11.0 COLUMBIA RIVER CHUM ESU

11.1 COASTAL STRATA POPULATIONS

11.1.1 Grays River

11.1.1 Background

Due to forest harvest activity on extensive private forest lands and intense agricultural development in the lower mainstem and lower reaches of mainstem tributaries, 70 percent of this watershed is in young forest stand age or is non-forested. Agricultural development near the mouth of the river has also severely reduced backwater habitats in the tidal influence zone, significantly reducing habitat available to juvenile chum. The impact of these perturbations in the watershed is a marked decline in life-history diversity, as modeled in EDT. Given that these impacts are not permanent, there is a high probability that these channel morphology impacts can be healed. The fact that the area is largely rural gives at least a medium likelihood of success.

11.1.1.2 Suggested Mitigation Measures and Constraints

The most important restoration opportunities in Grays River are associated with reconnecting side channel and floodplain areas and restoring riparian function in the agricultural zone of the subbasin. Degraded watershed processes resulting in bed load issues should be improving, because they were caused by historic upper basin forest practices. However, potential improvement opportunities are rated as medium. Current local efforts are focused on artificially stabilizing banks and dredging for flood control, neither of which addresses identified limiting factors related to channel morphology.

11.1.2 Elochoman River

11.1.2.1 Background

Two general categories of impairment affect the Elochoman River: 1) degraded sediment, flow, and riparian processes as a result of intensive timber harvests in the middle and upper elevations, and 2) degraded floodplain and riparian function related to agricultural development in the lower river valleys. While upper watershed impacts translate downstream, it is the lower elevation impacts that have the greatest impact on chum salmon.

11.1.2.2 Suggested Mitigation Measures and Constraints

Protecting important chum spawning reaches will require conservation easements or purchase. Improvements to habitat diversity could be achieved through restoration actions addressing degraded channel morphology. Resolving impacts of agricultural use to floodplain function and riparian structure can be accomplished with the right set of incentives, such as the Conservation Reserve Enhancement Program. Temperature limiting factors can be improved through the same measures.

11.1.3 Mill Creek

11.1.3.1 Background

As noted for the Elochoman River above, intensive timber harvest in the upper watershed has contributed to degraded sediment, flow, and riparian processes that limit production of chum in the lower watershed. Additionally, scattered residential development is a contributing factor.

11.1.3.2 Suggested Mitigation Measures and Constraints:

Improved forest land management in the upper watershed offers long-range habitat improvement potential. Appropriate land use regulation would address the issue of scattered and dispersed impacts from residential development. There do not appear to be major habitat restoration project opportunities that would provide a measurable response outside of these natural and regulatory processes.

11.1.4 Youngs Bay

11.1.4.1 Background

Historically, the entire Youngs Bay system supported a large chum run. The Klaskanine River supported over 500 chum spawners, and spawners were observed (but apparently not counted) in the Youngs and Lewis and Clark rivers. Currently, there is no reported usage of this drainage by chum salmon. This area has been highly modified by diking, port development, and urban growth.

11.1.4.2 Suggested Mitigation Measures and Constraints:

The most important restoration opportunities in Youngs Bay are associated with artificial channel confinement and riparian degradation that have occurred in the lower reaches of the subbasin. Potential improvement opportunities are rated as medium, because local initiatives are focused on channel 'fixing' and flood control, neither of which address the channel morphology issues in this system.

11.1.5 Clatskanie River

11.1.5.1 Background

Historically, chum spawning occurred in the Clatskanie River, Plympton Creek, and Beaver Creek. Currently, chum usage is not reported in this basin. Extensive diking and draining for agricultural purposes have disconnected the floodplain in the lower reaches. Extensive logging has occurred in the upper reaches of the Clatskanie River, with subsequent downstream effects. Fine sediment has silted in many of the spawning areas available in the past.

