

Appendix C

Non-regulatory Programs and Projects

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Appendix C

Non-regulatory Programs and Projects

River and Floodplain Management Capital Project Examples

The 2006 King County Flood Hazard Management Plan includes capital projects that acquire floodprone properties and set back levees so that rivers are reconnected to their floodplains. Basin-specific projects are listed in Chapter 5 of the Plan at the following location:

<http://www.kingcounty.gov/environment/waterandland/flooding/documents/flood-hazard-management-plan.aspx>

Several Cedar River projects are described below as examples of the flood risk reduction and habitat benefits of these projects. This appendix also includes lists of completed projects and proposed capital programs, demonstrating the political and financial commitment to implementing these regionally significant floodplain reconnection projects.

Upcoming projects on the Cedar River are listed below in chronological order according to planned or expected start of construction. These dates are subject to change pending completion of acquisitions, receipt of permits, availability of funding, and other variables. The first eight projects listed are expected to start construction before 2016. Start dates for the other projects are less certain and not expected until at least 2017 and beyond. A separate map shows project locations.

Projects starting before 2016

1. Cedar River Knotweed Control and Replanting Project (since 2009)

- **Location:** Cedar River, from City of Seattle's Municipal Watershed at Landsburg Road SE (River Mile [RM] 22) to City of Renton (RM 5).
- **Expected Outcome:** Work with private property owners to control knotweed, install native plants, and improve riparian conditions along the Cedar River and its tributaries. Implemented by the King County Noxious Weed Control Program and the City of Seattle via the Cascade Land Conservancy and Friends of the Cedar River.
- **Status:** Under way since 2009. Continue until knotweed is adequately controlled and all riparian vegetation restored, if funded, for at least the next 10 years.

2. Rainbow Bend Levee Removal and Floodplain Reconnection Project (2012)

- **Location:** Downstream for 0.8 miles from Cedar Grove Road SE bridge.
- **Expected outcome:** Reduce flood risks to SR-169, neighboring properties, and infrastructure. Allow the river to be dynamic, move within project area boundaries, and create more diverse instream and off-channel habitat features.

Status: Construction planned for summer 2012.

3. Completion of Belmondo Revetment Repair (2012)

- **Location:** Immediately adjacent to SR-169 and Cedar River Trail at RM 10.3-10.4.
- **Expected Outcome:** Complete repair of levee damaged in 2006 and 2009 flood events. Protect SR-169, Cedar River Trail, and a regional fiber optic cable line. Establish a stable toe incorporating contemporary biotechnical bank stabilization elements along entire bank length bordering the highway. Slow erosive velocities against the levee and provide modest improvement in habitat condition.
- **Status:** Emergency repair completed on 400 LF during 2009 flood; 200 LF segment reconstructed in 2010 as the permanent repair and mitigation for emergency work. Design for remaining 260 LF is under way; construction scheduled for 2012.

4. Cedar Rapids Levee Setback Retrofit (2012)

- **Location:** Both banks of the river between RM 7.3 and 7.8.
- **Expected Outcome:** Retrofit and enhance setback levees to allow river to move more naturally while strengthening protection for neighboring properties, store floodwaters, and enhance habitat conditions at the project boundaries.
- **Status:** Levee set back in 2010, emergency repairs in 2011, retrofit expected in 2012 pending receipt of permits.

5. Herzman Levee Setback and Floodplain Reconnection (2013)

- **Location:** RM 6.5 right bank.
- **Expected Outcome:** Set back downstream end of Herzman Levee to reduce erosive velocities against the Cedar River Trail Levee, which protects SR-169 on the opposite bank. Increase area available for flood conveyance and storage to lower peak elevations and velocities.
- **Status:** One necessary parcel was donated. Additional acquisition interests/needs to be assessed in 2011 during preliminary design. Construction expected in 2013-2015.

6. Gravel Removal at River Mouth (2013)

- **Location:** Mouth of Cedar River.
- **Expected Outcome:** Conduct routine maintenance dredging of the certified levee lining the river mouth. Maintain conveyance and storage capacity and restore full function. Protect Boeing and areas of downtown Renton from inundation by a 100-year flood event.
- **Status:** Project scheduled to start in 2011. King County will coordinate efforts with City of Renton, local sponsor. Construction expected to start in 2013-2014.

7. Elliot Bridge Levee Setback and Floodplain Reconnection Project (2014)

- **Location:** Downstream from the 154th Place SE Bridge to the Punnet Briggs levee (right bank, downstream from the old Elliot Bridge crossing).
- **Expected Outcome:** Remove flood-prone homes that have experienced repetitive damage from the floodplain. Set back existing levees to restore natural floodplain functions, convey and store floodwaters, and foster healthy riverine habitat and salmon recovery.
- **Status:** Acquisition is under way; approximately 60% of the planned properties acquired from willing landowners.

- Phase 1: Partial setback of the right bank levee (Orting Hill) under consideration as WA DOT habitat mitigation project. If selected, construction scheduled for 2014.
- Phase 2: Following additional acquisitions, construction of the greater project expected in 2015 to 2020.

8. Mouth of Taylor Reach (a.k.a. Rhode-Getchman and Jan Road/Rutledge-Johnson) Levees Setback and Floodplain Reconnection (2015)

- **Location:** Both river banks downstream from the highway SR-169 crossing at 218th Place SE; levees located between RM 13.2 – 13.5 and 13.8 -13.9 both banks, and Taylor Creek bordering RM 13.3 – 13.8 right bank.
- **Expected Outcome:** Acquire flood-prone homes from willing sellers to eliminate flood risk. Set back Rhode, Getchman, Jan Road, and Rutledge-Johnson levees on left and right banks to reduce flood risks to SR-169, trail, fiber optic network, neighboring residential properties, and possibly Maxwell Road, and restore habitat in Taylor Creek and the river.
- **Status:** Acquisition under way from willing sellers. Approximately 60 % of the planned properties have been acquired. Engineering and design expected in 2011-2013. Construction anticipated after properties have been acquired from willing sellers, 2015 to 2020.

Projects starting after 2016

9. Riverbend Mobile Home Park Acquisition and Levee Setback (2017)

- **Location:** RM 7.0 – 7.3 left bank.
- **Expected Outcome:** At a minimum, acquire from willing sellers and remove mobile homes immediately adjacent to the river and at greatest risk of flood damage from channel migration. If entire park is acquired from willing seller, Riverbend Levee can be set back to:
 - Reduce flood risks for a densely populated neighborhood subject to channel migration and flood hazards
 - Restore natural floodplain functions, convey and store floodwaters, lower peak elevations and velocities, and foster healthy riverine habitat and salmon recovery
 - Reduce need for long-term flood facility maintenance and emergency response
 - Connect several large tracts of county-owned and -managed lands that provide some of the best and most productive habitat in the lower Cedar River basin
 - Present opportunity for significant habitat enhancement such as sustainable off-channel rearing and refuge habitat for Chinook and other salmonid species.
- **Status:** In 1990, several of these homes were undermined and were saved only by an emergency repair to the eroding revetment. Acquisition from willing sellers is scheduled to begin in 2015. Construction would follow in 2017-2020.

10. Lower Belmondo Levee Removal and Floodplain Reconnection (a.k.a. Cummings/Littlefield Levee Project) (2018)

- **Location:** Upstream from the SE Jones Rd crossing.
- **Expected Outcome:** Remove Cummings and Littlefield levees to allow the river to be dynamic and move within its floodplain for flood and habitat benefits over 0.4 of a mile.

- **Status:** Most of the residents left this isolated flood-prone area when the bridge was replaced. Acquisition from willing buyers of remaining (2?) homes is under way. Construction will happen following acquisition, likely in 2018 to 2020 or beyond.

11. Lower Jones Road Setback (2018)

- **Location:** RM 6.0-6.2 left bank.
- **Expected Outcome:** Set back a section of Lower Jones Road where river abuts directly against roadway and the bank is vulnerable to frequent flood damages. Protect integrity of Jones Road, which serves a significant residential population. May improve habitat for native salmonids and threatened Chinook.
- **Status:** Project design scheduled to start in 2015. Construction would not likely start before 2018-2020.

12. WPA Levee Removal and Floodplain Reconnection (2020)

- **Location:** RM 10.8-11.0 left bank.
- **Expected Outcome:** Allow the river to be dynamic and move within its floodplain for a half-mile stretch immediately downstream from the Rainbow Bend project.
- **Status:** Acquisition from willing sellers is under way. Construction will follow acquisition, not likely until 2020 or beyond.

13. Lower Lions Levee Setback and Floodplain Reconnection (a.k.a. McDonald Levee Setback) (2020)

- **Location:** Upstream from the Cedar Grove Road bridge.
- **Expected Outcome:** Acquire from willing sellers and remove repetitively flooded homes. Allow the river to be dynamic and move within its floodplain for a 1/3 mile stretch immediately upstream from the Rainbow Bend project.
- **Status:** Acquisition from willing sellers is under way. Construction to happen following acquisition, not likely prior to 2020 or beyond.

14. Byers Bend Acquisition and Floodplain Restoration (2020)

- **Location:** Right bank between RM 13.2 and 12.7, located between the Cedar Trail 7 Levee (SE 197th St., if extended) and the Rawson Levee (SE 190th St., if extended).
- **Expected Outcome:** Acquire from willing sellers and remove repetitively flooded homes. Allow the river to be dynamic and move within its floodplain for a half-mile stretch immediately downstream from the Mouth of Taylor Creek project.
- **Status:** Acquisition is just beginning. Restoration construction will occur following acquisition from willing sellers, likely in 2020 or beyond.

15. Maplewood Flood Study (TBD)

- **Location:** RM 3.3-4.3 right bank.
- **Expected Outcome:** The Maplewood neighborhood is subject to flooding at relatively high flows. However, it is also located directly across the river from a known landslide hazard area that, if triggered, could redirect flows of the entire mainstem river through the neighborhood. This study would assess the risks to homes and public safety, seek input from area residents, and evaluate potential actions to reduce the risks.
- **Status:** Study scheduled to start in 2012. Implementation of recommendations would not be scheduled until study is completed and reviewed by Flood Control District.

16. Dorre Don and Byers Road Flood Study (TBD)

- **Location:** Exact limits of study have not yet been determined, but area could include RM 15.5-17.6 right bank and RM 11.5-13.0 left bank.
- **Expected Outcome:** The Dorre Don and Byers Road neighborhoods are subject to repeated and severe flooding at moderate to high flows. King County has completed some flood buyouts from willing sellers in these areas, but many more homes remain at risk. This study would assess the risks in these neighborhoods, seek input from area residents, and evaluate potential actions to reduce the risks.
- **Status:** Study scheduled to start in 2011. Implementation of recommendations would not be scheduled until study is completed and reviewed by Flood Control District.



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King County Flood Control District Accomplishments

The King County Flood Control District was established in 2007 to provide a proactive, regional approach to flood control as well as to fund improvements to the county's nearly 500 aging and inadequate flood protection facilities. Funding for the Flood District comes from a countywide property tax levy of 10 cents per \$1,000 assessed value. This amounts to approximately \$40 per year on a \$400,000 home. The levy raises roughly \$36 million a year. This funding dramatically increased the number of projects that could be completed within King County each year. The additional funding also enhanced King County's ability to receive federal and state matching funds.

Members of the King County Council oversee the Flood District as a Board of Supervisors. A 15-member Advisory Committee made up of local government officials and citizens provides advice to the board. The King County Department of Natural Resources and Parks, Water and Land Resources Division, carries out the approved flood protection projects and programs.

The following highlights activities undertaken by the Flood District:

Actions to reduce flood risks

- Completed 61 levee repair and rehabilitation projects since creation in 2008; 25 multi-year projects are planned to continue in 2011.
- Leveraged over \$40 million in state and federal funds.
- Provided funding for flood risk reduction activities in each of King County's 40 jurisdictions through the Opportunity Fund.
- Completed over 32 home elevations of at-risk structures since 2008, 20 more in progress and another 5 pending grant applications.
- Acquired 71 at-risk properties and 80 acres, valued at approximately \$20 million.
- King County's innovative levee rehabilitation approaches have been profiled in national reports by FEMA and serve as a model for other jurisdictions seeking to protect public safety while promoting environmental objectives.
- Capital project prioritization criteria are cited in a 2010 Department of Ecology report to the Legislature as a model construct for prioritizing levee rehabilitation needs.

Increase understanding of flood risks

- Completed floodplain mapping for every major river in King County.
- One of the only local governments in Washington to identify channel migration risks.
- Technical analyses enabled the U.S. Army Corps of Engineers (USACE) and emergency managers to quickly generate inundation scenarios when USACE Howard Hanson Dam problems were discovered.

Board of Supervisors: Julia Peterson, Chair • Reagan Dunn, Vice Chair
Bob Ferguson • Larry Gasser • Jane Hayes • Kathy Lambert • Joe McDevinn • Eric J. Phillips • Proven Reichbauer
Executive Director: Kristine Lund

Communicate flood risks to stakeholders and the public

- Highest-rated county in the nation in FEMA's Community Rating System (CRS), which allows a 40% insurance rate reduction for unincorporated area residents; many other jurisdictions in King County are also able to claim CRS credits for the Flood District's activities.
- Flood Warning Center and Flood Patrols activated during flood events. The Flood Warning Center provides round-the-clock coordination of weather and river flooding information. Since 2008 the Flood Warning Center has opened 12 times, operated for over 400 hours with over 1,700 person-hours monitoring river and levee conditions, and coordinated with emergency first-responders and the general public.
- Developed a Flood Alert System, providing approximately 4,000 citizens and first-responders with automated real-time information about flood conditions on King County's major rivers.
- 2006 King County Flood Plan is recognized by the Department of Ecology and FEMA as a 'model' flood risk reduction plan, and is regularly cited by other jurisdictions.
- Developed flood preparedness videos in 22 languages, enabling floodplain managers throughout the state to increase flood awareness among vulnerable population groups.
- Nationally recognized outreach campaign to raise awareness of increased flood risks for the Green River Valley due to Howard Hanson Dam issues.

Adopted 2011-2016 Capital Project List
King County Flood Control District

July 11, 2011

River	Flood Risk	Impl Risk	Project	Name	Carryover	Original 2011	Change from Original	Reallocated 2011	2011 Reallocated + Carryover	2012	2013	2014	2015	2016	Total
Skykomish-Miller	66%	72%	FL0001	Miller River Home Buyout	\$921	\$600,000		\$600,000	\$600,921						\$600,921
Skykomish-Miller	79%	51%	FL0002	Miller River Road Protection	\$85,157		\$50,000	\$50,000	\$135,157						\$135,157
Skykomish-Miller	76%	46%	FL0004	Timber Lane Village Home Erosion Buyouts	\$94,017		\$50,000	\$50,000	\$144,017	\$515,000	\$530,450	\$828,493	\$853,347	\$878,947	\$3,750,254
Skykomish-Miller	74%	46%	FL0005	S.F. Skykomish River Repetitive Loss Mitigation	\$203,447				\$203,447				\$213,249	\$219,847	\$636,343
Skykomish-Miller	Repair	Repair	FL0007	Mcknight Repair	\$39,741				\$39,741						\$39,741
Skykomish-Miller	92%	46%	FL0010	Maloney Cr Conf Improvements		\$50,000		\$50,000	\$50,000						\$50,000
Skykomish-Miller	66%	44%	FL0013	Skykomish Home Buyouts										\$827,419	\$827,419
Upper Snoqualmie	Repair	Repair	FL1001	Mf Snoq Flood Repairs	\$24,591										
Upper Snoqualmie	84%	85%	FL1002	N Bend Resid Flood Mitgtn	\$1,459,432				\$1,459,432						\$1,459,432
Upper Snoqualmie	79%	49%	FL1003	South Fork Levee System Improvements	\$832,032	\$1,766,862	(\$1,400,862)	\$366,000	\$1,198,032	\$1,215,400	\$1,485,260	\$2,731,818			\$6,630,510
Upper Snoqualmie	Repair	Repair	FL1005	Upper Snoq R Flood Repairs	\$25,947		(\$25,497)	(\$25,497)	\$450						\$450
Upper Snoqualmie	68%	13%	FL1017	Kimball Creek And Snoqualmie Basin	\$218,018	(\$200,000)		(\$200,000)	\$18,018						\$18,018
Upper Snoqualmie	79%	79%	FL1018	City Of Snoqualmie Natural Area Acquisitions	\$226,841				\$226,841						\$226,841
Upper Snoqualmie	76%	33%	FL1019	Middle Fork Levee System Capacity Improvements	\$781,781	\$960,444	\$558,787	\$1,519,231	\$2,301,012	\$328,808	\$699,106				\$3,328,925
Upper Snoqualmie	76%	26%	FL1022	SR202 Bridge Lengthening on South Fork Snoqualmie										\$347,782	\$347,782
Upper Snoqualmie	89%	54%	FL1023	Upper Snoqualmie Residential Flood Mitigation	\$1,146,972	\$1,105,615	\$72,443	\$1,178,058	\$2,325,030	\$1,255,324	\$1,337,735	\$1,425,640	\$1,000,000	\$1,000,000	\$8,343,729
Upper Snoqualmie	Repair	Repair	FL1024	Mason Thorson Ext Repair	\$1,162				\$1,162						\$1,162
Upper Snoqualmie	Repair	Repair	FL1029	Vallcoda Repair	\$39,174		(\$39,174)	(\$39,174)							
Upper Snoqualmie	Repair	Repair	FL1030	Allen Repair	\$19,255		(\$15,000)	(\$15,000)	\$4,255						\$4,255
Upper Snoqualmie	Repair	Repair	FL1041	Mason Thorson Ext 2011 Repair			\$200,000	\$200,000	\$200,000						\$200,000
Upper Snoqualmie	Repair	Repair	FL1042	Shakemill Levee 2011 Repair			\$250,000	\$250,000	\$250,000						\$250,000
Upper Snoqualmie	Repair	Repair	FL1043	Record Office Revetment 2011 Repair			\$50,000	\$50,000	\$50,000						\$50,000
Upper Snoqualmie	Repair	Repair	FL1044	Meadowbrook Revetment 2011 Repair			\$50,000	\$50,000	\$50,000						\$50,000
Lower Snoqualmie	84%	97%	FL2001	Aldair/Fall City Buyout	\$2,117,082	\$86,335	\$500,000	\$586,335	\$2,703,417						\$2,703,417
Lower Snoqualmie	Repair	Repair	FL2002	Lower Snoqualmie River Flood Damage Repairs	\$577,021	\$500,000	(\$1,070,000)	(\$570,000)	\$7,021						\$7,021
Lower Snoqualmie	68%	72%	FL2012	Mcelhoe/Person Levee	\$267,268	\$75,000		\$75,000	\$342,268		\$1,059,330				\$1,401,598
Lower Snoqualmie	84%	49%	FL2013	Snoqualmie 13.5 Revetment	\$150,707	\$300,000	(\$300,000)		\$150,707	\$515,000	\$2,121,800				\$2,787,507
Lower Snoqualmie	74%	21%	FL2014	Lower Snoqualmie River Repetitive Loss Mitigation	\$1,066,886				\$1,066,886			\$251,983	\$259,542	\$267,329	\$1,845,540
Lower Snoqualmie	Repair	Repair	FL2015	Mcelhoe-Person Repair	\$40,483	(\$50,000)	\$9,517	(\$40,483)							
Lower Snoqualmie	N/A	N/A	FL2018	Farm/Flood Task Force Implementation	\$28,965	\$100,759	(\$759)	\$100,000	\$128,965	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$628,965
Lower Snoqualmie	82%	74%	FL2020	Lower Snoqualmie Residential Flood Mitigation	\$540,029	\$300,000	(\$200,000)	\$100,000	\$640,029	\$300,000	\$300,000	\$300,000	\$400,000	\$400,000	\$2,340,029
Lower Snoqualmie	Repair	Repair	FL2021	Sinerra Qualle 2011 Repair			\$500,000	\$500,000	\$500,000	\$500,000	\$2,000,000				\$3,000,000
Tolt	Repair	Repair	FL3001	Tolt River Flood Repairs	\$163,271		(\$163,271)	(\$163,271)							
Tolt	74%	N/A	FL3002	Tolt River Corridor Study	\$223,355		\$135,000	\$135,000	\$358,355	\$51,500					\$409,855
Tolt	66%	64%	FL3004	Lower Tolt River Acquisition			\$75,000	\$75,000	\$75,000				\$800,000		\$875,000
Tolt	82%	79%	FL3005	San Souci Neighborhood Buyout	\$698,881	\$1,365,967	\$1,000,000	\$2,365,967	\$3,064,848						\$3,064,848
Tolt	66%	64%	FL3006	Tolt River Natural Area Floodplain Reconnection/Ac									\$2,244,938	\$2,579,347	\$4,824,284
Tolt	82%	62%	FL3007	Tolt River SR 203 to Trail Bridge Floodplain Recon	\$244				\$244				\$411,119	\$691,512	\$1,102,875
Tolt	74%	21%	FL3008	Tolt River Repetitive Loss Mitigation								\$180,514			\$180,514
Tolt	84%	79%	FL3009	Tolt River Mile 1.1 Levee Setback	\$125,523	\$1,937,850	\$150	\$1,938,000	\$2,063,523	\$1,236,000	\$1,273,080	\$1,311,272			\$5,883,875
Tolt	Repair	Repair	FL3012	Frew Emergency Rpr	\$1,897				\$1,897						\$1,897
Raging	78%	79%	FL4001	Alpine Manor Mobile Home Park Neighborhood Buyout	\$1,174,670	\$1,083,244	(\$193,452)	\$889,792	\$2,064,462	\$916,486	\$943,980	\$972,300	\$1,001,468		\$5,898,696
Raging	Repair	Repair	FL4002	Raging River Flood Damage Repairs	\$31,211		(\$31,211)	(\$31,211)							
Raging	68%	77%	FL4016	Abandoned Bridge Abutment and Waring Revetment Cha										\$160,397	\$160,397
Raging	66%	41%	FL4021	Preston-Fall City Upper	\$387,925		(\$300,000)	(\$300,000)	\$87,925						\$87,925
Sammamish	58%	N/A	FL5001	Willowmoor Floodplain Restoration			\$150,000	\$150,000	\$150,000						\$150,000
Lk Wash Tribs	74%	56%	FL6002	Issaquah Creek Repetitive Loss Mitigation								\$327,818			\$327,818
Lk Wash Tribs	71%	49%	FL6003	Bellevue - Lower Coal Creek Phase 1								\$2,036,890	\$2,138,414	\$4,491,272	\$8,668,576
Lk Wash Tribs	71%	58%	FL6004	McAleer/Lyon Creek Channel Improvements								\$700,000			\$700,000
Cedar	76%	N/A	FL7001	Cedar Grove Mobile Acq	\$62,931		(\$25,000)	(\$25,000)	\$37,931						\$37,931

Revised CIP: Current Project Allocations

River	Flood Risk	Impl Risk	Project	Name	Carryover	Original 2011	Change from Original	Reallocated 2011	2011 Reallocated + Carryover	2012	2013	2014	2015	2016	Total
Cedar	83%	N/A	FL7002	Cedar Rapids Levee Setback	\$2,622		(\$2,621)	(\$2,621)	\$1						\$1
Cedar	Repair	Repair	FL7003	Cedar River Flood Damage Repairs	\$693,783	(\$500,000)	(\$193,500)	(\$693,500)	\$283						\$283
Cedar	74%	N/A	FL7004	Cedar River Repetitive Loss Mitigation	\$145,097				\$145,097		\$300,000	\$300,000	\$300,000		\$1,045,097
Cedar	79%	N/A	FL7005	Elliott Bridge Levee Setback And Acquisition	\$197,728	\$930,440	(\$906,860)	\$23,580	\$221,308		\$954,810				\$1,176,118
Cedar	78%	N/A	FL7006	Rainbow Bend Levee Setback and Floodplain Reconne	\$1,044,292	\$832,059	\$237,459	\$1,069,518	\$2,113,810	\$1,238,000					\$3,349,810
Cedar	79%	69%	FL7014	Dorre Don Meanders Ph 1	\$242,209				\$242,209						\$242,209
Cedar	78%	51%	FL7015	Herzman Levee Setback	\$265,389	\$469,504	(\$469,504)		\$265,389		\$795,675				\$1,061,064
Cedar	78%	44%	FL7016	Jan Road-Rutledge Johnson Levee Setbacks	\$258,879	\$394,321	(\$394,321)		\$258,879			\$819,545			\$1,078,424
Cedar	79%	69%	FL7017	Maplewood Levee Setback Ph 1						\$103,000					\$103,000
Cedar	89%	59%	FL7018	Cedar River Gravel Removal	\$352,791	\$369,684	(\$43,016)	\$326,668	\$679,459	\$1,345,872	\$1,386,248	\$1,903,781			\$5,315,360
Cedar	79%	51%	FL7020	Lower Jones Road Setback									\$173,163	\$624,251	\$797,413
Cedar	82%	48%	FL7021	Riverbend Mobile Home Park Acquisition and Levee S									\$238,260	\$245,408	\$483,668
Cedar	84%	46%	FL7022	Maplewood Levee Setback Ph II									\$640,917	\$2,243,427	\$3,084,344
Cedar	79%	62%	FL7023	Renton- Cedar River Bridge Flood Reduction Project										\$618,211	\$618,211
Cedar	Repair	Repair	FL7026	Belmondo Emergency Repair	\$140				\$140						\$140
Cedar	Repair	Repair	FL7027	Cedar Rapids Repair	\$1,022				\$1,022						\$1,022
Cedar	Repair	Repair	FL7034	Byers Curve Repair	\$3,291				\$3,291						\$3,291
Cedar	71%	58%	FL7037	Rhode Levee Setback	\$220,109	\$463,816	(\$463,816)		\$220,109			\$1,639,091			\$1,859,200
Cedar	Repair	Repair	FL7038	Herzman Repair	\$285,930		(\$285,930)	(\$285,930)							
Cedar	79%	49%	FL7039	Dorre Done Phase 2 Hazard Mitigation										\$908,917	\$908,917
Cedar	73%	47%	FL7040	Cedar Pre-Construction Strategic Acquisition	\$275,477	\$1,114,015	\$2,385,985	\$3,500,000	\$3,775,477		\$1,000,000	\$1,000,000	\$4,000,000		\$9,775,477
Cedar	92%	67%	FL7043	Cedar River Trail 2b Fema	(\$2,578)		\$4,000	\$4,000	\$1,422						\$1,422
Cedar	79%	77%	FL7044	Belmondo Fema 1653 Ph I	\$775,871				\$775,871						\$775,871
Cedar	Repair	Repair	FL7048	Cedar Rapids 2011 Repair			\$500,000	\$500,000	\$500,000						\$500,000
Cedar	Repair	Repair	FL7049	Youngs Revetment 2011 Repair			\$40,000	\$40,000	\$40,000						\$40,000
Green	Repair	Repair	FL8003	Green R Flood Repairs	\$846				\$846						\$846
Green	100%	62%	FL8016	Briscoe Levee #1-#3 #5-#8	\$2,326				\$2,326						\$2,326
Green	100%	54%	FL8017	Briscoe Reach Design (180th To 200th)	\$2,457,629	\$100,000	(\$1,600,000)	(\$1,500,000)	\$957,629						\$957,629
Green	88%	62%	FL8021	Reddington Reach	\$815,646	\$50,000	\$3,827,000	\$3,877,000	\$4,692,646	\$4,940,000	\$6,200,000				\$15,832,646
Green	82%	28%	FL8025	Gaco Western										\$626,008	\$626,008
Green	Repair	Repair	FL8027	Stoneway Lower Repair	(\$4,495)		\$10,000	\$10,000	\$5,505						\$5,505
Green	Repair	Repair	FL8029	Horeseshoe Bend Repair	\$47,335		(\$47,335)	(\$47,335)							
Green	Repair	Repair	FL8030	Ratolo Repair	\$25,000		(\$25,000)	(\$25,000)							
Green	Repair	Repair	FL8031	Gateway Lower / Codiga Repair	\$150,000	\$400,000	(\$549,816)	(\$149,816)	\$184						\$184
Green	76%	56%	FL8036	Lower Russell/Holiday		\$800,000	\$800,000	\$800,000	\$800,000			\$218,545	\$787,856	\$4,057,459	\$5,863,861
Green	92%	72%	FL8037	Upper Russell/Soames-Dolan	\$161,545	\$2,775,500	(\$1,925,500)	\$850,000	\$1,011,545	\$463,500	\$2,852,250				\$4,127,295
Green	N/A	N/A	FL8038	Green River PL84-99 Mitigation	\$2,388,064		\$1,100,000	\$1,100,000	\$3,488,064	\$165,000	\$100,000				\$3,753,064
Green	95%	77%	FL8039	Boeing Setback Levee					\$392,533	\$2,614,140					\$3,006,673
Green	95%	41%	FL8041	Horseshoe Bend Acquisition And Reconstruction	\$979,551		\$415,080	\$415,080	\$1,394,631	\$427,532	\$440,358	\$453,569	\$467,176		\$3,183,267
Green	42%	36%	FL8042	Lone's Addition To 8th										\$70,000	\$70,000
Green	Repair	Repair	FL8043	Dykstra Lowspot Repair	(\$1,967)		\$16,000	\$16,000	\$14,933						\$14,933
Green	84%	54%	FL8045	Green River Flood Emergency Prep	\$1,877,583				\$1,877,583						\$1,877,583
Green	100%	56%	FL8058	Green Pre-Construction Acquisition	\$5,396,000		(\$4,900,000)	(\$4,900,000)	\$496,000		\$3,500,000	\$1,000,000			\$4,996,000
Green	100%	54%	FL8059	Tukwila 205 - Lily Point	\$849				\$849						\$849
Green	100%	69%	FL8060	Briscoe Levee Setback							\$765,121	\$788,075	\$1,261,920	\$5,796,370	\$8,611,487
Green	100%	69%	FL8061	Desimone Levee Setback							\$848,720	\$1,748,363	\$1,800,814	\$1,854,839	\$6,252,736
Green	100%	54%	FL8062	Segale Levee Setback							\$848,720	\$1,748,363	\$1,800,814	\$1,854,839	\$6,252,736
Green	68%	62%	FL8063	Reddington Setback Ph II		\$1,350,191	(\$1,350,191)				\$1,000,000	\$3,000,000	\$500,000		\$4,500,000
Green	N/A	N/A	FL8072	Hawley Rd Levee FCAAP			\$900,000	\$900,000	\$900,000						\$900,000
Green	N/A	N/A	FL8073	Boeing Levee Addition FCAAP						\$2,070,000					\$2,070,000
White	58%	N/A	FL9001	County Line To A-Street Flood Conveyance	\$1,815,992	\$4,775,000	(\$4,775,000)		\$1,815,992	\$3,000,000	\$3,365,018				\$8,171,010
White	71%	N/A	FL9002	Red Creek Acquisitions										\$579,637	\$579,637
White	66%	N/A	FL9004	White-Greenwater Acquisition	\$149				\$149					\$695,564	\$695,713
White	66%	54%	FL9007	Pacific Right Bank Acquisition And Setback Berm	(\$7,339)	\$1,760,046	(\$594,776)	\$1,165,270	\$1,157,931		\$212,180	\$163,909	\$2,251,018		\$3,785,038
White	TBD	TBD	FL9012	City Of Pacific Gravel And Debris Removal										\$1,363,376	\$1,363,376
White	TBD	TBD	FL9013	White River Corps 205										\$320,794	\$320,794

River	Flood Risk	Impl Risk	Project	Name	Carryover	Original 2011	Change from Original	Reallocated 2011	2011 Reallocated + Carryover	2012	2013	2014	2015	2016	Total
Seattle	100%	54%	FL8002	Alaskan Way Seawall Replacement Feasibility	(\$5,848)		\$5,848	\$5,848							
Seattle	100%	54%	FLC001	Alaskan Way Seawall Construction		\$4,250,000		\$4,250,000	\$4,250,000		\$10,000,000	\$10,000,000	\$5,750,000		\$30,000,000
Seattle	100%	54%		Alaskan Way Seawall Contra		(\$4,000,000)	\$4,000,000								
Seattle	79%	84%	FLC002	South Park - Duwamish Backwater Inundation at 4th		\$3,000,000	(\$2,000,000)	\$1,000,000	\$1,000,000	\$3,500,000					\$4,500,000
Mon/Maint	N/A	N/A	FLM000	Flood CIP Monitoring and Maintenance	\$173,499	\$256,781	\$43,219	\$300,000	\$473,499	\$309,000	\$318,270	\$327,818	\$337,853	\$347,782	\$2,114,022
Opportunity Fund	N/A	N/A	FLS000	Subregional Opportunity Fund	\$5,514,516	\$3,607,031	(\$36,070)	\$3,570,961	\$9,085,477	\$3,630,219	\$3,688,651	\$3,751,916	\$3,823,543	\$3,902,040	\$27,881,846
Countywide Miscellaneous	N/A	N/A	FLX012	Hole Rock Stockpile	\$5,259				\$5,259						\$5,259
Countywide Miscellaneous	N/A	N/A	FLX200	Flood Emergency Contingency	\$137,623	\$250,000	(\$100,000)	\$150,000	\$287,623	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$1,537,623
Countywide Miscellaneous	N/A	N/A	FLX300	PL84-99 Mitigation		\$2,100,000	(\$2,100,000)								
Countywide Miscellaneous	N/A	N/A	FLX400	Central Costs		\$115,000		\$115,000	\$115,000	\$126,500	\$53,045	\$54,636	\$56,275	\$57,964	\$463,420
Countywide Miscellaneous	N/A	N/A	D15712	Contract Fund Default Project	\$11,434		(\$11,434)	(\$11,434)							
Total					\$39,560,584	\$34,845,464	(\$8,828,019)	\$26,017,445	\$65,578,029	\$28,500,141	\$50,912,340	\$42,948,478	\$34,061,488	\$38,480,537	\$260,481,013

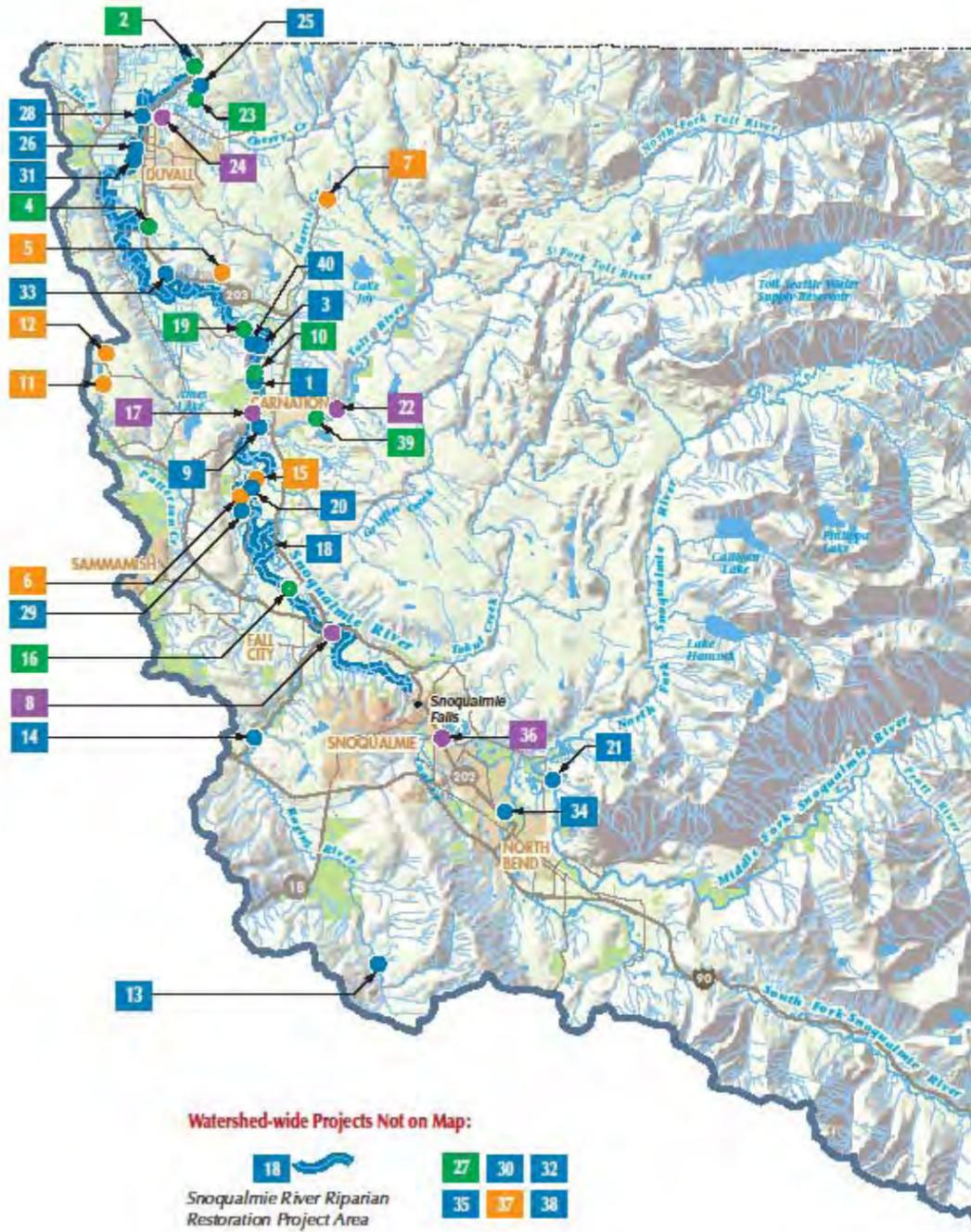
King County Flood District Completed Projects 2008-2010

Name	Basin	Description	Year Completed	Flood Risk
Miller River Road Protection	S.F. Skykomish	Supplement and extend the existing log crib that helps to direct flow toward the Miller River bridge.	2010	71%
Middle Fork Snoqualmie Large Wood Mitigation	Upper Snoqualmie		2008	84%
Allen Revetment Repair	Upper Snoqualmie	Repair damage from 2006 flood event	2008	82%
Riverben Repair	Upper Snoqualmie	Repair damage from 2006 flood event	2008	37%
Si View Park	Upper Snoqualmie	Repair damage from 2006 flood event	2009	37%
Mason Thorson Ext Repair	Upper Snoqualmie	Repair damage from 2009 flood event	2009	71%
Reif Rd River Mile 4.1 Repair	Upper Snoqualmie	Repair damage from 2009 flood event	2009	79%
Allen Repair	Upper Snoqualmie	Repair damage from 2009 flood event	2010	71%
McElhoe Person Levee Repair	Lower Snoqualmie	Repair damage from 2006 flood event	2008	82%
Aldair Levee Repair	Lower Snoqualmie	Repair damage from 2006 flood event	2008	82%
Tolt River Road Shoulder Protection	Tolt	Install 200 feet of buried rock riprap along the shoulder of the Tolt River Road to protect the road from active channel migration.	2009	74%
Tolt River Mouth to SR 203 Floodplain Reconnection Project	Tolt	Set back the existing levee within Tolt River - John MacDonald Park to increase flood storage and conveyance	2009	39%
Highway to Railroad Bridge Emergency Repair	Tolt	Repair damage from 2009 flood event	2009	0%
Frew Emergency Repair	Tolt	Repair damage from 2009 flood event	2009	66%
Arruda Revetment	Raging	Repair damage from 2006 flood event	2008	76%

