Chimacum Creek Watershed

Agriculture, Fish & Wildlife Habitat Protection Plan

"*A scientifically credible strategy should be based on identifying what is possible, attainable and sustainable." Independent Science Panel, May 2000*

(1) Purpose and Intent

Agriculture, fish and wildlife are important components of the Chimacum Creek Watershed. This plan provides a voluntary framework for the protection of fish and wildlife habitat in a manner that conserves and protects existing and ongoing agricultural operations in the watershed. "Existing and ongoing agriculture" is defined as agricultural activities on lands enrolled in the Open Space Tax Program for agriculture or designated as Agricultural Lands of Long-Term Commercial Significance on the Comprehensive Plan Land Use Map in this watershed. The plan will:

(1) Protect the existing functions and values of fish and wildlife habitat in and adjacent to streams on agricultural land. For purposes of this Section, "existing functions and values" shall mean the following:

(a) Water quality standards identified in Chapter 173-201A WAC.
(b) The existing presence or absence of large woody debris within the stream.
(c) The existing riparian buffer characteristics and width, including but not limited to the existing amount of shade provided by the existing riparian buffer.
(d) The existing channel morphology.

(2) Conserve and protect agricultural lands of long-term commercial significance, specifically those lands in existing agricultural activity as defined by Section 2 of the Jefferson Co. Unified Development Code (UDC), that are located adjacent to streams.

.

Since many of the areas that are subject to this plan are located in the floodplains where substantial drainage infrastructure has been constructed, this Plan also must accommodate those existing drainage functions. Agricultural operations on lands which are not included in the definition of existing agriculture are required to comply with the other provisions of Section 2 of the UDC.

It is the goal of Jefferson County and agricultural landowners to implement the provisions of this plan consistent with Local, State and Federal programs to protect the health, welfare and safety of the community; accommodate continued operation and maintenance of the drainage infrastructure; and to protect existing agriculture, fish and wildlife habitat and anadromous fisheries, as mandated by the GMA. This plan is intended, to the maximum extent possible, to rely on and coordinate with but not substitute for or duplicate, other State and Federal programs that address agricultural activities in a manner that protects water quality and fish habitat. See Appendix D for a list containing some of the above referenced programs.

Background:

Impacts on Fish & Wildlife Habitat by Agriculture:

The major impacts of agriculture on fish and wildlife habitat in the Chimacum Cr. watershed have been the channelizing of the stream course, removal of riparian vegetation; draining of wetlands; bank erosion due to livestock access, and the introduction of reed canarygrass to the watershed. The majority of these impacts occurred from the late 1800's through the 1960's. While detrimental to salmonids the agriculturalization in the watershed has provided habitat for migrating trumpeter swans and waterfowl, which utilize flooded pastures and hayfields in winter.

Since the 1970's, efforts by individual landowners, agencies and community groups have had positive impacts on fish and wildlife habitat within the watershed. Most streams and ditches have been

fenced to exclude livestock from the stream and stream banks; best management practices such as roof water management systems, pasture management, and livestock waste management have been implemented that improved water quality; over 3.5 miles of fish habitat improvement projects have been implemented, and over 70 acres of riparian vegetation planted.

Impacts on Agriculture of Fish and Wildlife habitat protection and improvements:

One component of both the Growth Management Act and Jefferson County Comprehensive Plan is the protection of agricultural land of long-term significance. One criterion for identifying ag land of long term significance is that the soils have been determined to be "prime soils" by the USDA Natural Resources Conservation Service. Most of the soils within the areas affected by this plan are prime "if drained and not flooded during the growing season". To continue to be viable for agriculture it is essential to maintain the drainage on these soils. Fish and wildlife habitat improvements that have negative impacts on drainage of ag land will reduce the acreage of agricultural land of long-term commercial significance available for production. For example, fencing livestock out of the stream, while improving water quality and riparian habitat, has resulted in low gradient reaches being clogged with reed canarygrass causing problems for both agriculture and fish (low dissolved oxygen levels, lack of habitat diversity). Planting extensive, no touch riparian buffers will also reduce the amount of land available for agriculture. In addition, as trees within these buffers grow in height, the shading effect on land adjacent to the buffer will decrease ag productivity outside the buffer.

Maintaining Existing Agriculture and Protecting Fish and Wildlife Habitat:

Maintaining existing agricultural capability and protecting fish and wildlife habitat are compatible if done correctly. Attempting to restore fish and wildlife habitat to pre-European settlement conditions throughout the watershed is not compatible with maintaining existing agriculture but improvements can be, and are being, implemented.

