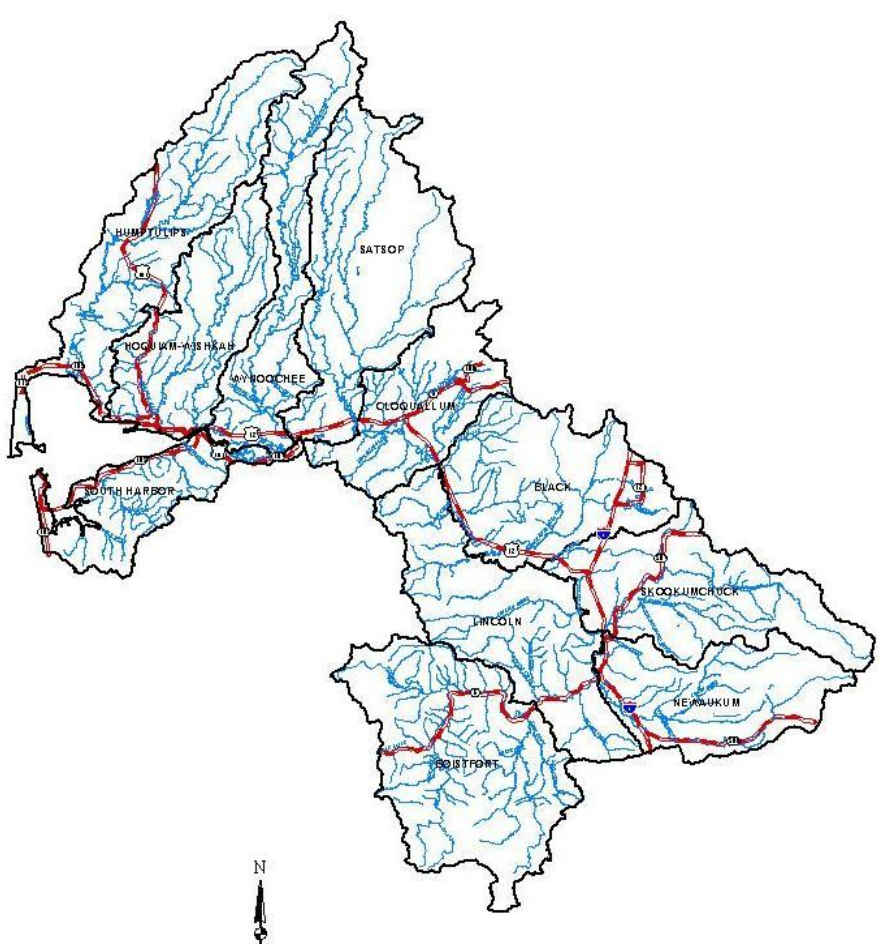
The Chehalis Basin Salmon Habitat Restoration and Preservation Strategy for WRIAs 22 and 23

Subbasin Action Steps

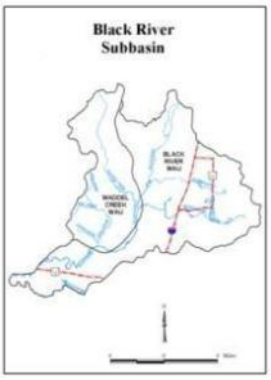


Contents

See the Chehalis Basin Salmon Habitat Restoration and Preservation Work Plan for WRIAs 22 and 23 (pages 77 – 255) for greater detail: http://www.co.grays-harbor.wa.us/info/pub_svcs/Lead_Entity/library/library.htm

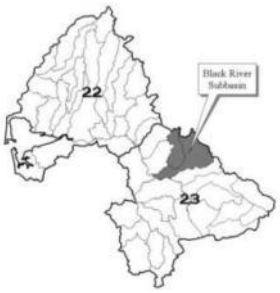
Black River Management Unit

Black River Management Unit – Black River



Major Tributaries:
Beaver Creek
Waddell Creek
Salmon Creek
Mima Creek

Anadromous Fish Stocks:
fall Chinook
coho
chum
cutthroat
winter steelhead



Tier 1 Concerns

Water Quality, Riparian, Water Quality

- ☐ Conduct study on unregulated/regulated withdrawals, especially gravel mines
- ☐ Control invasive species on Lower Black, Bloom's Ditch, and Stoney and Beaver Creeks
- ☐ Control point-source contamination from dairy farms
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement alternative methods of bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Implement TMDL recommendations
- ☐ Increase education and outreach in the watershed to inform about water withdrawals
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect areas of mid-to-late seral stage riparian corridors with priority given to older stands
- ☐ Reduce water withdrawals from surface sources
- ☐ Revegetate open riparian areas with native plants, especially conifers
- ☐ Revegetate stream and river banks for added protection from erosion

Tier 2 Concerns

Large Woody Debris, Fish Passage

- ☐ Change natural gas pipeline river crossing
- ☐ Correct barrier culverts
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Educate landowners on the importance of leaving LWD in a river
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LW pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Revegetate open riparian areas with native plants

Tier 3 Concerns

Floodplain, Sediment

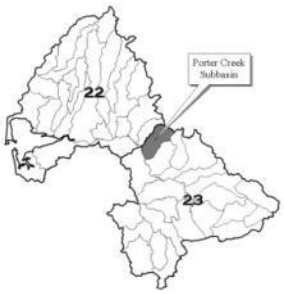
- ☐ Assess floodplain conditions and identify impacts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify sources that are contributing to sediment loading
- ☐ Implement alternative methods of bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Reduce sediment loading by reducing road densities (abandoned/decommissioned)
- ☐ Relocate gravel mines away from shorelines and 100-year floodplain
- ☐ Revegetate stream and river banks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Black River Management Unit

Black River Management Unit – Porter Creek

Major Tributaries:
WF Porter Creek
SF Porter Creek
NF Porter Creek

Anadromous Fish Stocks:
Fall Chinook
spring Chinook
coho
cutthroat
winter steelhead



Tier 1 Concerns

LWD, Fish Passage, Riparian

- ☐ Correct barrier culverts
- ☐ Determine LWD levels in Porter Creek; develop LWD supplementation if LWD levels are low
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install logjams and single piece key placement using large conifer if possible
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Remove / control invasive species
- ☐ Revegetate open riparian areas with native plants

Tier 2 Concerns

Sediment, Floodplain

- ☐ Assess floodplain conditions and identify impacts
- ☐ Determine if sedimentation is a problem in Porter Creek
- ☐ Identify contributing sources if sediment is a problem
- ☐ Implement alternative methods of bank stabilization (bioengineering)
- ☐ Reconnect, enhance, and/or restore potential off-channel, floodplain, and wetland habitat
- ☐ Work with landowners to reduce livestock access to Porter Creek

Tier 3 Concerns

Water Quantity, Water Quality

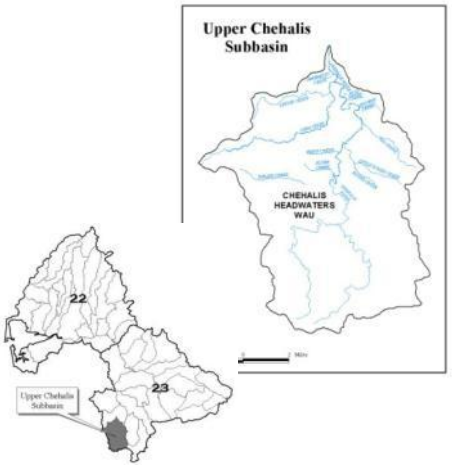
- ☐ Determine if instream flows are a problem in Porter Creek
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Determine water quality conditions in Porter Creek

Boistfort Management Unit

Boistfort Management Unit – Upper Chehalis River

Major Tributaries:
Elk Creek
Rock Creek
Crim Creek
Big Creek
Thrash Creek
Cinnebar Creek
West Fork Chehalis River

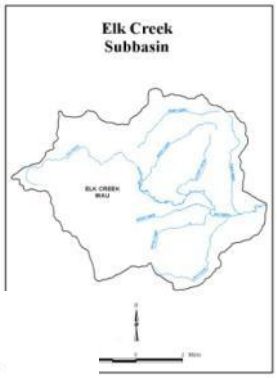
Anadromous Fish Stocks:
Fall Chinook
Spring Chinook
coho
cutthroat trout
winter steelhead