Bryce Bump Revetment Repair	Raging	Repair damage from 2006 flood event	2008	76%
Preston Fall City Lower Revetment	Raging	Repair damage from 2006 flood event	2009	76%
Raging Bridge to Bridge Left	Raging	Repair damage from 2006 flood event	2009	76%
Raging Bridge to Mounth Right	Raging	Repair damage from 2006 flood event	2009	76%
Waring Revetment Repair	Raging	Repair damage from 2006 flood event	2008	76%
Bridge to Bridge L Repair	Raging	Repair damage from 2009 flood event	2009	42%
Bridge to Bridge R Repair	Raging	Repair damage from 2009 flood event	2009	47%
Cedar Grove Mobile Home Park Acquisition	Cedar	Purchase homes and property that are subject to extreme flooding.	2010	76%
Cedar Rapids Levee Setback	Cedar	Provide local match for \$1.5 M levee set back project designed to improve flood conveyance and capacity.	2010	63%
Banchero-Barnes Revetment Repair	Cedar	Repair damage from 2006 flood event	2008	97%
Cedar River Trail Site 2 Revetment Repair	Cedar	Repair damage from 2006 flood event	2008	97%
Dorre-Don Repair	Cedar	Repair damage from 2006 flood event	2008	97%
Belmondo Emergency Repair	Cedar	Repair damage from 2009 flood event	2009	79%
Cedar Rapids Repair	Cedar	Repair damage from 2009 flood event	2010	63%
Cedar River Trail 1 Repair	Cedar	Repair damage from 2009 flood event	2009	100%
Cedar River Trail 3 Repair	Cedar	Repair damage from 2009 flood event	2009	100%
Petorak-Wadhams Repair	Cedar	Repair damage from 2009 flood event	2009	63%
Rhode Levee Repair	Cedar	Repair damage from 2009 flood event	2009	61%
Jan Road Repair	Cedar	Repair damage from 2009 flood event	2009	76%
Byers Curve Repair	Cedar	Repair damage from 2006 flood event	2010	66%
Rainbow Bend Repair	Cedar	Repair damage from 2009 flood	2009	47%

		event		
Lower Dorre Don Repair	Cedar	Repair damage from 2009 flood event	2009	45%
Herzman Repair	Cedar	Repair damage from 2006 flood event	2010	61%
Belmondo Rvtmnt Repair FEMA PW1653	Cedar	Repair damage from 2009 flood event	2010	79%
Dykstra Revetment Repair	Green	Repair damage from 2006 flood event	2008	100%
Foster Golf Revetment	Green	Repair damage from 2006 flood event	2009	100%
Galli's Section Repair	Green	Repair damage from 2006 flood event	2008	100%
Horseshoe Bend 205 Repair	Green	Repair damage from 2006 flood event	2009	100%
Kent Shops-Narita	Green	Rehabilitate levees to reduce the risk of flooding in the Lower Green River.	2009	95%
Myer's Golf Levee	Green	Rehabilitate levees to reduce the risk of flooding in the Lower Green River.	2008	89%
Tukwila 205 Repair	Green	Repair damage from 2006 flood event	2009	100%
Foster Course FEMA Mitigation	Green	Repair damage from 2006 flood event	2009	100%
42nd Ave South Repair	Green	Repair damage from 2009 flood event	2009	87%
Stoneway Lower Repair	Green	Repair damage from 2009 flood event	2010	68%
Black River Pump Station Modifications	Green	Upgrade the Black River Pump Station	2010	N/A
Tukwila Pump Station Modifications	Green	Upgrade the Tukwila Pump Station	2009	N/A
Kent Containment	Green	Install containment barriers along the Green River	2009	N/A
Auburn Containment	Green	Install containment barriers along the Green River	2009	N/A
Tukwila Containment	Green	Install containment barriers along the Green River	2009	N/A
Renton Containment	Green	Install containment barriers along the Green River	2009	N/A
Porter Bridge Levee Flood Prep	Green		2009	N/A

Green River Levee Tree Removal	Green	Remove trees from Green River levees to comply with US Army Corps requirements	2010	N/A
Valentine Advance Measures	Green		2010	N/A
Tukwila 205 - Lily Point Reimbursement	Green		2010	N/A
White River Flood Damage Repair at Stuck River Drive	White	Replace eroded revetment with stable log and rock toe and 300 feet of biostabilized riverbank.	2008	37%
Dykstra Sinkhole Emergency Repair	Green	Make an emergency repair to a sinkhole developing on the Dykstra levee	2010	N/A



Habitat Restoration Projects Led by King County
with project number and name

- 1 Camp Gilead Off Channel Reconnection
- 2 Cherry Creek Mouth Restoration
- 3 Chinook Bend Reach Restoration
- 4 Deer Creek Channel Relocation
- 5 East Fork Weiss Creek Fish Passage Improvement
- 6 Gonnerson Revetment Removal
- 7 Harris Creek Tributary Fish Passage Improvement
- 8 Lower Raging River Restoration
- 9 Lower Tolt River Floodplain Reconnection
- 10 McElho/Person Levee Setback
- 11 NE 52nd Place Fish Passage Improvement
- 12 NE 67th Place Fish Passage Improvement
- 13 Raging River Kerriston Reach Restoration
- 14 Raging River Preston Reach Restoration
- 15 Snoqualmie River Byers Riparian Restoration
- 16 Snoqualmie River Fall City Reach Reconnection
- 17 Snoqualmie River Footbridge Off Channel Reconnection
- 18 Snoqualmie River Riparian Restoration
- 19 Stillwater Habitat Restoration
- 20 Stout Property Riparian Restoration
- 21 Three Forks Natural Area Restoration
- 22 Tolt River Natural Area Floodplain Reconnection

Habitat Restoration Projects Led by Other Organizations
with project number and name

- 23 Cherry Creek Floodplain Restoration
- 24 Cherry Valley Dairy Stream Enhancement
- 25 Cherry Valley Pump and Flood Gate Facility
- 26 Coe-Clemons Creek Restoration
- 27 Conservation Reserve Enhancement Program (CREP) Plantings
- 28 HerbCo Farm
- 29 Jubilee Farm Riparian Restoration
- 30 Lower Snoqualmie Restoration and Maintenance
- 31 McCormick Park Restoration
- 32 Middle Fork Snoqualmie River Valley Invasive Weed Removal Project
- 33 Oxbow Farm Channel Enhancement
- 34 Ribary Creek Restoration
- 35 Salmon-Safe Certification and Marketing
- 36 Sandy Cove Park Restoration
- 37 Shared Goals for Snoqualmie Salmon
- 38 Snoqualmie Tribal Community Conservation Corps
- 39 Tolt River Restoration
- 40 Wetlands Enhancement & Creation at Chinook Bend Natural Area

PROGRESS ON EARLY ACTION HABITAT RESTORATION PROJECTS (2006-2010)*
Snoqualmie/Skykomish Watershed, King County

*Projects identified in Snoqualmie 2015 Report

- Completed Project
- In Progress
- Scoping
- Rescoped or Cancelled
- Feb. 2nd 2011 Project Tour Sites
- Stream/River
- Watershed Boundary
- Major Road
- County Boundary
- Lake
- Incorporated Area
- King County Owned Properties



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King County
Department of Natural Resources and Parks
Water and Land Resources Division

2011 Three-Year Work Plan - WRIA 8 Watershed Implementation Priorities
New Projects Highlighted (Yellow = 2010; Green = 2011)
Completed Projects to be Removed (Red)

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Cedar																						
Capital Projects																						
Cedar River - Restore Floodplain Connectivity to Increase In-Stream Juvenile Rearing Productivity																						
Acquisition and Restoration	Cedar Reach 3	Protect and improve riparian habitat in future redevelopment	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Land Protected, Acquired, or Leased: Streambank or Riparian Protected (19 acres, 4500 linear feet)	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending	Acquisition	\$ -	restoration		\$ -	2014	SPU, CLC, Renton			SRFB/PSAR	C206	
Acquisition	Acquisition and Habitat Protection Upstream of Ron Regis park: Reach 4	Protect Habitat in Reach 4: Protect existing riparian habitat, instream habitat conditions and extensive LWD in reach. Most of reach already in public ownership or protected by regulations (e.g. steep slopes). Targeted parcel is adjacent to landslide reach immediately upstream of Ron Regis park. (C213)	Tier 1	Channel Structure and Complexity, Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Land Protected, Acquired, or Leased: Streambank or Riparian Protected (0.10 Miles)	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending	NA	\$ -	acquisition	\$ 200,000	NA	\$ -	2013	King County	\$ 200,000	\$ 50,000	KCD, King County SWM	C213
Restoration	Study Options to Protect Habitat in Reach 4 and Reduce Flooding and Erosion in Ron Regis park	Study Options to Protect Habitat in Reach 4 and Reduce Flooding and Erosion in Ron Regis Park: It is unclear how much further river is going to erode bank and migrate into Ron Regis park in landslide area. Eventually there will be a conflict with park uses. Explore using LWD and levee setback to prevent excessive erosion and flood damage to public lands associated with Ron Regis Park while protecting natural habitat forming processes in reach. Study should include lower Madsen Creek. (C214)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Instream: Large Woody Debris (0 Feet)	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending	NA	\$ -	Feasibility	\$ 40,000	NA	\$ -	2013	Renton / King County	\$ 40,000	\$ -		C214
Acquisition	Jones Reach Acquisition and Habitat Protection - C228b	Jones Reach: 20.8 acres, 13 parcels (of total 29 acres, 16 parcels) targeted for protection. Left bank of river already protected. Acquiring parcels on right bank of the river would allow both banks of the river to be protected. (C228)	Tier 1	Channel Structure and Complexity, Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (20.8 Acres)	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending	Acquisition	\$ 1,000,000	acquisition	\$ 1,400,000	acquisition	\$ 1,400,000	2013	King County (City of Seattle) partnership	\$ 3,800,000	\$ 1,000,000	KCD, King County SWM	C228B
Acquisition	Bucks Curve Buyout	Bucks Curve Buyout: Continue buying out structures to build on previous restoration efforts in vicinity of RM 6.2 to RM 6.4. Once sufficient land acquired, remove or setback existing levee, and revegetate floodplain. In best alternative, a portion of SE Jones Road could be relocated northward. (C215A)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (37 Acres)	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending	Acquisition	\$ 800,000	acquisition	\$ 800,000	acquisition	\$ 800,000	2013	King County / City of Seattle	\$ 2,250,000	\$ 750,000	KCD, King County SWM	C215A
Restoration	Bucks Curve Levee Setback/Removal	Bucks Curve Levee Setback / Removal: Once sufficient land acquired, remove or setback existing levee, and revegetate floodplain. In best alternative, a portion of SE Jones Road could be relocated northward. (C215B)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Instream: Channel Reconfiguration (Includes Channel Roughening), Activity Type - Instream: Large Woody Debris, Activity Type - Riparian: Revegetation Planting	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending	NA	\$ -	NA	\$ -	NA	\$ -	2013	King County / Corps of Engineers	\$ 40,000	\$ 40,000	KC Surface Water Mgmt CIP	C215B

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Restoration	Cedar River Rainbow Bend Restoration (C236-B)	(Name change from Cedar Grove Road - Rainbow Bend Levee Removal). Conduct further levee modification work to maximize channel-floodplain interactions. (C235)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation	Riparian, Instream	Activity Type - Instream: Channel Reconfiguration (Includes Channel Roughening), Activity Type - Instream: Large Woody Debris, Activity	Chinook	Coho, Sockeye, Steelhead	Design	NA	\$ -	NA	\$ -	Design	\$ 50,000	2010	King County / Seattle Public Utilities	\$ 50,000	\$ 50,000	King County SWM, Corps	C235B
Acquisition	Lower Lions Stream Reach Acquisition	30 acres (12 parcels) includes a large area of riparian forested floodplain between the Cedar River and SE 188th Street. Enhances side channel that was constructed in the area, allows expansion, and completion of side channel. (C239)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Instream, Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (39 Acres)	Chinook	Coho, Sockeye, Steelhead	underway	Acquisition	\$540,000	Acquisition	\$540,000	Acquisition	\$540,000	2010	King County	\$1,620,000		Conservation Futures, King County SWM	C239
Acquisition	218th Place Side Channel Protection and Enhancement	218th Place Side Channel: Protect 5 acres, 1 parcel, rural residential, riverfront. Once acquired there are opportunities for habitat enhancement in floodplain and off-channel areas. (Related to C242 to enhance 218th side channel once protected. C242 is not on start list.) (C244)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation	Instream, Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (5 Acres)	Chinook	Coho, Sockeye, Steelhead	NA	\$ -	NA	\$ -	NA	Acquisition	\$ 500,000	2012	King County	\$500,000	\$ -		C244
Acquisition	Mouth of Taylor Creek Reach Acquisition	Mouth of Taylor Creek Reach: Acquire approximately 40 acres of forested riparian floodplain associated with both the Cedar mainstem and the lower reach of Taylor Creek. The target parcels include approximately 1,000 feet of mainstem channel, nearly 1,300 feet of the lowermost reach and mouth of Taylor Creek, and one of the largest remaining floodplain wetlands adjacent to the mainstem. Some of the acquisitions will facilitate future levee removal and/or modification projects (Getchman and Rhode Levees). Completes acquisition by 2009, with restoration by 2012. (C245)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Wetland	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (40 Acres)	Chinook	Coho, Sockeye, Steelhead	underway	Acquisition	\$ 1,000,000	Acquisition	\$ 1,250,000	Acquisition	\$ 1,250,000	2010	King County	\$ 3,500,000	\$ 1,350,000	FEMA, Open Space Bond, King County SWM, Conservation Futures	C245
Acquisition	Belmondo Reach Acquisition	Belmondo Reach: 71 acres, 10 parcels, rural residential, riverfront. No levees in reach, numerous side channels, braided reach. Located between WPA and Cummings levees. Reach includes Trib 0316 confluence area. Area is just downstream of Cedar Grove Road / Rainbow Bend acquisition and meander bend restoration. (C232)	Tier 1	Floodplain Connectivity & Function	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (71 Acres)	Chinook	Coho, Sockeye, Steelhead	underway	Acquisition	\$ 500,000	Acquisition	\$ 800,000	Acquisition	\$ 1,800,000	2010	King County	\$ 3,100,000	\$ 1,100,000	HCP, Conservation Futures, King County	C232
Acquisition	Elliot Bridge Habitat Acquisitions	Acquisition of high habitat value properties (7 parcels, 6.7 acres) in the Elliot Bridge reach. These acquisitions will supplement flood buy-outs in the reach and will facilitate early removal and setback of the levee. (C216-B)	Tier 1	Floodplain Connectivity & Function	(Volume I) WRIA 8 Chinook Salmon	Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (6.7 Acres)	Chinook	Coho, Sockeye, Steelhead	underway	Acquisition	\$500,000	Acquisition	\$500,000			2010	King County	\$1,676,000	\$676,000	KCD, King County SWM	C216 B
Acquisition	Royal Arch Reach Acquisitions	Acquisition of parcels in the Royal Arch Reach (RM 13.19 to 14.19) of the Cedar River mainstem. Potential habitat restoration opportunities include restoration of a historic side channel for high flow refuge for juveniles, and spawning and rearing habitat.	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon	Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (24.76 Acres)	Chinook	Coho, Sockeye, Steelhead	underway	Acquisition	\$500,000	Acquisition	\$500,000	Acquisition		2011		\$2,000,000	\$1,000,000	SPU HCP	C247
Acquisition	Dorre Don Meanders Reach Acquisition	Dorre Don Meanders Reach: Protect 71 acres, 14 parcels, rural residential, riverfront with flooding issues. Includes an extensive floodplain riparian forest, numerous valley floor spring-fed features including side channel, stream, and oxbow habitats. (C253)	Tier 1	Floodplain Connectivity & Function	(Volume I) WRIA 8 Chinook Salmon Conservation	Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (71 Acres)	Chinook	Coho, Sockeye, Steelhead	underway	Acquisition	\$ 1,000,000	Acquisition	\$ 1,500,000	Acquisition	\$ 1,500,000	2011	King County / City of Seattle	\$ 4,000,000	\$ 1,000,000	Conservation Futures, King County SWM	C253

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Cedar River - Protect and Restore Hydrologic Processes to Support Egg Incubation and Pre-Spawning Migrant Life Stages																						
Restoration	Enhance Flows at Lower Rock Creek	Lower Rock Creek Flows: Enhance Flows for Pre-Spawning Migrants: Work with the City of Kent in establishing instream flows that are protective of Chinook through their HCP	Tier 2	Stream flow, Water quality	Chapter 4 (Volume I) WRIA 8	Instream	Instream flow: water flow returned to stream	Chinook		feasibility pending		\$ -		\$ -		\$ -		Kent	\$ -	\$ -		C351
Cedar River - Restore LWD to Increase In-Stream Juvenile Rearing Productivity																						
Restoration	LWD over Landsburg Dam	Explore feasibility of passing large woody debris over Landsburg Dam. (C260)	Tier 1	Channel structure and complexity	Chapter 4 (Volume I) WRIA 8	Instream	Instream: large woody debris	Chinook		feasibility pending	0	\$ -	Feasibility Study	\$ 25,000	NA	\$ -	ongoing	City of Seattle	\$ -	\$ -	0	C260
Cedar River - Restore Riparian Function to Increase In-Stream Juvenile Rearing Productivity																						
Restoration	City of Renton Riparian Restoration	Riparian restoration in City of Renton-owned parkland upstream of I-405 bridge on left bank. Define area and then restore (C209/C210)	Tier 1	LWD recruitment, Floodplain connectivity	(Volume I) WRIA 8 Chinook	Riparian	Riparian	Chinook		feasibility pending	NA	\$ -	riparian restoration	\$ 81,000	NA	\$ -	2010	Renton	\$ 81,000	\$ 21,000	Local Government	C209 / C210
Subtotal - Capital - Cedar												\$ 5,840,000	\$ 7,636,000	\$ 7,840,000	\$ 22,857,000	\$ 7,037,000						
Migratory																						
Capital projects																						
Lakes - Restore Shoreline Complexity to Increase Juvenile Rearing and Migratory Survival																						
Restoration	Small Creek Mouth and Shoreline Restoration	Opportunities to restore small creek mouths or restore shorelines (remove bulkheads, reduce armoring, reduce number of docks, or restore vegetation). Work with private landowners (including homeowner demonstration project) or on public lands throughout section 1 and 2. (C267, C269 - South Lake Washington Habitat Design and Restoration, C270, and C271- Mapes Creek daylighting demonstration site).	Tier 1	Shoreline complexity	Chapter 4 (Volume I) WRIA 8 Chinook Conservation Plan	Instream, Lakeshore	Instream: channel reconfiguration, Riparian: planting, Lakeshore: armor modification/ removal, modify/ remove overwater structure	Chinook		feasibility pending	Design/ Construction	\$ 1,500,000	Design/ Construction	\$ 1,000,000	Design/ Construction	\$ 1,000,000	2015	Seattle	\$ 3,500,000	\$ 2,500,000	Renton, or Seattle and Corps	C267, C269 - C271
Restoration	Lake Washington Shoreline Restoration	Lake Washington Shoreline Restoration: Remove bulkheads and place gravels. C288A (Chism Beach Park); C285 (Newcastle Beach Park)	Tier 1	Shoreline complexity		Lakeshore												City of Bellevue				C288a; c285
Restoration	South Lake Washington DNR Shoreline Restoration	Shoreline restoration of WA Department of Natural Resources property. Remove am portion of flume (along lakeside), create shallow water habitat, protect existing cove, and plant overhanging riparian vegetation.	Tier 1	Reduced habitat complexity; Shoreline complexity	Chapter 4 (Volume I) WRIA 8 Chinook Conservation Plan	Riparian	Activity Type - Estuarine & Nearshore: Restore elevation (1 Each), Activity Type - Riparian Habitat: Planting (8 Acres)	Chinook		feasibility pending	Design		Construction				2015	Dept. of Natural Resources			SRFB/PSAR	C266
Ship Canal Lake Union Locks - Improve Survival of Migrating Adults and Juveniles																						
Restoration	Operational Improvements to Locks	Operational Improvements to Improve Juvenile and Adult Chinook Survival (eg Add/Replace strobe lights to locks to deter smolts and prevent entrainment.) (M204)	Tier 1	Fish Passage	Chapter 4 (Volume I) WRIA 8 Chinook Salmon	Estuary	Fish passage	Chinook		Operational Improvements	\$ 150,000	0	\$ -	\$ -			Ongoing	Corps	\$ 150,000	\$ 150,000	Corps	M204
Estuary and Nearshore - Improve Juvenile Rearing Habitat																						
Restoration	Feeder Bluff Restoration Feasibility Study and pilot restoration projects	Nearshore feasibility assessment to develop multiple beach nourishment designs for restoration (M2 & M3)	Tier 1	Sediment supply	Chapter 4 (Volume I) WRIA 8 Chinook	Nearshore	Beach nourishment	Chinook		Feasibility assessment	\$100,000						2010	King County	\$300,000	\$150,000	WDFW; SRFB/PSAR, KCD; ESRP	M2/M3
Restoration	Big Gulch Pocket Estuary Restoration	Big Gulch Pocket Estuary: Design and restoration of pocket estuary and culvert improvements to restore system connectivity and improve sediment transport into the nearshore. (M222)	Tier 1	Passage; Reduced Habitat Capacity	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Estuary River Delta	Activity Type - Estuary or Nearshore: Culvert Replacement - Estuary/Nearshore (1 Each), Activity Type - Land Protected, Acquired, or Leased: Upland Protected (1.10 Acres)	Chinook	Coho, Steelhead	Feasibility and Design	\$ 100,000	Restoration	\$ 1,900,000	\$ -			2012	Mukilteo	\$ 20,000,000	\$ 1,900,000	Local Governments / Grants/ Mitigation	M222
Restoration	Willow Creek Daylighting	Daylight Willow Creek along much of its length downstream of Edmonds Marsh to create an open channel. Willow Creek would be moved out of the existing pipe from the marsh to the Sound into a daylighted channel. The creek would pass under a new bridge culvert (trestle) that is being placed beneath existing and future BNSF rail lines near Pt. Edwards and enter the Sound near or through Marina Beach Park. (M233)	Tier 1			Riparian; nearshore	Stream restoration and nearshore connectivity	Chinook	Coho, cutthroat									People for Puget Sound				M233

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Subtotal - Capital - Migratory												\$ 1,850,000	\$ 2,900,000	\$ 1,000,000			\$ 23,950,000	\$ 4,700,000				
Sammamish - North Lake Washington Tributaries																						
Capital Projects																						
NLW Tribs - Channel Complexity and Large Woody Debris to support juvenile rearing and fry colonization life stages																						
Restoration	Lower Bear Creek Restoration	Lower Bear Creek Restoration: Provide an enhanced channel alternative to the ditched and leveed lower 3,000 feet of Bear Creek, including a new refuge confluence with the Sammamish River. Add LWD, restore riparian conditions. (N201)	Tier 1	Channel Structure and Complexity, Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook Salmon	Riparian, Instream	Activity Type - Instream: Channel Reconfiguration (Includes Channel Roughening) (0.50 Miles), Activity Type - Instream:	Chinook	Coho, Sockeye	Feasibility Completed	Construction	\$ 1,000,000	Construction	\$ 9,000,000	Monitoring	\$ 25,000	2010	Redmond	\$ 10,000,000	\$ 850,000	design and permitting 2006-2010,	N201
Restoration	Evaluate Locations for LWD Additions	Evaluate locations for LWD addition. Focus on Reach 6, which has the highest restoration potential but does not presently include any projects. (N242)	Tier 1	Channel Structure and Complexity, Riparian Areas & LWD Recruitment	(Volume I) WRIA 8 Chinook Salmon	Instream	Activity Type - Instream Habitat: Channel structure - Large woody debris (1750 Feet)	Chinook	Coho, Sockeye	Feasibility Pending	Feasibility Study	\$ 50,000	Construction	\$ 150,000	Construction	\$ 150,000	2013	King County	\$ 350,000	\$ 100,000	Local governments	N242
Restoration	Evans/Bear Creek Restoration	Evans/Bear Creek Restoration: In-channel restoration is needed in Bear Creek and Evans Creek through the former dairy farm at the confluence; RM 1.25 to RM 2.5 on Bear Creek and RM 1.2 to RM 4.6 on Evans Creek (Same as Keller Farm). Reconfigure channel where it has been widened due to past farm practices, enhance riparian area, add LWD, replant. (N208/N211)	Tier 1	Channel Structure and Complexity	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Instream: Channel Reconfiguration (Includes Channel Roughening) (4.65 Miles), Activity Type - Instream: Large Woody Debris (4500 Feet), Activity Type - Riparian: Revegetation Planting (5 Acres)	Chinook	Coho, Sockeye	Feasibility Pending	Acquisition	\$ 2,000,000			Restoration	\$ 1,000,000	2010	Redmond / WSDOT	\$ 3,000,000	\$ 3,000,000	Private / WSDOT	N208 / N211
Acquisition	Protect headwaters of Cottage Creek and Bear Creek	Acquire forest property, development rights/conservation easements, and provide enhanced incentives to retain and plant forest area environments. (N277)	Tier 1			Riparian, instream		Chinook										Snohomish County				N277
Restoration	Cottage Creek Restoration	Cottage Creek: Explore opportunities to improve floodplain connection in reach by removing riprap or artificial constrictions. (N282)	Tier 1	Channel Structure and Complexity	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Instream	Activity Type WRIA 8: Armor modification/removal (2750 Linear Feet)	Chinook	Coho, Sockeye	Feasibility Pending	Restoration	\$ -			Restoration	\$ 180,000	2010	King County	\$ 90,000	\$ 90,000	Local governments	N282
Restoration	North Creek School (now called Clearwater School) Restoration	Continue North Creek School Project: Work with school to do additional riparian restoration, large woody debris addition and side channel enhancements on their property. This project has been one of Snohomish county's top priorities in recent years. (N378)	Tier 2	Channel Structure and Complexity, Riparian Areas & LWD Recruitment	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Channel Reconfiguration (Includes Channel Roughening), Activity Type - Instream: Large Woody Debris, Activity	Chinook	Coho, Sockeye, Steelhead	Construction	Restoration	\$240,360	Restoration	\$134,350			2011	Snohomish County	\$ 374,710	\$134,350	Local government; NFW	N378
NLW Tribs - Hydrologic processes to support egg incubation, juvenile rearing, and adult migration																						
Acquisition	Bear Creek Forest Cover Protection	Bear Creek Forest Cover Protection: Acquire forest property, development rights/conservation easements, and provide enhanced incentives to retain and plant forest area environments. Particularly forested area south of Puget Power Trail and at corner of 116th and Avondale Road. (N216)	Tier 1	Riparian Areas & LWD Recruitment, Water Quality	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Upland, Riparian	Activity Types - Acquisition/Easements/Leases: Upland protected (24 Acres)	Chinook	Coho (Secondary Species), Sockeye (Secondary Species)		Acquisition	\$ 800,000	\$ -	\$ -	\$ -	\$ -	2010	King County	\$ 800,000	\$ 200,000	Local governments	N216
Acquisition	Little Bear and Great Dane Creeks Forested Wetland Protection	Forest Cover, Wetland Protection: Protect large, undeveloped forested wetland on both Little Bear and Great Dane Creeks. Approximately 100 acres including 10 parcels. Also listed under Great Dane Creek Reach 1. (N422)	Tier 2	Water Quality, Reduced Habitat Capacity	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Wetland	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (100 Acres)	Chinook			Acquisition	\$ -	Acquisition	\$ 500,000	Acquisition	\$ 500,000	2009	Snohomish County	\$ 1,000,000	\$ 500,000	Local governments	N422

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Acquisition	Little Bear Reach Riparian Wetland Protection	Protect Riparian Wetland in Little Bear Reach 10: Protect undeveloped, forested wetlands (second growth forest) in reach covering approximately 55 acres and 12 parcels owned by two landowners. Enhance with large woody debris. (N424)	Tier 2	Riparian Areas & LWD Recruitment, Water Quality, Reduced Habitat Capacity	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Wetland	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (110 Acres)	Chinook		Feasibility Pending	Acquisition	\$ 500,000	Acquisition	\$ 750,000	Acquisition	\$ 750,000	2010	Snohomish County	\$ 1,000,000	\$ 250,000		N424
Acquisition	Little Bear Creek Forested Headwater Wetlands Protection	Little Bear Forest Cover Protection: Protect forested, headwater wetlands from corner of 51st and 180th upstream approximately 2 miles along Little Bear Creek through conservation easements and acquisition. Includes three wetland complexes totaling over 200 acres: 4 parcels along 180th St. on mainstem; ~7 parcels along Trout Stream from 180th to Interurban Blvd.; and 5 parcels north of 164th Street to 156th Street. (N429)	Tier 2	Riparian Areas & LWD Recruitment, Water Quality	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Wetland	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (200 Acres)	Chinook			Acquisition	\$ -	Acquisition	\$ 500,000	Acquisition	\$ 1,000,000	2011	Snohomish County	\$ 1,500,000	\$ 500,000	Local Governments	N429
Restoration Projects	Little Bear Creek Reach 2- Fish Passage 132 Ave NE (N401) and Fish passage 134th Ave NE (N402) with riparian restoration (N403)	Fish Passage Benefiting Chinook: 132nd Avenue NE (a low flow blockage), RM 0.45, and 134th Ave NE (3 cement pipes, broken), RM 0.5, City of Woodinville; Restore Riparian Vegetation up to H 522 and add large wood.	Tier 2	Degraded Habitat- Fish Passage; Riparian Areas & LWD Recruitment	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Instream	Passage: Fish passage blockages removed or altered (4); Riparian Habitat - plantings of native vegetation; Large Wood - placement	Chinook		Feasibility Pending							12/31/2055	Woodinville City of	300000		N401, N402, N403	
Restoration	Kelsey Creek Fish Passage and Channel Restoration - Reach 3 (N473)	N473 Fish Passage: Reduce jump height at concrete weirs using artificial riffle or other "safer" engineering. With N454/N458 - Installation of LWD, design and install LWD to provide hydraulic refuge areas during peak flows in stream segments 76-03 through 76-08 of Kelsey Creek. With N457/N459 - Restoration of Riparian Areas: Identify and implement opportunities to plant native coniferous trees in the riparian zones throughout the subarea. First priority should be the mainstem of Kelsey Creek.	Tier 2	Fish Passage, Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Instream, Riparian	Activity Type - Fish Passage: Fish passage blockages removed or altered (9 Each)	Chinook	Coho, Sockeye	Design & permits	Design						2014	City of Bellevue			Bellevue, KCD	N473
Restoration	North Creek Reach 5- Riparian Restoration and Stream Enhancements	Riparian Restoration and Stream Enhancements: Work with Landowners in Reach 5 to restore riparian vegetation and to do stream enhancements. Adopt-a-Stream Project in Snohomish County portion of North Creek. Project overlaps with Snohomish County North Creek Drainage Needs Report Project proposal.	Tier 2	Degraded Habitat- Channel Structure and Complexity, Degraded Habitat- Riparian Areas and LWD Recruitment	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Riparian Habitat: Planting	Chinook	(Secondary Species), Coho (Secondary)	Feasibility Pending							12/31/2015	Snohomish County of				N379, N384
Acquisition	Reach 6 Protection through Acquisition	North Creek- Protect remaining forest cover and wetlands through CAOs, regulations, BMPs, and incentives and acquisition where regulations and incentives are not sufficient. There are undeveloped forested areas and wetlands in the following reaches: Lower North reaches 4,3,2 and upper North reaches 10,9,8,7 (listed in EDT priority). (N385)	Tier 2	Riparian Areas & LWD Recruitment, Stream Flow, Water Quality	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Upland, Riparian	Activity Type - Riparian Habitat: Planting	Chinook			Acquisition								\$ 2,000,000			N385
NLW Tribs River - Restore Riparian Function to Support Juvenile Rearing and Fry Colonization																						
Restoration	NLW Tribs Riparian Restoration	Riparian restoration in reach. Most of the reach is publicly owned, but need to remove invasive plants and replant with native vegetation. (N206)	Tier 1	Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook	Riparian	Activity Type - Riparian Habitat: Planting (12 Acres)	Chinook	Coho, Sockeye	Design Completed		\$ -		\$ -	Restoration	\$ 25,000	2010	Redmond	\$ 25,000	\$ 12,500		N206

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID							
Acquisition	Reach 9- Bear Creek Waterways Program (N239)	Continue Bear Creek Waterways program to protect best remaining habitat. This reach includes Reach D. Change in feasibility with a willing seller of a large parcel.	Tier 1	Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook	Upland, Riparian	Activity Type - Land Protected, Acquired, or Leased: Streambank or Riparian Protected (62	Chinook	Coho, Sockeye	negotiations underway	Acquisition		Acquisition	\$ 1,350,000			2012	King County	\$ 1,350,000	\$ 900,000	KCD, CFT, SRFB/PSAR	N239							
Acquisition	Bear Creek Waterways Program	Continue Bear Creek Waterways program to protect best remaining habitat. Includes "Reach D" and Reach E. In particular, forested riparian parcels contiguous to already protected properties. Also protect undeveloped properties that can be restored. (N232, N303, N293, N286)	Tier 1	Riparian Areas & LWD Recruitment	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Upland, Riparian, Wetland	Activity Types - Acquisition/Easements/Leases : Upland protected (84 Acres)	Chinook	Coho, Sockeye		Acquisition	\$ -	Acquisition	\$ 500,000		\$ -	0	King County	\$ 500,000	\$ 100,000		N232, 303, N293, N286							
Restoration	Horse Farm Restoration (Bear Creek)	Restoration needed on Horse Farm property on NE 140th St. Reduce fine sediments, restore riparian areas. Pursue farm plan to address impacts to Bear Creek. (N228)	Tier 1	Riparian Areas & LWD Recruitment, Excessive Sediment	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Upland, Riparian	Activity Types- Agriculture BMP, Erosion control structures, riparian planting	Chinook	Coho, Sockeye	Feasibility Pending		\$ -	Restoration	\$ 25,000		\$ -	0	King County	\$ 25,000	\$ 12,500		N228							
Restoration	Paradise Valley Conservation Area Restoration (Bear Creek)	Remove invasive plants and plant riparian buffer along Bear Creek through out Paradise Valley Conservation Area. (N276)	Tier 1	Riparian Areas & LWD Recruitment	(Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian	Activity Type- Riparian Habitat: plant removal/control and riparian planting	Chinook	Coho, Sockeye	Feasibility Pending		\$ 50,000		\$ -		\$ -	0	Snohomish	\$ 50,000	\$ 25,000		N276							
Subtotal - Capital - NLW Tribs.																													
Sammamish River - Protect and Restore Floodplain Connectivity to Support Juvenile Rearing and Adult Migration																													
Restoration	Swamp Creek Regional Park Wetland and Stream Restoration (N335)	Swamp Creek Regional Park Wetland and Stream Restoration: As identified in the Sammamish River Corridor Action Plan, 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.	Tier 1	Channel Structure and Complexity, Riparian Areas & LWD Recruitment, High Water Temperatures	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Instream, Riparian (1 acre), Wetland (28 acres)	Instream, Riparian, Wetland	Chinook	Coho, Sockeye, Steelhead	Design underway	permits		Construction								Kenmore, SRFB/PSAR, KCD	N335							
Restoration	Sammamish River Reach 2- Wetland Restoration on Right Bank in Bothell and Riparian Wetlands adjacent to 102nd Avenue bridge (N337/N338)	Wetland Restoration on Right Bank in Bothell: Restore historic wetlands on right bank downstream of 102nd Avenue bridge to be seasonally inundated wetlands with small channels connecting them to the river.(N337). Enhance and reconnect riparian wetlands and remnant side channels adjacent to 102nd Avenue bridge on left bank (N338)		Degraded Habitat-Floodplain Connectivity and Function		Riparian, Wetlands		Chinook		Feasibility Pending							12/31/2015	Bothell City of				N337, N338							
Restoration	Transition Zone Restoration	Restore Transition Zone: Restoration of the left meander (Marymoor meander) below the weir as either the main channel or a seasonal channel with wetlands is recommended. Reroute tributary 0141 into wetland. Enhance or create pools at small tributary outlets, at meander bends downstream of the transition zone, and just downstream of the weir. Restoration elements could include excavation of new channel, creation of pools, and an overflow bench with wetland vegetation; removal of non-native vegetation; placement of gravel substrate in new channel; connection to capture hyporeic flows; and revegetation of riparian and wetland areas with native plants. (N358)	Tier 1	Channel Structure and Complexity, Riparian Areas & LWD Recruitment, High Water Temperatures, Reduced Access to Spawning Habitat - Fish Passage/Anthropogenic/Natural Barriers	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Riparian Habitat: Planting (1 Acres), Activity Type - Wetlands: Upland wetland - wetland restoration (28 Acres)	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending	Design	\$ 270,000	Construction	\$ 1,800,000		\$ -	2011	King County	\$ 2,070,000	\$ 1,270,000	King County Surface Water Mgmt and River Improvement Fund, Army Corps	N358							
Restoration	Sammamish River Restoration	Re-grade banks, create flood benches at or below high-water mark, and plant banks and benches with native vegetation. Particular focus should be given to the upper river (RM 11 to RM 13.6) and downstream of the major tributaries. An emerging bench/ wetland would provide juvenile salmonid shallow rearing habitat. (N356)	Tier 1	Floodplain connectivity and function		Floodplain, riparian	Regrade banks and restore riparian vegetation	Chinook										City of Sammamish				N356							
Restoration	Sammamish River Tributary Mouth Restoration Feasibility and Restoration	Sammamish River Tributary Mouth Restoration Feasibility and Restoration: Feasibility and design study for each of the tributary mouths in the Sammamish River. Implement restoration projects. Includes Bear, Little Bear, North, and Swamp Creeks, as well as Willows (trib 0102), Peters (trib 0104), and tribs 0057A, 0068, 0069, 0095, 0095A, and 0095B. (N201, N339, N346, N357)	Tier 1	Floodplain connectivity and function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Instream, Riparian, Wetland	Activity Type - Instream Habitat: Channel reconfiguration and connectivity (0.50 Miles), Activity Type - Instream Habitat: Channel structure - Large woody debris (3000 Feet)	Chinook	Coho, Sockeye, Steelhead	Feasibility Pending		\$ -	Feasibility and Design	\$ 150,000		\$ -	2015	King County	\$ 150,000	\$ 50,000	Local Government	N201, N339, N346, N357							
Subtotal - Capital																													

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Sammamish - Issaquah																						
Issaquah Tribes - Protect and Restore Channel Complexity to Support Juvenile Rearing and Pre-Spawning Migrants																						
Restoration	Sammamish State Park Restoration	Sammamish State Park Restoration: Revisions of the State's Plan for the park emphasis restoration of the wetlands, streams and lakeshore areas. EDT modeling results suggest park restoration in Reach 1 has highest restoration potential to affect VSP attributes, but based on an aggressive approach. Opportunity to work with State and consultants on restoration actions. (I204)	Tier 1	Regulatory Mechanisms	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian	Activity Type - Riparian Habitat: Planting and native plant establishment	Chinook		Feasibility Completed	Restoration	\$ 50,000	Restoration	\$ 50,000	Restoration	\$ 50,000	2010	Washington State Parks	\$ 150,000	\$ 150,000	Washington State Parks / Local Govts	I204
Restoration	Pickering Place Channel and Riparian Restoration	Pickering Place Channel and Riparian Restoration, Stream restoration along 1,800 feet of west bank Issaquah Creek. Restoration could include removal of hardened banks and floodplain, side channel, and riparian enhancements. (I207)	Tier 1	Floodplain Connectivity & Function, Channel Structure and Complexity	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream	Activity Type - Floodplain Restoration: Channel Connectivity/Rehabilitation/Creation - Floodplain Restoration (1800 Linear Feet), Activity Type - Riparian: Revegetation Planting (8.20 Acres)	Chinook		Feasibility Pending	Restoration		Restoration		Restoration		2010	Issaquah	\$500,000		Local Governments	I207
Acquisition and Restoration	Bush Lane Acquisition and Restoration	Bush Lane Acquisition and restoration. When combined with Pickering Place could create a large protected/restored section of Issaquah Creek on both banks and some of lower NF Issaquah. Stream, riparian, and floodplain restoration on 1,200 feet of Issaquah Creek east bank. Stream/buffer enhancements can be combined with other public use of upland area of site, such as active recreation. (I206 & I208)	Tier 1	Floodplain Connectivity & Function, Channel Structure and Complexity	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream, Wetland	Activity Type - Floodplain Restoration: Channel Connectivity/Rehabilitation/Creation - Floodplain Restoration (1200 Linear Feet), Activity Type - Land Protected, Acquired.	Chinook		Feasibility Pending							2010	Issaquah			Local Governments	I206, I208, I274, I270
Restoration	Restoration at confluence of Issaquah Creek and E Fork Issaquah Creek	Project concepts developed by Kokanee Work Group for multiple species benefit: • I211A) Cybill-Madeleine Park Habitat Enhancement – Regrade banks, add large wood and other pool-forming features, create side-channel habitat • I211B) E Fork Issaquah Creek Confluence restoration – Remove armoring and re-grade right bank to increase connection to floodplain. Add large wood and plant native riparian species	Tier 1	instream habitat complexity (LWD, pools, spawning gravel)				kokanee (only in conjunction with a program to reestablish kokanee; historically Issaquah Crk had the early-run, which is now considered extinct). Coho, steelhead, cutthroat		City of Issaquah is finalizing the master site plan for this park and has applied for KCD funding for future phases.							2010	City of Issaquah				I211A; I211B
Restoration	Juniper Acres Restoration	Juniper Acres Restoration. A small 2-acre parcel recently acquired. When combined with Issaquah Park and other City owned parcels, represents good restoration potential in urban reaches. (I212)	Tier 1	Floodplain Connectivity & Function	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream, Wetland	Activity Type - Floodplain Restoration: Channel Connectivity/Rehabilitation/Creation - Floodplain Restoration (550 Linear Feet)	Chinook		Feasibility Completed	Restoration						2010	Issaquah	\$150,000		Local Governments	I212
Protection	Additional South Issaquah Creek Greenway Acquisitions	Additional South Issaquah Creek Greenway Acquisitions: Large parcels adjacent to the South Issaquah Creek Greenway offer additional potential for open space preservation, riparian and wetland enhancements, instream restoration, and side channels. Includes Mohl Property, located immediately downstream of Sycamore Drive on west bank; and other properties. (I225)	Tier 1	Channel Structure and Complexity, Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Upland, Riparian, Instream, Wetland	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (19 Acres)	Chinook			Acquisition	\$ -			Acquisition	\$ 750,000	2010	Issaquah	\$ 750,000	\$ 375,000	Local Governments/ KCD	I225

