

The priority projects listed in this matrix implement management strategy Policy MS1 (Chapter 5 – Section 5.7) and the Habitat Plan tier 1 conservation hypotheses.

Total costs to implement these priority projects range from \$198.3 million to \$291.4 million

*(Note: There is some overlap among Middle Green River, Lower Green River, and Duwamish Estuary projects within each subwatershed-wide category. Costs are adjusted to avoid double counting).*

TABLE 8-2

**Summary of Priority Projects**

**Duwamish Estuarine Transition Zone**

Viable Salmonid Population Parameters Addressed	Conservation Hypothesis	Habitat Management Strategy	Hypothesized Necessary Future Conditions	No.	Habitat Plan Action	Location by River Mile/Reach	Costs
Abundance, Productivity, Diversity	<b>DUW-3:</b> Enlarging Duwamish River Estuarine transition zone habitat by expanding the shallow water and slow water areas will enhance habitat quantity and quality of this key Chinook salmon rearing area, leading to greater juvenile salmon residence time, greater growth, and higher survival.	Restore intertidal mudflats (below RM 7) and channel edge habitats (upstream of RM 7) to create low velocity and shallow water habitat at expected flow levels during juvenile migration.  Substitute lost slow water/shallow water areas, focusing actions at the mouth of the Duwamish to RM 1, between RM 2-5, and upstream of RM 5.5.  Rehabilitate riparian areas in the entire watershed.	Estuarine habitat (transition zone area where juveniles adjust to hyperosmotic conditions) is expanded to encompass 30% of historical habitat area (target is 173 acres) and habitat quality is functioning to improve juvenile growth and survival rate.	1	<b>Duw-7:</b> Shallow water habitat creation (20 acres)	RM 7.0 to 5.5 (both banks)	\$15 million to \$26 million
				2	<b>Duw-9:</b> Bank restoration and revetment setback	RM 6.6 to 5.5	\$1,06 million to \$1,8 million
				3	<b>Duw-10:</b> North Wind's Weir shallow water habitat	RM 6.3 (right bank)	\$1.8 million to \$2 million
				4	<b>Duw-11:</b> Shallow water habitat creation (10 Acres)	RM 5.5 to 4.7	\$17 million to \$43 million (10 ac).
				<b>Total: \$35 million to \$73 million</b>			

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Summary of Priority Projects