Tier 1 Concerns

Fish Passage, Sediment, Riparian

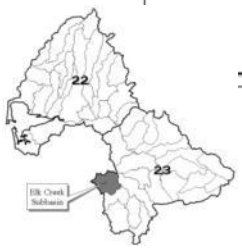
- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify those roads that are contributing to sediment loading
- ☐ Implement bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Improve fish passage at fishways and add fishways to structures that do not have them
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce road densities by abandoning/decommissioning roads to reduce sediment loading
- ☐ Revegetate open areas with native plants
- ☐ Upgrade all logging roads to comply with Forest Practices Act Rules and Regulations

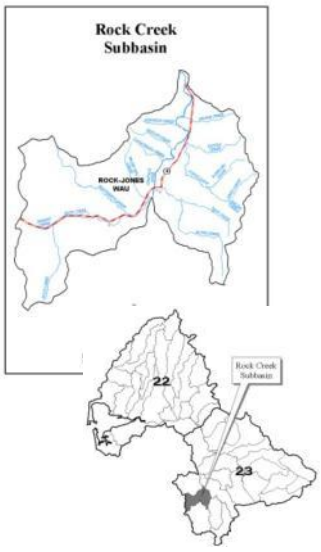


Tier 2 Concerns

Large Woody Debris, Water Quality

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Determine if water withdrawals are being followed in accordance with water rights
- ☐ Determine ways to keep LWD in system
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Educate landowners on the importance of leaving LWD in the stream
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement TMDL recommendations
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Reduce sediment loading by reducing the road densities (abandoned/decommission)
- ☐ Remove / control invasive species
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate streams and riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations





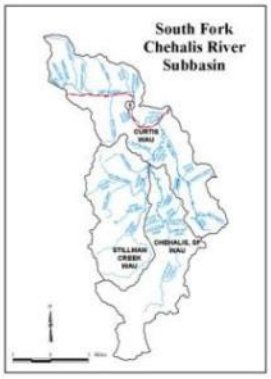
Tier 3 Concerns

Water Quantity, Floodplain

- ☐ Comply with Forest Practices Act Rules and Regulations
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Further assessments or off-channel work should be selected based on site-specific conditions on Crim, Thrash, Cinnabar Creeks, East Fork Chehalis River, Elk and Rock Creeks
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Implement approved nutrient enhancement efforts
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties (fee simple or easement) of riparian habitat
- ☐ Reconnect and enhance (add LWD to streams) and/or restore potential off channel floodplain/ wetland habitat
- ☐ Reduce water withdrawals from surface sources
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Remove / control invasive species
- ☐ Remove logjams on site-specific basis
- ☐ Revegetate open riparian areas with native plants

Boistfort Management Unit

Boistfort Management Unit – South Fork Chehalis River



Major Tributaries:
Lake Creek
Stillman Creek

Anadromous Fish Stocks:
Fall Chinook
Spring Chinook
coho
cutthroat trout
winter steelhead

Tier 1 Concerns

Riparian, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify (pinpoint) sources that are contributing sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Revegetate open areas with native plants
- ☐ Revegetate streams and riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Large Woody Debris, Water Quality

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Educate landowners on importance of LWD in streams
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement TMDL recommendations
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce sediment loading by reducing road densities
- ☐ Revegetate open areas with native plants
- ☐ Revegetate stream and riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

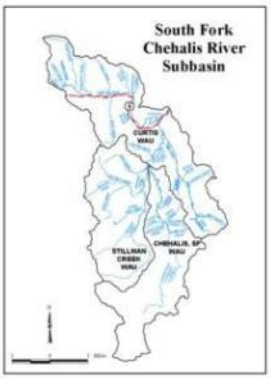
Tier 3 Concerns

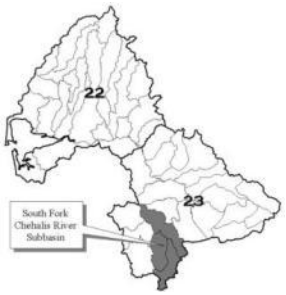
Water Quantity, Floodplain

- ☐ Assess floodplain conditions to identify impacts
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement approved nutrient enhancement efforts
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Reduce water withdrawals from surface sources
- ☐ Remove hard armoring (riprap) or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open areas with native plants

Boistfort Management Unit

Boistfort Management Unit – Lake Creek





Major Tributaries:
Barney Creek
Deep Creek

Anadromous Fish Stocks:
Coho
cutthroat
winter steelhead

Tier 1 Concerns

Riparian, Sediment, Water Quality

- ☐ Conservation Reserve Enhancement Program
- ☐ Control invasive species
- ☐ Identify sources that are contributing to sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement TMDL recommendations
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate stream and riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Water Quantity, Fish Passage

- ☐ Barrier culvert corrections especially on Barney Creek
- ☐ Protect and plant trees and shrubs in agricultural areas

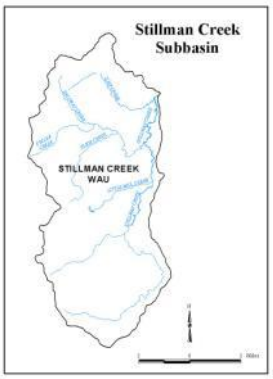
Tier 3 Concerns

Large Woody Debris, Floodplain

- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reconnect the floodplain and former off-channel habitat
- ☐ Revegetate open riparian areas with native plants

Boistfort Management Unit

Boistfort Management Unit – Stillman Creek



Major Tributaries:
Lost Creek
Halfway Creek
Keller Creek
Little Mill Creek

Anadromous Fish Stocks:
Fall Chinook
Spring Chinook
coho
cutthroat trout
winter steelhead

Tier 1 Concerns

Water quality, Fish Passage, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Correct barrier culverts
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement TMDL actions
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Revegetate open areas with native plants
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Large woody Debris, Riparian, Water Quantity, Floodplain

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Develop LWD supplementation plan that will install logjams and key pieces
- ☐ Educate landowners on the importance of leaving LWD in the stream
- ☐ Identify sources that are contributing to sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement alternative methods of bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reconnect, enhance, and/or restore potential off channel floodplain and wetland habitat
- ☐ Reduce sediment loading by reducing road densities
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate stream and riverbanks for at a protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

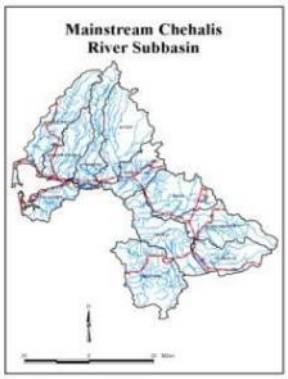
Tier 3 Concerns

Water Quantity, Floodplain

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Develop LWD supplementation plan that will install logjams and key pieces
- ☐ Identify sources that are contributing to sediment loading
- ☐ Implement alternative methods of bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Reconnect, enhance, and/or restore potential off channel floodplain and wetland habitat
- ☐ Reduce sediment loading by reducing road densities
- ☐ Revegetate stream and riverbanks for at a protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Chehalis Mainstem Management Unit

Chehalis Mainstem Management Unit – Mainstem Chehalis River



Major Tributaries:	**Anadromous Fish Stocks:**
Wynoochee River	Fall Chinook*
Satsop River	spring Chinook
Black River	summer Chinook*
Scatter Creek	coho
Skookumchuck River	fall chum
Newaukum River	cutthroat
South Fork Chehalis River	winter steelhead*
Elk Creek	summer steelhead
Lincoln Creek	bull trout*
Bunker Creek	(*priority stock)

Tier 1 Concerns

Riparian, Water Quality, Floodplain

- ☐ Assess floodplain conditions and identify impacts (focus upstream of RM 20)
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement alternative methods of bank stabilization (bioengineering)
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Protect key properties to facilitate natural channel migration and reconnection to the floodplain (EDT) by a fee simple or easement
- ☐ Reconnect and restore off-channel habitat identified in USOCE (2002)
- ☐ Relocate gravel mining away from shorelines and 100-year floodplain
- ☐ Remove / control invasive species
- ☐ Revegetate open riparian areas with native plants
- ☐ TMDL implementation – temperature, pH, fecal coliform