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Restoration	Squak Valley Park Restoration	Squak Valley Park Restoration. Improve habitat complexity and riparian forest, create off-channel areas connected to the stream, large woody debris placement. Levee removal (all or parts - unknown). Right bank Issaquah - 8. (I226)	Tier 1	Floodplain Connectivity & Function, Channel Structure and Complexity, Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian, Instream, Wetland	Activity Type - Estuarine & Nearshore: Channel modification / creation (1250 Yardst), Activity Type - Instream Habitat: Channel structure - Large woody debris (1250 Feet), Activity Types - Acquisition/Easements/Leases: Upland protected (1.90 Acres)	Chinook		Feasibility Completed	Restoration						2010	Issaquah	\$700,000		Local governments	I226 B
Acquisition	Issaquah Waterways Acquisition and Restoration and Carey/Holder/Issaquah Creek Confluence	Issaquah Waterways Acquisition and Restoration (I249) and Carey/Holder/Issaquah Creek Confluence (I248, I250, I252): Middle Issaquah Reach 12 acquisition and restoration and the confluence of Issaquah, Carey and Holder Creeks. Acquisition in fee or conservation easement to restore or expand riparian buffers. Removal of invasives. Plan includes increased fenced buffers (100 ft for named tributaries and 50 ft. for unnamed tributaries), and restricted access to the riparian corridors. (I248, I249, I250, I252)	Tier 1	Riparian Areas & LWD Recruitment	Chapter 4 (Volume I) WRIA 8 Chinook Salmon Conservation Plan	Riparian	Activity Type - Riparian: Revegetation Planting (120 Acres)	Chinook		Feasibility Pending	Acquisition	\$ -	Acquire conservation easement	\$ 350,000	Acquire Conservation Easement	\$ 350,000	2009	King County	\$ 700,000	\$ 350,000	Local Governments/ KCD/Conservation Futures	I250
Issaquah - Protect and Restore Riparian Function to Support Juvenile Rearing and Spawning Migrants																						
Acquisition	Wildwood Acquisition	Wildwood Acquisition: Acquisition of the left bank property opposite recent acquisition of one of the few remaining large undeveloped parcels (8 acres - Johnson property) on lower Issaquah Creek. (I222)	Tier 1	Riparian Areas & LWD Recruitment	(Volume I) WRIA 8 Chinook Salmon Conservation	Upland, Riparian	Activity Type - Land Protected, Acquired, or Leased: Upland Protected (0.30 Acres)	Chinook				\$ -		\$ -	Acquisition	\$ 300,000	2009	Issaquah	\$ 300,000	\$ 150,000	Local Governments	I222
Issaquah - Protect and Restore Water Quality to Support Egg Incubation, Juvenile Rearing, and Pre-Spawning Migrants																						
no projects																						
Issaquah - Hatchery Capital Projects																						
Hatchery	Issaquah Integrated Fish Passage	Issaquah Integrated Fish Passage. Allow unhindered adult passage of Chinook and coho. Open up 10 miles of habitat. (was "Issaquah Hatchery Dam Passage") (I221)	Tier 1	Reduced Access to Spawning Habitat - Fish Passage/Anthrop	Chapter 4 (Volume I) WRIA 8 Chinook	Instream	Activity Type - Fish Passage: Fishways (Ladders, Chutes or Pools) - Fish Passage	Chinook	Coho	Feasibility Completed		\$ 400					2010	Issaquah, Corps of Engineers, and	\$800,000	\$2,400,000	Local Governments, Army Corps of	
Subtotal - Capital - Issaquah												\$ 50,400	\$ 400,000	#####	\$4,050,000	#####						
TOTAL - Capital Projects												\$13,650,760	\$ 25,445,350	\$ 14,920,000	\$ 76,791,710	\$ 23,256,350						
Non-Capital																						
Non-capital needs for Adaptive Management and Coordination																						
Future Habitat Project Development	5-6% Capacity Funds	Assistance to site-specific projects or addressing barriers to implementation of projects or programs. Identifying priorities for programmatic actions.	All					Chinook			Facilitation, project or	\$53,885	Facilitation, project or	\$53,885	Facilitation, project or	\$53,885	Ongoing	Multiple stakeholders	\$161,655	\$0	PSAR Capacity Funds	
Watershed Plan Implementation & Coordination	Salmon Recovery Coordination	Salmon Recovery Coordination/ Adaptive Management Framework and Plan Implementation tracking	All					Chinook			Facilitation, databases	\$100,000	Facilitation, databases	\$100,000	Facilitation, databases	\$100,000	Ongoing	Multiple stakeholders	\$300,000	\$50,000	Local govts	
Watershed Plan Implementation & Coordination	Habitat, Hatchery, and Harvest Integration	Enhanced Integration of Habitat, Hatchery, and Harvest Management Actions	All					Chinook			Implement recommendations from	\$50,000	Implement recommendations from	\$50,000	Implement recommendations from	\$50,000	Ongoing	Managers and Multiple Stakeholders	\$150,000	\$0		
Watershed Plan Implementation & Coordination	Lead Entity Coordination & Administrative Support of Watershed Committees	Lead entity coordination* & Administrative Support and coordination of the watershed committees / Completion and periodic revisions to the watershed salmon plan	All					Chinook			Staffing (3.5 FTE)	\$561,000	Staffing (3.5 FTE)	\$561,000	Staffing (3.5 FTE)	\$561,000	Ongoing	Local gov't & Lead entity	\$1,683,000	\$1,683,000	ILA Local govts & LE grant	
Sub-total - Non-capital needs for Adaptive Management and Coordination												\$764,885	\$764,885	\$764,885	\$2,294,655	\$1,733,000						

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Non-capital needs for WRIA 8 Plan Programmatic Recommendations (For a more detailed list of the programmatic recommendations, associated limiting factor, and cost estimates, see Attachment B: WRIA 8 Programmatic Actions List)																						
Habitat Protection	Integration of regulatory flexibility to benefit salmon	(No examples proposed)	Tier 1	and Sediment Quality, Floodplain Connectivity, Riparian Vegetation, Sediment				Chinook			Staffing, materials, and mix of other resources	\$56,000	Staffing, materials, and mix of other resources	\$56,000	Staffing, materials, and mix of other resources	\$56,000	Ongoing	Multiple stakeholders and WRIA 8	\$175,000	\$130,500	Local govts and other sources	
Habitat Protection	Incentive programs	Examples of Programs: Incentives to restore ecosystem function (C007) Riparian – Negotiate for enhancement of riparian buffers (C006)	Tier 1	"				Chinook			Staffing, materials, and mix of other resources	\$266,000	Staffing, materials, and mix of other resources	\$266,000	Staffing, materials, and mix of other resources	\$266,000	Ongoing	Multiple stakeholders and WRIA 8	\$798,000	\$396,000	Local govts and other sources	
Habitat Protection	Innovative approaches to stormwater and shoreline management	Examples of programs: Green Shorelines C729/C730, I730, C030/C033, I056/N051/N057: Outreach to encourage lakeshore restoration. Activities could include workshops, media campaign, permitting or financial incentives, technical assistance, lakeshore design criteria, or demonstration projects. Technical assistance for stormwater pollution abatement	Tier 1	"				Chinook			Staffing, materials, and mix of other resources	\$268,000	Staffing, materials, and mix of other resources	\$268,000	Staffing, materials, and mix of other resources	\$268,000	Ongoing	Multiple stakeholders and WRIA 8	\$804,000	\$402,000	Local govt and other sources	
Habitat Protection	Increase Best Management Practices (BMPs)	Examples of Programs: Septic tank maintenance. Encourage commercial car wash and alternatives for charity car washes, and car maintenance.	Tier 1	"				Chinook			Staffing, materials, and mix of other resources	\$181,000	Staffing, materials, and mix of other resources	\$181,000	Staffing, materials, and mix of other resources	\$181,000	Ongoing	Multiple stakeholders and WRIA 8	\$543,000	\$363,000	Local govts and other sources	
Habitat Protection	Support existing regulations that benefit salmon	No examples proposed	Tier 1	"				Chinook			Staffing, materials, and mix of other resources	\$453,000	Staffing, materials, and mix of other resources	\$453,000	Staffing, materials, and mix of other resources	\$453,000	Ongoing	Multiple stakeholders and WRIA 8	\$1,359,000	\$903,750	Local govts and other sources	
Outreach and education	Outreach and education	Examples of Programs: Stewardship – Encourage community stewardship (e.g. C721 with C719/C731 but basinwide) Streamside Landowner Education workshops for education, stewardship and BMP implementation Promote tree cover value (C720/N719/N735/I715) Stormwater actions - basinwide Natural Yard Care – basinwide Protection of nearshore	Tier 1	"				Chinook			Staffing, materials, and mix of other resources	\$1,905,000	Staffing, materials, and mix of other resources	\$1,905,000	Staffing, materials, and mix of other resources	\$1,905,000	Ongoing	Multiple stakeholders and WRIA 8	\$5,715,000	\$476,250	Local govts and other sources	
Sub-total - Non-capital needs for Programmatic Recommendations												\$3,129,000	\$3,129,000	\$3,129,000			\$9,394,000	\$2,671,500				
Monitoring																						
Monitoring	Evaluating Cumulative Effectiveness	Evaluating Cumulative Effectiveness of Actions (Habitat)	All		Chapter 6 Volume I WRIA 8 Plan			Chinook			Planning, site selection/	\$200,000	Planning, data acquisition	\$150,000	Planning, data acquisition and	\$150,000	Ongoing	Multiple stakeholders	\$500,000	\$300,000	Local govts	
Monitoring	Stock Monitoring Support	Stock monitoring support (Fish In/Out)	All		Chapter 6 Volume I WRIA 8 Plan			Chinook			Spawner surveys, smolt	\$461,034	Spawner survey s,	\$461,034	Spawner surveys, smolt	\$461,034	Ongoing	Multiple stakeholders	\$1,383,102	\$1,081,305	Local govts, WDFW	

Plan Category	Project Name	Project Description	Priority Tier	Primary Limiting Factors Addressed	Reference Document for limiting factor	Habitat Type	Activity Type and Project Performance	Primary Species Benefiting	Secondary Species Benefiting	Current Project Status	Year 1 Activity to be funded	Year 1 Estimated Budget	Year 2 Activity to be funded	Year 2 Estimated Budget	Year 3 Activity to be funded	Year 3 Estimated Budget	Likely end date	Likely sponsor	Total Cost of Project	Local share or other funding	Source of funds (PSAR, SRFB, other)	Project ID
Monitoring	Project Effectiveness	Evaluate projects to determine the benefit to Chinook of specific features of restoration projects	All		Chapter 6 Volume I WRIA 8 Plan			Chinook			Staffing, site selection/reconnaissance and materials, field work, reporting	\$600,000	Staffing, site selection/reconnaissance and materials, field work, reporting	\$600,000	Staffing, site selection/reconnaissance and materials, field work, reporting	\$600,000	Ongoing	Multiple stakeholders	\$1,800,000	\$600,000	Local govts, WDFW	
Sub-total - Non-capital needs for Monitoring												\$1,261,034	\$1,211,034	\$1,211,034			\$3,683,102	\$1,981,305				
Total Non-Capital Need											Total year 1 need	\$4,390,034	Total year 2 need	\$4,340,034	Total year 3 need	\$4,340,034	Total Programmatic non-capital need	\$13,077,102	\$4,652,805			
* In the recent past, WRIA 8 received \$60,000/year for lead entity coordination. The \$75,000 figure is an estimate received from Evergreen Funding.																						
Priority projects and programs benefitting non-listed species																						
Restoration	Lake Sammamish tributary delta improvements (Project Number TBD)	Improve natural delta formation processes along stream tributaries to Lake Sammamish to improve habitat for juvenile Chinook as well as Kokanee salmon. Projects (A,B,C) were investigated for maximum Chinook and Kokanee benefits and feasibility and approved by Kokanee Work Group in 2010: • A) Lewis Creek Delta Restoration; • B) Zaccuse Creek Trail Culvert Removal; • C) Laughing Jacobs Creek: Sammamish State Park Channel Re-route		A) fish passage barrier; non-natal stream mouth and shoreline rearing areas (juvenile Chinook). B) fish passage barrier (kokanee). C) kokanee spawning habitat - substrate, instream habitat complexity and riparian cover; Chinook shoreline and non-natal stream rearing area.	Tabor...; AMEC 2011	kokanee spawning habitat; Chinook rearing habitat		kokanee, Chinook	coho, cutthroat	Conceptual designs completed by AMEC for Kokanee Work Group								A) City of Sammamish; B) City of Sammamish; C) WA State Parks			TBD A,B,C	
Acquisition/Restoration	Ebright Creek Enhancement and Acquisition (new for 2011: I310A and I310B)	Ebright Creek: Enhance mouth and protect lower reaches of Ebright Creek on East shore of Lake Sammamish. If property on lower reaches of creek is acquired there could be educational outreach opportunities on the site. (I-310) Description to include I310A Ebright Creek Wetland Enhancement and I310B Ebright Creek Fish Passage Restoration (NOTE: Projects considered by WRIA 8 Technical Committee to have benefits to juvenile Chinook at creek mouth	Tier 1	Loss of Habitat, Reduced Habitat Capacity	Chapter 9 Volume 1 WRIA 8 Plan	Riparian, Instream	Activity Type WRIA 8: Restore Creek Mouths/Pocket Estuaries (1)	Chinook		Feasibility Pending			Acquisition	\$ 300,000			2010	City of Sammamish	\$ 300,000	\$ 150,000	Local Governments	I310A; I310B

- DRAFT –
Snoqualmie Watershed Forum
Salmon Plan Five-year Status Report

November 17, 2010



Introduction

Since 1998, the Snoqualmie Watershed Forum (Forum), partner governments and non-governmental organizations have worked to restore salmon populations and to improve watershed health through collaborative action. From 1998-2005, the Forum played a key role in the development of the Snohomish Basin Salmon Conservation Plan (Salmon Plan). The Salmon Plan's geographic scope is Water Resource Inventory Area (WRIA) 7, which extends from the headwaters of the Snoqualmie and Skykomish watersheds to the Snohomish River estuary and associated Puget Sound nearshore environment. The Forum is active within the King County portion of WRIA 7, which includes portions of the South Fork Skykomish watershed in addition to the Snoqualmie watershed (see Figure 1, next page).

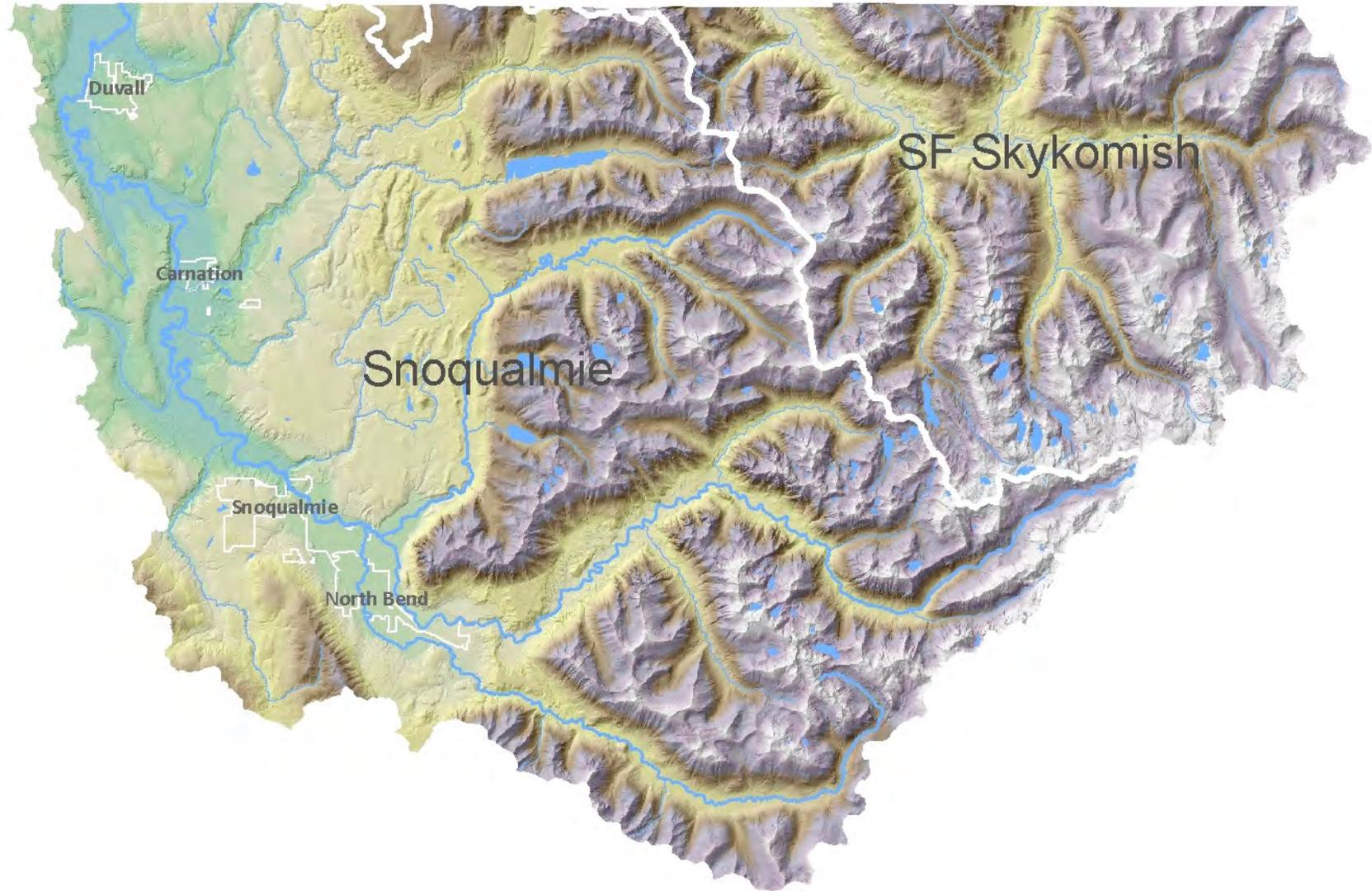
The Salmon Plan defines a science-based, strategic approach to the recovery of threatened salmon populations over a fifty-year period and identifies ten-year benchmarks for habitat restoration actions. The plan also includes recommendations for the protection of integral habitat types, such as forests, wetlands and floodplains, that support vital watershed processes.

Following the completion of the Salmon Plan in 2005, the Forum began to implement capital and non-capital elements of the plan within the Snoqualmie watershed through direct actions by its member governments and by supporting the activities of numerous partner organizations. This Five Year Status Report addresses several key questions about our progress toward Salmon Plan goals and about the status of the watershed as a whole:

- Are we on track to accomplish our 10-year restoration goals?
- Are there policies, programs and regulations in place to ensure protection of intact habitat and important watershed functions?
- What are the recent trends in salmon and human populations in the watershed and how do those trends affect our actions?
- What progress have we made in filling key data gaps that were identified in the Salmon Plan?
- What's working and what can we do better over the next five years?

Reductions in salmon harvest and substantial changes in hatchery management are also integral components of the Salmon Plan. The report highlights key trends in these areas in the discussion of salmon population status and in the research section, but a more comprehensive discussion of these topics is beyond the scope of this report.

Figure 1. The Snoqualmie Watershed Forum’s activity area includes the King County portions of the Snoqualmie and South Fork Skykomish Watersheds.



Habitat Restoration

The completion of the Salmon Plan in 2005 was the culmination of intensive scientific investigation into the causes of salmon population decline. Habitat loss and alteration, excessive harvest and the adverse effects of hatchery production are all implicated in the demise of Snohomish Basin Chinook salmon, the focal species of the Salmon Plan.

Salmon utilize different types of habitats during different portions of their life cycle. Chinook salmon typically spawn in mainstem rivers and large tributaries; as the largest species of Pacific salmon, they spawn in the large gravels that are found in these areas. However, juvenile Chinook – which rear in the river for anywhere from 2-16 months prior to their seaward migration – utilize a variety of complex, slower-water habitats along the river channel margin, backwater areas, side channels and even off-channel areas that may only be accessible during high water. As they migrate toward saltwater, they also take extensive advantage of estuary sloughs, blind tidal channels and nearshore areas in Puget Sound. *The Salmon Plan is founded on the premise that juvenile rearing habitat is the primary habitat bottleneck for Chinook salmon.*

The Salmon Plan approach to restoration is ‘process based’. This means that the recommended actions are first and foremost intended to restore the natural processes that create and maintain habitat, rather than ‘building’ habitat out of whole cloth. So, instead of recommending the construction of rearing channels or large wood jams (though large wood jams are included as a short-term, second-tier action in some areas), the plan emphasizes the restoration of dynamic river processes.

For example, in the mainstem Snoqualmie River and its largest tributaries where Chinook salmon spawn (i.e., the Tolt and Raging Rivers), the loss of rearing habitat is in large part the consequence of levees and revetments along the riverbank that have been constructed to prevent erosion and reduce flooding. Compared to its historical condition, the river is severely channelized and devoid of the complex habitat conditions that juvenile salmon need. Thus, the highest priority restoration projects in the

Snoqualmie watershed involve the removal of levees and revetments that will allow natural river processes to occur.

The Chinook Bend project is a prime example of this approach. By removing the levees that have constrained the river in this prime spawning and rearing reach for the past 50 years, one goal of this multi-faceted project is to promote the natural development of a more complex channel form akin to those seen in aerial photographs from the 1930s (see Figure 2).

Figure 2. Chinook Bend project site in 2009 and in 1937.



Even in the 1930s, the river valley was substantially affected by land clearing and intensive cattle grazing,

but the river channel itself had not yet been as dramatically constrained.

The upstream (southern edge) levee was removed in 2009 and the remaining downstream revetment is scheduled for removal in 2011 or 2012. The project also involves extensive tree planting on the site with over 20 acres of planting completed to date.

The Salmon Plan also identifies many other restoration actions in mainstem rivers, lowland tributaries and headwater areas that are needed to support properly functioning hydrologic and sediment processes, and to create the types of habitat conditions that salmon need. These include restoration of riparian forests, elimination of fish passage barriers in tributaries, decommissioning of forest roads that are no longer needed, addition of large tree trunks and log jams into river channels¹, and a variety of other actions. The **Snoqualmie Watershed Conceptual Zones fold-out graphic** (located at the end of this report) highlights some of the restoration priorities that have been identified for different portions of the watershed.

Progress toward 10-year goals

The Salmon Plan established quantitative ten-year goals for restoration actions in certain areas (Table 1). *These goals represent 20% of the overall effort required under the 50-year recovery plan.*

When evaluating progress toward these goals, a few key points are important to keep in mind:

- The goals themselves refer to net gains in each category. This means that a complete progress evaluation must include an assessment of losses attributable to new development or other factors, in addition to the gains attributable to restoration.
- Many restoration actions are initial investments in long-term processes. For example, when a section of levee is removed, it may take years or

¹ In the Salmon Plan, large wood placement is considered a short-term measure to fill the void until restored riparian forest mature and provide natural wood.

decades before habitat conditions resemble their natural state.

- Simple tables of goals mask a more complex suite of restoration targets. For example, the goal for riparian restoration in mainstem areas has been simplified to a fixed number of acres. However, details in the plan prioritize certain areas for restoration, and define the width and maturity of riparian forests that are considered 'functional'.

Table 1. Restoration progress toward Salmon Plan ten-year goals in highest priority habitat areas.

Sub-basin Strategy Group and Habitat	10 Year Goals	2005-2010 Progress
Nearshore Beaches and Shoreline	At least 1 mile	0.2 mile (20%)
Estuary: Restored Tidal Marsh	1,237 acres	375 acres (30%)
Mainstem: Restored Edge Habitat*	5.2 miles	1 mile (19%)
Mainstem Restored: Off-Channel Habitat*	84 acres	21 acres (25%)
Mainstem: Restored Riparian Habitat*#	128 acres	71 acres (56%)
Mainstem: Large Wood*	20 new jams	8 jams (40%)

* Goal is for the King County portion of plan area in Mainstem Primary Restoration Sub-basins.
Progress refers to acres of trees planted, but riparian functions not restored until trees survive to maturity.

 Not on track to meet 10-year goal
 On track to meet 10-year goals.

For the five major goals highlighted in Table 1, only the riparian restoration goal is on track to meet 10-year targets while others lag behind. Further evaluation of riparian restoration progress must include an assessment of location, planting-area width, and plant survival over time.

Spotlight on tree planting: Restoring riparian forest around streams and rivers is a vital component of salmon recovery. In the Snoqualmie watershed, in addition to major planting projects on public lands, farmers and other private landowners have planted thousands of trees to help provide shade, reduce bank erosion, improve water quality and create wildlife habitat. Many planting projects utilize volunteer crews that help to promote community awareness and support for restoration efforts.

Similarly, most installed log jams noted in Table 1 are in the Lower Tolt River project floodplain. Eventually they may play the role of wood jams in an active channel, but until floodplain processes are reinitiated at the site over time, these jams will remain largely ineffective.

The Salmon Plan also developed goals for riparian restoration and off-channel habitat gains in tributary streams (such as Cherry, Harris, Patterson and Ames Creeks) and in second-tier mainstem areas (Table 2). These include the South Fork Tolt River below the dam and the portion of the mainstem Snoqualmie River between Snoqualmie Falls and the Raging River.

Table 2. Progress toward Salmon Plan ten-year habitat restoration goals in second tier sub-basins.

Sub-basin Strategy Group and Habitat	10 Year Goals	2005-2010 Progress
Mainstem Secondary: Riparian Restoration*#	3 acres	0 acres
Mainstem Secondary: Off-channel habitat*	3 acres	0 acres
Rural Primary: Riparian Restoration*#	7 acres	0 acres
Rural Primary: Off-channel Habitat*	5 acres	0 acres
Rural Secondary: Off-channel Habitat*	21 acres	0 acres
Rural Secondary: Riparian Restoration#	No target defined	11 acres

* Goal is for the King County portion of plan area.
Progress refers to acres of trees planted, but riparian functions not restored until trees survive to maturity.

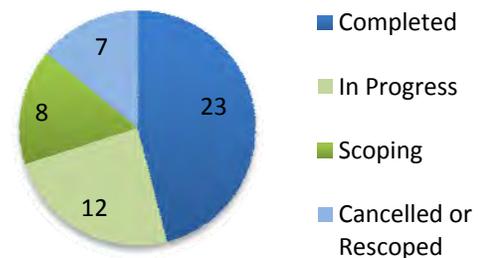
Not on track to meet 10-year goal
On track to meet 10-year goals.

Basin-wide ten year goals include the replacement of 60 or more culverts that block fish migration, with an emphasis on those that block Chinook salmon habitat or are in areas heavily utilized by coho salmon or bull trout. Progress on culvert replacement has not been thoroughly evaluated.

To help kick-off plan implementation, the Forum developed a specific ten-year project list that included a variety of large-scale and smaller-scale restoration actions in the watershed. While new project ideas and opportunities are regularly added to the list and some others may be altered or deemed infeasible, steady progress is being made through the actions of numerous basin partners (Figure 3).

The chart simply shows the number of projects that are in each status category and therefore does not capture status relative to the percentage of projected cost or effort across project types.

Figure 3. Current status of the 50 restoration projects on the Snoqualmie 10-year list.



Other restoration achievements

The Salmon Plan does not provide quantitative goals for all types of restoration actions, but progress is being made on a number of capital and non-capital project types that benefit water quality, riparian condition and other habitat attributes.

- Several miles of fencing have been installed to limit livestock access to waterways.
- Ambitious efforts have been initiated to eradicate noxious weeds - such as knotweed, reed canary grass and ivy - from private and public lands alike along major rivers and streams in the watershed.
- With federal and local funding, landowners in the Patterson Creek and Raging River basins are getting engaged in stewardship programs through a collaborative effort of the county and a local non-profit partner.
- The Salmon Safe Farm program has helped numerous local farmers to implement best management practices on their farms that benefit water quality, fish and wildlife.

[WE WILL ADD QUANTITIES TO THESE ACTIONS]

While projects like these are not as visible as large-scale restoration actions, they are vital to the long term vision of improved watershed health and salmon recovery.

Funding for restoration

For most large capital projects (such as Chinook Bend and the Lower Tolt Floodplain Reconnection project) it can take many years to develop designs, raise sufficient funds, apply for permits, acquire land and conduct public outreach before any work takes place on the ground. Each of these steps requires money and the supply of funds has not kept pace with the projected need to support timely implementation of the Salmon Plan.

Figure 4 shows the amount of funds received for restoration actions in the watershed. The estimated annual need within the Snoqualmie watershed to ensure robust progress toward restoration goals is approximately \$3.5-4 million. That level of funding was nearly achieved once in 2007 due to a one-time infusion of Puget Sound Acquisition & Restoration funding, but the average funding level is half that of the goal.

State restoration funds (e.g., Salmon Recovery Funding Board/ Puget Sound Acquisition &

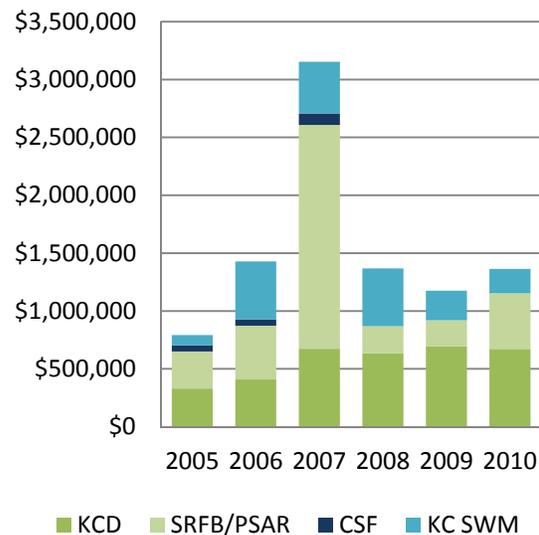
Restoration funds) are less predictable as a source for Snoqualmie-specific projects because they are allocated through a competitive process across the entire Snohomish basin. In addition, state funds are vulnerable to changes in the state budget.

King County’s Surface Water Management (SWM) fee is a source of substantial funds for county-led projects. However, this source, too, is quite vulnerable under the county’s dire budget situation and is allocated across three major watersheds.

The King Conservation District (KCD) grant fund is the most stable source year-to-year and provides a critical source of local dollars to match state and federal sources.

The Forum is most directly involved in the expenditure of KCD funds. The Forum evaluates project proposals from basin partners through an annual grant process and forwards its recommendations to the KCD Board of Supervisors for approval.

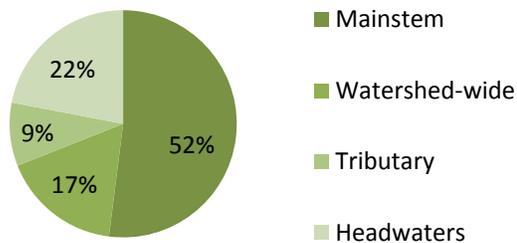
Figure 4. Snoqualmie restoration funding by source, 2005-2010². Does not include funding for acquisitions.



² SRFB: Salmon Recovery Funding Board, PSAR: Puget Sound Acquisition and Restoration, KCD: King Conservation District, CSF: Community Salmon Fund, KC SWM: King County Surface Water Management fees.

Figure 5 shows the approximate distribution of KCD funds across geographic areas within the watershed. Many “watershed-wide” actions are non-capital projects that involve outreach and education.

Figure 5. Proportion of King Conservation District grants expended in sub-basin categories.



Summary and future challenges

Habitat restoration is a cornerstone of the salmon recovery effort. It is also an effort that attempts to remedy the effects of past actions while also facing additional challenges posed by human population growth and climate change.

In the Snoqualmie watershed, substantial progress has been made during the first five years of Salmon Plan implementation. Several large capital projects have been completed or are under way, such as Chinook Bend, the Lower Tolt Floodplain Reconnection project, and the Carlin Levee Removal. In addition, dozens of smaller projects have also been implemented in mainstem and certain tributary areas.

However, despite the efforts of Forum member governments, the King Conservation District and numerous other basin partners, we are well behind the pace required by the plan in most restoration action categories. The results shown in Table 2 suggest that certain combinations of project types and locations have been entirely absent from implementation efforts in the first five years. Strategic targeting of effort into these areas will be necessary in the future.



Funding for restoration has averaged roughly \$1.5 million per year, compared to an estimated need of \$3.5-4.0 million. Nearly all of the available funds are secured through competitive grant programs that require tremendous expenditure of effort for an uncertain rate of return. At the same time, the funding outlook is more bleak today than at the Salmon Plan’s signing, with both state and local budgets under severe stress. Absent new, dedicated funding to support restoration, the likelihood of success in meeting short-term and long-term targets for habitat condition is very low.

Restoration projects face additional implementation challenges due to time consuming and costly permit requirements. Under some permit processes, restoration projects are treated no differently than any other construction project. With the exception of the Joint Aquatic Resources Permit Application (JARPA) process which streamlines the permit process in some cases, restoration projects generally face more local permit requirements today than in 2005.

A major emerging challenge for large-scale restoration projects in particular is the uneasy relationship between salmon recovery and agriculture. The Salmon Plan explicitly states that agriculture is an important component of the watershed today and in the future. However, the most important lands for potential restoration are coincident with agricultural lands in the floodplain of the Snoqualmie River. Consistent with the plan, the first generation of large projects has occurred largely on public land. As these opportunities are exhausted, the next generation of projects, in areas like the Fall City reach of the Snoqualmie River, will face a more difficult challenge of supporting long-term

agricultural viability while simultaneously restoring river processes. The outcome of this issue will in large part determine the fate of large-scale river restoration in the watershed and of the prospects for salmon recovery. That is why the Forum, King County and other basin partners are actively engaged in discussions with the agricultural community to address this challenging but critical topic.

Habitat Protection

While habitat restoration refers to the rehabilitation of degraded habitat conditions, habitat protection is aimed at preventing further harm and to preserving intact habitat conditions where they are present. Thus, habitat protection refers to those policies, programs and regulations that help to limit or prevent degradation of environmental conditions, or that preclude or discourage ecologically adverse changes in the type or intensity of land use.

The Salmon Plan identifies ecological priorities for protection in different portions of the watershed. In river reaches with high current or potential use by Chinook salmon, the salmon plan calls for the prevention of further floodplain development or fill, maintenance of opportunities for rivers to migrate within their natural channel migration areas, and protection of intact riparian and off-channel habitats. Not surprisingly, the restoration portion of the plan calls for reestablishing these same functions in places where they have been lost. Throughout the watershed, the plan calls for the protection of wetlands, forests and floodplains to support natural hydrologic and sediment processes.

How is habitat protection achieved? For any location in the watershed, protection is a function of a multitude of land use policies, ownership, regulations, enforcement and voluntary incentives.



‘Permanent’ protection

Some forms of protection are more permanent than others. For example, public lands comprise over 384,000 acres (64%) of the watershed, with the vast majority under federal and state ownership in the upper watershed. These lands range from designated Wilderness Areas that are highly protected, to lands designated for active forestry. The City of Seattle owns over 13,000 acres in the South Fork Tolt River basin as protection for its water-supply reservoir. The county owns a variety of natural lands, working forests and park lands in the lower watershed, while each city also maintains parks and open space.

Spotlight on the Raging River: In 2009, with the support of Mountains to Sound Greenway Trust and Cascade Land Conservancy, King County partnered with the Washington State Department of Natural Resources to purchase the development rights from over 4,000 acres of forestland in the Raging River basin, a key spawning area for Chinook salmon, coho salmon and steelhead trout. As part of the deal, the state acquired roughly 7,000 acres of privately-owned forest land

In general, while the level of ecological protection varies dramatically depending on the designated purpose of public land, it is fairly unlikely to be sold or converted to an entirely different use. However, the changing landscape of state budgets in particular may put certain public lands at risk in the future.

Since 2005, the county's Department of Natural Resources and Parks has purchased more than 225 acres of land in the watershed primarily for their ecological value, and an additional 31 acres of properties repeatedly damaged by flooding. These flood-prone sites along rivers like the Raging and Tolt will provide many future opportunities for habitat restoration.

Many private forest and farm lands in the watershed have also been permanently protected from conversion to other uses through the acquisition of their associated development rights. *The rights from more than 90,000 acres of privately owned forest lands and over 4,900 acres of farmland have been purchased through the county's Transfer of Development Rights and Farmland Protection Program, respectively.* Since 2005, over 4,600 acres have been added to the two programs, combined.

Check out the ***“Habitat Protection: Where are the gaps?”*** fold-out graphic to see where permanent and non-permanent protection measures are currently in place, and where they are lacking.

‘Non-permanent’ protection

Less permanent habitat protection is provided by a variety of land use planning tools and tax incentive programs. In the case of private property, a local government's land use designation – such as forestry, agriculture, multiple use, rural residential, or mining - defines the broad land use goals for a particular area, but still may allow substantially divergent activities and development patterns to take place. For example, certain forest lands can be sub-divided into large residential lots, and golf courses may be allowed on agricultural land.

The policy direction provided by each local government through its comprehensive plan is

implemented through its zoning code and other development regulations. Importantly, land use designation, zoning and other regulations can change substantially over time through city or county council action.

In some cases, local governments apply special land-use overlays on top of existing designations to further emphasize policy objectives. For example, the vast majority of land designated for agriculture in the watershed is within the Snoqualmie Valley Agricultural Production District (APD). The designation limits the type and intensity of allowable activities in the APD, but also affects surrounding uses. According to the county's comprehensive plan, rural residential areas within one quarter mile of an APD shall not be developed at a density greater than one home per ten acres. While the intent of this provision is to minimize land-use conflicts, it also serves to prevent high density rural development and may reduce the loss of wetlands and forest cover in certain areas.

Similarly, the county has designated over 26,000 acres of rural residential areas in the watershed as Rural Forest Focus Areas (RFFA). The RFFA places enhanced limits on the subdivision of existing lots in an effort to maintain forest cover and limit the density of new development. The RFFA zones are also identified as preferred ‘sending sites’ for the Transfer of Development Rights (TDR) program.

