from future development through critical areas ordinance and/or Shoreline Master Program updates or acquisition. Note that steep slopes that are already developed need to be protected from erosion as a health and safety issue.
 - Do pilot projects to open up certain slide prone areas (e.g., by building trestles under railroad), so that slides make it into the nearshore and/or investigate appropriateness of a beach nourishment program. The experimental nature of a beach nourishment program requires a comprehensive and robust adaptive management and monitoring system. (M2, M3)

- Create an education campaign for property owners along bluff as well as general public: *Have you fed your beach today?* Define feeder bluffs, challenge the notion that all erosion is a bad thing. (M724)

Reduce bank hardening, especially in areas where armoring falls within tidal zone and/or separates a sediment source from nearshore environment, to restore natural shoreline accretion and depletion processes and support littoral habitat creation. Protect and restore Marine Riparian Vegetation (MRV), to maintain overhanging cover and terrestrial inputs for juvenile Chinook and their prey.

Basinwide recommendations:

- Protect remaining nearshore vegetation (on low or high bluffs) through regulation and/or acquisition. Regulatory tools to protect vegetation and prevent further development on and near top of bluffs, include: steep slope ordinances, bald eagle protection ordinances, critical areas ordinances, and clearing ordinances. (M7)
- Offer incentives to encourage bulkhead removal and revegetation along shoreline, including: allow regulatory flexibility during redevelopment, provide expertise (e.g., templates for shoreline planting plan, bulkhead design); expedite permitting at local, state and federal levels. (M8)
- For areas with existing residential, commercial, and industrial development west of the railroad (e.g. Nakeeta Beach, Point Wells, Richmond Beach):
 - Prohibit new development, at least in areas designated as conservancy.
 - During redevelopment, reduce overall impacts to nearshore, e.g., limit additional riprap to that required to protect structures, require riparian revegetation, avoid construction in intertidal zone, use smallest feasible footprint for structures, redevelop industrial sites into less intensive uses.
 - Promote pilot projects to better understand impacts of bank hardening in estuary and nearshore. As site specific projects are pursued “to remove structures, fill, and bulkheads” through fee simple purchase of parcels, address any regulatory or programmatic actions in order to expedite these projects. (M4)
- Commodore Park and Wolfe Creek Restoration: Explore feasibility of habitat restoration at Commodore Park, located immediately downstream of the Hiram M. Chittenden Locks on the south bank. Armored seawall should be removed and restored to a gentler vegetated slope. Project could be combined with daylighting of Wolf Creeke to create a pocket estuary downstream of the locks. (M250)
- Offer shoreline property owners a series of shoreline design workshops on: shoreline planting design/ noxious weed management; slope stabilization and erosion control using vegetation; natural yard care; porous paving options; alternatives to vertical wall bulkheads; salmon friendly dock design; and environmentally friendly methods of maintaining boats, docks, and decks. Offer professional workshops to marine contractors and design professionals on more environmentally friendly shoreline design. (M714, M716, M718, M719)

Reduce the number and coverage of overwater structures (e.g., docks, piers) as a way to reduce segmentation of the shoreline and the effects on both habitat forming processes and juvenile Chinook behavior.

Basinwide recommendations:

- Prohibit new residential overwater structures. For new public facilities (e.g., ferry docks), incorporate salmon-friendly design features and mitigate for unavoidable impacts. Retrofit existing overwater structures with salmon friendly design features. Where applicant meets guidelines for marine overwater structures, offer expedited local/state/federal permitting (similar to concept being promoted for Lake Washington overwater structures by NOAA Fisheries and other agencies). (M10, M11, M13)

- Remove overwater structures and pilings when possible; increase interpretive signage and media exposure at areas where structures are removed such as at Edmonds parks. Offer incentives to build community docks to replace individual docks in Salmon Bay. (M11)
- Expand outreach about value of eelgrass beds as juvenile source of food and habitat – and the negative effects that docks, overwater structures, and bulkheads have on the eelgrass. Encourage combined docks or more salmon friendly designs that impede less sediment and let more light into water; involve community and youth in eelgrass replantings and monitoring studies. (M714, M716, M721)

Reconnect and enhance small stream mouths to create pocket estuaries for smaller juvenile Chinook; for WRIA 8 fish, pocket estuaries may have most benefit near the Locks by providing an increased estuary area. Reconnect backshore areas (e.g., marshes, wetlands) to contribute to shoreline habitat diversity and terrestrial inputs. More information is needed about marine nearshore habitat processes and connections to juvenile Chinook salmon habitat, and how railroad design could be altered to restore access to pocket estuaries and backshore areas.