Tier 2 Concerns

Large Woody Debris, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Determine LWD levels in Chehalis Mainstem; develop a LWD supplementation plan if LWD levels are low
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Increase hydrologic continuity – reduce impervious surfaces
- ☐ Install logjams and single key piece placement using large conifer if possible
- ☐ Reduce stormwater discharge directly to streams (rapid runoff)
- ☐ Reduce water withdrawals from surface sources
- ☐ Restore wetlands for water storage

Tier 3 Concerns

Sediment

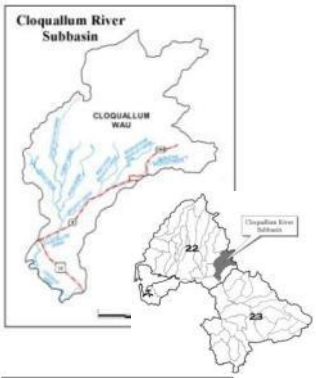
- ☐ Implement alternative methods of bank stabilization (bioengineering)
- ☐ Implement corrective actions in tributaries to decrease sediment delivery into mainstem
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Revegetate stream/river banks for added protection from erosion
- ☐ Upgrade all logging roads to comply with Forest Practices Act Rules and Regulations

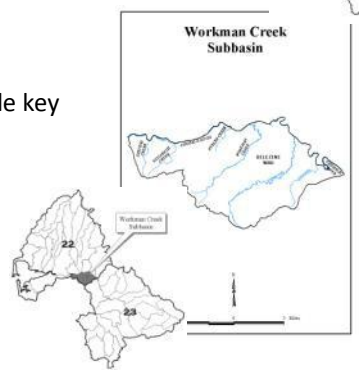
Cloquallum Management Unit

Cloquallum Management Unit – Cloquallum Creek

Major Tributaries:
Mox-Chehalis Creek
Newman Creek
Vance Creek
Falls Creek
Bush Creek
Delezene Creek
Workman Creek
Wildcat Creek

Anadromous Fish Stocks:
Fall Chinook
coho
chum
cutthroat
winter steelhead





Tier 1 Concerns

Fish Passage, Riparian Water Quantity

- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Implement activities that lead to natural recharge of aquifers (LFA)
- ☐ Increase hydrologic continuity – reduce impervious surfaces
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce stormwater discharge directly to streams (rapid runoff)
- ☐ Restore riparian corridor in the Cloquallum subbasin (identify specific degraded areas for restoration)
- ☐ Restore wetlands for water storage
- ☐ Revegetate open riparian areas with native plants

Tier 2 Concerns

Floodplain, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Assess floodplain conditions and identify impacts
- ☐ Identify sources that are contributing to sediment loading
- ☐ Implement alternative methods of bank stabilization through bioengineering
- ☐ Minimize motor vehicle access to streams
- ☐ Protect key properties to facilitate natural channel migration and reconnection to the floodplain by fee simple or easements
- ☐ Reconnect, enhance, and/or restore potential off-channel, floodplain, and wetland habitat
- ☐ Remove hard armoring or implement bioengineering techniques in place of riprap
- ☐ Revegetate stream and riverbanks for added protection from erosion
- ☐ Upgrade all logging roads to comply with Forest Practices Act Rules and Regulations

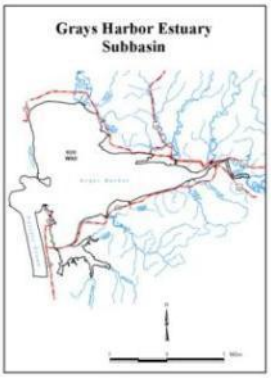
Tier 3 Concerns

Large Woody Debris, Water Quality

- ☐ Determine LWD levels in Cloquallum subbasin
- ☐ Determine water quality conditions
- ☐ Develop LWD supplementation plan that will increase LWD by installing logjams and single key piece placement using large conifer when possible
- ☐ Educate landowners on the importance of leaving LWD (not taking for firewood)
- ☐ TMDL Implementation – Temperature, pH, fecal coliform

Grays Harbor Estuary Management Unit

Grays Harbor Estuary Management Unit – Grays Harbor Estuary



Major Tributaries:

Anadromous Fish Stocks:
Spring Chinook
fall Chinook*
summer Chinook*
coho*
chum
winter steelhead*
bull trout*
(*priority stock)

Tier 1 Concerns

Water Quality, Total Estuary Habitat Loss

- ☐ Enhance water quality
- ☐ Evaluate current water quality conditions and the impact of effluent treatment technologies
- ☐ In situ biomonitoring
- ☐ Minimize chemical usage in estuary and upland habitat
- ☐ Phytoremediation
- ☐ Pier removal
- ☐ Reclaim developed estuary habitat
- ☐ Reduced effluent discharge
- ☐ Sediment dredging and/or capping

Tier 2 Concerns

Exotic Species, Sediment, Surge Plain, Tributary Connectivity

- ☐ Control invasive species
- ☐ Enhance access to off-channel habitat
- ☐ Enhance estuary connectivity by removing migration barriers
- ☐ Evaluate current estuary habitat usage and distributions of life-history patterns among salmonid stocks
- ☐ Minimize the spread of non-native Spartina
- ☐ Reduce sediment re-suspension via dredging

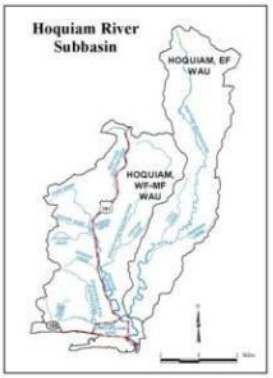
Tier 3 Concerns

Ocean Connectivity, Large Woody Debris, Channel Stability

- ☐ Enhance eel grass bed density
- ☐ Increased LWD in mud flats

Hoquiam-Wishkah Management Unit

Hoquiam-Wishkah Management Unit – Hoquiam River

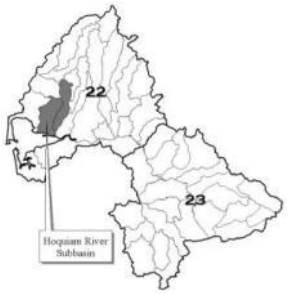


Major Tributaries:
West Fork Hoquiam
North Fork Hoquiam
East Fork Hoquiam
Middle Fork Hoquiam
Little Hoquiam River
Polson Creek
Hoover Creek
Barnard Creek

Anadromous Fish Stocks:
Fall Chinook*
coho
chum
cutthroat
winter steelhead
(*priority stock)

Tier 1 Concerns

Water Quality, Fish Passage, Riparian



- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Adjust sediment flushing through dams to occur only during high flow events
- ☐ Consider providing access to natural barriers on case-by-case basis
- ☐ Correct barrier culverts
- ☐ Determine water quality conditions
- ☐ Develop improved methods of flushing sediment from the municipal dams
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Implement alternative methods of bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Implement TMDL recommendations
- ☐ Improve fish passage at dam fishways and add fishways to dams that do not have them
- ☐ Increase hydrologic continuity-reduce impervious surfaces
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce sediment loading by reducing road densities (abandoned/decommission)
- ☐ Reduce storm water discharge directly to streams (rapid runoff)
- ☐ Remove / control invasive species
- ☐ Restore wetlands for water storage
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate riverbanks for added protection from the erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Floodplain, Sediment

- ☐ Assess floodplain conditions and identify impacts
- ☐ Conduct studies similar to that done on Upper Wishkah River to determine sediment loading and reduction
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Develop improved methods of flushing sediment from municipal dams
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties to facilitate natural channel migration and reconnection to the floodplain (fee simple)
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Remove dams were feasible
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open riparian areas with native plants
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

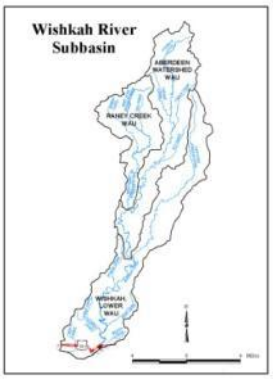
Tier 3 Concerns

Large Woody Debris, Water Quantity

- ☐ Adjust dam flows to better accommodate fish
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Determine LWD quantities
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Increase hydrologic continuity – reduce impervious surfaces
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce storm water discharge directly to streams (rapid runoff)
- ☐ Restore wetlands for water storage
- ☐ Revegetate open riparian areas with native plants