Table 11-1. Columbia River Chum (yearlings) Ecological Improvement Potential

			Data Sources					
	①	②		③	④		⑤	⑥	⑦
	Range of System Survival Rates GAP [D*]	Index of Potential to Increase Population: H/M/L (base period abundance/pro-ductivity estimate; recent abundance/ productivity estimate or % Interim Target)	CSTN	Qualitative Assessment (CHART, NWFSC approach and other info) of Potential to Improve/Increase Habitat (H/M/L)	CSTN	Primary Candidate Anthropogenic Limiting Factors: **F**low, **C**hannel **M**orphology (bed, banks, sediment, LWD, sinuos., connectiv.), **T**emperature, **W**ater **Q**uality	CSTN	Ecological Improve-ment Potential	Improvement Potential Adjusted Based on Practical Constraints	Proposal to Fill Gap and Performance Measures/ Standards/ M&E
Coastal stratum (7 populations)									
Grays River		VH (4300:705)		H		CM, F		H	M	
Elochoman River		VH (1100:150)		H		CM, T		H	M	
Mill Creek		VH (1000:150)		H		CM, Floodplain		H	M	
Big Creek		VH		H		CM		H	M	
Cascade stratum (7 populations)									
Cowlitz River		VH (1000:150)		H		CM, F		M	L	
Kalama River		VH (600:150)		H		CM, F		H	L	
Lewis River		VH (4000:150)		H		CM, T		H	M	
Salmon Creek		M (no counts)		H		CM, WQ		M	L	
Washougal River		VH (1000:150)		H		CM		M	M	
Gorge stratum (2 populations)									
Lower Gorge Tributaries		L (500:450)		L		CM, F		L	L	
Upper Gorge Tributaries		VH (450:10)		H		CM		H	VL	

*D = Delayed mortality due to transportation

CSTN = Council, States, TRTs, NWC

11.1.5.2 Suggested Mitigation Measures and Constraints

The most important restoration opportunities in the Clatskanie River are associated with artificial channel confinement and riparian degradation that has occurred in the agricultural zone of the subbasin. Historic upper-basin forest practices have degraded watershed processes downstream, resulting in bed load issues in the lower reaches. However, potential improvement opportunities are rated low, because local initiatives are focused on dredging as a means to channel 'fixing' and flood control, neither of which addresses the issue of channel morphology. In addition, breaching dikes and improving floodplain connectivity in the lower reaches will likely not enjoy broad local support.

11.1.6 Scappoose Creek

11.1.6.1 Background

Historically, Milton Creek supported a run of about 200 chum per year. Water diversion for the City of St. Helens out of Milton Creek may have contributed to run size reduction. Currently, chum usage is not being documented in this basin. Efforts have been undertaken by local watershed groups to improve passage and habitat within Scappoose Creek. Urban development has blocked passage in many of the small tributaries. Increased waterfront development has also modified riparian areas and nearshore processes.

11.1.6.2 Suggested Mitigation Measures and Constraints

Appropriate land use regulation would address the issue of scattered and dispersed impacts from residential development. There do not appear to be major habitat restoration project opportunities that would provide a measurable response outside of the above-mentioned natural and regulatory processes.

11.1.7 Big Creek

11.1.7.1 Background

Big Creek, Bear Creek, and Gnat Creek all historically supported runs of chum. Currently, this area is the only known tributary system that supports chum on the Oregon side of the Columbia River. Hatchery and dam construction has blocked fish from some suitable areas upstream.

11.1.7.2 Suggested Mitigation Measures and Constraints:

Passing fish above blockages may provide for some increase in chum usage, but there are very few fish currently present. Straying from Washington rivers might be a more effective means of increasing the number of chum in this system than habitat actions.

11.2 CASCADE STRATA POPULATIONS

11.2.1 Cowlitz River

11.2.1.1 Background

Watershed process impairments in the Cowlitz River drainage are mainly limited to hydrologic impacts due to land cover changes. The lack of "hydrologically mature" forest, high amounts of impervious surface, and high road densities are all contributing factors. They result from timber harvest, residential/urban development, and agricultural use. Reductions in habitat diversity resulting from channel straightening, artificial confinement, loss of instream, stable, large woody material, loss of riparian function, changes to stream flow, and urban development in the lower reaches of tributary Coweeman are also contributing factors. Anthropogenic responses to the

natural impacts of the 1980 Mount St. Helens eruption, e.g., timber harvest and road building in the rain-on-snow zone, have exacerbated the hydrologic impairment of the watershed.