Basinwide recommendations:

- Protect stream mouths and wetlands from further degradation through Shoreline Master Programs and critical areas ordinances. Once stream mouths and wetlands are restored, protect from impacts from development through buffer requirements and stormwater management programs. (M14, M17, M18)
- Implement pilot projects to replace culverts with open bottom culverts or bridges/trestles wherever possible to allow for sand and gravel, large woody debris, and terrestrial inputs to contribute to the nearshore.
- Big Gulch Culvert Replacement: Replacement of the undersized culvert under the railroad with a trestle system to restore system connectivity and improve sediment transport into the nearshore. (M222)
- Implement projects to reconnect backshore areas, including:
 - Willow Creek Daylighting: Daylighting creek through existing fuel pier (using box culverts) will improve connectivity with Willow Creek Marsh. Proposed mitigation project for nearby "Edmonds Crossing" development. (M233)
 - Woodway Tidal Lagoon North: Potential culvert improvement project at an inter-tidal lagoon and mud flat where railroad was built offshore south of Willow Creek. (M235)
 - Deer Creek Culvert Replacement: Enhance the connectivity of Deer Creek and the associated estuarine wetland with the nearshore by replacing two concrete culverts with an oversized culvert or a trestle bridge. Potential Sound Transit mitigation project. (M236)
- Combine above restoration efforts with increased interpretive signage and video documentation for airing on government cable TV; make copies available to neighborhood and stewardship associations and encourage their participation in hands-on projects.
- Work with real estate community to help promote value of creek mouths to both property owners, environment, and shoreline community; encourage property owners to help restore them. Enlist help of neighborhood stewardship associations and Seattle Public Utility's Creek Stewardship program. (M720)

Protect sediment and water quality, especially near commercial and industrial areas (e.g., fuel spills, discharge of pollutants, etc.).

Basinwide recommendations:

- Address stormwater impacts (water quality and flows) throughout sub-area and from development near tops of bluffs, by: revising Phase 1 and 2 NPDES permits (consistent with Washington Department of Ecology's 2001 Stormwater Management Manual), requiring or

encouraging low impact development, retrofitting existing developments using natural drainage systems (e.g., SEASTreets). (M19)

- Determine extent to which residential structures along nearshore are on septic systems; determine if these systems are operating properly and if not require that they be fixed. Require that septic systems be inspected at time of sale. (M20)
- Discourage or prohibit any further filling and dredging in nearshore except for essential public facilities, and where associated with shoreline restoration projects. (M21)
- Promote boater/sea plane education campaign in order to improve and protect water quality compromised by fuel or toxic compounds from boat repairs, boat and sea plane maintenance. Carry out through signage at marinas, sea plane docks, boat yards, as well as messaging sent with boat/plane license registration. (M728)
- Educate and support businesses, property management companies, and homeowners associations on stormwater best management practices, specifically related to parking lot cleaning, storm drain maintenance and road cleaning. (M730)
- Train groundskeepers and property management companies about water polluting effects of landscape practices. Employ the “pride in workmanship” strategy, by placing signs that list who maintains the landscapes and parking lots along shorelines and the maintenance practices that they employ. (M729)

Chapter 9: Part 2**Preliminary Cost Estimate of Site Specific Projects and Programmatic Actions****Introduction**

The purpose of the preliminary cost estimate is to provide “ballpark” costs, not actual costs, of the WRIA 8 action start-list. The WRIA 8 action start-list consists of high priority site specific projects and programmatic actions selected from the comprehensive lists of projects and actions. During 2003 and 2004, the comprehensive lists were developed through extensive participation of local stakeholders, jurisdictional staff, environmental and business representatives, project experts, and the WRIA 8 Technical Committee. These comprehensive lists were developed without attaching costs, as their objective was to identify projects and actions that have the highest benefit to Chinook salmon. The action start-lists were then selected by the Service Provider Team by applying the Steering Committee’s approved criteria to the comprehensive lists. Upon completion of the action start-list an effort was undertaken to estimate costs for the projects and actions. These estimated costs give planning numbers to be used by decision makers within the context of overall funding plans.

This is a preliminary costing exercise. At this stage of the process, estimated costs are based on concepts, as well as specific projects. The concepts will be fleshed out over time as public and local government comments are incorporated into the plan and the results of the Treatment phase of the Ecosystem Diagnosis and Treatment model further refine priorities. Then cost estimates will need to be further refined as well to provide more accurate information. The cost estimates are subject to further – potentially substantial – revision as additional information regarding project scope, design and other factors becomes available.