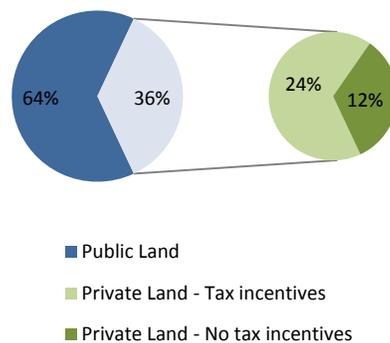
Open Space Charter Amendment: In 2009, King County voters approved an amendment to the County Charter that provides enhanced protection in perpetuity to a wide array of county-owned lands as well as private lands where the County holds a permanent conservation easement. In the Snoqualmie Watershed, over 100,000 acres are protected by the amendment. Specific properties protected by the amendment were chosen for their high value in safeguarding the county's many natural resources, habitat, recreation opportunities, and rural economy. In the future, that protection can only be removed by a super-majority of the County Council that requires seven out of nine votes.

A variety of property tax incentives are available to private landowners in King County who commit to preserving their properties as open space, forestland or farmland. Some tax incentives are applicable only to a portion of a parcel. For example, in the case of a residential property in the Public Benefit Rating System (PBRs) program, the undeveloped portions of a parcel may be eligible for tax incentives while the home site remains taxable at standard rates.

In the Snoqualmie and Skykomish watersheds, approximately 1,640 parcels covering 145,000 acres are enrolled in various tax incentive programs, with forestland accounting for the bulk of the acreage. This represents roughly two thirds of the non-public lands within the King County portion of the Snoqualmie and Skykomish watersheds.

While programs differ in their specific requirements, landowners are generally required to maintain the property in a condition equal to or better than at the time of enrollment. Some programs require the owner to prepare and abide by an approved resource management or stewardship plan. Enrollment is voluntary. Thus, a property owner may withdraw, but must pay back taxes and penalties to do so.

Figure 6. Proportion of private land enrolled in property tax incentive programs.



Since 2005, approximately 1,440 new acres have been enrolled in the PBRs and Timberland programs administered by King County's Water and Land Resources Division. These programs are utilized primarily in areas zoned for rural residential development. In contrast, the Agriculture and Forestland current use taxation programs, which are administered by the County Assessor, are primarily applied to designated farm and forest lands within the APD and Forest Production District (FPD). The vast majority of parcels enrolled in the latter two programs have been enrolled for many years.

Table 3 (located at the end of the Habitat Protection section) lists the principal habitat protection programs and their attributes, along with data on enrollment, where applicable and available.

Land use regulations

Each city and county government is responsible for enacting regulations to protect the functions and values of critical areas (such as streams and wetlands), water quality and other natural assets. The county and cities within the Snoqualmie watershed have updated their respective critical areas regulations since 2005 based on Best Available Science, as required by State law. No two jurisdictions have adopted identical protective regulations for streams and wetlands, the two categories of critical areas most closely associated with salmon recovery and water quality. For example, stream buffer requirements for rivers and large streams range from 165 ft to 100 ft, while

buffers for the most ecologically significant wetlands (Category I) range from 300 ft to 150 ft.

Local jurisdictions also enact regulations to protect streams and other natural areas from the impacts of construction activities. King County's Department of Development and Environmental Services conducted an analysis of compliance with site development conditions for single-family residential construction projects in unincorporated portions of the Snoqualmie watershed. The study evaluated compliance with a variety of permit conditions related to environmental protection, such as erosion and sediment control, protection of wetlands and streams, drainage best management practices, clearing limits, and others.

Spotlight on construction regulations:

A 2008 study by King County DDES showed that over 50% of single-family home construction projects are out of compliance with erosion and sediment control permit requirements, with potentially

The study found high rates of non-compliance with certain development conditions, topped by erosion and sediment control with a non-compliance rate of 51% and drainage BMPs of 32%. The study underscores the importance of enforcement in the context of environmental protection and highlights the need to evaluate the on-the-ground effectiveness of regulations.

Each jurisdiction in the watershed is also required to update its Shoreline Master Program (SMP) pursuant to the Shoreline Management Act, which applies to lands within 200 ft of shorelines of the state as well as associated wetlands that may extend beyond 200 ft. Most SMPs were originally adopted in the mid to late 1970s and the current program update cycle is the first of its kind. New provisions in State law require each jurisdiction to achieve "no net loss" of environmental functions within shoreline jurisdiction through a combination of land use designations, regulations and restoration.

Effective floodplain development regulations can also play a significant role in habitat protection. King County is recognized for strict limitations on construction, fill and other development activities in floodplain areas. In rural parts of the county like the Snoqualmie valley, the reality of flooding coupled with stringent regulations means that the conversion of floodplain areas from agriculture to more intensive development is highly unlikely. In contrast, three of four cities in the watershed (excluding Duvall) face significant development challenges due to the fact that a large fraction of each city lies within the floodplain. See the Population and Housing Trends section for more about this issue.

Forest and farm regulations

Forested headwater areas are critical to the maintenance of hydrologic conditions that support salmon recovery. The Salmon Plan assumes that forest cover in the upper watershed will improve incrementally over time due to modern forestry regulations and the high proportion of public lands in headwater areas. To date, no efforts have been made to assess whether trends in forest cover and maturity are in fact improving as predicted. An evaluation of trends in forest condition should be conducted during the next five years of implementing the salmon plan.

Timber harvest practices are governed by a combination of state and federal guidelines and regulations. The Northwest Forest Plan (NWFP) is a series of federal policies and guidelines governing land use on federal lands in Washington, Oregon and California. The NWFP was adopted in 1994 and includes an Aquatic Conservation Strategy that is intended to maintain and restore the ecological health of watersheds and aquatic ecosystems. On state and privately-owned timberlands, forest practices are governed primarily by the State's Forest Practices Rules, first issued in the mid 1970's, and subsequently supplemented by the Timber, Fish and Wildlife (TFW) Agreement in 1987, the Forests and Fish legislation in 1999, and a variety of other rulemaking activities to address specific resources and issues of concern.

Agricultural practices are subject to both state and county regulations, such as the Washington State Dairy Nutrient Management Act and the County's

Livestock Management Ordinance (LMO). The LMO primarily addresses standards for animal density, manure management and fencing requirements to limit animal access to waterways. The County's Critical Area Ordinance also places limitations on the clearing of land for new or expanded agricultural operations in wetland and aquatic area buffers. Both the LMO and CAO provide incentives, such as reduced buffer requirements, for farms that have an approved 'farm management plan'. The role of this and other stewardship programs in habitat protection is discussed further below.

Stewardship planning

King County, King Conservation District and other groups provide several types of stewardship and technical assistance programs that are designed to promote best management practices and habitat protection in exchange for regulatory flexibility.

Agricultural property owners can prepare a Farm Management Plan with free assistance from the King Conservation District as well as technical support from King County. A plan can be used to develop customized habitat protection actions that are consistent with agricultural practices. In exchange for implementing a farm plan, the property owner may take advantage of flexibility from standard critical areas regulations, such as reduced stream buffers for agricultural activities. There are 334 parcels in the watershed with approved farm plans in place covering a total 5,276 acres.

Spotlight on farm plans: Of the 334 parcels covered by farm plans, only 107 and roughly 3,200 acres are located within the APD. The balance of parcels and acreage are located primarily in rural residential areas. This may be due to the fact that the benefits of regulatory flexibility are greater for a property owner in a rural residential area where more stringent regulations apply.

Similarly, owners of forest land can receive technical assistance from the county to prepare a Forest Management Plan that provides regulatory flexibility

for forest practices. The preparation and implementation of a plan is a prerequisite for participation in the Timberland tax incentive program. Approximately 345 parcels that account for 11,768 acres are under forest management plans³, primarily on smaller forest land holdings.

Beginning with the CAO update in 2005, rural residential property owners have had access to the Rural Stewardship Plan program that allows owners to tailor habitat protections to the specific conditions on their property. The program was intended to provide free technical assistance from King County, comprehensive land management planning, flexibility on stream and wetland buffers, and a simpler, potentially less expensive permitting process for development projects. However, resources to implement the program have been severely reduced in recent years. Less than 10 properties have enrolled in the program in the Snoqualmie watershed.

Summary and future challenges

Through a combination of public ownership and the purchase of development rights, the forested character of a very large fraction of the watershed is unlikely to change. This provides a vital insurance policy for the long-term hydrologic functions of the watershed. However, ownership and land use designation are only half the battle. Forestry practices and the effectiveness of forestry regulations in maintaining forest cover and protecting habitat must also be evaluated. This is an important priority for the next five-year period of salmon plan implementation.

Similarly, the floodplain of the Snoqualmie River mainstem below Snoqualmie Falls is unlikely to convert from agriculture to other uses. This is due to a combination of its land use designation, the acquisition of development rights through the FPP program, and perhaps most of all due to stringent floodplain regulations. However, the effectiveness of farming regulations and farm management plans should also be evaluated.

³ Many large-scale industrial forestlands, such as the Hancock Snoqualmie Forest, also operate under forest management plans, but these are typically developed under a separate program.

The most significant gaps in habitat protection occur in the tributary basins and foothills that are largely designated as rural residential areas. In addition to policies and regulations, a variety of tax incentive programs help to dissuade subdivision and development. However, these protections are not permanent. The level of protection would benefit from better targeting of incentive programs to vulnerable habitat resources, such as riparian properties in Rural Forest Focus Areas.

Many county residents take advantage of stewardship programs simply because they want to be better stewards of the land, quite apart from any specific plans for further development of their properties. However, stewardship planning creates an explicit trade-off between habitat protection and regulatory flexibility. Certain protections, such as buffer width, may be reduced in exchange for implementation of other stewardship practices. Whether this results in a net benefit to habitat protection is an open question and can likely be determined only on a case-by-case basis.

An evaluation of regulatory effectiveness is beyond the scope of this report, but it is a glaring omission in the overall assessment of habitat protection in the watershed. As demonstrated by the pilot study by King County DDES, compliance with permit conditions and other regulations cannot be taken for granted. City and county regulatory programs should be evaluated for their effectiveness in protecting watershed processes and specific habitat types.

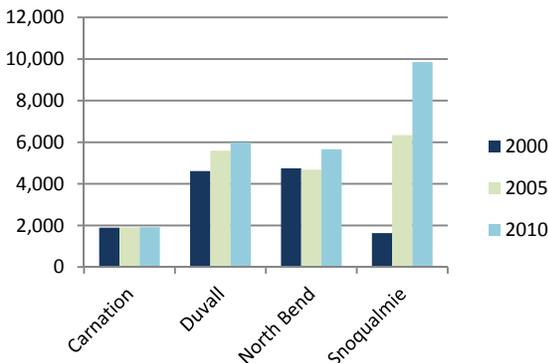
Table 3. Key habitat protection programs and selected attributes.

Program	Focal Areas	Purpose	Permanent protection	Total Acres	2005-2010	Notes
Current Use Taxation - Forestland	Forested, > 20 acres.	Tax incentive to preserve land in forestry	No. Can be reversed with payment of back taxes and penalties.	129,000	No Data. Mostly pre-2005.	Majority also in TDR and Open Space Charter Amendment Programs
Current Use Taxation - Agriculture	Agricultural lands	Tax incentive to preserve land in agriculture	No. Can be reversed with payment of back taxes and penalties.	12,072	No Data. Mostly pre-2005.	Majority also in Farmland Preservation Program
Timberland	Forested, 5 to 20 acres. Small-lot forests on land zoned Rural Residential.	Tax incentive to preserve land in forestry	No. Can be reversed with payment of back taxes and penalties.	1,490	205	
Public Benefit Rating System	Primarily areas zoned as Rural Residential	Points-based tax incentives to preserve and manage land for variety of benefits, such as stream buffers, ground water protection areas, threatened or endangered wildlife, public recreation and historic property.	No. Can be reversed with payment of back taxes and penalties.	3,074	1,232	
Transfer of Development Rights	Primarily Forest Production District and areas zoned residential in Rural Forest Focus Areas	Prevent future development or change in land use.	Yes. Development rights permanently removed.	95,072	4,534	Majority also in CUT Forestland and Open Space Charter Amendment Programs
Farmland Preservation Program	Agricultural lands	Preserve agricultural lands. Prevent change in land use.	Yes. Development rights permanently removed.	4,965	110	Majority also in CUT Agriculture program.
Open Space Charter Amendment	County-owned lands and private forest lands that have permanent conservation easements.	Strengthen protection of designated open space lands by requiring supermajority of County Council to authorize any future changes in use.	Nearly, subject to supermajority vote of County Council.	100,289	100,289	Majority also in CUT Forestland and TDR Programs

Population and housing trends

The Snoqualmie Watershed is largely rural in character. Cities account for roughly 2% of the watershed area, but nearly 40% of its total population. According to 2010 estimates from the State Office of Financial Management (OFM)⁴, the four cities' combined population is 23,420, a near doubling of the 2000 census estimate⁵. The unincorporated area population is approximately 38,100 and has remained stable in recent years, consistent with countywide trends. The City of Snoqualmie has experienced dramatic growth through a combination of annexation and development (Figure 7). In contrast, both Carnation and North Bend have only recently emerged from development restrictions due to challenges posed by sewer and water availability, respectively. Both cities are likely to grow in the coming years.

Figure 7. Population growth in Snoqualmie Valley cities, 2000-2010



Housing development patterns closely mimic population growth in the four cities. Figure 8 shows the total number of single-family, multi-family and other housing types in each city for 2010, according to OFM data.

⁴ <http://www.ofm.wa.gov/pop/default.asp>

⁵ A small portion of the City of Sammamish is also within the watershed, but accurate estimates of population within the area will not be available prior to the completion of the 2010 Census. Sammamish does not participate in the Snoqualmie Watershed Forum.

Figure 8. Total housing units in Snoqualmie Valley cities

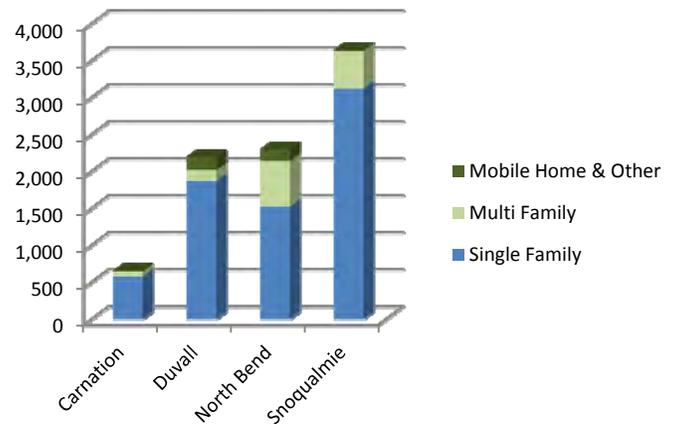
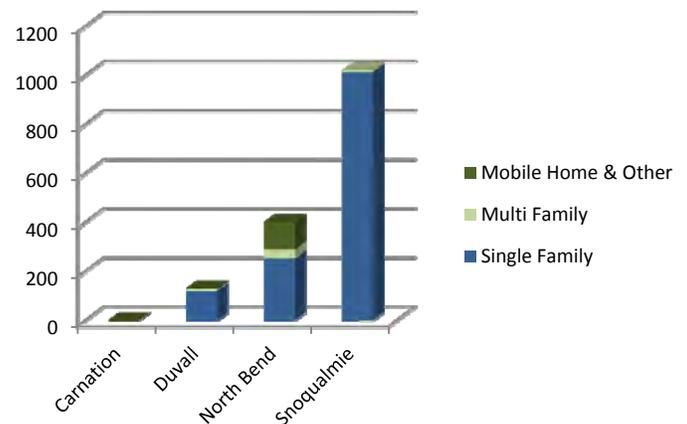


Figure 9 shows the number of new units added since 2005. Single-family homes represent the vast majority of new development in the watershed, exemplified by the addition of nearly 1000 single-family units in the City of Snoqualmie.

Figure 9. New housing units, 2005-2010.

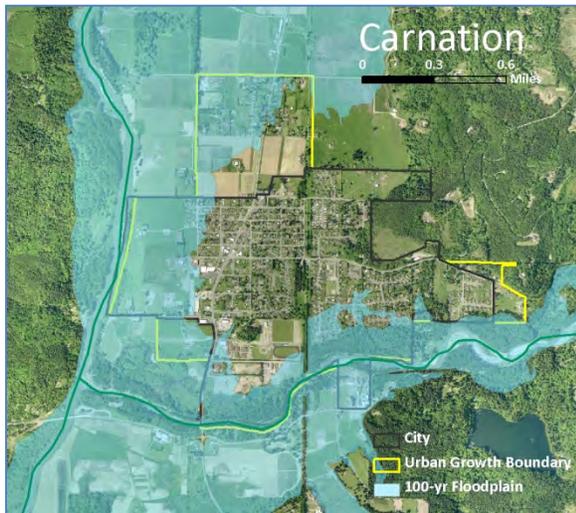


Future growth is likely to be concentrated within cities through sub-division and redevelopment of rural-sized lots, and also via annexation. Each of the cities in the watershed has an associated Urban Growth Area (UGA) that is meant to accommodate future growth. Currently, cities comprise approximately 10,500 acres in the watershed. An additional 3,500 acres lie within the UGA outside of existing city limits, with more than 2,400 of those

acres located around the cities of North Bend and Snoqualmie.

However, the growth and development potential of each City depends on a variety of factors. For example, in the cities of Snoqualmie, North Bend and Carnation, a large fraction of the city and UGA is located within the 100-year floodplain of the Snoqualmie, South Fork Snoqualmie, Middle Fork Snoqualmie Rivers or Tolt Rivers (see example in Figure 10).

Figure 10. City of Carnation is affected by the floodplains of the Tolt and Snoqualmie Rivers.



In some cases, the UGAs also contain portions within identified Channel Migration Hazard areas. Thus, due to policy and regulatory factors associated with the floodplain (such as Shoreline Master Plans, Critical Area Ordinances and recent developments associated with the federal flood insurance program), as well as the purely practical challenges of floodplain development, significant portions of existing cities and UGAs may be difficult to develop at higher densities.

Learn more about how land use policies, regulations, tax incentive programs and other factors affect development and environmental conditions in the **Habitat Protection** section.

In the long-term, it may be possible to expand UGA boundaries into new areas outside of floodplains, but

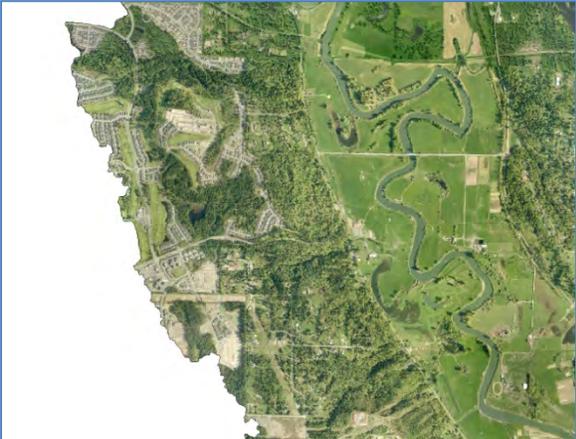
the topographic setting presents challenges for expansion. Moreover, in some areas that flank the existing UGA, King County has established Rural Forest Focus Areas that are strongly discouraged from further subdivision. Thus, the desire to concentrate growth in and around existing cities may come into conflict with the related goal of preserving forest cover in adjacent rural areas.

Summary and Future Challenges

Despite high rates of growth in localized areas, the watershed as a whole remains largely rural in character. Growth in the watershed's four cities is consistent with state and county land use policy and helps to preserve low-density rural areas.

One area of concern is the encroachment of urban-density development on the uplands that border the western boundary of the watershed in the city of Sammamish and in the unincorporated Redmond Ridge area (Figure 11). An increase in impervious area coupled with stormwater management practices can lead to potentially serious downstream impacts. Higher rates of flow through steep hillside ravines can exacerbate erosion and can cause localized flooding and sediment impacts on the valley floor. In the summer of 2010, a beaver dam in the Redmond Ridge UPD was breached (apparently intentionally) and caused a torrent of water and sediment to rush down the Adair Creek canyon, covering the West Snoqualmie Valley Road with sediment and flooding the basement of a local resident. The streambed itself was severely scoured and will likely take many years to recover. This case illustrates the importance of education as well as sound surface water management policies in protecting downstream landowners and natural resources.

Figure 11. Urban density development along ridge tops that overlook the valley (Redmond UPD).

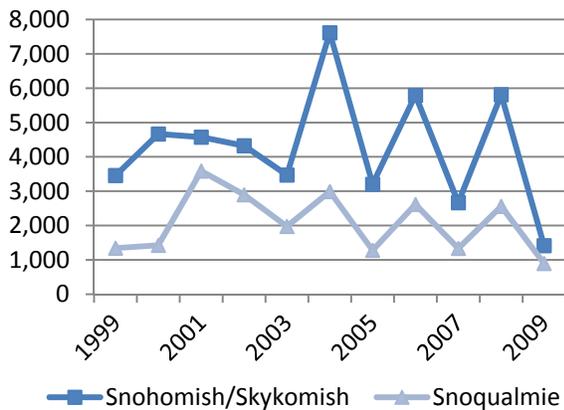


Status of Salmonid Populations

Chinook salmon: There are two distinct populations of Chinook salmon in the Snohomish Basin. The Skykomish population is an “integrated” one composed of both hatchery and natural spawners. The Snoqualmie population spawns naturally, with core spawning areas in the Tolt River, Raging River and in the Snoqualmie River itself. The Tolt and Raging Rivers are the most significant sources of spawning gravel to the Snoqualmie River. Thus, Chinook spawning is concentrated in the reaches located downstream of these two tributary confluences, near Fall City and Carnation.

The number of Chinook salmon that survive to spawn (after harvest) is called “escapement”. In the Snohomish system, escapement varies substantially year-to-year due to natural variability in environmental conditions during the freshwater and ocean life stages, as well as variability in harvest. The last ten years do not demonstrate any clear trends in population abundance (Figure 12).

Figure 12. Snohomish Basin Chinook Escapement (1999-2009)

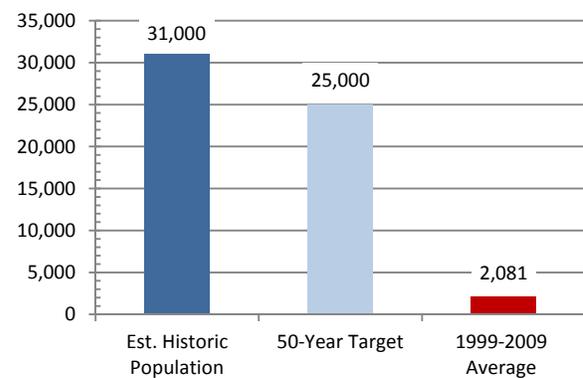


However, as shown in Figure 13, current Chinook abundance is well below the estimated average historical levels and below the 50-year recovery goal established in the Salmon Plan. In the Snoqualmie, recent escapement levels are approximately 6% of the historical abundance.

What about harvest? In the mid 1980’s, harvest rates of Snohomish Basin origin Chinook were as high as 70%. Since the late 1990’s, rates have been much lower, averaging between 30% and 40%, with the most recent few years closer to 20%.

There is no harvest effort directed at the natural-origin Snohomish Chinook stock within Puget Sound, but these fish are still vulnerable to harvest that is directed at other stocks in the area. The majority of overall harvest occurs in Canadian waters.

Figure 13. Snoqualmie Chinook recent escapement and recovery benchmarks



With a decrease in harvest, why aren’t more fish returning to the spawning grounds? The pattern suggests that productivity is decreasing, i.e., the same number of spawners is producing a smaller number of fish in the next generation. In the salmon plan, decreasing productivity is thought to be most closely related to poor conditions during the juvenile life stages that include incubation and rearing in river, estuary and nearshore environments. Food availability in the ocean is also thought to be a significant contributor to Chinook salmon growth and survival.

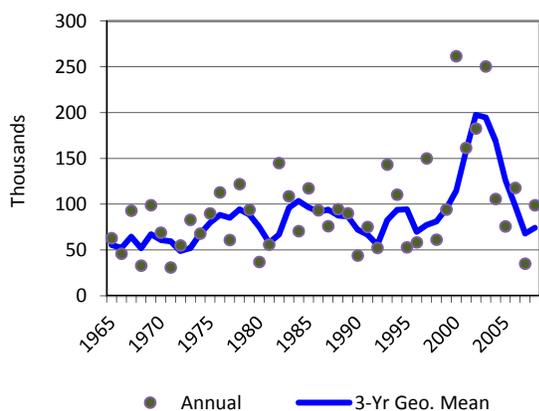
Other factors may also be at play, such as harmful effects of interbreeding hatchery fish or competition due to crowding caused by large numbers of hatchery fish in some areas.

Learn more about how we are trying to boost low Chinook productivity in the **Restoration** section and about hatchery fish interactions in the **Research** section.

Steelhead are the anadromous version of rainbow trout and are also listed as Threatened under the Endangered Species Act. The Snoqualmie hosts two separate runs of steelhead: the Tolt River summer run, which spawns only in the Tolt River and its two forks, and the Snoqualmie River winter run, which spawns primarily in the mainstem Snoqualmie, Tolt and Raging Rivers. The larger winter run population has declined precipitously in recent years from over 2000 fish in the late 1990's to less than 1000 in recent years. The summer run is much smaller, but had been relatively stable at about 150 spawners through 2003. More recently, numbers have declined with only an average of 70 spawners from 2004-2009. Federal, tribal and state managers and biologists are currently developing guidance for steelhead recovery in the Snohomish basin and across Puget Sound.

Coho salmon are more abundant than Chinook, in part because they utilize many smaller tributaries for spawning. The Snohomish basin is one of the top producers of coho salmon in Puget Sound. Due to differences in how escapement is estimated for coho, data are aggregated for the Snohomish system as a whole. Following several years of strong returns in 2001-2004, recent years show a significant downward trend (Figure 14).

Figure 14. Snohomish Basin natural coho escapement (1965-2009).



Coho are currently listed as a Species of Concern, but continued declines could lead to their listing as

Threatened under the federal Endangered Species Act.

Summary and future challenges

It is far too early to know whether the Salmon Plan, which was ratified just five years ago, is working. While progress is being made on important restoration priorities, harvest management and hatchery practices, it will likely take many years to detect a change in population trends. Moreover, It is also important to remember that salmon populations are naturally highly variable year-to-year. Both upward and downward trends can be masked by that variability.

Still, the recent low returns of Chinook, coho and steelhead are troubling and point to the need for more diligent monitoring, research and dedication to the implementation of the Salmon Plan. The available data for the fall 2010 Chinook season suggests that it may be the worst year yet for the Snohomish system. Similarly, winter steelhead counts were at record lows during their spring 2010 spawning season.

Not all salmon are doing poorly. For example, pink salmon (which return almost exclusively in odd calendar years) have been tremendously abundant in recent years, with a 2009 spawner estimate for the Snohomish Basin of nearly 2 million fish. Pink salmon differ in their life history from Chinook, coho and steelhead in that they spend almost no time rearing in freshwater. Instead, they migrate downstream as juveniles almost immediately following emergence from the gravel.

It may appear self-evident, but we need to count the fish to know how many there are. While fairly accurate estimates of the number of adults are obtained through harvest records and annual spawner surveys conducted primarily by WDFW and tribes, estimating juvenile fish production is much more difficult. The Tulalip Tribes have operated a juvenile rotary screw trap on the mainstem Snoqualmie for several years in an effort to estimate juvenile abundance, size and productivity. If we are to learn whether our habitat restoration and protection efforts in the Snoqualmie watershed are working, the long-term continuation of the trapping effort is vital.

Addressing Data Gaps Through Research

[THIS SECTION WILL DESCRIBE EFFORTS TO DATE TO ADDRESS DATA GAPS WITH BRIEF DESCRIPTIONS OF STUDIES/RESEARCH/MONITORING EFFORTS.]

- Water quality synthesis
- Ames Creek WQ study and work by Wild Fish in Cherry
- Oxbow fish surveys
- Smolt trapping by Tulalip
- Snoqualmie at Carnation monitoring
- Modeling of hatchery/wild fish interactions
- 10-year flood depth analysis

Top ten lessons for the next five years

The following lessons emerge from a review of the first five years of Salmon Plan implementation, not necessarily in order of importance:

1. **Continue collaboration to resolve agriculture vs. habitat restoration issue.** The resolution of the restoration vs. agriculture issue must be given high priority with an emphasis on solutions that ensure the long-term viability of both. Without it, salmon recovery is not likely to succeed in the Snoqualmie watershed.
2. **Accelerate implementation of floodplain reconnection projects.** Despite substantial success in implementing several large-scale restoration projects, we are well off the pace to meet 10-year targets established in the Salmon Plan. Experience with the first generation of projects should make it possible to move future projects from the analysis of feasibility to construction in a more streamlined fashion. The importance of transferring lessons learned to future projects and other project sponsors cannot be overstated.
3. **Don't ignore second-tier restoration priorities.** Little progress has been made toward 10-year goals for restoring second-tier mainstem areas and certain rural tributaries. Alternatives for targeting specific restoration efforts to these areas should be identified and implemented.
4. **Develop a new, dedicated funding source.** The demand for restoration funding significantly exceeds the current supply. A new, dedicated source of funding should be developed to support restoration efforts. The competitive, grant-dependent funding model requires a disproportionate amount of available staff resources to pursue an uncertain and shrinking return.
5. **Make permitting of restoration projects easier and less expensive.** Local and state permitting agencies must streamline permitting to enable more project dollars to be spent on the ground. Restoration projects should not encounter all the same hurdles and expenses that are faced by development projects.
6. **Target habitat protection efforts to rural residential areas.** Rural residential areas remain very vulnerable to further loss of forest cover and wetlands, coupled with other impacts associated with subdivision and development. Tax incentives, stewardship plans and other tools should be prioritized to the most vulnerable areas.
7. **Evaluate forest cover trends and effectiveness of forestry regulations.** Forested lands in the upper watershed appear fairly well protected from conversion to other uses through public ownership and the purchase of development rights from large tracts of private forests. However, the effectiveness of forestry regulations in protecting watershed processes should be evaluated. An analysis of forest cover change via remote sensing data should also be conducted in the near future to assess trends.
8. **Evaluate effectiveness of local land use regulations.** For all land use types, regulations and their enforcement are the last line of defense against environmental degradation. The effectiveness of local land use regulations, including enforcement, should be evaluated.
9. **Evaluate effectiveness of stewardship plans (farm, forest, rural).** Stewardship plans often come with a trade off in the form of regulatory flexibility, but their net environmental outcomes have not been evaluated. Currently we lack a clear understanding of the environmental outcomes associated with incentive-based approaches to habitat protection.
10. **Invest in monitoring fish and habitat.** The continued funding and operation of the Tulalip Tribes' smolt trap is essential if we are to know whether our restoration actions are having an effect. The Forum should help to advocate for stable funding from state and federal sources. Similarly, monitoring of the effects of large-scale habitat projects, such as the Snoqualmie at Carnation effort, is vital for informing our approach to future projects.

Three-Year Implementation Plan Narrative for
Lake Washington/Cedar/ Sammamish Watershed (WRIA 8)

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Introduction

This document provides a brief narrative to accompany the 2011 3-Year Work Plan update for the Lake Washington/Cedar/Sammamish Watershed (WRIA 8). Both the capital and non-capital actions listed in the 3-Year Plan reflect the most important known priorities for Chinook conservation and recovery in the watershed, and are based upon analyses and hypotheses described in detail in the *Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan (2005)*.

Estimated costs for each action in the 3-Year Work Plan are based on the 10-Year Start List cost estimates from the WRIA 8 Plan or other recent updates. This 3-Year Work Plan update was developed in consultation with the WRIA 8 Salmon Recovery Council and Technical Committee.

The conservation and practical rationale for the 3-Year Work Plan remains unchanged from the 2009 narrative. Refer to that narrative if more detailed information is needed (<http://www.govlink.org/watersheds/8/reports/default.aspx>).

Consistency

1. What are the actions and/or suites of actions needed for the next three years to implement your salmon recovery chapter as part of the regional recovery effort?

The accompanying spreadsheet lists the actions needed to implement the WRIA 8 work plan in the next three years. Specific additions or deletions for 2011 are outlined below:

Additions for 2011

(Migratory/Nearshore/Multiple Populations)

- Daylight Willow Creek along much of its length downstream of Edmonds Marsh to create an open channel. (M233).⁶

(Cedar River Population)

⁶ The project code (M233, C288, etc) is the nomenclature used in the WRIA 8 Chinook Conservation Plan to identify projects. Refer to Volume 2 of the Conservation Plan if more information about a particular project is required.

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- Lake Washington Shoreline Restoration: Remove bulkheads and place gravels. C288A (Chism Beach Park); C288B (Beaux Arts Park); C285 (Newcastle Beach Park).

(Sammamish River Population)

- Protect headwaters of Cottage Creek and Bear Creek (N277)
- Sammamish River Restoration: re-grade banks, create flood benches at or below high-water mark, and plant banks and benches with native vegetation (N356).
- Restoration at the confluence of Issaquah and East Fork Issaquah Creeks (I211A, I211B). Projects to benefit multiple species (Chinook and kokanee salmon).
- Lake Sammamish tributary delta improvements (Project Number TBD). Project to benefit multiple species (Chinook and kokanee salmon).
- Ebright Creek Enhancement and Acquisition (new for 2011: I310A and I310B). Projects to benefit multiple species (Chinook and kokanee salmon).

Removals for 2011

- Squak Valley Park Restoration (I226). Project creates off-channel habitat for salmon rearing and refuge along Issaquah Creek.
- Sammamish State Park Restoration (I202–A8). Project restores 5.5 acres of riparian habitat along 1,200 feet of Issaquah Creek.

Programmatic actions needed for the next three years include all those on the WRIA 8 10-Year Start List of Actions (Volume 1, Chapter 9), with some examples provided in the 3-Year Work Plan description column, and the key ones highlighted below:

- Complete the H-Integration process and work with co-managers to implement priority recommendations.
- Continue work with co-sponsors on overcoming barriers to more salmon-friendly lake shorelines.
- Continue to support efforts to encourage Low-Impact Development
- Build on successful 'Lakeside Living' workshops and Green Shorelines Guidebook outreach efforts and potentially extend this outreach model to streamside property owners.
- **NEW EMPHASIS FOR 2011:** Work with streamside property owners and jurisdictions to encourage stewardship and other protective measures in streamside areas. This new emphasis is an adaptive management response to land cover change analysis initially presented at the WRIA 8 Summit in December 2010 and completed in 2011 (discussed in #5 below).

The PSP/RITT review of the 2010 three-year work program update for WRIA 8 noted that specific programmatic actions supporting regulations that benefit salmon were not identified, nor were strategic opportunities being carried out to engage in Shoreline Master Program update processes. WRIA 8 lacks staff to track and coordinate these processes with its 27 member jurisdictions, and this element has not been addressed in this 2011 update.

Research, monitoring and evaluation actions needed include:

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- Continue habitat status and trends monitoring for the Cedar River and for wadeable streams. WRIA 8 received a grant from the EPA in 2010 to continue survey work through 2013. An interim report will be presented to the WRIA 8 Salmon Recovery Council in the Fall of 2011.
- Complete an overall WRIA 8 Monitoring and Adaptive Management Framework – this framework will leverage effectiveness and implementation monitoring efforts already taking place and help strategically direct future effectiveness monitoring to focus on projects with greatest uncertainty, as well as incorporate H-Integration efforts. The WRIA 8 Technical Committee began work with PSP and the RITT in 2010 to develop this framework in the context of overall Puget Sound adaptive management, but RITT guidance documents have yet to be distributed.
- Work with RITT and Puget Sound Partnership to devise methods for programmatic effectiveness monitoring.

Pace/Status

2. What is the status of actions underway per your recovery plan chapter? Is this on pace with the goals of your recovery plan?

As of December 2010 (5 years into our 10-year Plan), WRIA 8 has completed approximately 14% of the capital projects on the 10-year project list. A further 29% are active. Jurisdictions are advancing the WRIA 8 Conservation Plan with the funding available to implement the Plan, though funding is short of targets identified in the Plan. Programmatic and capital actions are in progress, as detailed in previous narratives, the 2006-2007 WRIA 8 Implementation Progress Report (http://www.govlink.org/watersheds/8/planning/progress_report.aspx), and the December 2010 WRIA 8 Summit (<http://www.govlink.org/watersheds/8/committees/1012/default.aspx>).

3. What is the general status of implementation towards your habitat restoration, habitat protection, harvest management, and hatchery management goals?

Some progress has been made in H-integration prior to 2011 (see previous narratives), but further progress awaits development of an adaptive management framework (progress slowed in 2010).

Sequence/Timing

4. What are the top implementation priorities in your recovery plan in terms of specific actions or theme/suites of actions? How are these top priorities being sequenced in the next three years? What do you need to be successful in implementing these priorities?

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Capital projects during the next three years of implementation continue to attempt to increase fry colonization and juvenile rearing success by protecting and restoring areas of floodplain connectivity in and around areas that have high Chinook spawning concentrations. To be successful in implementing these top priorities we will continue to need funding and support for large-scale flood plain reconnection projects along high priority river corridors. High land values and multiple parcel ownership in most reaches mean that projects often take many grant rounds to acquire property on a scale sufficient for restoration to be effective.

Within Lake Washington, restoration actions are focused on the southern end of the lake to benefit the Cedar River fry-migrant life stage that rears in the lake, as well as migrating pre-smolts (parr). We hypothesize that restoration of shallow sandy habitat with overhanging vegetation will reduce predator efficiency, and increase juvenile survival in Lake Washington. Given the highly developed condition of the lake, most actions to date have taken place on public property. The Green Shorelines program promotes similar benefits on private property. This program is ongoing.

The naturally spawning Sammamish River population continues to have low abundance and low productivity, and actions continue to be necessary in the near-term to secure this population from any increase in extinction risk. Actions are also necessary to ensure that the habitat potential exists to support recovery in the future as population productivity increases and the distribution expands into the Tier 2 North Lake Washington tributaries (e.g. Little Bear and North Creeks). This requires programmatic actions to maintain and restore landscape level processes at risk from development as well as capital projects to acquire functioning habitat or restore degraded habitats. These acquisitions include headwater areas in Upper Bear Creek, Cottage/Cold Creek, Little Bear Creek, and North Creek to maintain forest cover, water quality, and hydrologic processes.

The nearshore component of the WRIA 8 plan includes significant uncertainties. Actions are focused on identifying specific locations where feeder bluff connections to the nearshore environment can be restored, and restoring pocket estuaries where possible. The railroad severely constrains restoration opportunities in WRIA 8, making a feasibility study essential for WRIA 8 to implement feeder bluff projects throughout the 10-year plan horizon.

In order to be successful the WRIA requires stable, predictable state and federal funding support, as well as continued state leadership on conservation messages at the regional level (e.g., STORM).

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Next Big Challenge

5. Do these top priorities reflect a change in any way from the previous three-year work program? Have there been any significant changes in the strategy or approach for salmon recovery in your watershed? If so, how & why?

Land cover change analysis reported at the December 2010 WRIA 8 Summit revealed that forest cover continues to decline and impervious area continues to increase in riparian areas, although overall forest cover outside the Urban Growth Area boundary appears to be stable. An appreciable amount of forest cover loss between 2005 and 2009 was in areas vested under previous Sensitive Areas Ordinances. In light of our analyses, WRIA 8 is increasing emphasis on programmatic protection messages and private landowner stewardship of riparian areas in 2011. The WRIA 8 Implementation Committee is currently investigating strategies to accomplish this.

There have been no significant changes in our project implementation strategy, though the Technical Committee is considering whether changes may be warranted in the near future.