Hoquiam-Wishkah Management Unit

Hoquiam-Wishkah Management Unit – Wishkah River



Major Tributaries:
East Fork Wishkah River
West Fork Wishkah River

Anadromous Fish Stocks:
Fall Chinook
coho*
chum
cutthroat
winter steelhead
bull trout*
(*priority stock)

Tier 1 Concerns

Sediment, Riparian, Fish Passage

- ☐ Consider providing access over natural barriers on a case-by-case basis
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Develop improved methods of flushing sediment from municipal dams
- ☐ Gravel enhancement downstream of dams to decrease scouring and incision
- ☐ Identify sources that are contributing to loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect (fee simple or easement) key properties of habitat
- ☐ Reduce sediment loading by reducing road densities (abandoned/decommissioning)
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate stream/riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations
- ☐ Upper watershed above RM 28.5 included in a sediment model analysis completed by Rayonier

Tier 2 Concerns

Floodplain, Large Woody Debris

- ☐ Assess floodplain conditions and identify impacts
- ☐ Develop LWD supplementation plan that will install logjams and key pieces
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties to facilitate natural channel migration and reconnection to the floodplain
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open riparian areas with native plants

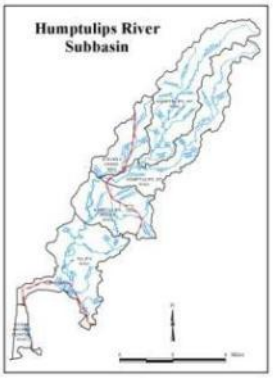
Tier 3 Concerns

Water Quality, Water Quantity

- ☐ Adjust dam flows to better accommodate fish
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Implement activities that lead to natural recharge of aquifers (reduce stormwater discharge directly to streams, restore wetlands water storage, increase hydrologic continuity)
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce water withdrawals from surface sources
- ☐ Revegetate open riparian areas with native plants

Humptulips Management Unit

Humptulips Management Unit – Humptulips River



Major Tributaries:
Big Creek
Stevens Creek
Deep Creek

Anadromous Fish Stocks:
Fall Chinook*
spring Chinook
coho*
chum
cutthroat
winter steelhead*
summer steelhead
bull trout
(*priority stock)

Tier 1 Concerns

Water Quality, Fish Passage, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Correct barrier culverts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Determine water quality conditions
- ☐ Develop LWD supplementation plan that will install logjams and key pieces
- ☐ Develop improved methods of flushing sediment from the municipal dams
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement alternative methods of bank stabilization in locations of excessive erosion
- ☐ Implement TMDL recommendations
- ☐ Improve fish passage at fishways and add a fishway to those structures without ones
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Minimize motor vehicle access to streams
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Revegetate open riparian areas with native plants
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Riparian, Floodplain

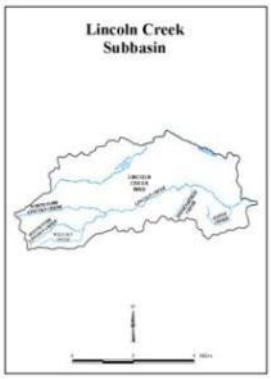
- ☐ Assess floodplain conditions and identify impacts
- ☐ Control invasive species
- ☐ Determine LWD quantities; develop LWD supplementation plan that will install logjams and key pieces
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reconnect, enhance, and/or restore potential off-channel, floodplain, and wetland habitat
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open riparian areas with native plants

Tier 3 Concerns

Water Quantity, Large Woody Debris

- ☐ Develop LWD supplementation plan that will install logjams and key pieces
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Revegetate open riparian areas with native plants

Lincoln Management Unit



Lincoln Management Unit – Lincoln Creek

Major Tributaries:
Eagle Creek
Sponenberg Creek
Wildcat Creek
North Fork Lincoln Creek
South Fork Lincoln Creek

Anadromous Fish Stocks:
Coho
winter steelhead
cutthroat

Tier 1 Concerns

Sediment, Riparian, Fish Passage

- ☐ After culverts are prioritized then implement highest priority culverts
- ☐ Control invasive species
- ☐ Determine the extent roads are contributing sediment
- ☐ Prioritize fish barrier corrections identified by the Lewis County Roads Department and Lewis Conservation District
- ☐ Protect and preserve riparian habitat in Lincoln Creek subbasin
- ☐ Restore riparian corridor along Lincoln Creek
- ☐ Work with landowners in the lower reaches to reduce livestock access to Lincoln Creek

Tier 2 Concerns

Floodplain, Water Quality

- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Implement soft armoring techniques where riprap occurs using Integrated Streambank Protection Guidelines manual (see Wampler et al 1993 for riprap locations)
- ☐ Restore riparian corridor
- ☐ Work with landowners to correct failing septic systems
- ☐ Work with landowners to exclude livestock from accessing Lincoln Creek and its tributaries

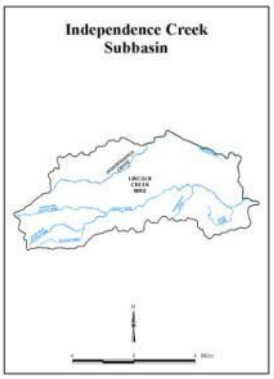
Tier 3 Concerns

Large Woody Debris, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Develop a LWD supplementation plan and install LWD where appropriate
- ☐ Implement forest practice rules in forested headwaters to eliminate ditchwater connection to live streams
- ☐ In the lower and middle reaches of Lincoln Creek recreate wetlands for water storage and off-channel habitat
- ☐ Lincoln Creek is closed to further water appropriations
- ☐ Protect and preserve wetlands and springs in Lincoln Creek subbasin
- ☐ Revegetate riparian corridor

Lincoln Management Unit

Lincoln Management Unit – Independence Creek



Tributaries:

Anadromous Fish Stocks:
Coho
cutthroat

Tier 1 Concerns

Sediment, Riparian, Fish Passage

- ☐ After culverts are prioritized then implement highest priority culverts
- ☐ Identify extent roads are contributing sediment
- ☐ Identify solutions to reduce erosion at identified locations in the middle and upper reaches
- ☐ Prioritize fish barrier corrections identified by Lewis County Roads Department and Lewis Conservation District
- ☐ Protect and preserve riparian habitat in Independence Creek subbasin
- ☐ Restore riparian corridor along Independence Creek
- ☐ Work with landowners in lower reaches to reduce livestock access to Independence Creek

Tier 2 Concerns

Large Woody Debris, Water Quality

- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Restore riparian corridor
- ☐ Work with landowners to exclude livestock from Independence Creek and its tributaries

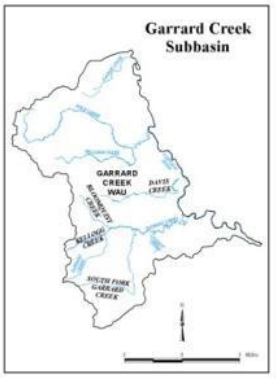
Tier 3 Concerns

Floodplain, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Develop a LWD supplementation plan and install LWD where appropriate
- ☐ Implement Forest Practice Rules in forested headwaters to eliminate ditchwater connection to live streams
- ☐ Protect and preserve wetlands and springs in Independence Creek subbasin

Lincoln Management Unit

Lincoln Management Unit – Garrard Creek



Tributaries:

Anadromous Fish Stocks:
Coho
winter steelhead
cutthroat

Tier 1 Concerns

Sediment, Riparian, Fish Passage, Water Quality, Water Quantity

- ☐ After Lewis Co CD completes a culvert barrier assessment, prioritize fish barrier corrections
- ☐ Control invasive species
- ☐ Implement Forest Practice Rules in forested headwaters to eliminate ditchwater connection to live streams
- ☐ In the lower and middle reaches of Garrard Creek recreate wetlands for water storage and off-channel habitat
- ☐ Reduce stream reach erosion at sites identified by Wampler et al (1993); primarily in the upper reaches
- ☐ Replace highest priority passage barriers
- ☐ Restore riparian corridor at RM 1.4-3.1, RM 4-5.2, and RM 6.5-7.6
- ☐ Work with landowners in the lower reaches to reduce livestock access to Garrard Creek