Viable Salmonid Population Parameters Addressed	Conservation Hypothesis	Habitat Management Strategy	Hypothesized Necessary Future Conditions	No.	Habitat Plan Action	Location by River Mile/Reach	Costs				
<b>Middle Green River Subwatershed</b>											
Abundance, Productivity, Diversity, and Spatial Structure	<p><b>MG1:</b> Protecting and creating/restoring habitat that provides refuge (particularly side channels, off channels, and tributary access), habitat complexity (particularly pools) for juvenile salmon over a range of flow conditions and at a variety of locations (e.g. mainstem channel edge, river bends, and tributary mouths) will enhance habitat quality and quantity and lead to greater juvenile residence time, greater growth, and higher survival.</p> <p><b>MG3:</b> Protecting and restoring natural sediment recruitment (particularly spawning gravels) by reconnecting sediment sources to the river will help maintain spawning, adult holding, and juvenile habitat.</p>	<p>Restore areas with some functioning off-channel habitat; restore lateral channel migration to create off-channel habitat.</p> <p>Restore lateral channel migration to recruit sediments.</p> <p>Restore natural cycle of succession and plant diversity of riparian areas.</p> <p>Substitute sediment recruitment through gravel and large woody debris supplementation.</p>	Refugia is established that provides habitat to support both juvenile and adult Chinook (RM 31.3-45.3).	1	<b>MG-1:</b> Upper (Middle) Green River side channels	RM 60	\$676,000 to \$775,000				
				2	<b>MG-2:</b> Brunner Slough (Kanaskat North) off-channel creation	RM 58	\$1.2 million to \$1.4 million				
				3	<b>MG-3:</b> Flaming Geyser floodplain reconnection, side channel connection, and habitat restoration	RM 45.1 to 44.3	\$2.2 million to \$3.4 million				
				4	<b>MG-4:</b> Flaming Geyser side channel construction, floodplain reconnection	RM 44	\$608,000 to \$1.1 million				
				5	<b>MG-6:</b> Newaukum Creek riparian planting and large woody debris placement	RM 14.3 to 0	\$4.3 million to \$4.9 million				
				6	<b>MG-8:</b> Newaukum Creek mouth riparian planting and large woody debris	RM 4.3 to 0.3	\$938,000 to \$1.1 million				
				7	<b>MG-9:</b> Lones Levee removal and channel migration restoration	RM 38	\$2.9 million to \$3.3 million				
				9	<b>MG-10:</b> Burns Creek replanting, large woody debris placement, fencing	RM 38	\$421,500 to \$483,000				
				10	<b>MG-11:</b> Turley Levee setback, floodplain reconnection	RM 37	\$195,000 to \$222,000				
				11	<b>MG-12:</b> Levee Setback to reconnect floodplain and allow channel migration	RM 36	\$1.5 million to \$2.7 million				
				12	<b>MG-13:</b> Hamakami Levee breach to reconnect Floodplain	RM 36	\$650,000 to \$ 744,000				
				13	<b>MG-14:</b> Kaech Side Channel and wetland reconnection	RM 35	\$267,000 to \$305,000				
				14	<b>MG-15:</b> Neely and Porter Levees setback and floodplain reconnection	RM 35.5 to 34.5	\$7.5 million to \$13 million				
				15	<b>MG-16:</b> Ray Creek replanting, off-channel reconnections, and fencing	RM 34.2	\$2.2 million to \$2.5 million				
				16	<b>MG-17:</b> Porter Levee setback and floodplain reconnection	RM 34	\$974k to \$1.1 million				
				17	<b>MG-18:</b> Fenster-Pautzke setback and floodplain reconnection	RM 32	\$940,000 to \$1.7 million				
				18	<b>MG-19:</b> Middle Green acquisitions	Various	\$23.7 million to 26.2 million (if all properties acquired)				
				<b>Total:</b>							<b>\$51.2 million to \$65 million</b>