Costs will also change over the timeframe of the start-list, which varies from projects that are ready to be implemented to undefined projects that may or may not be undertaken in the future. Programmatic actions are also variable; for example, some actions may need high levels of effort in the near term or others may need lower levels of effort sustained over a longer term.

Chapter 7 considers funding options to implement the first ten years of the planning horizon. This cost estimate is a component of that plan but is not a consistent annual cost over a ten-year period. Rather, site specific project costing gives an estimate for the action start-list projects that may change as other projects are identified as higher priority, or if projects are removed from, or modified on, the list due to feasibility constraints. Another variable that affects the implementation of the projects is when the funds are available, which also may vary significantly depending on the nature of the projects moving forward in any given year. The second component of this preliminary cost estimate is for programmatic action costs. It is important to note that the full-time equivalent (FTEs) staffing could be an additional level of effort, and thus cost, to that identified under shared staff (Chapter 2) and local jurisdictional efforts. This will depend on potential efficiencies that might be derived through collaborative implementation and whether local governments are already staffing identified or similar actions.

Overview of Methodology

The action start-list contains 166 actions, with many having several components. The first step was to group and code these actions so that costs could be viewed by various categories and types. Two main categories were formed - site specific projects and programmatic actions. Site specific projects are those actions that will occur on an identified location in the watershed. The two types of site specific projects

are protection and restoration. Programmatic actions include three types: land use actions, public outreach, and studies. These actions generally occur over a broader area of the watershed. The actions were also coded for where they occurred within the watershed into three groups: basin wide, within the Urban Growth Area (UGA) and outside the UGA. Research or studies associated with the proposed monitoring program were not included here (See Chapter 6).

Sources of Information

Information on costs for the site specific projects was gathered from a variety of sources. For some projects there were detailed estimates available from project managers who had developed costs as part of a pre-design costing estimate or as a grant funding request. Another source for detailed information was the Army Corps of Engineers' Lake Washington/Ship Canal General Investigation Study. If detailed project cost estimates were not available, then *A Primer on Habitat Project Costs (Primer, Evergreen 2003)* was used as follows to estimate types of projects that have similar components or characteristics. First, components were selected from the *Primer* to define an Acquisition, Riverine or Streambank restoration group (see Appendix D.2 for descriptions). Second, the projects were given a cost estimate based on the appropriate group's cost range. For projects that have a partial or older cost estimate from programs such as Waterways 2000 or the Cedar River Legacy, the method included refinement either through project managers or by comparing with a cost estimate using the *Primer*. One excellent example of comparable estimates was *Costing of the Hood Canal Coordinating Council's Summer Chum Salmon Recovery Plan (2004, Evergreen)* that used the *Primer* to group and cost projects. Finally, costs were brought up to 2004 costs by using a three percent per year inflation rate.

Sources of cost information on programmatic actions came primarily from the Service Provider Team for the land use actions and the public outreach actions. Estimates were developed by using similar programs or actions and then determining the amount of effort the action would need. Then this level of effort was evaluated by the Service Provider Team to estimate if it was already included in work being done by local jurisdictions or whether it constituted an additional level of effort. If it was an additional level of work, it was assigned a value for full time equivalent (FTE) staff time. Due to limited time the Service Provider Team did not consult with stakeholder jurisdictions on whether they have these programs, and if so the staffing level. Collaboration at a later date may identify efficiencies for implementing these actions. *A Primer on Habitat Project Costs (Primer, Evergreen 2003)* included an addendum, *Estimated Non-capital Costs of Watershed Salmon Recovery Plans* that gave a general FTE cost value (\$100,000/FTE) that was used throughout this preliminary cost estimate for staff costs. If materials would be needed, these costs were estimated as well. For example, one public outreach proposal recommends producing and distributing copies of a video on habitat for Chinook for shoreline property owners. This is a new action and was included in material cost estimates.

Reliability of Information

The mix of high and low reliability in the cost estimates in this lumped-sum preliminary estimate gives an overall average that should be noted as a rough estimate. This is acceptable for planning cost estimates and future refinement of the actions and their estimates will strengthen their reliability. For site specific projects, pre-design estimates and known acquisition costs increased the overall reliability. Projects that are still conceptual, with undefined scopes or stream miles or acreage unknown had the opposite effect and decreased the reliability.

The reliability of information for programmatic actions results in a very rough cost estimate at this time. Costs were kept generic to capture all jurisdictions because limited consultation occurred with local jurisdictions to tailor costs. There was also limited research on actual program costs to use as comparables with the estimates. Most of the programmatic actions had the scope defined at only a preliminary level. In addition, the FTE staff estimates associated with start-list programmatic action implementation did not at this time adjust costs for efficiencies that might later be realized through jurisdictional collaboration or jurisdictional staff already implementing identified or similar actions. Additional discussion with stakeholders is needed to identify other, potentially more efficient, methods to implement these programmatic actions. The total programmatic FTE counts may be covered in part in the future by identifying existing levels of effort not accounted for, or a change in work programs to accomplish this work.