Tier 2 Concerns

Water Quantity, Water Quality

- ☐ Work with landowners in the lower reaches to reduce livestock access to Garrard Creek
- ☐ Implement forest practice rules in forested headwaters to eliminate ditchwater connection to live streams
- ☐ In the lower and middle reaches of Garrard Creek recreate wetlands for water storage and off-channel habitat

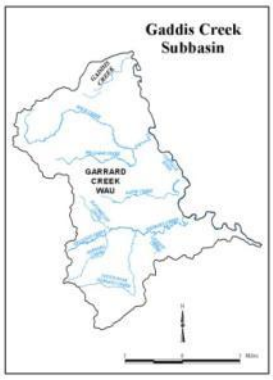
Tier 3 Concerns

Floodplain, Large Woody Debris

- ☐ Determine LWD levels and then develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Replace riprap with soft armoring techniques identified in the Integrated Streambank Protection Guidelines manual (see Wampler et al 1993 for riprap locations)

Lincoln Management Unit

Lincoln Management Unit – Gaddis Creek



Tributaries:

Anadromous Fish Stocks:
Coho
Cutthroat

Tier 1 Concerns

Sediment, Floodplain, Fish Passage

- ☐ A formal inventory to comprehensively identify barrier status within the Gaddis subbasin
- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Identify and implement solutions to reduce erosion at identified sites; primarily in middle and upper reaches
- ☐ Identify extent roads are contributing sediment
- ☐ Prioritize fish barrier corrections after Lewis CD completes an assessment
- ☐ Replace highest priority passage barriers
- ☐ Work with landowners in the lower reaches to reduce livestock access to Gaddis Creek

Tier 2 Concerns

Large Woody Debris, Riparian

- ☐ Control invasive species
- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Further assessment to identify additional areas that have impacted riparian habitat
- ☐ Restore riparian corridor primarily in the middle and lower reaches (agricultural lands)

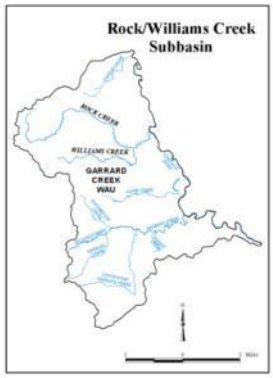
Tier 3 Concerns

Water Quantity, Water Quality

- ☐ Implement forest practice rules in forested headwaters to eliminate ditchwater connection to live streams
- ☐ Re-create wetlands for water storage and off-channel habitat in lower and middle reaches
- ☐ Work with landowners in the lower reaches to reduce livestock access to Gaddis Creek

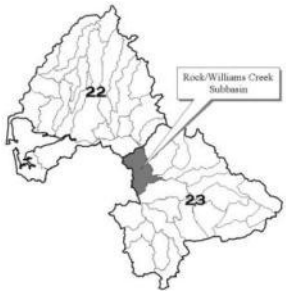
Lincoln Management Unit

Lincoln Management Unit – Rock/Williams Creek



Major Tributaries:
Williams Creek

Anadromous Fish Stocks:
Fall Chinook
spring Chinook
coho
winter steelhead
cutthroat



Tier 1 Concerns

Sediment, Floodplain, Fish Passage

- ☐ Correct highest priority fish passage barriers
- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Identify extent roads are contributing sediment
- ☐ Identify solutions to reduce erosion at identified sites; primarily in middle/ upper reaches
- ☐ Prioritize fish barrier corrections
- ☐ Work with landowners in the lower reaches to reduce livestock access to Rock Creek and Williams Creek

Tier 2 Concerns

Large Woody Debris, Riparian

- ☐ Control invasive species
- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Restore riparian corridor along Rock Creek from RM 1.5-2.9 and Williams Creek from RM 0-1 and RM2.2-3.8

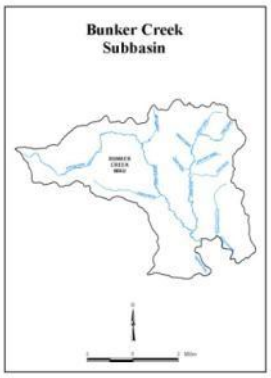
Tier 3 Concerns

Water Quantity, Water Quality

- ☐ Implement forest practice rules in forested headwaters to eliminate ditchwater connection to live streams
- ☐ Re-create wetlands for water storage and off-channel habitat in the lower / middle reaches
- ☐ Work with landowners in the lower reaches to reduce livestock access

Lincoln Management Unit

Lincoln Management Unit – Bunker Creek



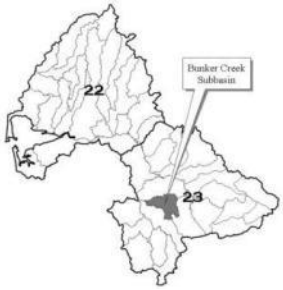
Major Tributaries:
Deep Creek
Van Ornum Creek (an independent tributary to the Chehalis River)

Anadromous Fish Stocks:
Coho
winter steelhead
cutthroat

Tier 1 Concerns

Sediment, Floodplain, Fish Passage

- ☐ After culverts are prioritized then implement highest priority culverts
- ☐ Determine the extent roads are contributing sediment and identify corrective actions
- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Prioritize fish barrier corrections identified by the Lewis Co Roads Dept and Lewis Conservation Dist
- ☐ Reduce stream reach erosion at identified sites; primarily in the lower reaches
- ☐ Work with landowners to exclude livestock access to streams in the Bunker Creek WAU



Tier 2 Concerns

Large Woody Debris, Riparian

- ☐ Control invasive species
- ☐ Determine LWD needs for the drainages in the Bunker Creek WAU
- ☐ Develop a LWD supplementation plan and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Restore riparian corridor along Bunker Creek and Deep Creek

Tier 3 Concerns

Water Quantity, Water Quality

- ☐ Bunker Creek is closed to further water appropriations
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Identify potential sites to re-create wetlands for water storage and off-channel habitat
- ☐ Implement TMDL recommendations for Bunker Creek
- ☐ Restore riparian corridor
- ☐ Work with landowners to correct failing septic systems in Bunker Creek

Lincoln Management Unit

Lincoln Management Unit – Scammon Creek, Mill Creek, Stearns Creek

Major Tributaries:
South Branch Scammon
(Scammon Creek)
West Fork Stearns
Ripple Creek
Coal Creek (Stearns Creek)
Wisner Creek (Mill Creek)

Anadromous Fish Stocks:
Coho
winter steelhead
cutthroat

Tier 1 Concerns

Sediment, Fish Passage, Water Quality

- ☐ After culverts are prioritized then implement highest priority culverts
- ☐ Determine the extent roads are contributing sediment
- ☐ Determine water quality conditions for Mill, Coal, and Scammon Creeks
- ☐ Implement TMDL recommendations for Stearns Creek
- ☐ Prioritize fish barrier corrections identified by Lewis Co Roads Dept and Lewis Conservation Dist
- ☐ Reduce erosion in the identified sites of upper reaches of Stearns Creek
- ☐ Work with landowners along Mill Creek to reduce livestock access

Tier 2 Concerns

Water Quantity, Riparian, Large Woody Debris

- ☐ After LWD needs are determined, develop a LWD supplementation plan and install LWD where appropriate; this action should start in Stearns Creek because of its potential spawning habitat
- ☐ Control invasive species
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Determine LWD needs for the drainages in the Scammon-Stearns WAU
- ☐ Develop a LWD supplementation plan for Stearns Creek and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain
- ☐ Identify potential sites to recreate wetlands for water storage and off-channel habitat (Stearns Creek should be first priority in the Scammon-Stearns WAU)
- ☐ Restore riparian corridor in the Scammon-Stearns WAU

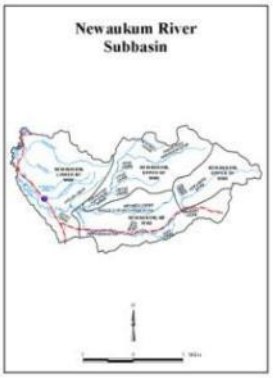
Tier 3 Concerns

Floodplain, Large Woody Debris

- ☐ Develop a LWD supplementation plan for Stearns Creek and install LWD where appropriate; this will retain bedload and elevate streambed level to allow better connection to floodplain.
- ☐ Determine LWD needs for the drainages in the Scammon-Stearns WAU.