TABLE 8-2  
Summary of Priority Projects

Viable Salmonid Population Parameters Addressed	Conservation Hypothesis	Habitat Management Strategy	Hypothesized Necessary Future Conditions	No.	Habitat Plan Action	Location by River Mile/Reach	Costs
<b>Lower Green River Subwatershed</b>							
Abundance, Productivity, Diversity, and Spatial Structure	<b>LG1:</b> Protecting and creating/restoring habitat that provides refuge (particularly side channels, off channels, and tributary access), habitat complexity (particularly pools) for juvenile salmon over a range of flow conditions and at a variety of locations (e.g. mainstem channel edge, river bends, and tributary mouths) will enhance habitat quality and quantity and lead to greater juvenile residence time, greater growth, and higher survival.	Rehabilitate existing bank lines to create low velocity and shallow water habitat during juvenile migration  Rehabilitate off-channel habitat by reconnecting habitats to mainstem.  Rehabilitate riparian areas by establishing native vegetation along banks of mainstem and tributaries.  Substitute loss of slow water areas by creating new off-channel habitats and placement of large woody debris along bank lines.	Mainstem, tributary, and off-channel habitats are improved to increase juvenile rearing, life-stage diversity and productivity (increase egg-to-fry and fry-to-fingerling survival rates). Targets are functioning habitats representing 45% of historical habitat area. Habitats are side channels (target = 4.5 km), wetlands (target = 1185 acres, tributaries within the valley bottom (target = 36 km), ponds (target = 32 acres), shallow channel edges, large woody debris jams, and in-channel pools.  Hydrologic connection to floodplain, tributaries and historical off-channel habitats are restored to achieve 45% of historical habitat area.	1	<b>LG-1:</b> Riverside Estates side channel	RM 28.8 (left bank)	\$504,000 to \$577,000
				2	<b>LG-2:</b> Olson Creek	RM 28.5 (right bank)	\$700,000 to \$900,000
				3	<b>LG-3:</b> Horsehead Bend	RM 26	\$605,000 to \$692,000
				4	<b>LG-4:</b> Off-channel habitat rehabilitation	RM 25.9 (left bank)	\$970,000 to \$1.8 million
				5	<b>LG-5:</b> Northeast Auburn Creek	RM 25.6 (left bank)	\$732,000 to \$838,000
				6	<b>LG-6:</b> Acquisition, revetment setback, floodplain wetland restoration and off-channel habitat rehabilitation	RM. 25.3-25.1 (left bank)	\$2.8 million to \$5.0 million
				7	<b>LG-7:</b> Lower Mill Creek, Green River Park, Hawley Road Levee and Lower Mullen Slough	RM 24-21.3	\$4.4 million to \$5 million
				8	<b>LG-8:</b> Schuler Brothers Reach	RM 2.1-0.3	\$2.5 million to \$3 million
				9	<b>LG-9:</b> Rosso Nursery off-channel rehabilitation and riparian restoration	RM 20.8 to 20	\$1.0 million to \$1.6 million
				10	<b>LG-10:</b> Mainstem maintenance (including Boeing Levee)	RM 32 to 17	\$35 million to \$40 million
				11	<b>LG-11:</b> Acquisition and off-channel habitat rehabilitation	RM 17.3-16	\$11.0 million to \$22 million
				12	<b>LG-12:</b> Briscoe Levee setback/off-channel habitat rehabilitation	RM 16.1-15.8	\$700k to \$1.2 million
				13	<b>LG-13:</b> Acquisition, levee setback, habitat rehabilitation	RM 15.3-14.7	\$2.6 million to \$ 3.7 million
				14	<b>LG-15:</b> Habitat rehabilitation	RM 12.65-12.5	\$1.0 million to \$1.5 million
				15	<b>LG-16:</b> Gilliam Creek	RM 12.5	\$629,000 to \$721,000
				16	<b>LG-17:</b> Fort Dent Levee setback	RM 11.7-11.4	\$200,000 to \$330,000
				17	<b>LG-18:</b> Black River Marsh	RM 11.0	\$45,000 to \$52,000
				18	<b>LG-19:</b> Lower Springbrook Reach	RM 1.0	\$4.3 million to 5 million
				<b>Total:</b>			

TABLE 8-2  
Summary of Priority Projects

Middle Green River, Lower Green River, Estuary, and Marine Nearshore Rearing Habitat

Viable Salmonid Population Parameters Addressed	Conservation Hypothesis	Habitat Management Strategy	Hypothesized Necessary Future Conditions	No.	Habitat Plan Action	Location by River Mile/Reach	Costs
<b>Duwamish Estuary Subwatershed</b>							
Abundance, Productivity, Diversity	<b>DUW-3:</b> Enlarging Duwamish River Estuarine transition zone habitat by expanding the shallow water and slow water areas will enhance habitat quantity and quality of this key Chinook salmon rearing area, leading to greater juvenile salmon residence time, greater growth, and higher survival.	Restore intertidal mudflats (below RM 7) and channel edge habitats (upstream of RM 7) to create low velocity and shallow water habitat at expected flow levels during juvenile migration.	Mainstem, off-channel, and tributary habitats are improved to increase juvenile rearing, life-stage diversity and productivity (increase egg-to-fry and fry-to-fingerling survival rates). Targets are functioning habitats representing 30% of historical habitat area. Habitats are shallow channel edge, Palustrine and Riverine-tidal wetlands (target=267 acres), and off-channel habitat (target=5 acres).	1 2 3 4 5 6	<b>Duw-7:</b> Shallow water habitat creation (20 acres) <b>Duw-9:</b> Bank restoration and revetment setback. <b>Duw-10:</b> North Wind's Weir shallow water habitat creation <b>Duw-11:</b> shallow water habitat creation (10 acres) at RM 5.5-4.7 (both banks) <b>Duw-12:</b> South Park bank restoration and shallow water habitat creation <b>Duw-13:</b> Kellogg Island rehabilitation	RM 7.0-5.5 RM 6.6 to 5.5 RM 6.3 (right bank) RM 5.5-4.7 RM 3.8-3.7 (left bank) RM 1.4-1.2	\$15 million to \$26 million \$1.06 million to \$1.8 million \$1.8 million to \$2 million \$17 million to \$43 million \$1.6 million - \$1.7 million \$2.5 million to \$ 7.7 million  <b>Total: \$39 million to \$82.2 million</b>