11.2.1.2 Suggested Mitigation Measures and Constraints

There are a number of riparian mitigation measures and opportunities that might be pursued in this system. However, in a local jurisdiction that does not provide for riparian integrity through local land use regulation, the ultimate chances of success for these efforts is questionable. The issue of hydrologic maturity of the forest land cover will be largely improved through time and forest practice regulation. It may also be possible to improve conditions in the chum zone by restoring habitat diversity that has been modified by channel straightening and confinement.

11.2.2 Kalama River

11.2.2.1 Background

The lower mainstem reaches of the Kalama offer the most important chum salmon production opportunity in this subbasin. These reaches suffer from impaired channel stability and habitat diversity, related to riparian and floodplain impacts from rural residential development, commercial development, agriculture, and transportation corridors. Sedimentation in these reaches is related to basin-wide forestry practices. Further degradation of these reaches will severely impact chum production.

11.2.2.2 Suggested Mitigation Measures and Constraints

The opportunity for restoration opportunities in the lower mainstem is dependent on appropriate land use regulation and the cooperation of private landowners. Floodplain restoration projects such as dike pullback and side channel reconnection could yield positive results in this system. Repairing the impacts from residential or commercial development would likely be a more complex and costly alternative. More effective stormwater treatment systems and regulations would also yield positive results for chum in this system.

11.2.3 Lewis River

11.2.3.1 Background

The mainstem Lewis between tidal influence and the Cedar Creek confluence has lost a significant amount of habitat due to artificial confinement projects. An estimated 50 percent of the historical floodplain has been disconnected from the river. Habitat diversity is severely limited in this straightened and simplified channel. Riparian function is impaired due to development within riparian areas. Historical chum production has been dramatically reduced as a result of habitat degradation in this reach. The lower East Fork of the Lewis River suffers from loss of key habitats, low habitat diversity, and channel instability. These conditions are partly due to recent avulsions of the mainstem into stream-adjacent gravel pits. This area also suffers from artificial confinement projects and degraded riparian zones. Riparian residential development is widespread in the lower portion of the basin and is expected to increase, thus

emphasizing the importance of careful land use planning to ensure that conditions for aquatic species are not further degraded.

11.2.3.2 Suggested Mitigation Measures and Constraints

There is little current chum production in this system, but significant gains in production could be realized if conditions in the lower mainstem and tributaries could be improved. Projects addressing habitat diversity, channel stability, and sediment routing are appropriately addressed by local entities. The benefits of restoration are potentially high, and the likelihood of success rates a medium on the scale of practical constraints.

11.2.4 Salmon Creek

11.2.4.1 Background

Salmon Creek flows through highly urbanized areas of the City of Vancouver and Clark County. Extensive urban and rural development within the subbasin has degraded habitat in the watershed. Stormwater impacts, loss of forest cover, altered riparian corridors, minimal instream habitat diversity, large areas of impervious surface, high road densities, channelization and streambank hardening, flood control projects, and passage barriers have all contributed to the degradation of habitat conditions.

11.2.4.2 Suggested Mitigation Measures and Constraints

The Salmon Creek subbasin is within the designated growth area of Vancouver and Clark County. While there are many interested citizen groups accomplishing subbasin restoration projects, it is important to recognize that development and population will continue to increase in this subbasin. Effective stormwater management may help avoid fish die-offs that have occurred in urbanized/restored stream systems.

11.2.5 Washougal River

11.2.5.1 Background

The Washougal subbasin is characterized by urban development in the lower mainstem, lower Little Washougal, and Lacamas Creek basins. The middle mainstem and lower WF Washougal are characterized by aggressive rural residential and agricultural development, with increasing development pressures. Because of its proximity to an expanding population center, the potential for further habitat degradation is high. Riparian function has been compromised by the loss of large woody material, streambank stability, and floodplain function, as well as the disruption of nutrient exchange and hyporheic flow processes.