Newaukum Management Unit

Newaukum Management Unit – Newaukum River



Major Tributaries:
Taylor Creek
Allen Creek
Gheer Creek
Lucas Creek
Kearney Creek
Mitchell Creek
Johns Fork Creek

Anadromous Fish Stocks:
spring Chinook
fall Chinook
coho
winter steelhead
cutthroat

Tier 1 Concerns

Riparian, Water Quality, Water Quantity

- ☐ Control invasive species
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Implement TMDL recommendations
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce water withdrawals from surface sources
- ☐ Revegetate open riparian areas with native plants
- ☐ Work with landowners to correct failing septic systems

Tier 2 Concerns

Fish Passage, Floodplain

- ☐ Assess floodplain conditions and identify impacts
- ☐ Correct barrier culverts
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring

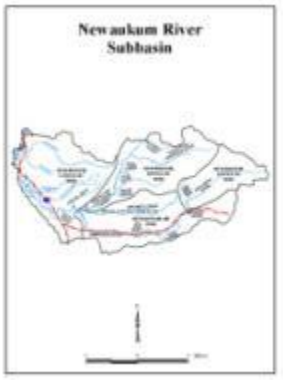
Tier 3 Concerns

Sediment

- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify sources that are contributing to sediment loading
- ☐ Revegetate stream/river banks for added protection from

Newaukum Management Unit

Newaukum Management Unit – Newaukum River (N. Fork & Tributaries)



Tier 1 Concerns

Riparian, Fish Passage, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify sources that are contributing to sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Improve fish passage at fishways and add a fishway to structures that do not have them
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce sediment loading by reducing low densities (abandon/decommission)
- ☐ Remove dams were feasible
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate stream/river banks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Water Quality, Water Quantity

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Identify sources that are contributing to sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement approved nutrient enhancement efforts
- ☐ Implement bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Implement TMDL recommendations
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Reduce water withdrawals from surface sources
- ☐ Restore wetlands for water storage
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate stream/river banks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 3 Concerns

Large Woody Debris, Floodplain

- ☐ Determine LWD quantities
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ LWD supplementation plan that will install logjams and key pieces
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open and areas with native plants

Newaukum Management Unit

Newaukum Management Unit – Newaukum River (S. Fork & Tributaries)

Tier 1 Concerns

Riparian, Fish Passage, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify sources that are contributing to sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement alternative methods of bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Revegetate open riparian areas with native plants (use Wampler et al 1993 to identify potential restoration sites)
- ☐ Revegetate stream/river banks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Water Quality, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Implement activities that lead to natural reach charge of aquifers
- ☐ Reduce water withdrawals from surface sources
- ☐ Restore wetlands for water storage

Tier 3 Concerns

Large Woody Debris, Floodplain

- ☐ Assess floodplain conditions; identify impacts
- ☐ Determine LWD quantities
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Remove hard armoring (riprap) or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open areas with native plants

Newaukum Management Unit

Newaukum Management Unit – Newaukum River (M. Fork & Tributaries)

Tier 1 Concerns

Riparian, Fish Passage, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify sources that are contributing to sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement alternative methods of bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce sediment loading by reducing low densities (abandon/decommission)
- ☐ Revegetate open riparian areas with native plants (Use Wampler et al 1993 to identify potential restoration sites)
- ☐ Revegetate stream/river banks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Water Quality, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Determine water quality conditions
- ☐ Implement TMDL recommendations
- ☐ Reduce water withdrawals from surface sources
- ☐ Restore wetlands for water storage

Tier 3 Concerns

Large Woody Debris, Floodplain

- ☐ Assess floodplain conditions and identify impacts
- ☐ Determine LWD quantities
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Install LWD pieces in conjunction with other restoration projects

Newaukum Management Unit

Newaukum Management Unit – Salzer Creek

Major Tributaries:
Coal Creek

Anadromous Fish Stocks:
Coho
cutthroat

Tier 1 Concerns

Sediment, Fish Passage, Riparian

- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate stream/riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Floodplain, Water Quality

- ☐ Assess floodplain conditions and identify impacts
- ☐ Currently undergoing corrective action as a federal Superfund site
- ☐ Implement TMDL recommendations
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Work with landowners to correct failing septic systems

Tier 3 Concerns

Large Woody Debris, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce water withdrawals from surface sources
- ☐ Revegetate open riparian areas with native plants

Newaukum Management Unit

Newaukum Management Unit – Coal Creek

Major Tributaries:

Anadromous Fish Stocks:
Coho
cutthroat

Tier 1 Concerns

Riparian, Water Quantity, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Identify sources that are contributing to sediment loading
- ☐ Implement bioengineering in locations of excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce sediment loading by reducing low densities (abandon/decommission)
- ☐ Restore wetlands for water storage
- ☐ Revegetate open the riparian areas with native plants
- ☐ Revegetate stream and riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Fish Passage, Water Quality

- ☐ Correct barrier culverts
- ☐ Implement TMDL recommendations

Tier 3 Concerns

LWD

- ☐ Determine LWD quantities
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Revegetate open riparian areas with native plants

Newaukum Management Unit

Newaukum Management Unit – Dillenbaugh Creek

Major Tributaries:
Berwick Creek

Anadromous Fish Stocks:
Coho
cutthroat

Tier 1 Concerns

Sediment, Fish Passage, Riparian

- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Identify sources that are contributing to sediment loading
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement bank stabilization (bioengineering) in locations other excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Revegetate open riparian areas with native plants
- ☐ Revegetate stream/riverbanks for added protection from erosion

Tier 2 Concerns

Water Quality, Large Woody Debris

- ☐ Determine LWD quantities
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement TMDL recommendations
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect by fee simple or easement key properties of riparian habitat
- ☐ Revegetate open riparian areas with native plants
- ☐ Work with landowners to correct failing septic systems

Tier 3 Concerns

Floodplain, Water Quantity

- ☐ Assess floodplain conditions and identify impacts
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Restore wetlands for water storage

Newaukum Management Unit

Newaukum Management Unit – Berwick Creek

Major Tributaries:

Anadromous Fish Stocks:
Coho
cutthroat

Tier 1 Concerns

Riparian, Fish Passage, Water Quality

- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Revegetate open riparian areas with native plants
- ☐ Work with landowners to correct failing septic systems

Tier 2 Concerns

LWD, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Implement activities that lead to natural reach charge of aquifers
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Protect key properties of riparian habitat by a fee simple or easement

Tier 3 Concerns

Floodplain, Sediment

- ☐ Assess floodplain conditions and identify impacts
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify sources that are contributing to sediment loading
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Revegetate stream and riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Newaukum Management Unit

Newaukum Management Unit – China Creek

Major Tributaries:

Anadromous Fish Stocks:
Coho
cutthroat

Tier 1 Concerns

Water Quality, Water Quantity, Riparian

- ☐ Control invasive species
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Implement TMDL recommendations
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect and preserve wetlands and springs
- ☐ Revegetate open riparian areas with native plants

Tier 2 Concerns

Sediment, Fish Passage

- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Identify sources that are contributing to sediment loading
- ☐ Implement bank stabilization (bioengineering) in locations of excessive erosion
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Prioritize fish barrier corrections identified by the Lewis County Roads Department and Lewis Conservation District
- ☐ Reduce sediment loading by reducing road densities (abandoned/decommission)
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations
- ☐ Revegetate stream or river banks for added protection from erosion

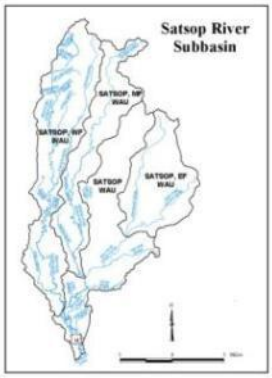
Tier 3 Concerns

Floodplain, LWD

- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reconnect, enhance, and it's/4 restore potential off channel, floodplain, and wetland habitat
- ☐ Remove hard armoring (riprap) or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open riparian areas with native plants

Satsop Management Unit

Satsop Management Unit – Satsop River



Major Tributaries:

Bingham Creek
Cook Creek
Dry Run Creek
Decker Creek
Baker Creek
Rabbit Creek
Smith Creek
Black Creek
Still Creek
Middle Fork Satsop River
West Fork Satsop River
East Fork Satsop River

Anadromous Fish Stocks:

Fall Chinook
summer Chinook*
coho
cutthroat
winter steelhead*
chum
bull trout
(*depressed stocks, SaSI)

Tier 1 Concerns

Floodplain, Water Quality, Riparian

- ☐ Address sediment input sources in West Fork Satsop, Middle Fork Satsop, and East Fork Satsop
- ☐ Control invasive species
- ☐ Five locations along the lower 6 miles of the mainstem have been identified as potential off-channel restoration projects; the quality and accessibility of these sites has been negatively impacted
- ☐ Projects identified in the report prepared by Ralph et al 1995
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Protect key properties to facilitate natural channel migration and reconnection to the floodplain by a fee simple or easement
- ☐ Reconnect, enhance, and/or restore potential off-channel, floodplain, and wetland habitat
- ☐ Reduce exposed soils by improved logging practices
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Relocate gravel mining/harvesting away from shorelines, 100-year floodplains, and stream channels
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring (riprap)
- ☐ Restore former gravel pit site located along Keys Road in the lower reach of the Satsop mainstem
- ☐ Revegetate open riparian areas with native plants
- ☐ See “The Lower Chehalis Riparian Assessment” (Dec 2003), to identify specific locations

Tier 2 Concerns

Fish Passage, Large Woody Debris

- ☐ Correct barrier culverts
- ☐ Determine LWD levels in the Satsop mainstem
- ☐ Develop LWD supplementation plan that will install logjams and key pieces
- ☐ Educate landowners on the importance of leaving LWD (not removing for firewood)

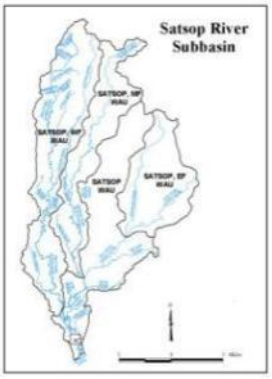
Tier 3 Concerns

Sediment, Water Quantity

- ☐ Address sediment input sources in West Fork Satsop, Middle Fork Satsop, and East Fork Satsop
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Implement Forests and Fish Rules and Regulations pertaining to logging
- ☐ Increase hydrologic continuity – reduce impervious surfaces
- ☐ Reduce exposed soils by improved logging practices
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Reduce stormwater discharge directly to streams (rapid runoff)
- ☐ Restore wetlands for water storage

Satsop Management Unit

Satsop Management Unit – West Fork Satsop River



Tier 1 Concerns

Fish Passage, Water Quantity, Sediment

- ☐ Correct barrier culverts
- ☐ Determine cause of higher average-month-per-year flow
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Protect wetlands and springs in WF Satsop drainage
- ☐ Upgrade all logging roads to comply with Forest Practices Act Rules and Regulations on: Swinging Bridge Creek, middle and upper Canyon River, Lower Little River, Save Creek and Robertson Creek

Tier 2 Concerns

Large Woody Debris, Riparian

- ☐ Control invasive species
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement (see "The Lower Chehalis Riparian Assessment" (December 2003), to identify specific locations)
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Restore riparian corridors in the WF Satsop drainage(see "The Lower Chehalis Riparian Assessment" (December 2003), to identify specific locations)
- ☐ Revegetate open riparian areas with native plants

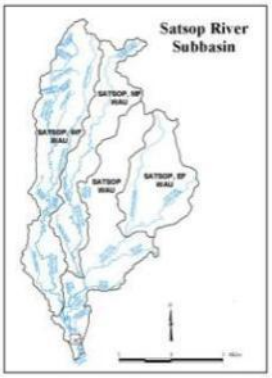
Tier 3 Concerns

Floodplain, Water Quality

- ☐ Assess floodplain conditions and identify impacts
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Off-channel habitat enhancement
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Restore riparian corridors in the WF Satsop drainage (see "The Lower Chehalis Riparian Assessment" 12/2003)
- ☐ Revegetate open riparian areas with native plants
- ☐ Upgrade all logging roads to comply with Forest Practices Act Rules and Regulations on: Swinging Bridge Creek, middle and upper Canyon River, Lower Little River, Save Creek and Robertson Creek

Satsop Management Unit

Satsop Management Unit – Middle Fork Satsop River



Tier 1 Concerns

Fish Passage, Water Quantity, Riparian

- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Implement Forests and Fish Rules and Regulations pertaining to logging
- ☐ Increase hydrologic continuity – reduce impervious surfaces
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Obtain data needed to determine cause of flow problems
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reduce stormwater discharge directly to streams (rapid runoff)
- ☐ Restore riparian corridors in the MF Satsop drainage
- ☐ Restore wetlands for water storage
- ☐ Revegetate open riparian areas with native plants

Tier 2 Concerns

Sediment, Water Quality

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Educate public about driving in streams
- ☐ Eliminate motor vehicle access to streams
- ☐ Fill data gaps by identifying all sources of input
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Reduce water temperatures – use riparian assessment to identify specific locations in Rabbit Creek

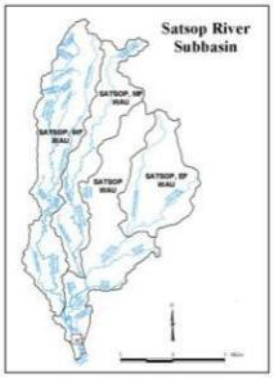
Tier 3 Concerns

Floodplain, Large Woody Debris

- ☐ Assess floodplain conditions and identify impacts (more data is needed)
- ☐ Determine LWD levels
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Enhance off-channel habitat

Satsop Management Unit

Satsop Management Unit – East Fork Satsop River



Tier 1 Concerns

Fish Passage, Riparian, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Educate landowners
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Minimize motor vehicle access
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Protect/preserve intact habitat
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Restore riparian corridors in the EF Satsop drainage
- ☐ Revegetate open riparian areas with native plants

Tier 2 Concerns

Large Woody Debris, Water Quality

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Determine if sedimentation is a problem
- ☐ Determine LWD levels
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Educate landowners
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Protect/preserve intact habitat
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Restore riparian corridors in the EF Satsop drainage
- ☐ Revegetate open riparian areas with native plants

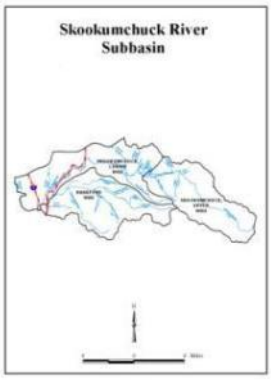
Tier 3 Concerns

Floodplain, Water Quantity

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Determine LWD levels
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity and channel connection to floodplain
- ☐ Implement activities that lead to natural recharge of aquifers
- ☐ Increase hydrologic continuity – reduce impervious surfaces
- ☐ Protect key properties to facilitate natural channel migration and reconnection to the Floodplain by a fee simple or easement
- ☐ Protect key wetlands, springs, groundwater fed channels and sloughs in EF Satsop
- ☐ Reduce stormwater discharge directly to streams (rapid runoff)
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Restore wetlands for water storage

Skookumchuck Management Unit

Skookumchuck Management Unit – Skookumchuck River



Major Tributaries

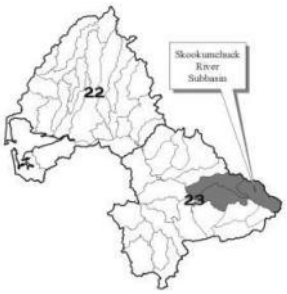
Hanaford Creek
Thompson Creek
Johnson Creek
Salmon Creek
Bloody Run Creek
Fall Creek
Pheeny Creek
Baumgard Creek
Laramie Creek
Eleven Creek
Twelve Creek
Three Creek
Hospital Creek

Anadromous Fish Stocks:

Coho*
Cutthroat
winter steelhead*
Spring Chinook*
Fall Chinook
(*priority stock)