TABLE 8-2  
Summary of Priority Projects

Viable Salmonid Population Parameters Addressed	Conservation Hypothesis	Habitat Management Strategy	Hypothesized Necessary Future Conditions	No.	Habitat Plan Action	Location by River Mile/Reach	Costs
<b>Marine Nearshore Subwatershed</b>							
Abundance, Productivity, Diversity, and Spatial Structure	<p><b>NSP2:</b> Protecting and increasing the availability of vegetated shallow nearshore and marsh habitats will enhance habitat quantity and quality and lead to greater juvenile salmon residence time, greater growth, and higher survival.</p> <p><b>NSP3:</b> Protecting nearshore sediment transport processes by reconnecting sediment sources and removing shoreline armoring that impacts sediment transport will lead to greater prey production, greater juvenile salmon growth and higher survival.</p>	<p>Protect existing functioning nearshore rearing habitat.</p> <p>Restore sediment recruitment and transport processes.</p> <p>Restore shallow water habitats.</p> <p>Restore riparian vegetation.</p> <p>Restore beaches, backshore, and associate plant communities.</p>	<p>Marine sediment recruitment and transport rates approach natural rates to maintain existing habitat and support habitat development to increase life-stage productivity.</p> <p>Marine habitats are improved to increase juvenile rearing, life-stage diversity, and productivity. Marine nearshore habitats include salt marshes, beaches and backshore, pocket estuaries, and shallow water habitat.</p> <p>Marine riparian zone is functioning and effective buffer widths are established to provide all riparian functions.</p>	1	<b>NS-1:</b> Pier 90 shallow water habitat rehabilitation	Pier 90 (Seattle)	\$2.2 million to \$6 million
Abundance, Productivity				2	<b>NS-2:</b> Myrtle Edwards Park small pocket beaches/shallow water habitat rehabilitation	Myrtle Edwards Park (Seattle)	\$7.7 million to \$8.9 million
				3	<b>NS-3:</b> Olympic Sculpture Park tidal embayment/shallow water habitat rehabilitation	Olympic Sculpture Park (Seattle)	\$2.5 million
				4	<b>NS-4:</b> Seattle Waterfront shallow water bench habitat rehabilitation	Elliott Bay (Seattle)	\$7.7 million to \$8.5 million
				5	<b>NS-5:</b> Burién Seahurst Park shoreline restoration, Phase 2	Seahurst Park (Burién)	\$5.3 million to \$5.9 million
				6	<b>NS-10:</b> Ellis Creek saltmarsh protection and restoration on Vashon Island	Ellis Creek (Vashon Island)	\$450,000 to \$1.6 million
				7	<b>NS-11:</b> Feeder Bluff protection and restoration of beach feeding processes in Normandy Park	Normandy Park	\$318,000 to \$1 million
				8	<b>NS-12:</b> Pocket Estuary restoration of Unnamed Creek in Normandy Park	Normandy Park	\$600,000 to \$2,000,000
				9	<b>NS-14:</b> Evaluate how to improve habitat value of Raab's lagoon.	Raab's Lagoon (Maury Island)	Costs not available
				10	<b>NS-17:</b> Functioning nearshore habitat protection	Various locations	\$11.3 million to \$12.6 million (total cost if all 51 properties were acquired)
				11	<b>NS-18:</b> Sandford Point feeder bluff restoration on Vashon Island	Vashon Island	\$90,000 to \$300,000
				12	<b>NS-19:</b> Tramp Harbor intertidal fill removal on Vashon Island	Vashon Island	\$90,000 to \$300,000
				13	<b>NS-20:</b> Maury Island fill removal	Vashon Island	\$45,000 to \$150,000
				14	<b>NS-21:</b> Sandy Beach fill and derelict pier removal on Vashon Island	Vashon Island	\$82,500 to \$275,000
							<b>Total:</b> <b>\$38 million to \$50 million</b>