6. What is the status or trends of habitat and salmon populations in your watershed?
 - a. **Habitat** status and trends monitoring (wadeable streams) began in July 2009, and is currently funded through 2013. Data are being loaded into the Washington Department of Ecology Status and Trends database and will be analyzed in future months. Information on habitat status in WRIA 8 is not yet available. An overall habitat status and trends framework, including wadeable streams and rivers, land cover, water quality, and hydrologic trends, continues to be in preparation.
 - b. WRIA 8 has been collecting salmon **population** status and trend data for more than 10 years. The figures and tables at the end of this document summarize Chinook adult and juvenile trends for WRIA 8. Over the last ten years, the overall trend in Chinook naturally spawning adult abundance has been increasing in the Cedar population and declining in the Sammamish population.
6. Are there new challenges associated with implementing salmon recovery actions that need additional support? If so, what are they?
 - a. The H-Integration process has not resulted in consensus on the role of hatchery-origin spawners on the Sammamish spawning grounds. Adaptive management actions or actions to test alternate hypotheses, if any, will require co-manager approval and likely require input from the RITT and PSP. Staff work load has prevented this issue from advancing in WRIA 8.

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- b. Detailed analyses of programmatic effectiveness are likely beyond the capacity of the WRIA to implement and would benefit from initiatives managed by an outside agency or university. However, a programmatic survey and subsequent analyses suggest areas of future emphasis in WRIA 8 (Figure 4).
- c. The stability of local funding for WRIA 8 team and local staff coordination and implementation of salmon recovery actions has become a concern due to shrinking local government budgets. Stable, predictable state and federal funding helps to keep local governments engaged and participating; messages and support for the importance of keeping the local effort going would be appreciated.
- d. The Population Recovery Approach (PRA) document proposed by NOAA-Fisheries in December 2010 presents potential major hurdles to salmon recovery efforts in WRIA 8. The WRIA 8 Salmon Recovery Council provided comments on our view of its technical and policy deficiencies in February 2011, but at this time it is unclear how those comments will be acted upon.
- e. King County has encountered significant challenges to the restoration of natural river processes in the Cedar River, mostly related to public safety issues centered around large wood. These challenges will continue to limit efforts at process-based restoration until a satisfactory balance is achieved. Continued support for the restoration of natural river processes, clearly articulated by the Puget Sound Partnership, NOAA-Fisheries, WDFW and other state and federal agencies, is needed to maintain an appropriate balance in the discussion.

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Figures and Tables

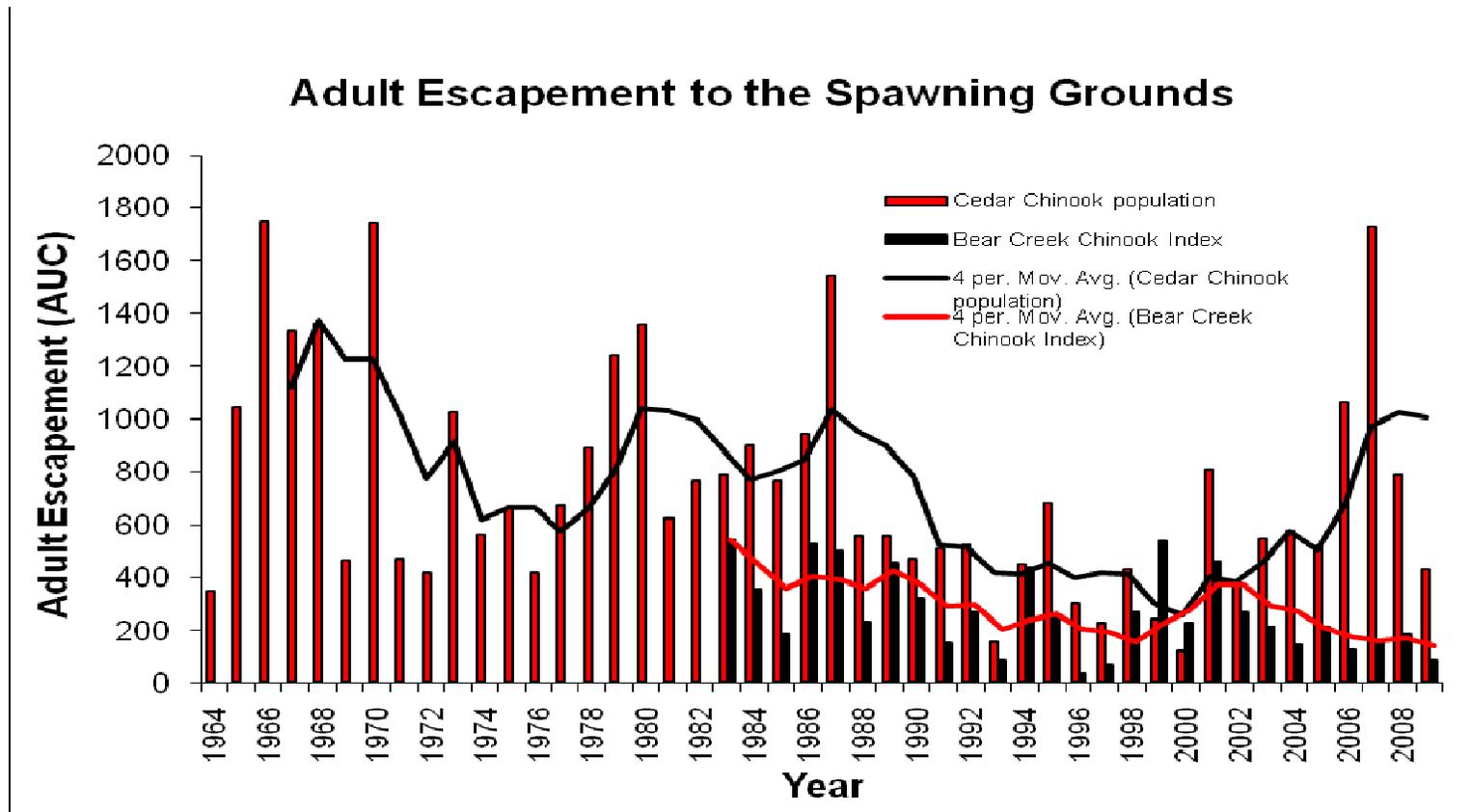


Figure 1. WRIA 8 Adult Escapement (Area Under the Curve estimation method). Data for 2009 are provisional: data from 2010 are not yet available from co-managers.

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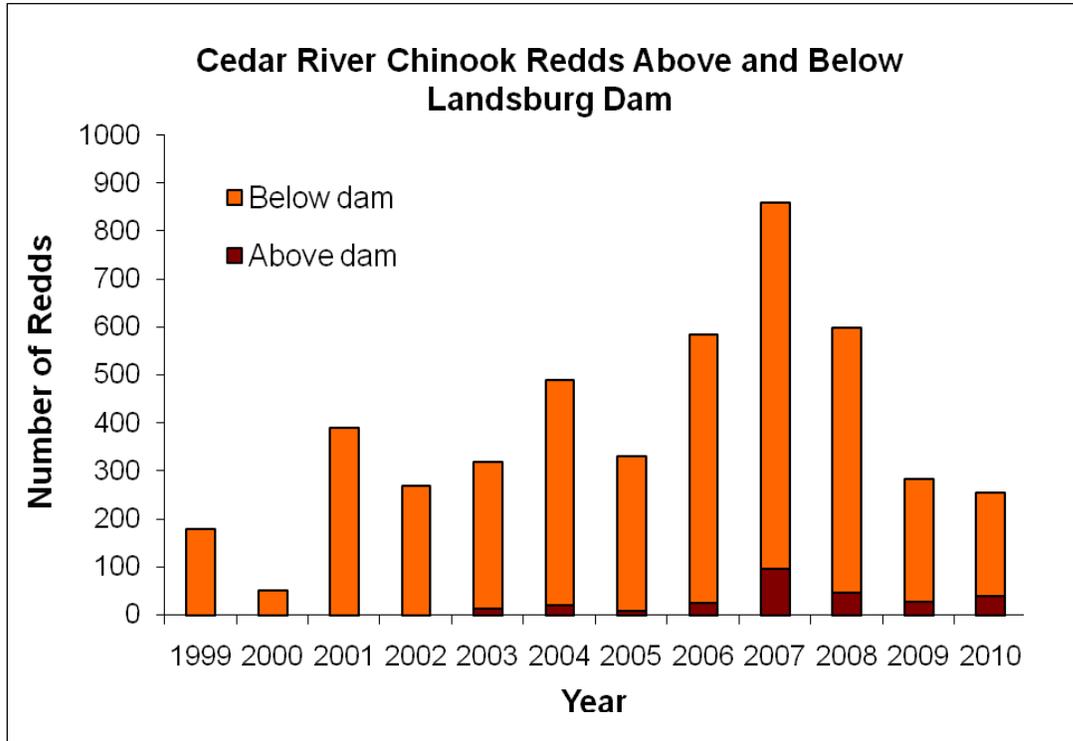


Figure 2. Cedar River Chinook Redds, 1999-2010. Data from 2010 are provisional.

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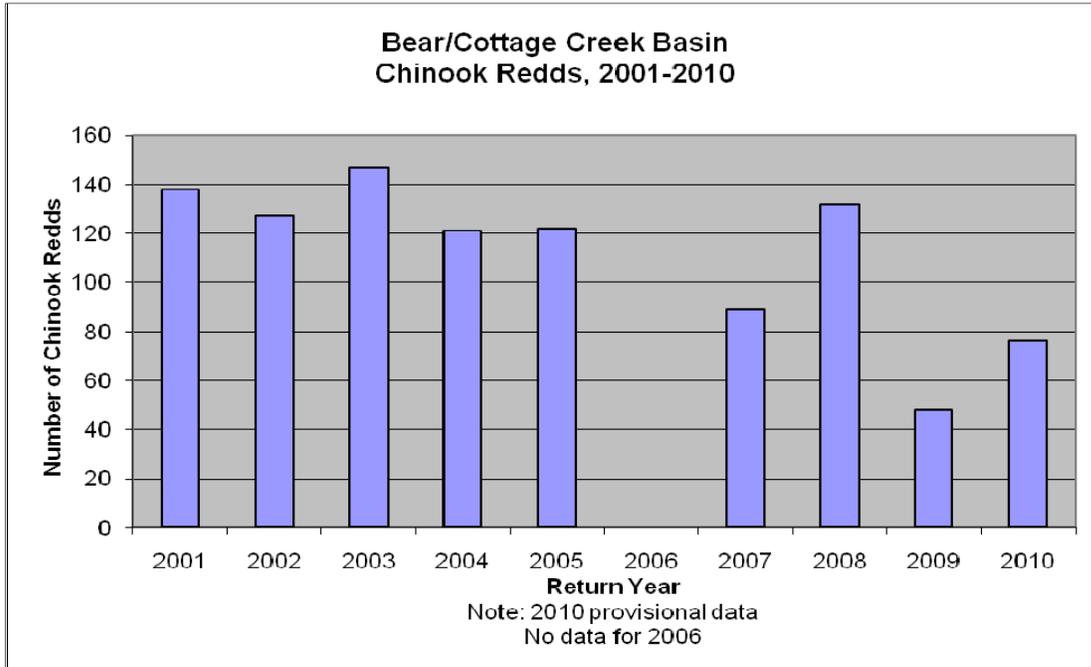


Figure 3. Bear/Cottage Creek Basin Chinook Redds, 2001-2009.

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2009 Survey Results

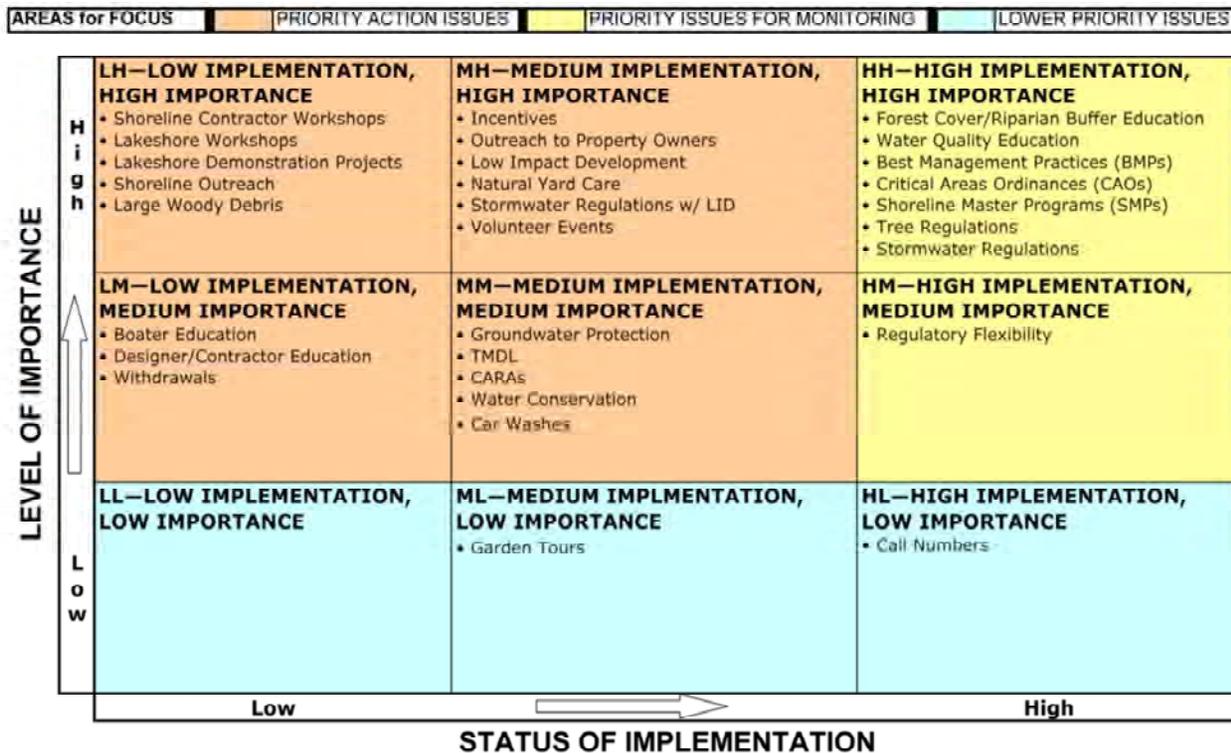


Figure 4. Results of 2009 programmatic implementation survey, as reported at the 2010 WRIA 8 Summit.

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Brood Year	Estimated Migration			% Migration		Est. Females	PED	Production/Female			Survival Rates		
	Fry	Parr	Total	Fry	Parr			Fry	Parr	Total	Fry	Parr	Total
1998	67,293	12,811	80,104	84.0%	16.0%	173	778,500	389	74	463	8.6%	1.6%	10.3%
1999	45,906	18,817	64,723	70.9%	29.1%	180	810,000	255	105	360	5.7%	2.3%	8.0%
2000	10,994	21,157	32,151	34.2%	65.8%	53	238,500	207	399	607	4.6%	8.9%	13.5%
2001	79,813	39,326	119,139	67.0%	33.0%	398	1,791,000	201	99	299	4.5%	2.2%	6.7%
2002	194,135	41,262	235,397	82.5%	17.5%	281	1,264,500	691	147	838	15.4%	3.3%	18.6%
2003	65,875	54,929	120,804	54.5%	45.5%	337	1,516,500	195	163	358	4.3%	3.6%	8.0%
2004	74,292	60,006	134,298	55.3%	44.7%	511	2,299,500	145	117	263	3.2%	2.6%	5.8%
2005	98,085	19,474	117,559	83.4%	16.6%	339	1,525,500	289	57	347	6.4%	1.3%	7.7%
2006	107,796	14,613	122,409	88.1%	11.9%	587	2,641,500	184	25	209	4.1%	0.6%	4.7%
2007	694,264	78,915	773,179	89.8%	10.2%	899	4,045,500	772	88	860	17.2%	2.0%	19.1%
2008	124,655	14,883	139,538	89%	11%	599	2,695,500	208	25	233	4.6%	0.6%	5.2%
2009	115,489	26,916	152,405	82.3%	17.7%	285	1,282,500	440	95	535	9.0%	2.9%	11.9%

Table 1. Production, productivity (production per female), and survival of Chinook fry and parr among brood years. Fry migration was assumed to be January 1 to April 15. Parr migration was assumed to be April 16 through July 13. Productivity was calculated from potential egg deposition (PED) for returning spawners. Data are Cedar River broods 1998 to 2009. (Table from Kiyohara and Zimmerman, 2011 and unpublished data; 2009 brood year data are provisional.)

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Brood Year	Estimated Migration			% Migration		Est. Females	PED	Production/Female			Survival Rates		
	Fry	Parr	Total	Fry	Parr			Fry	Parr	Total	Fry	Parr	Total
2000	419	10,087	10,506	4.0%	96.0%	133	598,500	3	76	79	0.1%	1.7%	1.8%
2001	5,427	15,891	21,318	25.5%	74.5%	138	621,000	39	115	154	0.9%	2.6%	3.4%
2002	645	16,636	17,281	3.7%	96.3%	127	571,500	5	131	136	0.1%	2.9%	3.0%
2003	2,089	21,558	23,647	8.8%	91.2%	147	661,500	14	147	161	0.3%	3.3%	3.6%
2004	1,178	8,092	9,270	12.7%	87.3%	121	544,500	10	67	77	0.2%	1.5%	1.7%
2005	5,764	16,598	22,362	25.8%	74.2%	122	549,000	47	136	183	1.0%	3.0%	4.1%
2006	3,452	13,077	16,529	20.9%	79.1%	131	589,500	26	100	126	0.6%	2.2%	2.8%
2007	1,163	11,543	12,706	9.2%	90.8%	276	1,242,000	4	46	50	0.1%	0.9%	1.0%
2008	14,243	50,959	65,202	21.8%	78.2%	132	594,000	108	386	494	2.4%	8.6%	11.0%

Table 2. Production, productivity (production per female), and survival of natural-origin Chinook in Bear Creek. Fry are assumed to have migrated between February 1 and April 8. Parr are assumed to have migrated between April 9 and June 30. Data are 2000 to 2008 brood years. (Table from Kiyohara and Zimmerman, 2009 and unpublished data; 2008 data are provisional. Data from 2009 brood year unavailable at the time of this report.)

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CAVEAT: Subwatersheds listed in order of priority. Projects prioritized 1 through 3.

Three-Year Watershed Implementation Priorities - Puget Sound Salmon Recovery Plan
WRIA 9 Habitat Work Schedule for Green/Duwamish and Central Puget Sound Watershed

Project Name	Priority Tier	Project Description	Likely sponsor	Total cost of first three years/phases	Local Share	SRPS/PSAR	Source of Funds	Primary Limiting Factors	Habitat Type	Activity Type	Primary Species	Secondary Species	2011		2012		2013		Likely end date	
													Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost		
Capital Projects																				
Duwamish Subwatershed: Enlarge Duwamish estuarine transition zone habitat by expanding shallow water and slow water areas, and expand/enhance the estuary, particularly vegetated shallow subtidal and intertidal habitats and brackish marshes. VSP parameters for this subwatershed focus on productivity.																				
North Wind's Weir (Project DUW-10) COMPLETED	1	Shallow Water Habitat Rehabilitation at RM 5.3: Create two acres of off-channel, shallow water habitat in the transition zone.	King County	\$3,200,000	\$1,974,000	\$500,000 (2007)	King County \$325,000; US ACEE \$1,600,000; KCD \$325,000	Reduced habitat capacity. Competition with Hatchery origin juveniles.	Transitions zone estuary.	Shallow water habitat restoration.	Chinook	Steelhead, Bull Trout, Orca	Construction	\$1,975,000	Monitoring/ Adaptive Management	\$85,000	Monitoring/ Adaptive Management	\$85,000	2009	
Riverbend Hill (Project DUW-6)	1	Reshape and revegetate the riverbank along South 115th Street at river miles 7.2 to 5.9, right bank, including relocation of South 115th. Set back the revetment where possible. The project would include placement of logs.	Tukwila	Habitat project costs to be determined		Unknown at this time	CFT (2008, submitted)	Reduced habitat capacity. Competition with Hatchery origin juveniles.	Transitions zone estuary.	Shallow water habitat restoration.	Chinook	Steelhead, Bull Trout, Orca	Design, engineering.		Permitting		Construction		2011	
Duwamish Gardens Shallow Water Habitat Creation at RM 7.6 Project DUW-7) Acquisition Completed	1	Acquire land within transition zone in order to create shallow-water habitat.	Tukwila	\$2,845,000	\$1,000,000	\$1,500,000		Reduced habitat capacity. Competition with Hatchery origin juveniles.	Transitions zone estuary.	Shallow water habitat restoration.	Chinook	Steelhead, Bull Trout, Orca	Feasibility	WDFW Engineering Assistance; PSAR 5% Capacity Funding	Design and permitting	\$300,000	Construction	\$2,200,000	2012	
Duwamish Gardens Shallow Water Habitat Creation at RM 7.6 Project DUW-7) Restoration in design phase		Restore estuarine transition zone habitat to provide critical habitat for juvenile salmon in the Duwamish Transition Zone.	Tukwila				Proposed SRPS 2010 \$127,000; KCD \$150,000 (2010).													
Riverton Creek Flapjacks Removal and Restoration	1	Remove flapjacks and restore an open water connection of Riverton Creek to the Duwamish River. This will restore and enhance salmonid habitat within Riverton Creek and improve its connection to the Duwamish River using natural processes and habitat elements to facilitate upstream migration and to	Tukwila	Feasibility phase: \$50,000	\$7,500	\$42,500	Tukwila \$7500	Reduced habitat capacity. Competition with Hatchery origin juveniles.	Transitions zone estuary.	Fish passage	Chinook	Coho	Design, engineering.	\$300,000	Construction	\$750,000	Monitoring/ Adaptive Management	\$100,000	2012	
Subtotals													\$1,975,000		\$85,000		\$85,000			
Lower Green River Subwatershed: Protect/restore refuge, habitat complexity and connectivity for juvenile salmon over range of flow conditions and variety of locations. VSP parameters for this subwatershed focus on productivity.																				
Riverview Park Restoration (Project LG-7) Design complete, construction planned for 2011	1	Provide summer rearing habitat and high flow winter refuge through excavation of an off-channel area combined with placement of large	Kent	\$3,500,000	KCD \$40,000 (2006) PENDING: \$50,000; PENDING: Kent \$617,000	\$150,000 (2006); 500,000 (2009);	ACOE (\$2,000,000) KCD (\$500,000); Kent	Altered stream flow, channel structures complexity, riparian areas, LWD.	Instream	Instream flow	Chinook	Steelhead, Bull Trout, Orca	construction	Funded	Monitoring/ Adaptive Management	\$200,000	Monitoring & Adaptive Management	\$50,000	2013	
Riverside Estates Levee Setback Project LG-1)	1	Levee setback, revegetation, benching, LWD.	King County	\$3,038,983			K/CFCZD	Altered stream flow, channel structures complexity, riparian areas, LWD.	Instream	Instream flow	Chinook	Steelhead, Bull Trout, Orca	Construction	\$290,268	Construction	\$447,637	Construction	\$2,301,078	2011	

CAVEAT: Subwatersheds listed in order of priority. Projects prioritized 1 through 3.

Project Name	Priority Tier	Project Description	Likely sponsor	Total cost of first three years/phases	Local Share	SRFS/PSAR	Source of Funds	Primary Limiting Factors	Habitat Type	Activity Type	Primary Species	Secondary Species	2011		2012		2013		Likely end date
													Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	
Capital Projects																			
Roose Nursery Off-Channel Rehabilitation and Riparian Restoration between RM 20.8 and 20 (LG-9)	1	Acquire property and rehabilitate habitat by constructing an outlet at RM 20.1. Actions would include removing fill, excavating off-channel flood refugia for juvenile rearing habitat, and planting native wetland and riparian vegetation.	KOPCZO,	\$3,500,000	KOPCZO, CPT/Parks Levee, WWRP,		KOPCZO	Altered stream flow, channel structure complexity, riparian areas, LWD.	Instream		Chinook	Steelhead, Bull Trout, Orca	Design	\$300,000	Design and permitting	\$300,000	Construction	\$2,000,000	2013
Downey Farmstead Restoration Project (Formerly Lower Green River Acquisition) (Project LG-7)	1	Acquire three properties immediately upstream of the Mullen Slough confluence and demolish buildings on one. A feasibility study will determine options for modifying Frager Road, reconnection of the upland to the river, and restoration of riparian habitat. Also acquire the Koch property on the left bank downstream of Riverview Park.	Kent (lead), King County, Green River Flood Control Zone District	\$1,200,000		\$975,085 (2003)	Kent \$180,000; King County \$25,000; Green River Flood Control Zone District \$25,000	Altered stream flow, channel structure complexity, riparian areas, LWD.	Instream	Instream flow	Chinook	Steelhead, Bull Trout, Orca	Final design and permitting	\$300,000	Construction	\$2,500,000	Monitoring	\$20,000	
DeLimon Levee Phases 1-4 (Project LG-13)	1	Levee setback, revegetation, benching, LWD.	King County	\$2,844,258			KOPCZO	Altered stream flow, channel structure complexity, riparian areas, LWD.	Instream	Instream flow	Chinook	Steelhead, Bull Trout, Orca	Design	\$80,507	Engineering, design, permitting.	\$898,873	Construction	\$1,864,976	2011
Mill Creek Floodplain Wetland and Off-Channel Habitat Rehabilitation (Project LG-7)	2	Restore lower 0.3 miles of Mill Creek and adjacent segments of currently armored riverbank.	Kent	\$1,500,000	no match required	\$100,000 (2006), \$200,000 (proposed 2010)	APPROVED: CPT: \$100,000 (2005 or 2006); City of Kent: \$100,000 (2005 or 2006)	Altered stream flow, channel structure complexity, riparian areas, LWD.	Instream	Instream flow	Chinook	Steelhead, Bull Trout, Orca	Complete Design & Permitting	\$100,000	Construct Project	\$1,400,000	Monitoring & Adaptive Management		2009
Mill Creek - Wetland SK	2	Restore the lower portion of Mill Creek - Wetland SK, improve riparian vegetation	Auburn	\$3,500,000	\$1,210,000			Altered stream flow, channel structure complexity, riparian areas, LWD.	Instream	Instream flow	Chinook	Steelhead, Bull Trout, Orca	Construction	\$700,000	Monitoring	\$20,000	Monitoring	\$200,000	2013
Hainstem Maintenance (Project LG-10)	1	Boeing Levee Setback and Restoration between RM 18 and 17.1 to enable extensive habitat rehabilitation.	Kent & King County	\$2,733,347			ORPCZO, KCD, Kent, ACDE	Altered stream flow, channel structure complexity, riparian areas, LWD.	Instream	Instream flow	Chinook	Steelhead, Bull Trout, Orca	Design Restoration Construction, Permitting	\$150,000	Construction	\$1,075,211	Complete Construction	\$1,658,136	2012
Subtotals				\$11,618,586	\$3,781,250	\$1,225,085								\$1,920,875		\$6,841,521		\$8,094,190	
Nearshore Subwatersheds: Protect, restore, or rehabilitate sediment transport processes by reconnecting sediment sources and removing shoreline armoring; pocket estuaries, lagoons, and spits; and sediment quality, particularly in Elliott Bay. VSP parameters for this subwatershed focus on productivity.																			
Pier 90 Shallow Water Habitat Rehabilitation (NS-1)	1	Protect and expand the area of shallow water habitat. The land comprising shoreline east of Pier 90 would need to be purchased. The riprap and fill would be moved in order to create additional shallow water habitat and the shoreline adjacent to...	City of Seattle	\$2,500,000				Loss of habitat,	Nearshore beach,	Nearshore	Chinook	Orca, forage fish	Feasibility, Technical Design	\$500,000	Design and permitting	\$750,000	Construction	1,250,000	2013

CAVEAT: Subwatersheds listed in order of priority. Projects prioritized 1 through 3.

Project Name	Priority Tier	Project Description	Likely sponsor	Total cost of first three years/phases	Local Share	SRFS/PSAR	Source of Funds	Primary Limiting Factors	Habitat Type	Activity Type	Primary Species	Secondary Species	2011		2012		2013		Likely end date
													Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	
Capital Projects																			
Myrtle Edwards Park Small Pocket Beaches/Shallow Water Habitat Rehabilitation (NS-2)	1	Create pocket beaches in Myrtle Edwards Park on Elliott Bay in Seattle. Riprap armoring would be removed and the slopes would be graded back to create natural slopes. Pocket beaches have a mix of sediments placed on them.	City of Seattle	\$6,000,000				Loss of habitat.	Nearshore beach.	Nearshore.	Chinook	Orca, forage fish	Feasibility, Technical Design	\$500,000	Design and permitting	\$750,000	Construction	\$4,000,000	2015
Baconfield-On-The-Sound (Project NS-11)	1	Feeder Bluff Protection and Restoration of Beach Feeding Processes in Normandy Park: Purchase and restore one of the last major privately-held undeveloped feeder bluffs along the	Normandy Park	\$500,000	\$70,500	\$50,873 (2005-2006); \$100,000 (2006); \$380,739 (2007)	Cascade Land Conservancy \$2,977 (2005), KCD \$54,500 (2006); Normandy Park \$6,000 (2005), CFT (2006 submitted)	Loss of habitat.	Nearshore beach.	Nearshore.	Chinook	Orca, forage fish	Feasibility, Technical Design	\$100,000	Acquisition	\$150,000	Construction	\$250,000	
Piner Point Restoration Bulkhead Removal (Project NS-17) - Restoration	1	Remove obsolete bulkhead,	King County	\$225,000	225,000														
Dockton Heights																			
Burien Seahurst Park Shoreline Restoration, Phase II (Project NS-5) - Design Completed, proposed for construction in 2011, funding secured	1	Continue shoreline restoration actions conducted in southern portion of Seahurst Park in Burien by removing a portion of shoreline armoring in the central area of the park, restoring natural beach slopes, and	Burien		\$150,000		Burien, IAC, PSAW, KCD \$150,000 (2007)	Loss of habitat.	Nearshore beach.	Nearshore.	Chinook	Orca, forage fish			Feasibility	\$40,000	Design, engineering, permitting	\$100,000	Const. in 2011
Dockton Road Removal and Feeder Bluff Restoration on Vashon Island (Project NS-19)	1	Remove road and inertial fill. Acquire upland properties if threatened by erosion. Project depends on Roads deciding to abandon the road.	King County Roads Division					Loss of habitat.	Nearshore embayment.	Nearshore.	Chinook	Orca, forage fish	Feasibility, Technical Design						
Blisport Creek Fish Passage Improvements on Vashon Island (Project NS-9)	2	Improve fish passage, beach condition, and cleanup hydrocarbons. This is a two phase project: 1) acquisition and 2) cleanup.	King County and/or Vashon-Maury Island Land Trust	Acquisition \$20,000 Cleanup \$500,000 Culvert replacement \$500,000				Altered stream flow.	Upstream, riparian.		Chinook	Orca, forage fish	Acquisition	\$20,000	Cleanup	\$500,000	Culvert Removal	\$500,000	2011
Evaluate How to Improve Habitat Value of Raab's Lagoon/Pocket Estuary on Maury Island (Project NS-14)	3	Work with property owner and neighbors to identify ways to improve habitat.	King County	Costs not available				Loss of habitat.	Nearshore embayment.	Nearshore.	Chinook	Orca, forage fish	Feasibility, Technical Design						
Marine Nearshore Acquisition Capital Projects																			
Functioning Nearshore Habitat Protection on Vashon/Maury Island (Project NS-17)	2	Protect sites with high habitat resource values - Dockton	King County	Adequate funding secured			Conservation Futures, NOAA	Loss of habitat.	Nearshore beach.	Land acquired	Chinook	Orca, forage fish	Acquisition						2008

CAVEAT: Subwatersheds listed in order of priority. Projects prioritized 1 through 3.

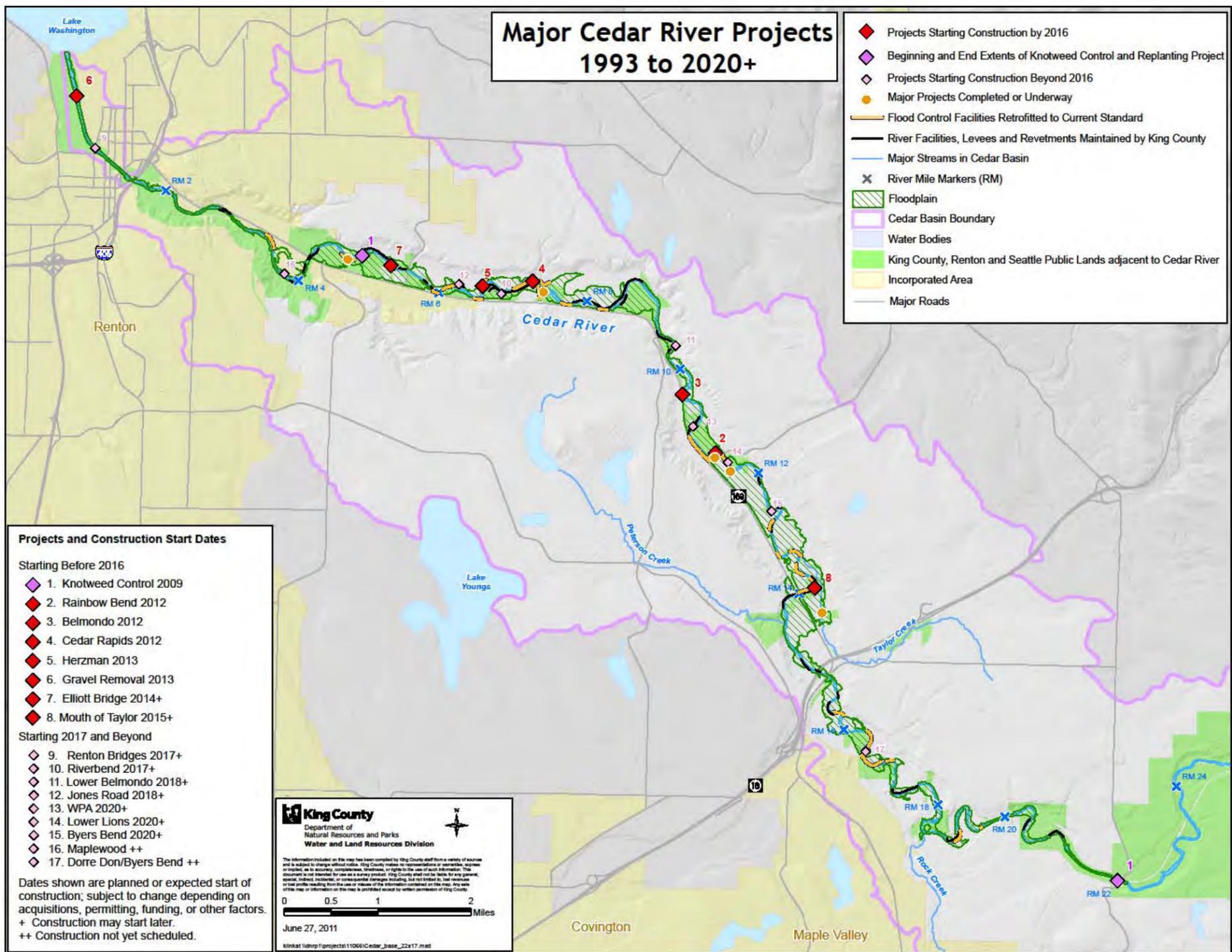
Project Name	Priority Tier	Project Description	Likely sponsor	Total cost of first three years/phases	Local Share	SRFB/PSAB	Source of Funds	Primary Limiting Factors	Habitat Type	Activity Type	Primary Species	Secondary Species	2011		2012		2013		Likely end date
													Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	
Capital Projects																			
Functioning Nearshore Habitat Protection - South Shoreline (Project NS-11)	1	Protect sites with high habitat resource values - Southwest Drift Cell - South Shoreline	Normandy Park	\$7,000,000	\$2,500,000			Loss of habitat,	Nearshore beach,	Acquisition	Chinook	Orca, forage fish	Feasibility	\$125,000	Acquisition	\$2,000,000	Acquisition	\$4,500,000	2014
Functioning Nearshore Habitat Protection on Vashon/Maury Island - Inspiration Pt. (Project NS-17)	2	Protect sites with high habitat resource values - Inspiration Pt.	King County	\$500,000			Conservation Futures, NOAA	Loss of habitat,	Nearshore beach,	Land acquired	Chinook	Orca, forage fish	Acquisition						2008
Functioning Nearshore Habitat Protection on Vashon/Maury Island - Neil Pt. (Project NS-17)	2	Protect sites with high habitat resource values - Neil Pt.	King County	\$500,000			Conservation Futures, NOAA	Loss of habitat,	Nearshore beach,	Land acquired	Chinook	Orca, forage fish	Acquisition						
Functioning Nearshore Habitat Protection on Vashon/Maury Island - Rabbit's Lagoon (Project NS-17)	3	Protect sites with high habitat resource values - Rabbit's Lagoon	King County				Conservation Futures, NOAA	Loss of habitat,	Nearshore beach,	Land acquired	Chinook	Orca, forage fish	Acquisition						
Functioning Nearshore Habitat Protection on Vashon/Maury Island - River Pt. (Project NS-17) Acquisition Completed!	2	Protect sites with high habitat resource values - River Pt.	King County	Adequate funding secured; need \$100,000 for bulkhead removal			SRFB	Loss of habitat,	Nearshore beach,	Land acquired	Chinook	Orca, forage fish	Acquisition						
Functioning Nearshore Habitat Protection on Vashon/Maury Island - Northside (Project NS-17)	3	Protect sites with high habitat resource values - Northside	King County	Adequate funding secured			Conservation Futures, NOAA	Loss of habitat,	Nearshore beach,	Land acquired	Chinook	Orca, forage fish	Acquisition						
Functioning Nearshore Habitat Protection on Vashon/Maury Island - Pt. Meyer Drift Cell (Project NS-17)	1	Protect sites with high habitat resource values - Pt. Meyer Drift Cell	King County	\$2,400,000	\$1,200,000	250000 (2007)	KC SWM; CPT (2008, submitted); RCO ALEA (2008, 2010 submitted); KC Park Levy	Loss of habitat,	Nearshore beach,	Land acquired	Chinook	Orca	Acquisition	\$1,500,000	Acquisition	\$1,500,000	Acquisition	\$1,500,000	2008
Subtotals				\$4,634,000	\$220,500	\$531,612								\$2,745,000		\$2,190,000		\$6,100,000	
Middle Green River Subwatershed. Protect/restore habitat that provides refuge and habitat complexity for juvenile salmon over a range of flow conditions and a variety of locations; enhance natural sediment recruitment by reconnecting sediment sources to river; protect and restore spawning and rearing habitat in lower Newaukum and Soos Creeks; maintain regional groundwater recharge and base flows to maintain Green River.																			
Middle Green River Reach (Projects MG-12, MG-13, MG-14, MG-15, MG-16)	1	Reconnect floodplain areas of the Green River allowing natural processes to be re-established including the creation of side-channel habitat and the	King County																
Porter Lavea Setback and Floodplain Reconnection (Project MG-17)		Remove (modify) existing levees to facilitate river connection to floodplain. LWD placement and riparian revegetation would be	King County	\$1,500,000			\$1,000,000 KCC; \$500,000 SWM	Loss of Habitat	Floodplain, riparian	Riparian, in-stream flow	Chinook	Steelhead	Design & Permitting	\$250,000	Construction	\$1,000,000	Construction	\$250,000	2014
Newaukum Creek Mouth Restoration Between Creek Miles 0.0 and 4.3 (Project MG-6) Completed!	1	Place large woody debris and plant native trees along the lower 4.3 miles of the creek, and reconfigure the lower 1,800 feet of the creek near the mouth.	King County	\$1,175,000		\$788,581 (2004)	King County, ACOE	Riparian areas and LWD recruitment	Instream, riparian	Riparian, in-stream flow	Chinook	Steelhead, bull trout	Design & Permitting	\$100,000	Construction	\$1,075,000	Monitoring/Adaptive Management		
Newaukum Creek Restoration Between Creek Miles 6.0 and 14.3 - Both Banks (Project MG-6)		Restore process-based ecological functions that include wetland and riparian restoration along Newaukum Creek (Bumclaw Plateau).	King County	\$300,000			\$200,000 KCC; \$100,000 SWM	Loss of Habitat	Riparian	Riparian, in-stream flow	Chinook	Steelhead	Construction	\$100,000	Construction	\$100,000	Construction	\$100,000	Ongoing

CAVEAT: Subwatersheds listed in order of priority. Projects prioritized 1 through 3.