Tier 1 Concerns

Floodplain, Riparian, Fish Passage



- ☐ Assess floodplain for off-channel and wetland habitat
- ☐ Continue steelhead supplementation provided by TransAlta; evaluate adding coho and Chinook
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Determine feasibility of restoring floodplain in Hanaford Creek
- ☐ Improve fish passage at fishways and add a fishway to those structures that do not have them
- ☐ Install riparian fencing to exclude or reduce livestock access at the 9 sites identified in the LFA
- ☐ Interplant conifers in deciduous dominant areas where appropriate in upper Skookumchuck
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reconnect, enhance, and/or restore potential off-channel, floodplain, and wetland habitat
- ☐ Relocate gravel mining/harvesting away from shorelines, 100-year floodplains, and stream channels
- ☐ Remove dams where feasible
- ☐ Remove hard armoring or implement bioengineering techniques in place of hard armoring
- ☐ Determine extent of impact "floodplain" roads have on floodplain functions; 3 mi in the lower Skookumchuck, 0.8 mi Salmon Creek, 2 mi Johnson Creek, 3.4 mi Thompson Creek. In upper Skookumchuck (above dam) "floodplain" roads found along Weyerhaeuser Mainline from RM 27-36.2; Twelve Creek, Laramie Creek, and Range Creek

Tier 2 Concerns

Water Quantity, Water Quality

- ☐ Determine if water withdrawals are being followed in accordance with current water rights
- ☐ Evaluate dam flows to determine if they need to be adjusted to better accommodate fish
- ☐ Reduce water withdrawals from surface sources
- ☐ TMDL Implementation – Temperature, pH, fecal coliform

Tier 3 Concerns

Sediment, Large Woody Debris

- ☐ Check on 2000 Mainline Road upgrades
- ☐ Determine if sedimentation is a problem in Hanaford Creek
- ☐ Determine LWD quantities
- ☐ Develop agreement with dam managers to collect
- ☐ Develop LWD supplementation plan that will install logjams and key pieces
- ☐ Identify those roads that are contributing to sediment loading
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ LWD at dam should be placed downstream rather than removed from system
- ☐ Placement/input of gravels below dam
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Upgrade all logging roads to comply with Forest Practices Act Rules and Regulations

Skookumchuck Management Unit

Skookumchuck Management Unit – Scatter Creek

Major Tributaries:

Anadromous Fish Stocks:
Fall Chinook
coho
cutthroat
winter steelhead

Tier 1 Concerns

Riparian, Water Quality, Water Quantity

- ☐ Conduct a water balance study
- ☐ Control invasive species
- ☐ Reduce water withdrawals from surface sources
- ☐ Revegetate open riparian areas with native plants, with wider buffers
- ☐ Riparian fencing to exclude or reduce livestock access
- ☐ RM 1, 5, 8, 9, and 12.5 are priority areas
- ☐ TMDL Implementation – Temperature, pH, fecal coliform

Tier 2 Concerns

Sediment, Fish Passage

- ☐ Correct barrier culverts
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading
- ☐ Erosion control treatments along forest roads, i.e., revegetation, bioengineering, and willow cuttings to reduce mass wasting

Tier 3 Concerns

Floodplain, Large Woody Debris

- ☐ Assess floodplain for off-channel and wetland habitat
- ☐ Determine LWD quantities
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Implement alternative methods of bank stabilization (bioengineering)
- ☐ Install LWD pieces in conjunction with other restoration projects

South Bay Management Unit

South Bay Management Unit – South Bay Tributaries

Primary Subbasins:
John's River
Elk River

Secondary Subbasins:
Alder Creek
Charley Creek
Newskah Creek
Chapin Creek
Campbell Creek
Indian Creek
Stafford Creek
O'Leary Creek

Anadromous Fish Stocks:
Fall Chinook
coho
chum
cutthroat
winter steelhead

Tier 1 Concerns

Fish Passage, Sediment, Riparian

- ☐ Correct barrier culverts
- ☐ Identify specific degraded riparian areas for restoration needs
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easements
- ☐ Reduce sediment loading by reducing road densities (abandoned/decommission)
- ☐ Remove / control invasive species
- ☐ Revegetate streams/riverbanks for added protection from erosion
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 Concerns

Large Woody Debris, Floodplain

- ☐ Correct barrier culverts
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Enhance estuary connectivity
- ☐ Install LWD pieces in conjunction with other restoration projects
- ☐ Reconnect, enhance, and or restore potential off channel, floodplain, and wetland habitat

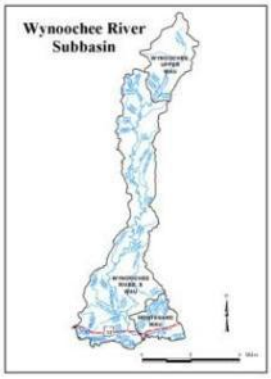
Tier 3 Concerns

Water Quality

- ☐ Implement TMDL recommendations

Wynoochee River Management Unit

Wynoochee River Management Unit – Wynoochee River



Major Tributaries:
Schaefer Creek
Black Creek

Anadromous Fish Stocks:
Fall Chinook
coho
chum
cutthroat
winter steelhead
summer steelhead
bull trout

Tier 1 concerns

Fish Passage, Riparian, Floodplain

- ☐ Assess floodplain conditions and identify impacts
- ☐ Conduct a study similar to upper Wishkah study to determine sediment loading and reduction
- ☐ Control invasive species
- ☐ Correct barrier culverts
- ☐ Gravel enhancement; when removing gravel build-up from the fish trap and dam and depositing it downstream additional gravel should be added to decrease scouring and incision downstream
- ☐ Habitat enhancement projects downstream from dam to mitigate losses
- ☐ Identify specific degree at riparian areas for restoration needs
- ☐ Improve fish passage at fishways and add a fishway to those structures that do not have them
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Protect key properties of riparian habitat by a fee simple or easement
- ☐ Reconnect, enhance, and/or restore potential off channel, floodplain, and wetland habitat
- ☐ Reduce the amount of allowable clearcuts at one time to allow for regeneration to catch up to logging
- ☐ Reduce the percentage of area harvested to allow regeneration to maintain a higher percentage of late seral timber at any given time to allow the watershed to retain more water
- ☐ Remove hard armoring (rip rap) or implement bioengineering techniques in place of hard armoring
- ☐ Revegetate open riparian areas with native plants
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations

Tier 2 concerns

Water Quality, Sediment

- ☐ Abandon roads on steep geologically sensitive areas
- ☐ Conduct a detailed study to determine the causes of temperature increases
- ☐ Conduct a study similar to the Upper Wishkah study to determine sediment loading and reduction
- ☐ Correct cross drains that may trigger mass wasting on geologically sensitive slopes
- ☐ Determine if sedimentation is a problem
- ☐ Erosion control treatments along forest roads to reduce mass wasting; i.e., revegetation, bioengineering, willow cuttings
- ☐ Identify sources that are contributing to sediment loading
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Reduce sediment loading by reducing road densities (abandon/decommission)
- ☐ Reduce the horsepower and speed of powerboats to reduce disturbance of bank and displacement of juveniles
- ☐ Reduce the percentage of area harvest it to allow regeneration to maintain a higher percentage of late seral timber at any given time to allow the watershed to retain more water
- ☐ Revegetate riverbanks for added protection from erosion
- ☐ Temperatures, DOs, pH, and turbidity should be monitored regularly
- ☐ Upgrade logging roads to comply with Forest Practices Act Rules and Regulations
- ☐ Wider riparian areas on agricultural lands with conifers dominating the tree species

Tier 3 concerns

Large Woody Debris, Water Quantity

- ☐ Adjust dam flows to better accommodate fish
- ☐ Conduct a study to collect additional data on the watershed canopy cover, dam operations and flow regimes (Smith/Wenger report)
- ☐ Develop LWD supplementation plan that will install logjams and key pieces to improve instream channel structure and habitat diversity
- ☐ Install riparian fencing to exclude or reduce livestock access
- ☐ Interplant conifers in deciduous dominant areas where appropriate
- ☐ Reduce the percentage of area harvested to allow regeneration to maintain a higher percentage of late seral timber at any given time to allow the watershed to retain more water
- ☐ Revegetate open riparian areas with native plants
- ☐ The LWD removed from the dam does not constitute the amount of LWD transporting downstream if the dam were not there, so there is a net loss of LWD recruitment from this area; even though LWD is removed from the dam area and placed below the dam, the natural recruitment has been diminished because much of the LWD above the dam does not float into an area where it can be recovered