TABLE 8-2  
Summary of Priority Projects

Middle Green River and Lower Green River Spawning Habitat

Viable Salmonid Population Parameters Addressed	Conservation Hypothesis	Habitat Management Strategy	Hypothesized Necessary Future Conditions	No.	Habitat Plan Action	Location by River Mile/Reach	Costs
<b>Middle Green River Subwatershed</b>							
Abundance, Productivity, Diversity, and Spatial Structure	<b>MG1:</b> Protecting and creating/restoring habitat that provides refuge (particularly side channels, off channels, and tributary access), habitat complexity (particularly pools) for juvenile salmon over a range of flow conditions and at a variety of locations (e.g. mainstem channel edge, river bends, and tributary mouths) will enhance habitat quality and quantity and lead to greater juvenile residence time, greater growth, and higher survival.	Restore areas with some functioning off-channel habitat; restore lateral channel migration to create off-channel habitat.  Restore lateral channel migration to recruit sediments.  Restore natural cycle of succession and plant diversity of riparian areas.	Refugia is established that provides habitat to support both juvenile and adult Chinook (RM 31.3-45.3).  Sediment recruitment and transport rates approach natural rates to increase productivity of spawning areas and to maintain and develop habitats (e.g. pool tail outs, spawning riffles, shallow channel edge) for improving life-history productivity. Segment target with suitable gravel size is 6,300 cubic yards/year to support spawning habitat (RM 64.4 to 31.3).		(See Middle Green River Subwatershed section of Table 7-2.  All of the projects provide both spawning and rearing habitat benefits.)		(See Middle Green River Subwatershed section of Table 7-2)
Abundance, Productivity	<b>MG3:</b> Protecting and restoring natural sediment recruitment (particularly spawning gravels) by reconnecting sediment sources to the river will help maintain spawning, adult holding, and juvenile habitat.	Substitute sediment recruitment through gravel and large woody debris supplementation.					
<b>Lower Green River Subwatershed</b>							
Abundance, Productivity, Diversity, and Spatial Structure	<b>LG1:</b> Protecting and creating/restoring habitat that provides refuge (particularly side channels, off channels, and tributary access), habitat complexity (particularly pools) for juvenile salmon over a range of flow conditions and at a variety of locations (e.g. mainstem channel edge, river bends, and tributary mouths) will enhance habitat quality and quantity and lead to greater juvenile residence time, greater growth, and higher survival.	Rehabilitate existing bank lines to create low velocity and shallow water habitat during juvenile migration  Rehabilitate off-channel habitat by reconnecting habitats to mainstem.  Rehabilitate riparian areas by establishing native vegetation along banks of mainstem and tributaries.  Substitute loss of slow water areas by creating new off-channel habitats and placement of large woody debris along bank lines.	Mainstem, tributary, and off-channel habitats are improved to increase juvenile rearing, life-stage diversity and productivity (increase egg-to-fry and fry-to-fingerling survival rates). Targets are functioning habitats representing 45% of historical habitat area. Habitats are side channels (target = 4.5 km), wetlands (target = 1185 acres, tributaries within the valley bottom (target = 36 km), ponds (target = 32 acres), shallow channel edges, large woody debris jams, and in-channel pools.  Hydrologic connection to floodplain, tributaries and historical off-channel habitats are restored to achieve 45% of historical habitat area.  Sediment processes and transport rates that produce spawning gravel (RM 25 to 32) are reestablished and improved to increase productivity spawning areas, increase spatial structure and maintain and develop habitats (e.g. pool tail outs, spawning riffles, shallow channel edge) that will increase life-history productivity. Spawning habitat target with suitable gravel size is 45% of historical levels (5,000 CY/year) for viability of population.	1 2 3 4 5	<b>LG-1:</b> Riverside Estates Side Channel <b>LG-2:</b> Olson Creek <b>LG-3:</b> Horsehead Bend <b>LG-4:</b> Off-channel habitat rehabilitation <b>LG-5:</b> Northeast Auburn Creek	RM 28.8 (left bank) RM 28.5 (right bank) RM 26 RM 25.9 (left bank) RM 25.6 (left bank)	\$504,000 to \$577,000 \$700,000 to \$900,000 \$605,000 to \$692,000 \$970,000 to \$1.8 million \$732,000 to \$838,000  <b>Total: \$3.5 million to \$4.8 million</b>