Project Name	Priority Tier	Project Description	Likely sponsor	Total cost of first three years/phases	Local Share	SRFB/PSAR	Source of Funds	Primary Limiting Factors	Habitat Type	Activity Type	Primary Species	Secondary Species	2011		2012		2013		Likely end date
													Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	
Capital Projects																			
Promote the Planting of Native Trees (Program WW-5)		Plant native trees in the riparian zone/floodplain of the Green River and Soos Creek.	King County	\$450,000			\$300,000 KCD; \$150,000 SWM	Loss of Habitat	Riparian	Riparian	Chinook	Steelhead	Construction	\$150,000	Construction	\$150,000	Construction	\$150,000	Ongoing
Setback and Removal of Penster and Pautzke Levees to Reconnect the Floodplain and Allow Channel Migration near RM 32 (Project MG-18) Completed!	1	Penster Levee Phase IA - Remove levees, lower the elevation of terraces and construct engineered loggams to reestablish floodplain connectivity and channel migration.	Auburn, King County	\$1,400,000		\$675,900 (2005-2006)	Green River Flood Control Zone District \$90,000; City of Auburn \$33,000	Channel structure/complety.	Instream, riparian	Riparian, Instream flow	Chinook	Steelhead, bull trout	Construction	\$1,225,000	Monitoring/Adaptive Management	\$75,000	Monitoring/Adaptive Management	\$75,000	2008
Setback and Removal of Penster and Pautzke Levees to Reconnect the Floodplain and Allow Channel Migration near RM 32 (Project MG-18) Construction planned for 2011/2012	1	Penster Levee Phase IB - Remove levees, lower the elevation of terraces and construct engineered loggams to reestablish floodplain connectivity and channel migration.		\$600,000 - \$800,000		\$250,000 (2007)		Channel structure/complety.	Instream, riparian	Riparian, Instream flow	Chinook	Steelhead, bull trout		Design & Permitting	\$150,000	Construction	\$850,000		2010
Setback and Removal of Penster and Pautzke Levees to Reconnect the Floodplain and Allow Channel Migration near RM 32 (Project MG-18) Construction completed!	1	Pautzke Levee - Remove levees, lower the elevation of terraces and construct engineered loggams to reestablish floodplain connectivity and channel migration. Phases A - E.	King County	\$3,500,000				Channel structure/complety.	Instream, riparian	Riparian, Instream flow	Chinook	Steelhead, bull trout		Design & Permitting	\$100,000	Construction	\$3,400,000		
Big Spring Creek Restoration (Project MG-7)	1	Construct new stream channel to replace ditch. Connect coldwater springs to headwaters.	King County	\$3,043,000 estimate			KCD: \$500,000 (estimate); SWM: \$250,000 (estimate); Corps: \$2,293,000	Stream flow patterns. High H2O temperature.	Instream, riparian	Water quality	Chinook	Coho	Construction	\$1,973,000	Construction	\$785,000	Construction	\$285,000	2008
Subtotals				\$20,520,000															
Totals				\$39,924,586															
Non Capital Programs-Not Prioritized																			
Lead entity coordination			Lead entity	\$225,000									Staffing (1 FTE)	\$75,000	Staffing (1 FTE)	\$75,000	Staffing (1 FTE)	\$75,000	Ongoing
Adaptive management and monitoring			Multiple stakeholders	\$600,000									Staffing (3 FTEs)	\$200,000	Staffing (3 FTEs)	\$200,000	Staffing (3 FTEs)	\$200,000	Ongoing
Nearshore Habitat Workshop			King County	\$35,000															
Support Seahurst Environmental Learning Center			City of Burien and Environmental Science Center	\$150-\$200K															
Create Incentives Program to Remove Failing Septic Systems on Vashon/Maury Island			King County																
Project Management and Public Outreach			WRIA Staff																
Stewardship & Educational Outreach			WRIA Staff																
Water Conservation Incentive Programs			Multiple stakeholders																

Major Cedar River Projects 1993 to 2020+

- ◆ Projects Starting Construction by 2016
- ◇ Beginning and End Extents of Knotweed Control and Replanting Project
- ◇ Projects Starting Construction Beyond 2016
- Major Projects Completed or Underway
- Flood Control Facilities Retrofitted to Current Standard
- River Facilities, Levees and Revetments Maintained by King County
- Major Streams in Cedar Basin
- × River Mile Markers (RM)
- ▨ Floodplain
- ▭ Cedar Basin Boundary
- ▭ Water Bodies
- ▭ King County, Renton and Seattle Public Lands adjacent to Cedar River
- ▭ Incorporated Area
- Major Roads



- Projects and Construction Start Dates**
- Starting Before 2016**
- ◆ 1. Knotweed Control 2009
 - ◆ 2. Rainbow Bend 2012
 - ◆ 3. Belmondo 2012
 - ◆ 4. Cedar Rapids 2012
 - ◆ 5. Herzman 2013
 - ◆ 6. Gravel Removal 2013
 - ◆ 7. Elliott Bridge 2014+
 - ◆ 8. Mouth of Taylor 2015+
- Starting 2017 and Beyond**
- ◇ 9. Renton Bridges 2017+
 - ◇ 10. Riverbend 2017+
 - ◇ 11. Lower Belmondo 2018+
 - ◇ 12. Jones Road 2018+
 - ◇ 13. WPA 2020+
 - ◇ 14. Lower Lions 2020+
 - ◇ 15. Byers Bend 2020+
 - ◇ 16. Maplewood ++
 - ◇ 17. Dorre Don/Byers Bend ++
- Dates shown are planned or expected start of construction; subject to change depending on acquisitions, permitting, funding, or other factors.
 + Construction may start later.
 ++ Construction not yet scheduled.

King County
 Department of Natural Resources and Parks
 Water and Land Resources Division

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0 0.5 1 2 Miles

June 27, 2011

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KING COUNTY

SHORELINE CUMULATIVE IMPACTS ASSESSMENT

September 2010

1. Purpose and General Description

This report assesses the potential for cumulative impacts of reasonably foreseeable future development in the shoreline jurisdiction that could result from development and activities over time under the King County Shoreline Master Program. The Department of Ecology's shoreline guidelines require local governments to evaluate and consider the cumulative impacts of reasonably foreseeable future development on the shorelines of the state (WAC 17-26-186(8)(d)).

Ecology's Guidelines require a local government's Shoreline Master Program (SMP) to result in "... no net loss of ecological functions and protection of other shoreline functions and/or uses." Master programs must contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities. The State's objective in directing local governments to evaluate potential cumulative impacts is to ensure that, when implemented over time, the proposed Shoreline Master Program goals, policies and regulations will achieve this no net loss standard.

Evaluation of such cumulative impacts should consider:

- Current conditions affecting the shorelines and relevant natural processes;
- Reasonably foreseeable future development and use of the shoreline; and
- Beneficial effects of any established regulatory programs under other local, state, and federal laws." (WAC 173-26-186(8)(d))

The King County Shorelines Cumulative Impacts Assessment uses these three considerations as a framework for evaluating the potential impacts to shoreline ecological functions and processes that may result from implementation of the proposed Shoreline Master Program over time.

In King County, current conditions are identified and described in the King County Shorelines Technical Appendix (May 2007). The King County Shoreline Master Program establishes standards for allowed uses and procedures to evaluate individual actions for their potential to impact shoreline resources on a case-by-case basis. This assessment analyzes the future development that is expected to result from allowed development and the cumulative impacts of that development on the shoreline.

2. Methods and Assumptions

Existing Shoreline Conditions

Existing shoreline conditions, based on the characterization of ecological process integrity in King County Shorelines Technical Appendix, are summarized to provide context for the impervious surface area discussion in this cumulative impacts assessment.

Shoreline Land Use and Permit Trends

Existing shoreline land use is evaluated through shoreline permit trends (dating back to 1990) and provides the basis for discussing historic versus expected future shoreline development. Shoreline permits are also included as part of the land use characterization in King County Shorelines Technical Appendix.

Overview of Key Shoreline Protection Standards

Allowable activities and protection requirements under current and proposed shoreline management regulations are summarized and compared. This analysis provides the basis for

determining how proposed regulations influence potential cumulative impacts. Key regulations are discussed.

King County proposes to use eight designations to regulate uses and modifications within the shoreline zones: High Intensity, Residential, Rural, Conservancy, Resource, Forestry, Natural, and Aquatic. The King County Shoreline Master Plan defines the criteria for assigning these designations. The quantitative element of this cumulative impacts assessment focuses on landward designations. Potential cumulative impacts to the Aquatic designation are qualitatively discussed in this analysis. The amount of shoreline (in terms of shoreline miles, acres and parcels) is defined to provide context for the results of the landscape analysis.

Review of Best Available Science Analysis and Results

The results of the risk assessment conducted as part of King County's critical areas⁷ regulatory update (adopted in 2004) are reviewed. This work is included as part of the shoreline cumulative impact assessment because the County proposes to rely on critical areas regulations to protect existing shoreline ecological functions.

Landscape Analysis: Impervious Surface Area in Shoreline Jurisdiction

An analysis was conducted to describe the existing conditions in shoreline zones within the County. Seven designations, all except the Aquatic, were coupled with the shoreline type (i.e. lake, marine, or stream) to generate 18 possible shoreline categories that defined the spatial extent of the analysis. Cumulative impacts were then analyzed for each shoreline category using a generalized estimate of new impervious surface that could occur in the shoreline zone under proposed regulations. Current conditions were compared to a hypothesized worst case scenario of possible future impacts (the maximum potential increase in impervious surface within the shoreline jurisdiction). This worst case scenario is discussed in terms of expected shoreline development.

Because more than 1,900 miles of stream and lake shorelines and 51 miles of marine shorelines within King County's Shoreline Master Program jurisdiction are evaluated, the quantitative analyses are statistically robust according to Osenberg (1994). By being

⁷ *Critical areas include: wetlands; fish and wildlife habitat conservation areas, including shorelines of the state and other aquatic areas; geologically hazardous areas, such as steep slopes and channel migration hazard areas; frequently flooded areas; and critical aquifer recharge areas.*

comprehensive, this analysis takes into consideration the issues of ecological scale, process and function.

It is assumed that development effects accrue in a cumulative fashion and that artificial impervious land covers are a good indicator of the level and potential degree of effect of development that occurs in proximity to shorelines of the county. To this end, the County's high-resolution GIS layer (4 feet on-a-side grid cells) of impervious areas (Marshall 2000) was used to create a quantifiable indicator of potential cumulative impacts within shoreline areas.

There are other obvious landcover alterations that are correlated with impervious surfaces and that affect ecological process and function (e.g. loss of natural vegetation and soil compaction associated with land clearing, riparian encroachment, and other direct hydrologic modifications). For this analysis, however, it was assumed that impervious surfaces are a suitable indicator of cumulative impacts of land use as indicated by other research (May 1997; Wissmar 2000). Additionally, following methods of Stanley et al (2005), impervious surface data was a major factor in determining the degree of alteration of ecological processes (see King County Shorelines Technical Appendix, May 2007).

King County's critical area regulations require all new development within aquatic area and wetland buffers to fully mitigate for the impacts on aquatic area or wetland functions. Mitigation that includes buffer enhancement is expected to be effective at achieving the shoreline management goal of no net loss of ecological function (Figure 1). Mitigation requirements are discussed further in the description of the proposed Shoreline Master Program below and in Attachment 1.

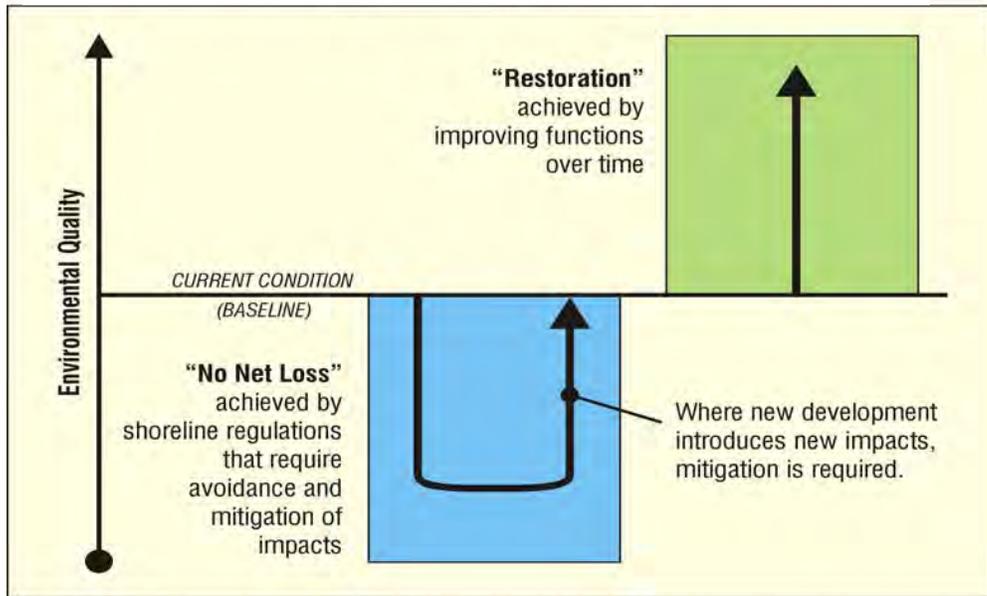


Figure 1. Environmental condition relative to disturbance. The blue square represents a disturbance and decreased environmental condition at the bottom of the arrow followed by mitigation of the impacts that returns the system’s ecological function to its pre-disturbance condition. The green square represents improved environmental function following restoration actions. (Source: Department of Ecology)

In order to evaluate the cumulative impact of the proposed Shoreline Master Program, cumulative impacts analysis started with an estimate of the current and potential future impervious surface for property located within the shoreline jurisdiction. The potential future cumulative impacts were estimated by increasing buffer impervious surface coverage on parcels in the shoreline jurisdiction by the amount that would be allowed under proposed shoreline regulations. Estimates of impervious area (i.e. potential cumulative impacts) were then averaged by shoreline type and designation.

To measure the differences between current and possible future conditions, a comparison of mean impervious surface percentages was performed. To further evaluate potential areas of concern, maps showing eligible parcels were reviewed to assess localized changes and consistency with designation and reach and drift cell characterization scores (pixel and summarized reach/drift cell scores).

3. Shoreline Land Use and Permit Trends

The 2007 King County Buildable Lands Report states that the urban area of King County contains almost 22,000 net acres of vacant or potentially redevelopable residential land. However, future development on 25% of the countywide land supply in single-family zones and 10% of the land in multifamily and mixed use zones would be restricted due to critical areas. Until the recent economic downturn, the County had been issuing approximately 7,000 residential permits per year for development throughout the unincorporated area. Approximately 1,000 of those permits are reviewed with regards to critical areas (Bottheim pers. comm. 2008). Rural unincorporated King County, where the vast majority of the County's shoreline jurisdiction is located, has grown relatively slowly since the Growth Management Act took effect in the mid-1990s. According to the 2006 King County Annual Growth Report, less than five percent of countywide new residential construction and population growth occurred in the rural unincorporated area.

Analysis of building permits issued from 1990 to 2004 within the shorelands of King County indicates that 2,019 County permits were issued (Table 1). About half (1,013) of the permits did not result in new impervious areas because they were for maintenance and repair of existing shoreline structures, timber harvest, or stormwater management. While some short-term impacts associated with these permits may have occurred, they are not likely to have resulted in a net loss of ecological function along King County shorelines. Of the remaining permits, 562 (28%) were for new single family homes and 355 (17%) were for a variety of new shoreline development including trails, utilities, docks, and other miscellaneous structures.

Table 1. Numbers of Shoreline building permits issued by proposed designation during 1990-2004.

Proposed Designation	Building Permits 1990-2004
High Intensity	7
Residential	162
Rural	186
Conservancy	228
Resource	104
Forestry	23
Natural	27

Within critical area buffers in recent years, approximately 60 permits per year have been approved to allow expansion of a single family residence by up to 1,000 square feet (Bottheim pers. comm. 2008). Such projects are approved only if the residence is already located within

the buffer area. Further, not all of these permits were for development in the shoreline jurisdiction.

Regarding in-water development trends, King County compiled new data on the location of shoreline docks as part of the inventory and characterization (King County Shorelines Technical Appendix, May 2007). The greatest number of docks is in the areas proposed as Conservancy, Rural, and Residential environmental designations. The density of docks in these designations ranges from about 1 dock per conservancy shoreline mile to 4 docks per rural shoreline mile to 16 docks per residential shoreline mile (Table 2). Under the proposed regulations, new docks will need to demonstrate that there are no other available options and any new docks in the Conservancy environment for a commercial or manufacturing use would have to be located at least 250 feet from another dock (see discussion under Shoreline Master Program in this document).

Table 2. Number of existing docks by proposed shoreline designation and water type.

Proposed Designation	Freshwater Docks	Marine Docks
High Intensity	0	5
Residential	438	0
Rural	242	84
Conservancy	379	12
Resource	0	1
Forestry	11	0
Natural	0	10

Major existing land uses and land use patterns along King County shorelines are summarized and in the King County Shorelines Technical Appendix.

4. Overview of Key Shoreline Protection Standards

[State and Federal Regulations](#)

In addition to local regulations, a number of state and federal agencies have regulatory jurisdiction over resources in the shoreline jurisdiction. As with local requirements, state and federal regulations apply throughout the County and significantly reduce the potential for cumulative impacts to shorelines. The major state and federal regulations affecting shoreline-related resources include, but are not limited to:

- Endangered Species Act (ESA): The federal ESA addresses the protection and recovery of federally listed species. Depending on the listed species, the ESA is administered by either the National Oceanic and Atmospheric Administration Fisheries or the United States Fish and Wildlife Service.
- Clean Water Act (CWA): The federal CWA requires states to set standards for the protection of water quality. It also regulates excavation and dredging in waters of the U.S., including wetlands. Certain activities affecting wetlands in the County's shoreline jurisdiction or work in the adjacent rivers may require a permit from the U.S. Army Corps of Engineers and/or Washington State Department of Ecology under Section 404 and Section 401 of the CWA, respectively.
- Hydraulic Project Approval (HPA): The Washington Department of Fish and Wildlife regulates activities that use, divert, obstruct, or change the natural flow of the beds or banks of waters of the state and may affect fish habitat. Projects in the shoreline jurisdiction requiring construction below the ordinary high water mark of Puget Sound or streams in the County could require an HPA. Projects creating new impervious surface that could substantially increase stormwater runoff to waters of the state may also require approval.
- National Pollutant Discharge Elimination System (NPDES): Ecology regulates activities that result in wastewater discharges to surface water from industrial facilities or municipal wastewater treatment plants. NPDES permits are also required for stormwater discharges from industrial facilities, construction sites of one or more acres, and municipal stormwater systems that serve populations of 100,000 or more.

[King County Plans and Regulations Relevant to Shoreline Protection](#)

The following is a general discussion of plans and regulations that apply in the King County shoreline jurisdiction.

King County Comprehensive Plan

The King County Comprehensive Plan seeks to balance social, environmental, and economic goals through land use and zoning regulations, critical areas regulations using best available science, and other development standards. Updated shoreline management goals and policies are adopted as Chapter 5 in the King County Comprehensive Plan. King County shoreline goals and policies are consistent with the State's goal to prevent a net loss of shoreline ecological processes and functions and to restore shorelines over time.

King County Code Title 21A: Zoning

The King County Code establishes land use zones that implement the Comprehensive Plan's vision for future land use. Zones near shorelines include agriculture, mining, forestry, open space, residential, office, commercial and industrial. King County zoning was developed in part with consideration of the results of basin plans that were developed to protect water resources and habitat.

King County Code, Chapter 21A.24: Critical Areas

King County first adopted comprehensive regulations to protect environmentally sensitive areas in 1990. Those regulations were significantly amended in 2004. The critical area regulations are designed to protect critical areas from adverse impacts of development and to protect public safety. The regulations establish development standards, buffers and allowed alterations in critical areas as well as ensure that the critical area impacts of any permitted development is fully mitigated. The regulations also require that mitigation sequencing: that impacts to the critical area must first be avoided, then minimized and finally mitigated. King County's Critical Area Regulations are found in K.C.C. Chapter 21A.24.

The Shoreline Master Program relies on the critical areas regulations to protect critical areas within the shoreline jurisdiction, ensuring that there will be a consistent set of standards both within and outside of the shoreline protection.

For aquatic areas that are also shorelines of the state, the regulations establish a buffer of 115 feet for aquatic areas inside the urban growth area and 165 feet for aquatic areas outside the urban growth area. The regulations also require a 15 foot building setback from the buffer. Alterations to the aquatic area and buffer are limited. A critical areas report is generally required prior to making alterations. The report must include an analysis of the impact of the activity on the aquatic area and its buffer.

King County's regulations do allow existing, legal residential structures located in aquatic area and wetland buffers to be expanded by up to 1,000 square feet. This expansion may be allowed within the aquatic area buffer provided it is in the area of least adverse impact. Mitigation for the impacts resulting from the expanding is required.

When it adopted its Critical Area Regulations, King County conducted a risk assessment of the regulations, considering best available science, as required by the Growth Management Act. See Best Available Science Volume II: Assessment of Proposed Ordinances (February 2004 available at <http://www.kingcounty.gov/property/permits/codes/CAO.aspx#best>). The conclusion of the analysis for aquatic areas, which includes the shoreline jurisdiction, was that the critical areas standards – in combination with all other programmatic, capital, stewardship and incentive programs – are highly consistent with aquatic area protection best available science. The only departure from best available science relevant to the Shoreline Master Program is that buffers may not adequately address microclimate control.

King County Code, Chapter 9.04: Surface Water Management

King County reviews development proposals to ensure that surface water management standards are met. The County also promotes the preservation of natural drainage systems, protection of fishery resources, and wildlife habitat.

The County's Capital Improvement Program also identifies, funds, and implements site-specific projects intended to provide flood control or alleviation, improve and enhance riparian habitat, replace culverts to improve fish passage, and improve water quality from stormwater runoff.

The main objective of surface water management requirements is to promote public health, safety and welfare by establishing and operating a comprehensive approach to surface and storm water problems in order to: reduce flooding, erosion and sedimentation; prevent and mitigate habitat loss; enhance groundwater recharge; and prevent water quality degradation. This comprehensive approach includes the following elements: basin planning; land use regulation; construction and maintenance of facilities; public education; and provision of surface and storm water management services. The County imposes limits on the maximum amount of impervious surface that is allowed and requires all new development to control and treat runoff.

King County Code, Chapter 16.82: Clearing and Grading Standards

[This](#) Code chapter defines the Clearing and Grading Standards for development within the County. The code regulates clearing and removal of vegetation, excavation, grading and

earthwork construction including cuts and fills, gravel pits, dumping, quarrying and mining operations within King County in order to protect public health, safety and welfare by:

1. Minimizing adverse stormwater impacts generated by the removal of vegetation and alteration of landforms;
2. Protecting water quality from the adverse impacts associated with erosion and sedimentation;
3. Minimizing aquatic and terrestrial wildlife habitat loss and impacts to other riparian functions, such as microclimate, caused by the removal of surrounding vegetation;
4. Protecting sensitive areas from adverse clearing and grading activities;
5. Facilitating and encouraging long term forest practice and agricultural production operations where appropriate;
6. Minimizing the adverse impacts associated with quarrying and mining operations; and
7. Preventing damage to property and harm to persons caused by excavations and fills.

Shoreline Master Program

King County adopted its Shoreline Master Program in 1978 and has not significantly amended it since then. The County's existing Shoreline Master Program goals and policies are an independent document that is not directly integrated into the King County Comprehensive Plan . King County's existing shoreline development regulations and permitting procedures are codified as a separate title – Title 25 of the King County Code. The existing Shoreline Master Program established a system of shoreline environment designations that provide a uniform basis for applying policies and use regulations within distinctly different shoreline areas. Generally, the environment designations adopted in 1978 were based on the then existing and planned development patterns, biological and physical capabilities and limitations of the shoreline, and King County's vision and objectives for its future development. The 1978 Shoreline Master Program uses four shoreline environment designations: Urban, Conservancy, Rural, and Natural.

The proposed Shoreline Master Program (September 2010) updates the King County's program to bring it into compliance with Ecology's guidelines. The updated Shoreline Master Program establishes a new system of environment designations, in compliance with Ecology's guidelines (WAC 173-26-211). The new system applies designation criteria and management policies consistently across areas with similar current and planned land uses and ecological characteristics. The proposed environment designations are: High Intensity, Residential, Rural, Conservancy, Resource, Forestry, Natural and Aquatic (Table 3). The criteria for these

shoreline designations are described in detail in Chapter 5 of the King County Comprehensive Plan.

Table 3. Proposed shoreline designation miles, acres and parcels.

Part A.

Current Program		
Current Designation	Miles	Acres
Conservancy	897	21,755
Natural	109	2,640
Rural	108	2,620
Urban	13	324

Part B.

Proposed Program				
Proposed Designation	Miles	Acres (% of total)	Shoreline Type	Parcels*
Conservancy	313	11,001 (18.2%)	Lake	775
			Marine	434
			Stream	2,897
Resource	127	16,160 (26.7%)	Marine	5
			Stream	695
Forestry	921	21,569 (35.6%)	Lake	49
			Stream	710
Natural	304	7,230 (11.9%)	Lake	14
			Marine	422
			Stream	215
Rural	73	3,064 (5.1%)	Lake	614
			Marine	1,507
			Stream	857
Residential	23	1,127 (1.9%)	Lake	968
			Stream	357
High Intensity	5	446 (0.7%)	Lake	3
			Marine	24
			Stream	105

*Due to spatial inconsistencies among data layers, there is some error in determining the exact number of parcels in each designation.

The proposed Shoreline Master Program adopts requirements that new development in the shoreline jurisdiction must avoid and then minimize and mitigate for the adverse impacts of proposed development activities. After avoidance and minimization, mitigation of impacts generally includes replacement or enhancement of buffers and affected critical areas. Key changes include: incorporation of critical areas protections into the shoreline regulations, and

updated standards for shoreline stabilization, docks and piers, and trails in shorelines. The proposed changes to development standards and use regulations are more protective than the existing Shoreline Master Program in large part due to formal inclusion of critical areas protections into the shoreline regulations. Attachment 1, Summary of Potential Cumulative Impacts Associated with Proposed Shoreline Master Program, qualitatively assesses how cumulative impacts may occur per designation and how those impacts would be offset by the requirements of the proposed Shoreline Master Program, other local, State and Federal regulations and non-regulatory actions.

Consistent with state guidelines (WAC 173-26-186), the proposed Shoreline Master Program includes new goals and policies addressing shoreline restoration within King County. The goals and policies for restoration establish the County's intent to achieve no net loss of shoreline ecological functions, and to also see an overall improvement to the condition of habitat and resources within the shoreline jurisdiction. The Shoreline Protection and Restoration Plan (September 2010) identifies restoration opportunities that include capital and programmatic restoration opportunities identified in salmon recovery and flood hazard management plans, and potential funding and partnership opportunities. The Plan acknowledges areas where shoreline functions have been degraded by past development activities and flood hazard reduction efforts (e.g. bank armoring and levee building) and recommends actions appropriate for existing conditions and constraints to ecological processes. Implementation of the Protection and Restoration Plan is expected to guide improvement of shoreline ecological functions within the County over time.

5. Existing Shoreline Conditions

As part of the County's Shoreline Master Program update process, the County conducted a shoreline inventory and characterization (King County Shorelines Technical Appendix, May 2007) that assessed the degree to which ecological functions and processes in the shoreline jurisdiction have been altered by existing development. The result of the characterization was a rating for each shoreline reach based on the degree to which its shoreline functions had been altered. A summary of the process alteration ratings by shoreline type and reach and broad geographic area (i.e., Vashon-Maury Island, lowlands, and federal and non-federal forest production areas) is provided in Table 4. Shoreline geographic areas include the unincorporated lowland (western third) of the County that primarily supports residential, commercial, and agricultural use; the privately managed Forest Production District (FPD Non-Federal Lands); and the state and federal forest lands and wilderness areas (FPD Federal Lands). In general, the analysis indicates that the majority of King County shorelines are in medium to high condition (relatively unaltered).

Table 4. Degree of Ecological Process Integrity. Average Reach Ratings by ecological process and shoreline type for unincorporated King County. Scores are based on the Characterization described in the Comprehensive Plan Appendix M. For each process, the average rating for all reaches within a location is reported. Potential ratings range from high (H), meaning ecological processes relatively unaltered to Low (L), meaning processes are highly altered by existing development. A summary of the percent of reaches for each rating categories is also presented.

Ecological Process	Marine	Lake scores by geographic location			River scores by geographic location		
	Vashon/ Maury	Lowland	*FPD Federal lands	FPD Non- Federal Lands	Lowland	*FPD Federal lands	FPD Non- Federal Lands
Light	M	MH	H	H	MH	H	H
LWD	M	MH	MH	MH	M	MH	M
Nitrogen	MH	H	H	H	MH	H	H
Phosphorus	MH	MH	H	H	MH	H	H
Pathogens	MH	MH	H	H	MH	H	H
Toxins	M	MH	H	H	MH	H	H
Sediment	ML	MH	MH	MH	M	H	MH
Water cycle	M	M	H	MH	M	H	MH
Wave energy	M	MH	H	H	N/A	N/A	N/A
Tidal influences	MH	N/A	N/A	N/A	N/A	N/A	N/A
OVERALL	M	MH	H	H	MH	H	H

Percentage of reaches in each rating category:

Ecological Process	Marine	Lake scores by geographic location			River scores by geographic location		
	Vashon/ Maury	Lowland	*FPD Federal lands	FPD Non- Federal Lands	Lowland	*FPD Federal lands	FPD Non- Federal Lands
Low	2.9	0.0	0.0	0.0	0.0	0.0	0.0
Medium Low	23.7	1.0	0.0	0.0	2.2	0.0	0.0
Medium	31.7	1.1	0.0	0.0	34.6	0.0	0.1
Medium High	15.6	78.9	9.5	3.1	45.7	2.0	11.1
High	26.1	19.1	90.5	96.9	17.6	98.0	88.8

*FPD = Forest Production District.

Impervious surfaces, among other data, is used to evaluate the degree of alteration of all of the ecological processes listed in Table 4, with the exception of wave energy. Discussion in the shoreline characterization analysis recognizes the direct relationship between impervious surface and the status of ecological processes (King County Shorelines Technical Appendix, May 2007)).

6. Landscape Analysis: Impervious Surface in Shoreline Jurisdiction

The landscape analysis was developed to generally identify the extent to which shoreline designations may be at risk from future development, to assist in refining the proposed Shoreline Master Program, and to help guide protection and restoration efforts. It estimated there will be a potential increase in buffer impervious surfaces in the shoreline jurisdiction, assuming that 1,000 square feet of new impervious surface is built on every eligible shoreline parcel. For purposes of this analysis, eligible parcels include private parcels that currently have impervious surface located within the 165-foot critical area buffer. Some designations (Forest, Resource, and High Intensity) are excluded from the analysis as there is minimal or no existing single family development in those areas. As additional areas are incorporated in the coming years, the vast majority of King County's development will be residential, mostly single family detached residences. Areas where non-residential development are allowed will be limited and is mostly located outside the shoreline jurisdiction.

This analysis assumes that: (1) any impervious surface in the buffer is a single family residence, which is the criteria for allowing expansion; (2) there is an existing single family residence in the buffer on every parcel where there is current impervious surface; (3) new impervious surface is not sited outside of the shoreline jurisdiction where it could be on large rural parcels and as required by the mitigation sequence; and (4) all property owners will choose to expand single family residences on eligible parcels. Therefore, this is a conservative worst case scenario.

This scenario shows a potential increase in the percent impervious for shoreline buffer areas. Overall, the total current percent impervious surface for all shoreline parcel buffers is 8.0% (Attachment 2). Given assumptions described above, the potential future impervious surface would be 9.4% for a net overall increase of 1.4%. While a seemingly small potential change, clearly some areas have much more potential for change than others. The most dramatic potential change in buffer imperviousness is for Residential lakes and Rural marine where percent buffer impervious surface could change from current 12.5% and 5.1% to potential future 35.9% and 29.6%, respectively (Table 5). A more moderate degree of change could occur for Rural lake and Rural stream, where percent buffer impervious could change from 10.7% and 0.1% currently to 22.3% and 13.6%, respectively for the future. Conditions for these shorelines generally range from low to medium/high; areas of high condition are generally not present in these areas and therefore had very little potential for change. Additionally, the Rural and Residential shorelines make up 7.0% of the total shoreline area (Table 3).

In contrast, most areas representing the highest conditions could experience no to relatively small increases in impervious surface in the buffer. For the Natural designation (11.9% of the total shoreline area) impervious surface is expected to change by less than 2%. This area is in high condition for the most part. Buffer impervious surfaces along Forestry, Resource and High Intensity shorelines would not be expected to increase at all as there are very few single family uses. Ultimately, 92.3% of King County's shorelines – including most shorelines that are in the highest ecological condition – would not likely experience a large change in impervious surface.

In addition to being mostly confined to a relatively small percentage of the shoreline buffer area, the effect of increased impervious surface in the buffer would be mitigated. As stated previously, it is estimated that this provision to allow expansion of single family residences by 1,000 square feet has been used in about 60 permits per year (less than 1% of about 7,000 total residential permits and about 1,000 permits that get detailed critical areas review per year). Furthermore, there are specific conditions under which this expansion is allowed within the shoreline jurisdiction, including:

- A mitigation sequence that requires avoidance, minimization and mitigation of shoreline ecological resources is applied (as discussed previously).

- Mitigation requirements specify that a comparable area of degraded buffer area must be enhanced (nonnative plants removed and replaced with native vegetation per an approved landscaping plan). For example, in shoreline areas where existing conditions are poor, such as in Quartermaster Harbor where water quality is low and where there may be a concentration of new impervious surface in the shoreline buffer, enhancement as a mitigation requirement may result in an improvement in ecological function over existing conditions. In other instances where conditions are currently moderate to high and on-site opportunities to restore degraded conditions are limited, such as along middle reaches of Bear Creek, Issaquah Creek, Raging River and the Cedar River, off-site mitigation may be required to offset impacts. Off-site mitigation would be guided by the Shoreline Protection and Restoration Plan priorities.
- A shoreline conditional use permit is required if expansion occurs in the Conservancy, Resource, Forestry or Natural shoreline environment. A conditional use permit is not required in the High Intensity, Residential and Rural shoreline environments. These 3 designations make up 7.7% of the shoreline jurisdiction.
- If an expansion is greater than 1,000 sf, a shoreline variance is required.
- A 3-year bond and monitoring is required to ensure at least 80% survival of native plants.
- A cumulative total of up to 1,000 sf expansion is allowed per parcel.
- 1,000 sf expansion is not allowed on parcels that were previously developed via a Rural Stewardship Planning permit.

Table 5. Potential Change in Buffer Imperviousness of King

County shorelines. Percent impervious areas are estimated from averages of all eligible parcels within each designation. Forestry, High Intensity, and Resource designations; these designations are excluded from the analysis.

Designation*	Shoreline Type	Average Existing Shoreline Buffer % Impervious, including hazard areas	Potential Future Average Buffer % Impervious, including hazard areas	Difference between Existing and Potential Future Average Buffer % Impervious
Conservancy	Lake	16.9	21.7	4.8
	Marine	8.2	11.8	3.6
	Stream	9.8	11.5	1.8
Natural	Lake	0.0	0.0	0.0
	Marine	4.7	6.5	1.8

Designation*	Shoreline Type	Average Existing Shoreline Buffer % Impervious, including hazard areas	Potential Future Average Buffer % Impervious, including hazard areas	Difference between Existing and Potential Future Average Buffer % Impervious
	Stream	1.6	3.0	1.4
Residential	Lake	12.5	35.9	23.4
	Stream	20.6	25.6	5.1
Rural	Lake	10.7	22.3	11.6
	Marine	5.1	29.6	24.5
	Stream	0.1	13.6	13.5
Forestry	Lake	3.4		
	Stream	3.3		
High Intensity	Lake	63.5		
	Marine	31.3		
	Stream	62.0		
Resource	Marine	6.8		
	Stream	0.5		

Conclusion

Consistent with the Shoreline Management Act goals, King County's Shoreline Master Program adopts new shoreline environment designations, updated development standards and regulations for shoreline modifications and uses and better protection for shoreline processes. The updated standards and regulations are generally more protective of the shoreline environment and are largely consistent with best available science in protecting aquatic areas.

As discussed in this analysis and summarized in Attachment 1, proposed development and mitigation standards help to ensure that new residential structures do not cumulatively affect shoreline ecology. The Shoreline Protection and Restoration Plan identifies opportunities to improve or restore ecological functions that have been impaired as a result of past development activities. In addition, the proposed Shoreline Master Program augments several County, state and federal regulations that also protect shoreline functions and values for a variety of goals, including the recovery of threatened salmon and Puget Sound restoration.

The King County shoreline is in generally good condition while including a variety of existing land uses. There are opportunities for new shoreline development on vacant lots or by expanding existing structures. However, it is reasonable to conclude that less than the estimated development or expansion will actually occur, given shoreline development trends since 1990.

The cumulative actions (protection, restoration, regulations, and stewardship) taken over time in accordance with the provisions of the updated Shoreline Master Program are not likely to result in a net loss of shoreline ecological functions from existing baseline conditions, and may result in an increase in shoreline ecological functions.