11.2.5.2 Suggested Mitigation Measures and Constraints

There are opportunities to accomplish restoration projects to address the habitat diversity, key habitat, and channel stability issues in this system, but the pressures of growth will continue to

exert a detrimental influence on the chum population. Responding to degraded riparian conditions and artificial confinement should be important priorities.

11.2.6 Clackamas River

11.2.6.1 Background

The Clackamas subbasin is characterized by urban development in the lower mainstem. Because of its proximity to an expanding population center, the potential for further habitat degradation is high. Riparian function has been compromised by the loss of large woody material, streambank stability, and floodplain function, and by the disruption of nutrient exchange and hyporheic flow processes. Water diversions have decreased flows. Urban and agricultural runoff have degraded water quality.

11.2.6.2 Suggested Mitigation Measures and Constraints

There are opportunities to accomplish restoration projects to address the habitat diversity, key habitat, and channel stability issues in this system, but the pressures of growth will continue to exert a detrimental influence on the chum population. Responding to degraded riparian conditions and artificial confinement should be important priorities

11.2.7 Sandy River

11.2.7.1 Background

The Sandy subbasin is characterized by urban development in the lower mainstem. The middle mainstem is characterized by rural residential and agricultural development, and by increasing development pressures. Because of its proximity to an expanding population center, the potential for further habitat degradation is high. In the lower reaches, riparian function has been compromised by the loss of large woody material, streambank stability, and floodplain function, as well as the disruption of nutrient exchange and hyporheic flow processes. Historically, chum salmon also utilized portions of the Bull Run River for spawning. Water diversion for the City of Portland has altered the natural flow regime in this system.

11.2.7.2 Suggested Mitigation Measures and Constraints

There is little current chum production in this system, but the potential for improvement exists if conditions in the lower mainstem could be improved. Projects addressing habitat diversity, channel stability, floodplain reconnection, and sediment routing would be beneficial. The benefits of restoration are potentially high, and the likelihood of success rates a medium on the scale of practical constraints.

11.3 GORGE STRATA POPULATIONS

11.3.1 Lower Gorge Tributaries

11.3.1.1 Background

Along with Grays River, the lower reaches and lower gradient portions of Hamilton and Hardy Creeks, the restored access to Duncan Creek, and the mainstem area at Ives Island are bright spots in chum reproduction in the Columbia River. Mainstem chum spawning near Vancouver, Washington (referred to as the I-205 and Rivershore sites) is considered part of the Lower Gorge spawning population. Springs and upwelling provide preferred chum spawning habitat. Recent observations of chum salmon at the mouths of lower gorge tributaries (Multnomah, Tanner, Oneonta and Horsetail creeks) indicate that some spawning may be occurring in these areas as well.

11.3.1.2 Suggested Mitigation Measures and Constraints

Addressing flows and the issue of dewatering mainstem channel spawning areas in the tailrace of Bonneville Dam is a key opportunity that will depend on FCRPS hydropower management.

Evaluation of the extent of usage and limiting factors at the river mouths of Oregon tributaries may lead to the potential for increasing spawning capacity. Blockage of gravel recruitment from culverts along Interstate 84 and the railroad bed may be limiting the potential for increased usage.

11.3.2 Upper Gorge Tributaries

11.3.2.1 Background

There is very little habitat available to anadromous fish in the Little White Salmon subbasin. Over a mile of historically available spawning habitat was impounded by Drano Lake when Bonneville Dam was constructed. The most important current habitat is therefore in the lower reach, just upstream of Drano Lake. Restoration of chum in the Wind River is unlikely, because historical spawning habitat was inundated by Bonneville Pool.

11.3.2.2 Suggested Mitigation Measures and Constraints

The main potential improvements in this system are related to improved passage over Bonneville Dam and restoration of historical spawning habitat currently inundated by Bonneville pool. Neither issue offers easy solutions or opportunity for mitigation. This population strata rates very low in the practical constraint column.

11.2 LITERATURE CITED

To be completed.