Overall Summary of Costs

This overall summary cost estimate (see Table 9-1) used the September 2004 action start-list Tier I site specific projects and programmatic actions. Individual cost estimates were developed for the three Chinook populations: Cedar River, North Lake Washington Tributaries, Issaquah and Migratory Areas (see Appendix D-2). Migratory areas include Lake Washington, Lake Sammamish, the Ship Canal, Locks, and Estuary and Nearshore Areas.

The total cost estimate for the three Chinook populations included 92 site specific projects that range in overall cost of \$143 million to \$170 million with an average project cost of \$1.5 million to \$1.8 million. Programmatic actions included 103 public outreach and land use actions that have an average annual cost range of \$785,000 to \$2.1 million. This annual estimate was multiplied by ten to reflect the overall planning goal. The total cost range is \$9.9 million to \$23.7 million, which includes North Lake Washington and Cedar River studies that cost approximately \$1.6 million. The range for staffing for the three Chinook populations is 7.8 to 21 full-time equivalent (FTE) staff. These programmatic staff estimates are an additional level of effort to the shared staff identified in Chapter 2 and to the current level of effort by local jurisdictions. However, it must be noted as stated earlier that the programmatic staff estimates represent only one method of implementing these types of actions.

Cost estimates were also “rolled-up” for the three Chinook populations by where the start-list actions occurred, such as basinwide, within the Urban Growth Area (UGA), or outside of the UGA. The site specific projects were distributed with 28 projects within the UGA and 50 outside of the UGA. The majority of programmatic actions, 54 of the 103 total actions, were basinwide, with 5 actions within the UGA and 7 actions outside the UGA. Migratory Area actions account for 29 actions, while the Tier II subareas have 5 actions.

The preliminary cost estimate sub-divided the 166 start-list actions into 217 actions for the cost estimate purposes only. The cost estimate includes 195 of these 217 actions. For eleven site specific actions, the projects have not been scoped to the point where enough details are available, or details were not readily available, to develop accurate cost estimates. In addition, eleven programmatic actions did not have an associated cost if the staff level was accounted for in another action, or was included in existing efforts by local jurisdictions. Thus, these 22 actions were not included in the cost calculations.

Next Steps

While the Steering Committee has reviewed the methodology for cost development, and individual stakeholders provided information on project actions, individual costs for start-list actions have not been reviewed and approved by working committees or the Steering Committee. If actions on the start-list are modified through upcoming public and Forum review processes, costs could be revised and then submitted for additional review. However, due to the conceptual stage of the site-specific actions and the uncertainty about how programmatic actions would be implemented, the cost estimates for both site-specific and programmatic actions cannot be improved until the start-list is approved by the Forum and other decisions about plan implementation become finalized.

Table 9.1 - WRIA 8 Action Start-List - "Ballpark" Cost Estimates For Cedar, North Lake Washington, Issaquah, Migratory Areas, And Tier II Subareas		
Site Specific Actions		
	Low	High
Tier I - Within UGA 28 Projects	\$47.6M	\$50.9M
Tier I - Outside UGA 50 Projects	\$70.4M	\$87.6M
Migratory Areas 6 Projects	\$5.1M	\$7.1M
Tier II 8 Projects	\$19.7M	\$24M
Average Cost per project (92)	\$1.5M	\$1.8M
Total Cost - Site Specific Projects	\$143M	\$170M
Programmatic Actions		
	Low	High
Tier I - Basinwide 54 Actions	\$454,000	\$1.1M
Tier I - Within UGA 5 Actions	\$20,000	\$100,000
Tier I - Outside UGA 7 Actions	\$50,000	\$250,000
Tier II - 5 Actions	\$10,000	\$70,000
Migratory Areas - 29 Actions	\$251,000	\$590,000
Annual number of FTEs / Staff	7.85	21
Annual Cost for 103 Actions	\$785,000	\$2.1M
Average Annual Cost per Action (103)	\$7,600	\$20,400
NLW and Cedar Studies	\$1.6M	\$1.6M
Material Costs - workshop handouts, videos, brochures, mailings	\$420,000	\$1M
Total Cost - Programmatic	\$9.9M	\$23.7M
Notes: 1) Migratory Areas include Lakes Washington and Sammamish, Ship Canal, Locks, and Estuary/ Nearshore; 2) M=million.		