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Attachment 1. Summary of Potential Cumulative Impacts Associated with Proposed Shoreline Master Program

Proposed Shoreline Designation	Length (miles), area (acres) and Proportional Area (%) of Designation	Potential Change in Buffer (165-ft wide) Impervious Surface (see Table 5)	Major Types of Foreseeable Future Development Likely to Affect Shoreline Condition	Potential Impacts to Shoreline Ecological Processes	Proposed SMP and Other Regulatory Offsets (Regulatory Citation)	Non-Regulatory Offsets
Natural	304 mi., 7,230 acres (11.9%)	<p>Potential change in % buffer impervious surface ranges from 0% (lakes), 1.4% (rivers) to 1.8% (marine).</p> <p>On freshwater shorelines, no concentration of eligible parcels in high quality areas. On marine shorelines, a small high density clump of eligible parcels in Quartermaster Harbor and sporadic distribution of parcels along outer edge of Maury Island – along medium to high quality shorelines.</p>	No major changes expected due to predominance of public lands managed for wilderness and natural resource condition	None or slight improvement over time where historic land uses are removed and restoration occurs	<ul style="list-style-type: none"> • KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), • WDNR FPA rules (ESA HCP applies), WDFW HPA • US Federal Land Policy and Management Act, Northwest Forest Act, ESA, CWA, Federal Wilderness Act and Mt. Baker-Snoqualmie National Forest Plan. • Conditional Use Permit (with Ecology review) required for 1,000 sf expansion in buffer 	Forestry and rural stewardship programs, tax incentive and TDR programs
Forestry	921 mi., 21,569 acres (35.6%)	There is little potential change as there are very few eligible parcels in this designation.	<ul style="list-style-type: none"> • No or only minimal changes expected due to predominance of lands in forestry and municipal uses. • Parcels are generally required to be at least 80 acres and limited non-forest related development is allowed • Very limited amount of new roads and other supporting infrastructure for residential development may occur 	<ul style="list-style-type: none"> • None or, at worst, very limited, infrequent and localized impact primarily to riparian vegetation and associated LWD and sediment processes caused by allowable development not able to be sited outside of regulatory buffer. • Limited construction of access roads and associated stream crossings 	<ul style="list-style-type: none"> • KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), • WDNR FPA rules (ESA HCP applies), WDFW HPA US Federal Land Policy and Management Act, Northwest Forest Act, ESA, CWA, Federal Wilderness Act and Mt. Baker-Snoqualmie National Forest Plan. • Conditional Use Permit (with Ecology review) required for 1,000 sf expansion in buffer 	Forestry and rural stewardship programs, tax incentive and TDR programs

Proposed Shoreline Designation	Length (miles), area (acres) and Proportional Area (%) of Designation	Potential Change in Buffer (165-ft wide) Impervious Surface (see Table 5)	Major Types of Foreseeable Future Development Likely to Affect Shoreline Condition	Potential Impacts to Shoreline Ecological Processes	Proposed SMP and Other Regulatory Offsets (Regulatory Citation)	Non-Regulatory Offsets
Resource	127 mi., 16,160 acres (26.7%)	There is little potential change as there are very few eligible parcels in this designation.	<ul style="list-style-type: none"> Minimal to moderate changes possible due to potential for new mining and agriculture. Limited number of new roads and other supporting infrastructure for mining and agriculture activities may occur 	Agriculture and mineral activities may impact vegetation and soils, modifying hydrology, sediment, LWD and nutrient processes and creating new sources for pathogens and toxics	<ul style="list-style-type: none"> KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), WDNR FPA rules (ESA HCP applies), WDFW HPA WDNR Surface Mining Act Mitigation required for all impacts and roads and other infrastructure must follow low impact design. Conditional Use Permit (with Ecology review) required for 1,000 sf expansion in buffer 	Agricultural stewardship (farm plans) WDNR Surface Mining Act requires reclamation for all but a very limited set of mining activities
Conservancy	313 mi., 11,001 acres (18.2%)	<p>Potential change in % buffer impervious surface ranges from 4.8 (lakes), 1.8% (rivers) to 3.6% (marine).</p> <p>On rural lakes and streams, high concentrations of eligible parcels in medium/high to high quality areas. On marine shorelines, low density and broad distribution of eligible parcels along medium to high quality shorelines.</p>	<ul style="list-style-type: none"> No or only minimal changes expected due to predominance of lands in hazardous, ecologically or culturally significant condition. <p>Parcels with development potential are generally of sufficient size to be able to locate new development outside of shoreline and are required to remain in largely forested condition Limited number of new roads and other infrastructure for septic and water to supply residential development may occur</p>	Relatively limited, infrequent and localized impact primarily to riparian vegetation and associated LWD and sediment processes caused by allowable development not able to be sited elsewhere and limited construction of access roads and associated stream crossings. Agriculture and mineral activities may impact water quality	<ul style="list-style-type: none"> KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), WDNR FPA rules (ESA HCP applies), WDFW HPA Conditional Use Permit (with Ecology review) required for 1,000 sf expansion in buffer 	<p>Forestry and rural stewardship programs tax incentive and TDR programs</p> <p>FHMP and Salmon Recovery CIPs</p>
Rural	73 mi., 3,064 acres (5.1%)	<p>Potential change in % buffer impervious surface ranges from 11.6% for (lakes), 13.5 % (rivers) to 24.5 % (marine).</p> <p>On rural lakes and streams, high concentration of eligible parcels in medium/low to medium/high condition. On marine shorelines, high concentration of parcels in Quartermaster Harbor and several clumps of parcels throughout marine shoreline – along low to medium/low condition drift cells.</p>	<ul style="list-style-type: none"> Minimal to moderate changes possible due to potential for: new residences, some of which may qualify for shoreline variance and be built in buffers, and expansion of up to 1,000 sq. ft for existing single family residential structures Limited number of new roads and other supporting infrastructure to accommodate new or expanded development 	New or expanded development may impact vegetation, LWD, sediment, hydrology, water quality, and light energy.	<ul style="list-style-type: none"> KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), WDNR FPA rules (ESA HCP applies), WDFW HPA. 	<ul style="list-style-type: none"> Rural stewardship programs tax incentive and TDR programs, Public involvement and education Open space acquisition, restoration and stormwater retrofit programs FHMP and Salmon Recovery CIPs

Proposed Shoreline Designation	Length (miles), area (acres) and Proportional Area (%) of Designation	Potential Change in Buffer (165-ft wide) Impervious Surface (see Table 5)	Major Types of Foreseeable Future Development Likely to Affect Shoreline Condition	Potential Impacts to Shoreline Ecological Processes	Proposed SMP and Other Regulatory Offsets (Regulatory Citation)	Non-Regulatory Offsets
Residential	23 mi., 1,127 acres (1.9%)	<p>Potential change in % buffer impervious surface ranges from 23.4 (lakes) to 5.1 % (rivers). There is no marine Residential shoreline.</p> <p>On rural lakes and streams, high concentration of eligible parcels along medium/low to medium/high condition shorelines. No eligible parcels on marine shoreline.</p>	<ul style="list-style-type: none"> Minimal to moderate changes possible due to potential for: new residences, some of which may qualify for shoreline variance and be built in buffers, and expansion of up to 1,000 sq. ft for existing single family residential structures Limited number of new roads and other infrastructure will be built to accommodate new or expanded development 	New or expanded development may impact vegetation, LWD, sediment, hydrology, water quality, and light energy.	<ul style="list-style-type: none"> KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), WDFW HPA 	<ul style="list-style-type: none"> Rural stewardship programs tax incentive and TDR programs, Public involvement and education Open space acquisition, restoration and stormwater retrofit programs FHMP and Salmon Recovery CIPs
High Intensity	5 mi., 446 acres (0.7%)	There is little potential change as there are very few eligible parcels in this designation.	<ul style="list-style-type: none"> Minimal changes expected due to high level of existing development. Limited potential for: new residences, some of which may qualify for shoreline variance and be built in buffers, and expansion of up to 1,000 sq. ft for existing single family residential structures Small amount of new roads and other infrastructure expected because most are already in place. 	Conditions expected to stay the same or improve somewhat over the existing baseline because new development or redevelopment will have to follow higher standards for environmental protection than was required of the older, existing development.	<ul style="list-style-type: none"> KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), WDFW HPA 	<ul style="list-style-type: none"> Public involvement and education Open space acquisition, restoration and stormwater retrofit programs FHMP and Salmon Recovery CIPs

Proposed Shoreline Designation	Length (miles), area (acres) and Proportional Area (%) of Designation	Potential Change in Buffer (165-ft wide) Impervious Surface (see Table 5)	Major Types of Foreseeable Future Development Likely to Affect Shoreline Condition	Potential Impacts to Shoreline Ecological Processes	Proposed SMP and Other Regulatory Offsets (Regulatory Citation)	Non-Regulatory Offsets
Aquatic	N/A	N/A	Minor change (positive and negative) possible due to implementation of the FHMP (a positive) but off-set by limited number of new docks and localized, limited use of dredging and bank armoring for emergency, private residence and critical facility protections	<ul style="list-style-type: none"> • Future conditions difficult to predict --- may stay the same or decline somewhat over the existing baseline because some new development in or along water is expected. • Alternatively, implementation of the FHMP could provide net improvement in river shoreline conditions due to construction of flood hazard reduction projects that remove, set-back or modify existing flood control structures and floodplain development. • Construction of docks and piers allowed in areas w/ past legal alterations and that currently provide less significant habitat. For marine shorelines, nearshore environmental conditions would be evaluated for potential impacts prior to approval of new docks or piers. Options such as sharing existing docks or installing a moorage buoy are preferred. 	<ul style="list-style-type: none"> • KC CAO (buffers, clearing limits, mitigation for all impacts, and roads and other infrastructure follow low impact design) and FHMP (zero-rise), • WDFW HPA • Conditional Use Permit required for new docks and piers in Natural and Resource shorelines. 	<ul style="list-style-type: none"> • Public involvement and education • Open space acquisition, restoration and stormwater retrofit programs • FHMP and Salmon Recovery CIPs

Attachment 2. Summary of Potential Change in Buffer Impervious Surface on Eligible Parcels

Designation*	Shoreline Type	Existing Conditions				Potential Future Conditions (1,000 sf added to the buffer of each eligible parcel)**						
		Average Shoreline Parcel % Impervious	Acres of Existing Impervious Surface in Buffer including hazard areas	Average Shoreline Buffer % Impervious including hazard areas	# Parcels with Existing Impervious in Buffer	# of Parcels with Existing Impervious in Buffer outside of Hazard areas	Acres of Potential Future Impervious Surface in Buffer, including hazard areas	Potential Future Average Buffer % Impervious, excluding hazard areas	Potential Future Average Buffer % Impervious, including hazard areas	Potential Future Average Parcel % Impervious including hazard areas	% of Total Parcels Potentially Affected	Total Parcels in Each Designation and Type
Conservancy	Lake	13.0	45.6	16.9	564	510	58.6	21.5	21.7	15.1	65.8	775
	Marine	7.4	14.2	8.2	274	74	20.5	9.6	11.8	10.2	17.1	434
	Stream	9.2	212.9	9.8	1,685	1,496	251.7	11.8	11.5	10.0	51.6	2,897
Natural	Lake	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0	14
	Marine	4.9	12.2	4.7	196	57	16.7	5.2	6.5	6.3	13.5	422
	Stream	1.5	0.9	1.6	34	21	1.6	2.2	3.0	1.9	9.8	215
Residential	Lake	25.8	56.4	12.5	779	708	74.3	34.6	35.9	31.6	73.1	968
	Stream	23.2	22.2	20.6	238	233	27.7	27.2	25.6	25.1	65.3	357
Rural	Lake	14.6	21.6	10.7	379	373	30.4	22.1	22.3	18.5	60.7	614
	Marine	21.3	93.5	5.1	1,312	624	123.7	33.4	29.6	27.1	41.4	1,507
	Stream	11.8	54.4	0.1	428	404	64.2	14.2	13.6	12.7	47.1	857
Forestry	Lake	3.5	6.5	3.4	12		6.5					49
	Stream	3.4	137.2	3.3	263		137.2					710
High Intensity	Lake	85.0	1.5	63.5	3		1.5					3
	Marine	27.3	1.0	31.3	22		1.0					24
	Stream	70.7	48.7	62.0	78		48.7					105
Resource	Marine	6.1	1.4	6.8	4		1.4					5
	Stream	7.2	94.4	0.5	361		94.4					695
Total Acreage			824.4				959.8					
Overall Buffer % Impervious***				8.0				9.4				

* There is minimal opportunity for use of the 1,000 sf expansion standard in the Forestry, High Intensity and Resource designations; these designations are excluded from the analysis.

**Exclude publicly-owned parcels and parcels that are in landslide hazard areas or severe channel migration zone.

***There are 10,258 total acres in the 165-foot buffer in King County's shoreline jurisdiction.

KING COUNTY SHORELINE PROTECTION AND RESTORATION PLAN

September 2010

A. PURPOSE AND GENERAL DESCRIPTION

Restoration planning is an important element of the environmental protection policies of the Shoreline Management Act (SMA). Local governments are required to have a “real and meaningful” strategy to address shoreline restoration as part of their shoreline master program (SMP) which implements the SMA at the local level. As part of this, they must promote restoration of shorelines based on an analysis of the nature and degree of shoreline ecological function impairment. Further, local governments are encouraged to plan for and support restoration through the SMP, as well as using other regulatory and non-regulatory programs. As part of restoration planning, it is also important to account for protection so as to prevent or minimize the need for future restoration and to ensure that restoration efforts will not be undone by future development. This document addresses both protection and restoration as the two main elements of a restoration plan.

This document summarizes: (1) the methods and results of King County’s shoreline analysis with respect to restoration planning; (2) the ways in which shoreline restoration is currently being planned; (3) actions that are expected to contribute to shoreline restoration over time; and (4) implementation. The King County Shorelines Technical Appendix (May 2007) (Technical Appendix) provides background on restoration, including how restoration is defined, the general approach to restoration planning, and a description of the reach and watershed characterization analysis used to assess shoreline ecological conditions. Understanding reach and watershed condition and context is critical in restoration planning to ensure that restoration actions are matched to the places where they will be most successful and make the most difference toward restoring ecological functions.

This Shoreline Protection and Restoration Plan (Plan) satisfies the restoration planning requirement of the SMA and provides general guidance for future shoreline planning efforts. It builds on and complements planning that has been done for other purposes, such as for salmon recovery or flood hazard reduction.

B. METHODS

This Plan uses a conceptual framework and methods similar to that of Diefenderfer et al (2006 http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/JC_RPMMethods_Battelle_11'06.pdf) to assess the range of restoration possibilities consistent with the watershed context and condition of river or lake reaches or marine drift cells. In this framework, anthropogenic (human caused or induced) stressors and disturbances operating on ecological controlling processes at reach and watershed scales are assessed to determine the extent to which anthropogenic factors affect ecosystem structure, processes, and, ultimately, functions. (Figure 1).

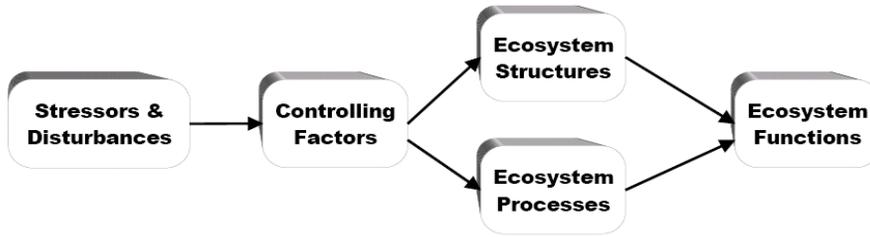


Figure 1. Conceptual model used in ecological analysis. (from Diefenderfer et al 2006)

Scores resulting from this assessment are indicative of the degree to which ecological processes have been altered and impaired. The Technical Appendix describes the specific processes considered and data sets and methods used to score each river and lake shoreline reach or marine drift cell, and their respective contributing basin. The result is that areas with similar scores and thus similar levels of impairment of ecosystem processes and structure can be grouped to provide general direction for protection and restoration actions given reach condition and context.

Stanley et al (2005) provide general recommendations for prioritizing protection and restoration that depend on the degree of alteration at site and watershed scales (Figure 2). For the protection and restoration analysis in this Plan, the site scale is equivalent to the lake or river shoreline reach or marine drift cell in Stanley and the watershed scale is the basin scale in Stanley.

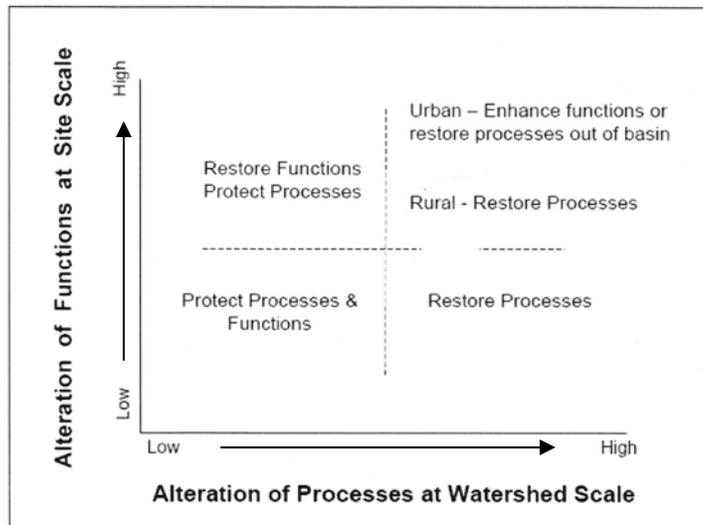


Figure 2. General recommendations from Stanley et al (2005, adapted from Shreffler and Thom (1993) and Booth et al (2004) for prioritizing protection and restoration based on degree of alteration at local (site/reach) and watershed scales. For our analysis, the local scale is equivalent to a lake or river shoreline reach or marine drift cell and watershed scale is equivalent to a basin.

This Plan categorizes reaches and drift cells into nine different categories of preferred actions based on condition of the reach or drift cell, as indicated by the degree of alteration at the site scale, and the overall condition of the basin in which the reach or drift cell is located. The preferred actions (Table 1) range from preservation and conservation under the highest conditions (high basin and reach conditions, H:H; i.e., the least altered from natural) to enhancement and creation under the poorest condition (low basin and reach conditions, L:L, the most altered from natural).

The King County alterations analysis categorized process integrity into five different categories (low, low-medium, medium, medium-high, and high). These five categories were reduced to three in order to match the three categories used for basin condition. To accomplish this reaches with scores of low-medium were combined with reaches that had low scores. Similarly, reaches with medium scores and reaches with medium-high scores were combined into a medium category.

This strategy was chosen to be reasonably conservative in using results of the analysis and to avoid over-scoring process integrity when looking at the best options for increasing or protecting ecological functions along a particular shoreline. For example, a high-medium shoreline would probably still have good opportunities for enhancement and restoration activities, while a high shoreline would likely not be as good of a candidate for restoration and would more likely need preservation. Therefore, the conclusion was that it was more appropriate to combine high-medium with medium in order to include restoration as an option.

SHORELINE REACH/DRIFT CELL	Low (L)	C (H:L) Restore Enhance	F (M:L) Enhance Restore	I (L:L) Enhance Create
	Moderate (M)	B (H:M) Enhance Restore Conserve Preserve	E (M:M) Conserve Enhance Restore	H (L:M) Enhance Create
	High (H)	A (H:H) Conserve Preserve	D (M:H) Conserve Enhance Restore Preserve	G (L:H) Enhance Conserve
		High (H)	Moderate (M)	Low (L)
	Basin Condition			

Table 1. Shoreline reach or drift cell protection and restoration actions depending on condition at the basin and reach/drift cell scales (modified from Diefenderfer et al, In Prep).

The various actions⁸ are defined as follows (adapted from Diefenderfer, et. al.):

Preserve – To protect intact processes, often through acquiring lands or easements to exclude activities that may negatively affect the environment.

Conserve – To maintain biodiversity by protecting or increasing the natural potential of landscapes to support multiple native species. Typically, this is accomplished through financial incentives for landowners intended to offset any economic loss resulting from managing the land for conservation.

Restore – To transform degraded conditions to a close approximation of historical conditions. Restoration generally involves more intense and extensive modification and manipulation of site conditions than would occur with enhancement projects. Example actions include levee breaching, removal, or setback.

Enhance – To improve a targeted ecological attribute and/or process. Example actions may include culvert replacement, riparian plantings and fencing, invasive species removal, and streambank stabilization.

Create – To construct or place habitat features where they did not previously exist in order to foster development of a functioning ecosystem. Examples include tidal channel excavation and the placement of dredge material intended to create marsh or other habitat. Creation represents the most experimental approach and, therefore, may have a lower degree of success, particularly when landscape-scale ecological processes are not sufficient to support the created habitat type.

c. RESULTS OF SHORELINE RESTORATION ANALYSIS

A total of 2,582 shoreline reaches and drift cells spanning 1,892 miles⁹ and covering 66,080 acres were assessed and placed into one of the nine categories for restoration activity guidance. Table 2 summarizes the results of the analysis by shoreline type (lake, marine, and river), major watershed resource inventory (WRIA) and restoration category. River shorelines account for the greatest length (1513 miles) and area (57,973 acres), followed by lakes (327 miles and 6809 acres) and marine shorelines (52 miles and 1298 acres). See Comprehensive Plan Appendix M.V. for the location of reaches by restoration type and priority action.

Overall, a very large portion (about 64 and 49 percent by length and area, respectively) of shoreline area is in the category of high basin and high reach (H:H) conditions (i.e., low degree of alterations), reflecting the large amount of county jurisdictional shoreline in forest production districts and protected areas, such as wilderness areas and municipal watersheds. Conservation and protection, particularly of the large-scale and mostly intact watershed processes, such as for sediment, hydrology and large woody debris (LWD), are the primary objectives for these areas (see Table 1).

Of the remaining categories, reaches in the moderate basin and reach condition (M:M) were second most prevalent by length and area followed by reaches in the moderate basin and high reach (M:H) and high basin and moderate reach (H:M) categories which were represented in approximately equal amounts. These reaches are largely found in rural parts of the county where a mix of land use, including both agricultural and rural residential, predominate and where basin conditions are moderate or better. With respect to SMP protection and restoration guidance, the categories for these reaches vary by whether conservation, preservation, enhancement, or restoration are part of the recommended mix of approaches.

⁸ These are actions to provide benefits over and above what regulations are expected to provide.

⁹ Mileages differ from those cited in Section 1 of Appendix D of this report due to the manner in which reaches were split for the analysis.

The least prevalent protection and restoration categories were in the moderate basin and low reach (M:L) and low basin and high reach (L:H) conditions by area and L:H by length. The categories reflect moderate to low conditions at the basin or reach scale. For guidance, recommended actions for M:L reaches are enhancement and restoration, whereas for L:H reaches, enhancement and conservation are recommended.

There were a small number of areas categorized as L:L where conditions were low at both the basin and reach scale and where enhancement and creation are the recommended actions. This category reflects high levels of alteration at both the reach and basin scales. There is a relatively small amount of L:L category because the county has little such land under its jurisdiction. For the most part, land in that category occurs in heavily developed areas along the Duwamish and Sammamish Rivers and is generally not located in unincorporated King County.

D. ACHIEVING THE SMP RESTORATION GOAL

The County has a wide array of policies, regulations, programs, capital improvement projects and public education and stewardship activities through which much of the protection and restoration of SMP jurisdictional shorelines will be accomplished (see King County 2007). Major plans and actions expected to help protect and restore shorelines are summarized below.

Comprehensive Plan: The King County Comprehensive Plan, which sets goals and accompanying policies for environmental protection in the context of population and economic growth needs, is the county's fundamental guidance document for land use and natural resource management. The first Comprehensive Plan was passed in 1964 in partial response to concerns about managing growth and its effects on the environment. In 1985, the Plan was modified to include an urban growth boundary line intended to limit growth to areas with adequate existing infrastructure and to protect natural resource lands and natural areas. Further amendments occurred with 1990 passage of the Washington State Growth Management Act, including a greater emphasis on protecting rural and natural areas and reducing the effects of sprawl by concentrating growth in existing areas of high density or where existing infrastructure can support high density. King County's first Growth Management Act comprehensive plan was adopted in 1994. Since that time the Comprehensive Plan has been amended several times (major updates occur every four years) but with no lessening of environmental goals. The Comprehensive Plan continues to place a priority on environmental and natural resource protection and restoration.

Land Use Regulations: All shorelines in King County's jurisdiction are now protected by land use regulations. King County's Sensitive Areas Ordinance (SAO), first adopted in 1990, provided protections for rivers, wetlands, and some lakes that were regulated as wetlands. The SAO did not apply to marine shorelines and lakes that were not classified as wetlands. In order to comply with changes to the Growth Management Act, King County adopted updated critical area, clearing and grading, and stormwater regulations in 2004 and took effect January 1, 2005, after a multi-year assessment of needs, including extensive review and consideration of best available science. Key changes included: (1) adding marine shorelines and lakes to the list of critical areas; (2) increasing regulatory buffer widths for wetlands and aquatic areas to increase protection of habitat from direct development effects, as well as to increase protection of riparian area processes (e.g., LWD recruitment and channel migration) critical for creating and sustaining habitat and critical species, such as federally ESA-listed Chinook salmon and bull trout; (3) establishing clearing limits to protect or minimize impacts to hydrology and other landscape level processes¹⁰; and (4) increasing mitigation requirements. In addition, the stormwater and clearing and grading regulations apply to the entire landscape, not just to critical areas or the shoreline jurisdiction. Thus, the combination of critical area, shoreline, clearing and grading, and stormwater regulations provides a solid foundation for protecting and restoring

¹⁰ *The clearing limits have since been found by the Washington Court of Appeals to violate a provision of state law governing the assessment of fees, taxes, and charges by local governments. The clearing limits are no longer being enforced.*

shoreline resources. Some variation is permitted where regulations create an undue and potentially unconstitutional burden on a landowner, or where the landowner desires flexibility and can clearly show a net environmental benefit by taking a different approach to development. Regardless, variances will require mitigation of adverse effects. Additionally, by protecting regulatory buffers and upland areas from conversion to developed surfaces, passive restoration of vegetation is expected to occur in areas that are below their vegetative potential (e.g., grass or shrubs present where trees should or could grow).

Watershed Resource Inventory Area (WRIA) Plans: Puget Sound Chinook salmon and coastal bull trout were listed as threatened under the Federal Endangered Species Act (ESA) in the late 1990s. More recently (May, 2007), steelhead trout were proposed for listing under the ESA. Concern over loss and listings of salmon populations led to major and unprecedented efforts to develop comprehensive watershed plans to protect and restore salmon habitat and recover salmon populations throughout Washington State. By 2005 all of King County's WRIsAs had multi-jurisdictionally adopted WRIA Plans variously called salmon conservation, recovery or habitat plans. These plans identify a large number and wide variety of programmatic, capital, and regulatory measures to protect and restore salmon and their habitat.

The salmon recovery plans are highly consistent with SMP goals because they emphasize protection and restoration of many of the same ecological processes and shoreline areas as the SMP. Chinook salmon, which are the priority species, migrate, spawn and rear along many of the same SMP jurisdictional shorelines needing restoration. Where WRIA-based salmon recovery measures extend upstream or upslope of the SMP jurisdictional area, their effects on ecological processes that control water quality, hydrology, sediment, riparian vegetation and large woody debris will likely benefit downstream or downslope shorelines. In summary, WRIA plan goals and actions are highly consistent with SMP jurisdictional area and protection and restoration needs.

Flood Hazard Management Plan (FHMP): In 2007, King County adopted the 2006 Flood Hazard Management Plan and a Countywide Flood Control Zone District. Funding for the District is provided through a property tax levy to implement an adopted budget and work program. In recognition that many past attempts at structural flood control have not worked well or have not been cost-effective, the FHMP outlines a series of programmatic and capital programs to reduce flood risk and costs primarily along rivers and larger streams that are also under shoreline jurisdiction. As part of this, the FHMP recommends numerous nonstructural capital projects ranging from buyout of floodplain properties and removal of associated structures and removal or set-back of flood protection facilities (levees and revetments) and restoration of associated floodplains, to smaller-scale efforts, such as elevation of homes suffering from repeated damage. Although these projects are generally proposed in order to reduce flood risk and costs to people, significant shoreline restoration benefits will likely accrue as well. Even the smaller projects, such as elevating structures, should provide benefits as a result of reducing flood flow impediments and reducing the amount of artificial debris and pollution that occurs when houses and other structures are damaged in floods.

Programmatic and Capital Improvement Projects: Programs and capital improvement projects (CIPs), protect and restore shorelines using a range of actions including: (1) acquiring lands or conservation easements and providing tax incentives to protect rare, sensitive or otherwise critical lands for achieving species recovery and flood risk reductions goals, (2) removing or making more environmentally friendly artificial impediments, such as barriers (e.g., dams, culverts, weirs) and levees, revetments, houses and other structures, that constrain or inhibit natural processes or that degrade the environment; (3) establishing healthy, mature native plant communities; (4) creating new habitats consistent with what current processes would support and where restoration of the historic condition is not warranted due to cost of removing or modifying other constraints; and (5) educating and working with landowners and agency staff to modify activities that adversely affect the environment and promote those that will restore and sustain shorelines.

Attachment A summarizes priority CIPs and programs proposed in the FHMP and WRIA Plans for WRIsAs 7, 8, 9, and 10. Due to the overlap in geography and the interplay between flood problems and salmon habitat restoration

needs, there is considerable overlap of CIPs in the flood and salmon plans. A total of 276 CIP and programmatic actions within the shoreline jurisdiction were identified (Table 3). Of these, the majority (234) are CIPs. WRIA 8 had the greatest number of proposed actions (135) followed by WRIsAs 9, 7 and 10 with 69, 67 and 3 actions, respectively. There are many other actions, such as fencing, native planting and large woody debris additions, not summarized here but that are planned for and expected to occur on small tributaries and lakes outside the shoreline jurisdictional area. They are expected to help restore jurisdictional shorelines as well.

Table 3

WRIA	Water Type	CIPs	Programs	Both
7	Fresh	61	8	0
8	Fresh	107	26	2
9	Fresh	45	5	0
9	Marine	18	1	0
10	Fresh	3	0	0
Total		234	40	2

Table 3. Number of CIPs and programs in the shoreline jurisdictional area proposed by WRIA Plan for a given water type (see Attachment A for individual project summaries).

Environmental Education and Stewardship: King County has an extensive history of public education, involvement, and stewardship on environmental issues, especially protection and restoration of aquatic areas (see King County 2007). Many of these efforts are conducted in concert with other jurisdictions, non-governmental organizations (aka NGOs) and local citizen and volunteer groups. Further, they are typically applied across a broad spectrum of land uses, including rural residential, agriculture (commercial and hobby farms), and forestry. In all cases, the goal is to encourage people who own or otherwise use land and aquatic areas to conduct their activities in less-impacting ways and, where possible, to restore the environment incrementally, such as by planting native plants, removing trash, and managing domestic animals, such as pets, especially their wastes. Although difficult to measure outcomes, these programs are generally believed to provide major cumulative protective and restorative benefits as people become more aware of the effects of their actions and learn ways to reduce their impact and restore natural systems, including shorelines.

Implementation: Implementation of this plan will be guided by a variety of factors including priorities, costs, and available funding. Further, to assess success, timelines and benchmarks will be necessary. This section addresses those factors as they relate to regulations, the WRIA Plans and the FHMP.

Priorities – of the various actions to achieve protection and restoration, implementation of regulations is a high priority everywhere. Implementation of the King County FHMP is also a high priority because it addresses flood

risk and costs and helps control flood insurance rates for King County citizens. The FHMP's priorities for implementing CIPs are based on the following criteria, in order of priority:

Consequences of taking no action - consequences are prioritized in order as (a) threats to public safety, (b) damage to public infrastructure, (c) impacts on the regional economy, and (d) damage to private structures,

Urgency - as a measure of how quickly an action needs to be taken to prevent a risk from growing worse,

Legal responsibility and authority - where there is a contractual relationship between King County and another person or agency, funding or partnership opportunities, and

Readiness of project - (a) is the project within an adopted local hazard mitigation plan? (b) do property interests need to be acquired (fee simple or easement)? (c) if property interests need to be acquired, is the landowner willing to sell? and (d) the anticipated project start date.

Although the FHMP's main goal is reduction of flood hazard risk, shoreline benefits accrue due to the secondary effects of removing or setting back flood protection facilities and associated development, or modifying flood protection facilities or elevating buildings *in situ* using methods that reduce effect of flooding on the structures. The result is that shorelines and associated floodplains are restored wholly or in part and remaining structures are designed with features that enhance habitat and water quality.

In contrast to regulations and the FHMP, implementation of WRIA Plan recommendations is voluntary for King County and other local governments. Regardless, they are a high priority for King County and the County uses the WRIA Plans to guide much of its capital investment in habitat protection and restoration. WRIA salmon recovery plans prioritize actions based on the degree to which listed salmonids, primarily Chinook, are expected to benefit.¹¹ The plans prioritize actions that protect and restore Chinook-bearing watersheds and habitats, including rivers, large tributaries, estuaries and marine nearshore environments and associated floodplains and wetlands. As a result, almost all of the priority actions of the WRIA plans contribute in some way to protection and restoration of SMP shorelines.

Costs and Funding - Costs for implementing the FHMP and WRIA plans have been identified and funding mechanisms are either in place or imminent. It should be noted, however, that both are subject to change due to uncertainty of funding, which can change due to economic and social change, and CIP costs caused by design, permitting and landowner uncertainty.

For the FHMP, the current 10-year implementation costs are projected as \$252M. The total cost of the FHMP is estimated to be between \$283M for the current published plan to \$360M when costs of the recent (2006) flood and additional city projects are included. If as yet unevaluated and unranked additional city-based projects are included, the total costs of the FHMP could be as much as \$415M. The FHMP program is proposed to be financed using a county-wide levy. The levy rate has not yet been decided by King County Council, but their decision is expected in

¹¹ *Chinook are the priority species because bull trout habitat recovery needs generally coincide with those for Chinook habitat, i.e., protecting and restoring headwaters and floodplains and improving edge and in-channel habitat complexity. Also, while the plans were developed prior to the federal Endangered Species Act (ESA) listing of steelhead trout, they are expected to be updated to account for steelhead recovery needs as well. Much steelhead habitat coincides with Chinook habitat, although steelhead will often use higher elevation and smaller streams than Chinook for spawning and rearing. As a result, the addition of steelhead as a priority species is not expected to modify the basic approach for habitat in recovery plans and may ultimately increase the emphasis for protection and restoration of SMP shorelines, particularly those used by steelhead but not by Chinook.*

the latter half of 2007. If funded at the proposed 10-cent/\$1k assessed property value, about \$252M would be generated to implement the FHMP over the first 10 years (2008 to 2018).

For WRIA Plans, the available funding scenarios are considerably more complex. Over the next ten years for all of Puget Sound WRIAs, a base level of at least \$60M/year is expected from federal sources alone, assuming positive results over time (Margaret Duncan, Shared Salmon Strategy, personal comm.). These funds will be matched to some degree by state and local funds and are to be allocated among WRIAs based on a formula that takes into account the number of chinook populations at risk and number of shoreline miles within each WRIA. For the near term, potential three-year project and programmatic costs and annual funding available from state and federal sources have been summarized by the Shared Strategy for each WRIA (Table 4, for source see <http://www.sharesalmonstrategy.org/watersheds.htm>). The three-year costs far exceed funding as they represent the costs of doing all the projects that a watershed has identified as “ready to go” based on Chinook needs and capacity to implement if funding was not a constraint. Funding is limited, however, to the amount available to a watershed from state and federal sources plus additional matching dollars from local sources. Because state and federal funds are typically matched with local dollars for a given project, the total amount spent over the next three years is expected to exceed the federal and state funding available in Table 4. For example, for construction projects it is proposed that Puget Sound Acquisition and Recovery (PSAR) Funds must be matched with at least 15% of other dollars (Brian Abbot, The Office of the Interagency Committee (IAC) Salmon Recovery Funding Board (SRFB), June 27, 2007 memo to WRIA lead entities).

Table 4

WRIA	Three-year Costs	Annual State and Federal Funding		
		<u>SRFB</u>	<u>PSAR and other sources</u>	<u>Total</u>
7	112.50	0.80	2.80	3.60
8	55.50	0.61	2.14	2.75
9	43.00	0.46	1.62	2.08
10/12	32.64	0.79	2.78	3.75
Total	243.64	2.66	9.34	12.18

Table 4. Three-year costs and funding availability for WRIA plan implementation. Costs are for 3-year implementation of programmatic and CIP habitat actions and reflect total potential capacity to implement all “ready to go” programs and projects with Chinook benefits. Annual State and Federal funding is conservative as it does not include matching local dollars; SRFB = Salmon Recovery Funding Board; PSAR = Puget Sound Acquisition and Restoration funds. All values are in millions of dollars.

Allocation of costs and funds specific to King County or its jurisdictional shorelines is not readily available. Within any WRIA, however, the majority of Plan projects and area affected are within the County’s jurisdiction (although many important projects are also in incorporated areas) and, because they are along marine shorelines, rivers and larger tributaries, they are also mostly along jurisdictional shorelines. Therefore, within any given WRIA, the majority of costs and funds are expected to be focused on SMP jurisdictional shorelines.

In one instance, for WRIA 7 (the Snohomish River Basin), information on recent funding for projects specific to King County is available and summarized here for illustration of how recent funding has been allocated. The King County portion of the WRIA 7 the Snohomish River Basin Salmon Conservation Plan calls for \$45 million (\$33

million in capital projects and \$12 million in non-capital projects) to be spent on plan implementation between 2005 and 2015. Between 2005 and 2007 (3 year time period) the following sources have spent funds on capital projects: King Conservation District - \$1,630,000; Salmon Recovery Funding Board (including 2007 Puget Sound Partnership) - \$3,185,000; King County SWM Capital Budget - \$1,500,000; Conservation Futures Tax - \$1,200,000 (Perry Falcone, personal communication).

Timelines and benchmarks - As described above, restoration of SMP shorelines relies on a variety of regulatory, programmatic and CIP actions, each of which have implementation timelines and benchmarks. Revised land use regulations, including critical areas, clearing and grading and stormwater ordinances, were implemented on January 1, 2005. The FHMP is envisioned and funded as a ten-year program. Specific projects will be identified and implemented each year through the CIP budget adopted annually by the King County Council. At the end of ten years (by 2018) a range of flood-related programs and CIPs (see Attachment A for example) will have been implemented, the exact cost and number of which will vary depending on issues such as funding, permitting, and landowner willingness.

For WRIA plans, salmon recovery is the ultimate goal and benchmark against which to measure success. Recovery is generally defined as reaching the point where the listed populations are not only viable - thus eligible for delisting under the federal ESA - but also able to support viable fisheries. The timeline for this is uncertain, but expected to be longer than short or mid term, i.e., decades rather than a few years to a single decade in length. To help guide and track implementation, WRIA plans generally have regular (yearly, three or five year) assessment and reporting intervals and intermediate (three to ten year) lists of goals and associated timelines and benchmarks in addition to the ultimate goal of recovery. For example, in its first ten years (by 2015), the Snohomish River Basin (WRIA 7) Salmon Recovery plan has identified desired increases over current condition of eighty-three, five, four, and fifty-eight percent in estuary, edge, riparian and off-channel habitat, respectively, and forty-one new log jams (Perry Falcone, personal communication). As noted earlier, due to emphasis on Chinook, these actions will largely affect shorelines under SMP jurisdiction. It is uncertain, however, exactly how much of this work will occur in King County's jurisdiction, but the plan generally calls for roughly equal (40 to 60 percent) of the gains to be in each county.

The WRIA Plans are considered flexible because of uncertainty over how salmon will ultimately respond to the myriad of habitat, harvest and hatchery factors being addressed as well as the many other factors, such as climate and geologic processes, which are beyond local control and often difficult if to predict. Additionally, many of the programs and CIPs have uncertainty associated with costs, feasibility and funding. As a result, all plans are guided by a monitoring and adaptive management strategy to adjust the plan's goals, strategies, etc., over time.

E. Summary and Conclusion

Consistent with guidance from Washington Department of Ecology, this report provides the results of an extensive analysis of shoreline restoration need and potential actions, consistent with condition of reaches and drifts cells and their respective basin contexts, and the major policies, programs, projects, and regulations that are expected to contribute toward restoration of SMP jurisdictional shorelines. The King County Comprehensive Plan provides policy goals and priorities consistent with shoreline protection and restoration. Regulatory programs help to prevent further loss of riparian and landscape level development impacts and may provide incremental passive restoration benefits as vegetation in degraded riparian areas matures over time. These policies and regulations set the stage for major shoreline restoration which is expected to result from implementation of WRIA and Flood Plans, each of which has a large array of CIPs and programs (many of which are common to both plans). Finally, shorelines are expected to be protected and restored through a program of public involvement and education that spans a wide range of land uses throughout the county. As a result of the above actions, shorelines should be better protected and ultimately restored relative to current conditions.

F. Literature Cited

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Attachment A.

Priority programs and capital improvement projects (CIPs) that are located along and expected to provide direct protect or restoration benefits to King County’s jurisdictional shorelines as recommended by watershed inventory area (WRIA) plans and the King County Flood Hazard Management Plan. Implementation will depend on availability of funding as well as detailed assessment of site conditions and costs, technical and permitting feasibility, and landowner participation.

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Cherry Creek	0.5	Cherry Creek Floodplain Restoration	Reconnect and restore 2,800 feet of Cherry Creek and combine flow of three ditches into a single naturalized stream	R	R	CIP
7	Cherry Creek	0.25	Cherry Valley Dairy Stream Enhancement	Remove fish barrier on small stream in Snoqualmie/Cherry Creek floodplain	R	R	CIP
7	Cherry Creek	0.25	Cherry Valley Pump and Floodgate Facility	Assess effect on fish survival of new pump and floodgate	R	R	CIP
7	Cherry Creek	0	Cherry Creek Mouth Restoration	Restore channel in previous (ca 1960) alignment and create approximately 2000 feet of new channel	R	R	CIP
7	Lower Snoqualmie River	All	Salmon Safe Certification and marketing	Promote fish-friendly agriculture	R	Both	P

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Lower Snoqualmie River	All	Shared Goats for Snoqualmie Salmon	Low impact approach to controlling invasive plants	R	Both	P
7	Lower Snoqualmie River	All	Conservation Reserve Enhancement Program (CREP)	Protect and restore riparian vegetation through reimbursement to farmers	R	Both	P
7	Lower Snoqualmie River	All	Snoqualmie Tribal Community Conservation Corps	Use locally-based conservation corps for restoration and protection projects	R	Both	P
7	Lower Snoqualmie River	All	Snoqualmie River Riparian Restoration on Agriculture Lands	Plant 50 acres of floodplain habitat throughout the Snoqualmie.	R	R	P
7	Lower Snoqualmie River	All	Lower Snoqualmie Restoration and maintenance	In cooperation w/ non-profit, identify and enhance 3 miles of riparian habitat, improve access to off-channel habitat, remove blockages to 1.5 miles of rearing habitat and restore a 3 acre wetland	R	R	P
7	Lower Snoqualmie River	7	Lower Snoqualmie River Early Action PIN# 0626079010	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Lower Snoqualmie River	7.2	HerbCo Farm (Riparian)	Remove blackberry and knotweed and replant with native vegetation along 1000 feet of the Snoqualmie River.	R	R	CIP
7	Lower Snoqualmie River	9.5	Lower Snoqualmie River Early Action PIN# 1226069019	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Lower Snoqualmie River	10.2	Lower Snoqualmie River Early Action PIN# 1426069004	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Lower Snoqualmie River	13.8	Tolt Pipeline Protection	Construct wood piling and log revetment to halt erosion that threatens the Tolt water supply pipeline	R	P	CIP
7	Lower Snoqualmie River	21.8	Stillwater Habitat Restoration	Restore floodplain processes to WDFW-owned property by removing levee and revetments and restoring vegetation	R	R	CIP
7	Lower Snoqualmie River	24.3	Snoqualmie River Footbridge Off-channel Restoration	Alternatives analysis to restore filled-in side channel habitat	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Lower Snoqualmie River	10.5	Coe-Clemons Creek Restoration	Restore creek in Snoqualmie floodplain	R	R	CIP
7	Lower Snoqualmie River	14	Deer Creek Channel Relocation	Relocate and restore channel in and adjacent to Snoqualmie floodplain	R	R	CIP
7	Lower Snoqualmie River	18.5	Oxbow Farm Channel Enhancement	Improve connectivity of oxbow with river	R	R	CIP
7	Lower Snoqualmie River	22.5	Chinook Bend Reach Restoration	Remove levee and restore riparian and floodplain vegetation and processes	R	R	CIP
7	Lower Snoqualmie River	22.5	Chinook Bend Wetlands Enhancement and Creation	Enhance existing and create additional wetlands	R	R	CIP
7	Lower Snoqualmie River	22.5	Lower Snoqualmie River Early Action PIN# 0925079025	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Lower Snoqualmie River	23	Camp Gilead/MacDonald Off-channel Reconnection	Remove ~ 400 feet of revetment to reconnect ~ 4 acres of off-channel habitat and wetlands and provide access to 1.3 miles of tributary habitat	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Lower Snoqualmie River	23	McElhoe-Pearson Levee Setback	Relocate 1,300 feet of levee to reconnect and restore floodplain	R	R	CIP
7	Lower Snoqualmie River	23.5	Lower Snoqualmie River Early Action PIN# 8656300195	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Lower Snoqualmie River	30	Lower Snoqualmie River Early Action PIN# 3325079029	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Lower Snoqualmie River	30.5	Lower Snoqualmie River Early Action PIN# 0424079028	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Lower Snoqualmie River	34.5	Fall City Natural Area Acquisitions	Acquire habitat in heavily used Chinook spawning area	R	P	CIP
7	Lower Snoqualmie River	27.8	Stout Property Restoration	Plant approximately 2 acres of riparian habitat along the Snoqualmie River.	R	R	CIP
7	Lower Snoqualmie River	27.7	Snoqualmie River Byers Riparian Restoration	Install a 600 foot-long "drift fence" to capture woody debris and create a natural log jam for habitat and erosion reduction	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Lower Snoqualmie River	28	Gonneson Revetment Acquisition and Removal	Acquire floodplain area and remove bank armoring to allow for lateral channel migration and floodplain restoration	R	R	CIP
7	Lower Snoqualmie River	28.2	Jubilee Farm (Riparian)	Remove invasive species and plant a 50 to 70 foot buffer along 1 mile of the Snoqualmie River	R	R	CIP
7	Lower Snoqualmie River	32.1	SE 19th Way Road Buyout	Purchase farm at risk of being isolated by bank erosion	R	R	CIP
7	Lower Snoqualmie River	32.5	Neal Road Relocation	Realign road currently closed due to bank failure	R	R	CIP
7	Lower Snoqualmie River	33	Snoqualmie River Fall City Reach Restoration	Reconnect and restore two side-channels	R	R	CIP
7	Lower Snoqualmie River	33	Lower Snoqualmie River Early Action PIN# 0924079012	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Lower Snoqualmie River	33.2	Lower Snoqualmie River Early Action PIN# 2925079019	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Lower Snoqualmie River	34.2	Aldair Buyout	Purchase homes and property at risk from failure of the Aldair levee	R	R	CIP
7	Lower Snoqualmie River	35.5	Fall City Levee Setback Feasibility Study	Conduct levee setback feasibility study for conveyance improvement and habitat enhancement.	R	R	CIP
7	Middle Fork Snoqualmie	All	Middle Fork Snoqualmie Invasive Weed Removal Project	Control and, if possible, eradicate invasive plants to protect high quality area	R	P	CIP
7	Middle Fork Snoqualmie	2.1	Middle Fork Levee System Capacity Improvements	Reduce flood risks caused by constrictions in segments of the incomplete levee system	R	P	CIP
7	Miller River	0.5	Miller River Home Buyout	Purchase and remove floodprone residence and restore floodplain	R	R	CIP
7	Miller River	0.5	Miller River Road Protection	Enhance constructed log jam to reduce erosion risks to the road	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Raging River	4.8	Raging River Preston Reach Restoration	Restore access to 7 acres of off-channel/floodplain habitat, 1200 feet of edge habitat and acquire 10 acres immediately upstream of the restoration	R	Both	CIP
7	Raging River	5.2	Alpine Manor Mobile Home Park Neighborhood Buyout	Purchase high-risk homes and property and restore floodplain	R	R	CIP
7	Raging River	10	Raging River Kerriston Reach Restoration	Add LWD to river	R	R	CIP
7	Raging River	0.2	Lower Raging River Floodplain Restoration	Investigate alternatives to reconnecting lower Raging river to its historic floodplain	R	R	CIP
7	S.F. Skykomish River	18.3	Timber Lane Village Home Flood Buyouts	Purchase property and remove homes subject to extreme erosion.	R	R	CIP
7	S.F. Skykomish River	18.7	Timber Lane Village Home Erosion Buyouts	Purchase property and remove homes subject to extreme erosion.	R	R	CIP
7	S.F. Skykomish River	3.5	South Fork Levee System Improvements	Initiate rehabilitation of the levee system	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Snoqualmie	All	SHRP Snoqualmie	Implement small scale restoration programs	R	R	P
7	Snoqualmie	All	Snoqualmie Tribal Community Conservation Corps	Conduct habitat restoration projects as needed	R	R	P
7	Tolt River	7	Stoessel Creek Acquisition	Acquire key properties to protect riparian areas and associated mussel populations	R	P	CIP
7	Tolt River	3	Tolt River Road Shoulder Protection	Protect road from channel migration	R	P	CIP
7	Tolt River	4.6	San Souci Acquisition	Acquire frequently-flooded properties to remove flood risks and restore floodplain processes	R	R	CIP
7	Tolt River	0.6	Tolt River SR 203 to Trail Bridge Floodplain Reconnection	Setback levee to improve conveyance and allow habitat enhancement	R	R	CIP
7	Tolt River	1.1	Tolt River Mile 1.1 Levee Setback	Setback levee to improve conveyance and allow habitat enhancement. Include purchase and removal of homes	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
7	Tolt River	2	Tolt River Natural Area Floodplain Reconnection/Acquisition	Acquire property in old side channel, remove a levee and reconnect and restore side channel	R	R	CIP
7	Tolt River	2	Tolt River Restoration	Restore 54 acres along river	R	R	CIP
7	Tolt River	0.3	Lower Tolt River Levee Setback(s) and Restoration	Setback levee and restore floodplain of lower Tolt river	R	R	CIP
7	Tolt River	0.3	Tolt River Mouth to SR 203 Floodplain Reconnection Technical Support	Provide technical support for floodplain reconnection project	R	R	CIP
7	Tolt River	1	Tolt River Flood Early Action PIN 2125079024	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Tolt River	1	Tolt River Flood Early Action PIN 2125079038	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Tolt River	26	Lower Snoqualmie River Early Action PIN# 2825079011	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
7	Upper Snoqualmie	43	Three Forks Natural Area Restoration	Remove non-native plants and replant 35 acres of formerly grazed lands	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Bear Creek	3	Reach 5 (RM 2 to 4) - protection	Protect floodplain and wetland areas adjacent to Keller Farm property (spans Reaches 4 and 5)	R	P	CIP
8	Bear Creek	4.5	Reach 6 (RM 4 to 4.75) - protection	Protect forested areas in reach, particularly south of Puget Power Trail & at 116th and Avondale Rd., and forested buffers and undeveloped properties	R	P	CIP
8	Bear Creek	5.25	Reach 7 (RM 4.75 to 5.9) - protections	continue Waterways program, especially at Classic nursery, and flows, contiguous forest cover and riparian forest in reach	R	P	P
8	Bear Creek	6.25	Reach 8 (RM 5.9 to 6.5) - protection	Protect Bear Creek Waterways Reach D, particularly forested riparian parcels contiguous to already protected areas and Swanson Horse Farm, as well as flows and upland and riparian forest cover,	R	P	P

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Bear Creek	4.5	Reach 6 (RM 4 to 4.75) - restoration	Restore riparian vegetation in Friendly Village development & equestrian center and reduce bank armoring and restore riparian vegetation in vicinity of NE 116th & Avondale Pl.	R	R	CIP
8	Bear Creek	All	LWD addition	Add LWD in select locations as identified in need and feasibility study	R	R	CIP
8	Bear Creek	3	Reach 5 (RM 2 to 4) - restoration	Restore channel conditions through a former dairy farm and install buffer strips (spans reaches 4 and 5).	R	R	CIP
8	Bear Creek	5.25	Reach 7 (RM 4.75 to 5.9) - restoration	Work with property owners to add LWD, restore riparian vegetation and reforest cleared areas	R	R	P
8	Carey Creek	1	Reach 1 (RM 0.0 to 1.8) - protection	Implement waterways recommendations	R	P	CIP
8	Carey Creek	3	Reach 3 (RM 2.5 to 3.5) - protection	Implement waterways recommendations	R	P	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Carey Creek	3.2	Carey Creek Culvert Removal	Remove large culvert (~ RM 3.2 on Carey Creek) to facilitate movements of fish and other ecosystems materials	R	R	CIP
8	Cedar River	5.5	Cedar River Early Action PIN# 2323059098	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP
8	Cedar River	13.9	Cedar River Early Action PIN# 3223069017	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP
8	Cedar River	13.9	Cedar River Early Action PIN#3223069089	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP
8	Cedar River	19.5	Cedar River Early Action 232206-9086	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	M	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Cedar River	17	Cedar River Early Action PIN# 6399600105	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP
8	Cedar River	17	Cedar River Early Action PIN# 6399600140	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP
8	Cedar River	17	Cedar River Early Action PIN# 6399600145	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP
8	Cedar River	15	Cedar River Early Action 510840-0040	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP
8	Cedar River	15	Cedar River Early Action 510840-0041	Acquire floodplain property and remove structures in anticipation of larger flood hazard reduction and floodplain restoration	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Cedar/Bear/Issaquah	All	Rural opportunity fund	Implement habitat protection and restoration actions as opportunities arise	R	Both	P
8	Cedar/Bear/Issaquah	All	Riparian restoration	Based on individual site needs, work with landowners to remove bank armoring, livestock and non-native plants and restore native plants	R	R	P
8	Cottage Lake Creek	3.75	Cottage Lake/Cold Creek Acquisition	Acquisition to protect critical cold water springs near outlet of Cottage lake	R	Both	CIP
8	Cottage Lake Creek	0.25	Reach 1 (RM 0.0 to 0.5) - protection	Implement Waterways Reach E, protect flows and upland and riparian forest cover and work with landowners to increase channel complexity and reforest cleared areas	R	P	CIP
8	Cottage Lake Creek	0.75	Reach 2 (RM 0.5 to 1.0) - protection	Protect 40-acre parcel on Cottage Lake Creek (Nickels Farm) and protect flows and upland and riparian forest cover work with landowners to increase channel complexity and reforest cleared areas	R	P	CIP

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8	Cottage Lake Creek	3.75	Cold Creek Natural Area Bog Restoration	Restore altered areas of bog	R	R	CIP
8	EF Issaquah	3.5	Reach 3 (RM 2 to 5) - protection	Acquire additional forested areas along creek	R	P	CIP
8	Evans Creek	1	Reach 3 (RM 0.75 to 1.25) - protection	Protect existing habitat in undeveloped Johnson Park	R	P	CIP
8	Evans Creek	1.75	Reach 4 (RM 1.25 to 2.25) - restoration	Conduct pilot project to reduce sedimentation, invasive reed canary grass, and to restore riparian vegetation	R	P	CIP
8	Evans Creek	1.75	Reach 4 (RM 1.25 to 2.25) - protection	Work with private property owners in reach to protect existing wetlands.	R	P	P
8	Evans Creek	3	Reach 5 (RM 2.25 to 3.5) - restoration	Move Evans Creek away from Redmond Fall City Road, re-meander, increase buffer and channel complexity and restore riparian vegetation	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Evans Creek	1	Reach 3 (RM 0.75 to 1.25) - restoration	Restore channel in Johnson Park and work with landowners elsewhere to restore instream and riparian habitat	R	R	P
8	Holder Creek	2.25	Reach 3 (RM 1.5 to 3) - protection	Acquire in-holdings on Taylor and Tiger mountains and protect forest cover	R	P	CIP
8	Holder Creek	1.25	Reach 2 (RM 1 to 1.5) - protection	Acquire 80-acre in-holding in Taylor Mountain Forest	R	P	CIP
8	Issaquah Creek	All	Holder Creek LWD addition	Add LWD where needed and feasible	R	R	CIP
8	Issaquah Creek	10	Reach 12 (RM 8.9 to 11.4) - protection	Protect 120 acre confluence area of Carey, Holder and Issaquah Creeks (includes Reach 1 on Carey and Holder Creeks, respectively) and several large parcels adjacent to Log Cabin Reach	R	P	CIP
8	Issaquah Creek	6	Reach 9 (RM 5.5 to 7.0) - protection	Work with private property owners to increase stream buffer protection	R	P	P
8	Issaquah Creek	8	Reach 11 (RM 7.5 to 8.9) - protection	Issaquah Creek Waterways, particularly Log Cabin Reach	R	P	P

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Issaquah Creek	7.25	Reach 10 (RM 7 to 7.5) - protection	Work with private property owners to increase stream buffer protection	R	P	P
8	Issaquah Creek	8	Reach 11 (RM 7.5 to 8.9) - restoration	Restore minor areas of otherwise high quality Log Cabin reach, assess removal of bank hardening in Four Creek subdivision area and work with landowners to improve water quality, in-channel and riparian conditions	R	R	Both
8	Issaquah Creek	7.25	Reach 10 (RM 7 to 7.5) - restoration	Assess landfill and septic system effects and work with property owners to restore habitat implement best management practices to reduce water quality impacts	R	R	Both
8	Issaquah Creek	9	Issaquah Creek Early Action PIN# 2223069015	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
8	Issaquah creek	11	Issaquah Creek - SE 252nd Restoration	Restore reach of Issaquah creek	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
8	Issaquah Creek	10	Reach 12 (RM 8.9 to 11.4) - restoration	Restore Holder/Carey confluence (if acquired) and work with property owners to restore habitat and implement best management practices to reduce water quality impacts	R	R	CIP
8	Issaquah Creek	7	Issaquah Creek Early Action PIN# 2616800580	Elevate structure(s) in floodplain to reduce flood damage risk	R	R	CIP
8	Issaquah Creek	8	Log Cabin Reach (RM 7.75 to 8.25) Wetlands	Remove non-native plants and restore native vegetation at select sites along up to 1.25 miles of Issaquah Creek	R	R	P
8	Issaquah Creek	6	Reach 9 (RM 5.5 to 7.0 - restoration	Work with property owners to restore habitat and implement best management practices to reduce water quality impacts	R	R	P
8	Lake Washington	N/A	O.O. Denny Park Bulkhead Removal	Remove bulkhead on Lake Washington and restore shoreline	L	R	CIP
8	Lower Cedar River	7.3	Cedar Rapids Floodplain Levee setback and Restoration	Restore floodplain vegetation and natural features in area of levee removal or setback	R	Both	CIP

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8	Lower Cedar River	7.3	Cook/Jeffries	Protect buffer and reconnect side-channel	R	Both	CIP
8	Lower Cedar River	5	Cedar - Riparian areas upstream of landslide	Protect riparian vegetation on county land upstream of landslide	R	P	CIP
8	Lower Cedar River	7.3	Cedar River Trail/SR 169 Riparian protection	protect intact riparian forest along trail and SR 169	R	P	CIP
8	Lower Cedar River	12	Byers Reach Protection	Protect 58 acres of riparian and floodplain areas	R	P	CIP
8	Lower Cedar River	12.7	Taylor Creek Mouth	Protect 40 acres of forested floodplain at mouth of Taylor Creek	R	P	CIP
8	Lower Cedar River	13.5	218 Side Channel	Protect 5 acre of floodplain with side channel	R	P	CIP
8	Lower Cedar River	14	Protect Royal Bend	Protect floodplain and steep slopes	R	P	CIP
8	Lower Cedar River	4	Cedar Maplewood	Explore possible flood buyouts and levee setback or removal opportunities	R	R	CIP
8	Lower Cedar River	5.5	Old Elliot Bridge	Removal of old Elliott Bridge and buyouts of repetitive loss properties	R	R	CIP

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8	Lower Cedar River	6.5	Cavanaugh Pond	Remove invasive plants and restore natural vegetation	R	R	CIP
8	Lower Cedar River	6.5	Herzman Levee	Remove or setback levee to reconnect the river with its floodplain	R	R	CIP
8	Lower Cedar River	6.5	Lower Jones Rd/Bucks Curve	Acquire key properties and restore riparian and floodplain functions and processes	R	R	CIP
8	Lower Cedar River	7	Cedar Brassfield	Explore possible flood buyouts and levee setback or removal opportunities in a reach constrained by levees on both banks.	R	R	CIP
8	Lower Cedar River	7	Riverbend Trailer Park	Purchase and remove select number (or possibly all) mobile homes nearest river, recontour revetment to reduce erosion, flood damage and improve flood conveyance and habitat	R	R	CIP
8	Lower Cedar River	7.3	Cedar Rapids Floodplain Acquisition	Acquirer 15 acres of floodplain for restoration	R	R	CIP

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8	Lower Cedar River	8.2	Cedar Scott-Indian / Jones Reach	Acquire homes subject to undermining behind levee, setback levee and restore floodplain	R	R	CIP
8	Lower Cedar River	8.2	Progressive Investment	Remove remainder of progressive investment levee and restore floodplain	R	R	CIP
8	Lower Cedar River	9.4	Cedar Littlefield-Cummings / Belmondo	Acquire and restore ten floodplain parcels with many side channels covering 71 acres. .	R	R	CIP
8	Lower Cedar River	10.9	Cedar Mountain Revetment	Remove revetment and restore riparian and floodplain area	R	R	CIP
8	Lower Cedar River	11	Cedar Grove Road Removal	In conjunction with buyouts, remove access road and restore floodplain	R	R	CIP
8	Lower Cedar River	11	Cedar Grove Junkyard	Buyout and remove junkyard and restore floodplain	R	R	CIP
8	Lower Cedar River	11	Cedar Grove Mobile Home Park	Buyout and mobile home park and remove levee	R	R	CIP

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8	Lower Cedar River	11	WPA Levee Setback and floodplain restoration	Acquire floodway homes, setback levee and restore floodplain currently behind WPA levee	R	R	CIP
8	Lower Cedar River	11.2	Rainbow Bend (aka Cedar Grove) Mobile Home Acquisition Project	Acquire and remove flood-prone mobile home park and homes and associated structures, and decommission and remove supporting infrastructure	R	R	CIP
8	Lower Cedar River	11.5	Rainbow Bend Levee Setback and Floodplain Reconnection	Setback or remove levee to accommodate of flooding and natural riverine processes and potentially construct side channels and associated floodplain features.	R	R	CIP
8	Lower Cedar River	11.7	McDonald Levee	Pursue additional buyouts near levee and restore floodplain	R	R	CIP
8	Lower Cedar River	11.8	Lower Lions Creek	Acquire key properties and restore riparian and floodplain functions and processes	R	R	CIP
8	Lower Cedar River	12	Byers Reach Restoration	Remove levee and restore floodplain	R	R	CIP

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8	Lower Cedar River	12	Lions Club Channel Restoration	Revegetate floodplain	R	R	CIP
8	Lower Cedar River	12.7	Taylor Creek LWD	Add LWD to lower reaches of Taylor Creek	R	R	CIP
8	Lower Cedar River	13.4	Jan Road Floodplain Reconnection	Remove or setback approximately 500 linear feet of raised embankment from the downstream end of each of the Jan Road Levee and the Rutledge-Johnson levees	R	R	CIP
8	Lower Cedar River	13.5	218 Side Channel Enhancement	Enhance side channel after protected	R	R	CIP
8	Lower Cedar River	13.8	Getchman Acquisition and Levee setback	Acquire land and setback levee to restore floodplain functions and processes	R	R	CIP
8	Lower Cedar River	14	Rhode Levee Setback and Home Buyouts	Acquire and remove structures, setback levee and restore floodplain	R	R	CIP
8	Lower Cedar River	14.2	Royal Arch revetment	Explore potential for removal of revetment	R	R	CIP

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8	Lower Cedar River	14.5	Peterson Creek mouth	Add LWD at mouth and consider use of LWD to facilitate fish passage at mouth	R	R	CIP
8	Lower/Middle Cedar River	All	SHRP Cedar	Implement small scale restoration programs	R	R	P
8	Lower/Middle Cedar River	All	Side channel inventory and evaluation	Inventory and assess side channels for restoration potential	R	R	P
8	Middle Cedar River	16.5	Reach 15 Protection	Protect 15 acres of forested floodplain upstream of county owned land	R	P	CIP
8	Middle Cedar River	17	Reach 16 - priority protections	Protect RB gravel sources and unstable right bank above Cedar River Trail Bridge and LB floodplain downstream of BN Nose	R	P	CIP
8	Middle Cedar River	20	Landsburg Reach	Protect 87 acres of forested floodplain and unarmored slopes	R	P	CIP
8	Middle Cedar River	16	Dorre Don Meanders	Protect 71 acres of forested floodplain with side channels	R	P	CIP
8	Middle Cedar River	17	BN Nose restoration	If BN Nose is protected, then restore floodplain	R	R	CIP

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8	Middle Cedar River	17.5	Cedar Orchard Grove	Acquire floodprone parcels and restore floodplain	R	R	CIP
8	Middle Cedar River	20.1	Wingert Side Channel	Enhance side channel with LWD and plantings	R	R	CIP
8	Middle Cedar River	20.2	Revetments @ RM 20.2 and 20.6	remove old revetments and restore riparian areas	R	R	CIP
8	Middle Cedar River	21.5	Wetland 69	Reconnect wetland 69 (an oxbow) to river	R	R	CIP
8	Middle Cedar River	16	Cedar Dorre Don /Dorre Don Meanders	Acquire flood-prone properties in lower Dorre Don area and modify levees and restore floodplain where feasible for reconnection of floodplain with the river	R	R	CIP
8	Rock Creek	0	Rock Creek - Fish Passage	Assess options to improve fish passage at mouth	R	R	CIP
8	Rock Creek	0.05	Rock creek - confluence area floodplain	Buyout RB house and restore floodplain at mouth	R	R	CIP
8	Rock Creek	0.1	Lower Rock Creek Channel Rehab Feasibility Study	Assessment of feasibility to restore natural channel conditions in lower part of Rock Creek	R	R	CIP

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8	Rock Creek	0.1	Rock Creek - Off-channel habitats	Assess feasibility of increasing off-channel habitat	R	R	CIP
8	Sammamish River	11	Reach 5 (RM 10 to 12.25) - restoration	Restore and create pools at mouth of Bear Creek, regrade banks to create shallow rearing habitat and restore riparian vegetation and enhance two tributary confluences	R	R	CIP
8	Sammamish River	13	Reach 6 (RM 12.25 to 13.75) - restoration	Implement the Sammamish River Transition Zone Restoration projects and restore channel, riparian and tributary mouth conditions	R	R	CIP
8	Sammamish River	13.5	Willowmoor	Reconfigure outflow from Lake Sammamish to maintain or reduce current flood risk and to reduce impacts on fish and wildlife	R	R	CIP

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8	Sammamish River	6	Reach 3 (RM 5 to 7.5) - restoration	Restore banks, shallow rearing habitat and riparian vegetation, enhance tributary confluences, and enhance and reconnect riparian wetlands near Gold Creek and I-405/SR 522 Interchange	R	R	CIP
8	Sammamish River	8	Reach 4 (7.5 to 10.5) - restoration	Restore meanders, bank in-channel and tributary confluence conditions	R	R	CIP
8	Upper Cedar River	All	Cedar HCP	Implement City of Seattle Habitat Conservation plan projects	R	Both	P
8	Upper Cedar River	All	HCP flows	Maintain flow commitments in HCP	R	Both	P
8	Upper Cedar River	22	Reach 19 - Instream	Improve habitat in Landsburg Impoundment pool	R	R	CIP
8	Upper Cedar River	22	Reach 19 - LWD	Install engineered logjams near RM 22	R	R	CIP
8	Upper Cedar River	22	Reach 19 - Riparian	Enhance riparian habitat on both sides of river	R	R	CIP
8	Upper Cedar River	23	Reach 29 - Flow redirection	Restoration of flows to Upper Rock Creek	R	R	CIP

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8	Upper Cedar River	23	Flow refuge creation	Install rock structures to create flow refuges	R	R	CIP
8	Upper Cedar River	23	Upper Rock Creek - confluence restoration	Restore confluence of Upper Rock Creek	R	R	CIP
8	Upper Cedar River	30	Upper Taylor Creek confluence restoration	Restore confluence of Upper Taylor Creek	R	R	CIP
8	Upper Cedar River	32	Reach 24 - Riparian	Enhance riparian habitat on both sides of river	R	R	CIP
8	Upper Cedar River	33.1	Reach 25 - Instream	Facilitate instream pool structure, habitat diversity and floodplain connections in reach	R	R	CIP
8	Upper Cedar River	33.1	Reach 25 - Riparian	Enhance riparian habitat on both sides of river	R	R	CIP
8	Upper Cedar River	33.5	Reach 26 - Instream	Facilitate instream pool structure, habitat diversity and floodplain connections in reach	R	R	CIP
8	Upper Cedar River	33.6	Reach 26 - Riparian	Enhance riparian habitat on both sides of river	R	R	CIP
8	Upper Cedar River	34	Decommission Road 71	Remove road and restore area	R	R	CIP

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8	Upper Cedar River	23	Reach 20 - Roads	Road decommissioning and improvement in Upper Rock Creek	R	R	P
8	Upper Cedar River	23	Reach 29 - Riparian	Enhance riparian habitat through adding vegetation and ecological thinning on both sides of Upper Rock creek	R	R	P
8	Upper Cedar River	33	Reach 26 - Roads	Decommission and improve roads	R	R	P
8	Upper Cedar River	33.1	Reach 25 - Roads	Decommission and improve roads	R	R	P
8	Upper Cedar River	All	LWD management	Conduct survey and plan for possible additions as determined necessary and safe	R	R	P
8	Upper Cedar River	All	Reach 24 - Roads	Decommission and improve roads	R	R	P
8	Upper Cedar River	All	Riparian enhancements	Enhance riparian conditions by adding vegetation and ecological thinning	R	R	P
8	Upper Cedar River	All	Road decommissioning and Improvement	Remove and improve roads to reduce sediment	R	R	P

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8	Upper Rock Creek	1.5	Upper Rock Creek - bridge 41	Reconstruct Bridge 41 to facilitate passage of flood flows and woody debris, if Walsh Lake outlet is diverted back to Rock Creek	R	R	CIP
8	Upper Rock Creek	1.5	Upper Rock creek - restore Walsh Lake Outlet to Upper Rock Creek	Assess effects of diverting Walsh lake outlet flows back into Upper Rock Creek	R	R	CIP
8	Upper Rock Creek	1	Upper Rock Creek - LWD additions	Add LWD as deemed necessary and safe	R	R	P
8	Upper Taylor Creek	0.5	Lower Taylor trestle and bridge	Remove/modify bridge and trestle to reduce channel confinement	R	R	CIP
8	Upper Taylor Creek	1	Reach 22 - Roads	Decommission and improve roads in Taylor creek	R	R	P
9	Green River	All	KCD Opportunity grant	Allocate grant funds to implement a wide range of small actions to protect and restore aquatic conditions	R	Both	P
9	Green River	All	WRIA 9 Grant Contingency	Contingency fund to take advantage of unforeseen or time-sensitive protection and restoration opportunities	R	R	CIP

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9	Green River	All	SHRP Green	Implement small scale restoration programs	R	R	CIP
9	Green/ Duwamish River Estuary	6.3	North Wind's Weir Shallow Water Rehabilitation	Create two acres of off-channel, shallow water habitat in lower Green River fresh-to-marine transition area	R	R	CIP
9	Lower Green River	15.8	Segale #2 & #3	Rehabilitate levees to reduce the risk of flooding in the Lower Green River.	R	R	CIP
9	Lower Green River	20.5	Rosso Nursery off-channel rehabilitation and Riparian Restoration	Create, and connect and restore off-channel habitat	R	R	CIP
9	Lower Green River	21	Schuler Brothers Reach Rehabilitation	Improve 90 acres of habitat to improve water quality and floodplain, riparian and instream conditions	R	R	CIP
9	Lower Green River	21.5	Mullen Slough Mouth Acquisition	Acquire Green River floodplain property for future restoration	R	R	CIP
9	Lower Green River	16.5	Gunter Levee Setback and Johnson Creek Restoration	Setback Gunter and Frager Road levees and acquire and restore off-channel, floodplain and tributary wetlands	R	R	CIP

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9	Lower Green River	22	Lower Mill Creek, Green River Park, Hawley Road Levee, Lower Mullen Slough	Restore access to lower valley tributaries, setbacks levees along Hawley and Frager Roads and restore channel edge and floodplain habitat.	R	R	CIP
9	Lower Green River	24.7	78th Avenue South	Acquire floodplain properties, relocate roadway/revetment system landward, and restore river edge, bank, and floodplain habitat	R	R	CIP
9	Lower Green River	25.6	Northeast Auburn Creek	Restore tributary access	R	R	CIP
9	Lower Green River	26	Horsehead Bend	Rehabilitate bank line to create shallow marginal habitat and stabilize eroding banks with native riparian vegetation.	R	R	CIP
9	Middle Green River	N/A	Bass/Beaver Lake	Acquisition of key areas for protection of lake ecology and processes	L	P	CIP
9	Middle Green River	50	Green River Gorge Protection (RM 45 to 55)	Protect 164 acres	R	P	CIP
9	Middle Green River	37.5	Green River Natural Area Additions (RM 35 to 40)	Protect 228 acres contiguous with or near the natural area	R	P	CIP

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9	Middle Green River	59	Kanasket Habitat Protection (RM 58 to 60)	Protect 48 acres	R	P	CIP
9	Middle Green River	34	Lower Green River Valley (RM 32 to 35)	Protect 65 acres of floodplain and tributary habitat	R	P	CIP
9	Middle Green River	45	Flaming Geyser Floodplain and side channel reconnection and restoration	Connect side channel and restore floodplain with LWD, native plants and gravel	R	R	CIP
9	Middle Green River	46	Flaming Geyser	Add gravel to Green River just upstream of Flaming Geyser State Park as Phase 1 of program to add gravel to Green River	R	R	CIP
9	Middle Green River	60	Middle Green Side Channel Restoration at RM 60	Restore a side channel and associated sediment and LWD processes	R	R	CIP
9	Middle Green River	38	Burns Creek Rehabilitation	Restore habitat with plants, LWD, fencing, invasive plant and fine sediment removal	R	R	CIP

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9	Middle Green River	38	Lones Levee	Remove existing levee, replace with smaller setback levee and restore river edge and riparian floodplain conditions	R	R	CIP
9	Middle Green River	58	Brunner Slough (Kanasket North)	Create a new side channel in a floodplain swale	R	R	CIP
9	Middle Green River	40	Side channel reconnection Program	Reconnect side channels between RM 32 and 45	R	R	CIP
9	Middle Green River	34.2	Ray Creek Restoration	Enhance channel and riparian conditions and connectivity	R	R	CIP
9	Middle Green River	35	Kaech Side Channel Rehabilitation	Reconnect and restore side channel	R	R	CIP
9	Middle Green River	62	Middle Green LWD supplementation Program	Restore LWD to river below Howard Hansen Dam	R	R	P
9	Middle Green River	63	Middle Green Gravel Supplementation Program	Restore gravel to river below river below Howard Hansen dam	R	R	P
9	Middle Green River	37	Turley Levee setback	Setback levee to protect agriculture and restore floodplain	R	R	CIP
9	Middle Green River	38	Lone's Levee Setback	Setback levee and restore floodplain	R	R	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
9	Middle Green River	32	Fenster-Pautzke Levee Setback & Floodplain Reconnection	Relocate levees and restore floodplain	R	R	CIP
9	Middle Green River	35	Horath-Kaech Levee Setback and Floodplain Reconnection	Setback levee to protect agriculture and restore floodplain	R	R	CIP
9	Middle Green River	35	Neely and Porter Levee Setback & Floodplain Reconnection	Setback levee to protect agriculture and restore floodplain	R	R	CIP
9	Middle Green River	36	Hamakami Levee Setback	Setback levee to protect agriculture and restore floodplain	R	R	CIP
9	Middle Green River	All	Middle Green River Acquisitions	Acquire properties as necessary to achieve flood hazard reduction and WRIA-based salmon habitat goals	R	R	P
9	Newaukum Creek	All	Newaukum Creek Acquisition	Acquire key areas for protection and restoration needs as identified in basin plan (TBD in 2007) and as funds available	R	Both	CIP
9	Newaukum Creek	6	Middle Newaukum Creek (RM 4 to 8.5)	Protect 100 acres of stream front and wetland areas	R	P	CIP

WRIA	Affected Shoreline	Approximate Location by RM (may be a reach mid-point)	Action	Description	Shoreline type (Marine = M, River = R, Lakes = L)	Primary Environmental Purpose/Effect (Protection = P, Restoration = R)	Type of action (program = P, project =CIP)
9	Newaukum Creek		Lower Newaukum Creek Protection (RM 0 to 4)	Protect 200 acres of stream frontage	R	P	CIP
9	Newaukum Creek	2	Newaukum Creek Mouth Restoration (0.0 to 4.3)	Place LWD and reconfigure lower reach of creek	R	R	CIP
9	Newaukum Creek	All	Newaukum Feasibility	Assess conditions and public safety and habitat needs in Newaukum Creek Basin	R	R	CIP
9	Newaukum Creek	All	Other Newaukum Restoration	Design and implement restoration as identified in basin plan (TBD in 2007) and as funds available	R	R	CIP
9	Newaukum Creek	6	Big Springs Creek Relocation	Relocate and restore creek at confluence with Newaukum Creek	R	R	CIP
9	Newaukum Creek	7	Newaukum Creek Restoration (RM 0.0 to 14.3)	Enhance, expand, reconnect wetlands, create and protect vegetated buffers and restore and reconnect off-channel habitats	R	R	P
9	Soos Creek	34	Lower Soos Creek Protection	Protect 44 acres of undeveloped floodplain	R	P	CIP
9	Soos Creek	34	Soos Creek LWD placement	Add woody debris to channel	R	R	CIP

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9	Upper Green River	64	Fish Passage at Howard Hanson Dam	Provide passage into Upper Green River	R	R	CIP
9	Upper Green River	67	Gale and Boundary Creeks Culvert Replacement	Remove culverts to restore passage for fish	R	R	CIP
9	Upper Green River	80	Upper Green Habitat Improvements	Add woody debris for hydraulic and habitat diversity and reconnect side channels (RM 73 to 82)	R	R	CIP
9	Upper Green River	84.1	Sunday Creek Revegation	Restore riparian vegetation under BPA powerlines	R	R	CIP
9	Vashon	Attachment B – Project NS-17	Functioning Nearshore Habitat Protection	Assess and potentially protect approximately 50 sites along nearshore for protection	M	P	CIP
9	Vashon	All	SHRP Vashon	Implement small scale restoration programs	M	R	P
9	Vashon	Attachment B – Project NS-6	Skeeter Creek Pocket Estuary Restoration	Restore mouth and adjacent shoreline of creek and restore fish passage	M	R	CIP
9	Vashon	Attachment B – Project NS-8	Dillworth and Gorsuch Creeks Pocket Estuaries Restoration	Restore mouth and adjacent shoreline of creeks	M	R	CIP
9	Vashon	Attachment B – Project NS-9	Miletta Fish Passage Improvements	Restore fish passage	M	R	CIP

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9	Vashon	Attachment B – Project NS-14	Raab's Lagoon Acquisition and Restoration	Acquisition and restoration of key areas for protection and restoration of marine ecology and processes	M	P	CIP
9	Vashon	Attachment B – Project NS-9	Tsugwalla Fish Passage Improvements	Restore fish passage	M	R	CIP
9	Vashon	Attachment B – Project NS 17	Lost Lake	Acquisition of key areas for protection of marine ecology and processes	M	P	CIP
9	Vashon	Attachment B – Project NS 17	Inspiration Point	Acquisition of key areas for protection of marine ecology and processes	M	P	CIP
9	Vashon	Attachment B – Project NS-9	Camp Sealth Fish Passage Improvements	Restore fish passage	M	R	CIP
9	Vashon	Attachment B – Project NS-9	Bates Fish Passage Improvements	Restore fish passage	M	R	CIP
9	Vashon	Attachment B – Project NS-7	Cove Creek Pocket Estuary Restoration	Restore mouth and adjacent shoreline of creek	M	R	CIP
9	Vashon	Attachment B – Project NS-9	Ellisport Creek Soil Remediation	Remove soil contaminated with oil	M	R	CIP
9	Vashon	Attachment B – Project NS-9	Ellisport Fish Passage Improvements	Restore fish passage	M	R	CIP

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9	Vashon	Attachment B – Project NS-10	Ellis Creek Estuary acquisition and restoration	Acquisition of key areas, removal of dirt road and restoration of tidal processes and connectivity with marine shoreline	M	R	CIP
9	Vashon	Attachment B – Project NS-17	Piner Point W.	Acquisition of key areas for protection of marine ecology and processes	M	P	CIP
9	Vashon	Attachment B – Project NS-17	Dockton Ext. & N	Acquisition of key areas for protection of marine ecology and processes	M	P	CIP
9	Vashon	Attachment B – Project NS17	Piner Point	Acquisition of key areas for protection of marine ecology and processes	M	P	CIP
9	Vashon	Attachment B – Project NS-17	Maury Island Marine Park E. Acquisition	Acquisition of key areas for protection of marine ecology and processes	M	P	CIP
10	Boise Creek	0.25	Boise Creek Restoration	Relocate and restore channel in historic location	R	R	CIP
10	Red Creek	0.25	Red Creek Acquisitions	Acquire floodprone properties and restore floodplain	R	R	CIP

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10	White River	All	White-Greenwater Acquisition	Acquire and remove at-risk structures, remove a concrete flood wall and restore floodplain	R	R	CIP