The coho salmon stock utilizing the agricultural areas of Chimacum Creek watershed are considered healthy (SASSI 1992) and other wildlife species are not in jeopardy due to existing agricultural operations. Though coho stocks are "healthy" there is always room for improvement. The status of steelhead and cutthrout trout has not been documented but they are present in the watershed. Cutthroat are apparently abundant throughout the watershed based on juvenile abundance data collected and personal observations. The one ESA listed salmon stock (summer chum salmon) utilizes the lower mile of the watershed, three miles downstream of the agricultural area. This stock was extirpated in the mid 1980's due to a number of reasons (ocean conditions, harvest and failure of a road culvert). Summer chum have been reintroduced through the efforts of local volunteers and there are ongoing efforts to protect the summer chum habitat..

The agricultural areas of the Chimacum Cr. watershed provide winter habitat for a growing population of Trumpeter Swans, as well as other waterfowl. Some of the areas used for hay/silage production and pasture support vegetation attractive to swans such as northern managrass (Glyceria borealis) and pasture grasses. Current management techniques result in a lush growth of this grass when the fields flood in winter. The Swan Society and Jefferson Land Trust are working with landowners to develop conservation easements focused on maintaining the current agricultural practices that provide excellent habitat for swans.

Other wildlife utilizing the agricultural areas are coyote, blacktail deer, beaver, otter, numerous species of birds and small rodents, and the occasional elk, bear, cougar and bobcat.

This plan will not answer the question of "how much is enough?" but it will lay out a mechanism for voluntary protection and improvements of fish and wildlife habitat on agricultural land compatible with maintaining existing agricultural capability. Given the structural and biological impacts of agriculture and other development on the Chimacum watershed, fish and wildlife habitat will have to be actively maintained in perpetuity. For instance, large woody debris will have to be placed and maintained in

some locations rather than depending on natural recruitment that could lead to flooding and drainage problems. Implementation of the plan will take place over the long-term as funding, technical assistance and opportunities for protection/improvement are available.

This plan is “performance based” and utilizes best available science coupled with local knowledge and monitoring data to determine what needs to be done. “Performance based” means that protection/improvement of fish and wildlife habitat will utilize studies/assessments (existing and future) and monitoring data to determine what, if anything, needs to be done in specific areas of the watershed and whether or not such actions are producing desired results. A list of studies and assessments relating to fish & wildlife habitat in the watershed is included in Appendix 3. Water quality data, which reflect impacts of agricultural operations on in-stream habitat have been collected since 1988. Data collected since 1988 have shown improvements and trends towards improvement. For example, at the monitoring station at the downstream end of the agricultural area fecal coliform levels have fallen from a geometric mean value of 280 FC/100 mL in 1988 to 25 FC/100 mL in 2002 (0-50 FC/100mL is considered "Class AA extraordinary" (changed to "Extraordinary Primary Contact Recreation" in 2003). This improvement in water quality is directly related to the voluntary impelementation of best management practices (bmp’s) including extensive fencing of streams and ditches by landowners. An ultimate goal of the plan is to have all surface water in the watershed meet the criteria for non-polluted water as specified in WAC chapter 173-201A Water Quality Standards for Surface Waters of the State of Washington (see Appendix A). It should be recognized that according to this WAC surface water entering northern Puget Sound and Hood Canal must meet the highest standard for water quality to be in compliance with the water quality standard, an extremely high standard to meet, and may be very difficult to meet in some areas. There are often instances when natural conditions result in water quality not meeting this standard. A more appropriate gauge for measuring "how well we're doing" is to compare conditions to those documented since 1988. A realistic goal is to maintain and improve on the conditions documented in the Jefferson Co. Conservation District “2003 Water Quality Screening Report . Solutions to problems will be site specific rather than one-size-fits-all**.**

(2) Applicability

(a) As defined in Section 2 of the UDC, all existing agriculture (including operation and maintenance of agricultural drainage infrastructure) which is located within 200 feet from a stream, or any existing agriculture (including operations and maintenance of agricultural drainage infrastructure) which adversely impacts the existing functions and values of fish and wildlife habitat shall be subject to the requirements of this Plan. Isolated ditches that have no channelized surface hydraulic connection or no piped hydraulic connection between the ditch and any stream shall not be subject to the requirements of this Section. Drainage tile used to convey groundwater shall not be considered a piped hydraulic connection.

(b) The provisions of this Section shall not be interpreted to permit expansion of existing agriculture (including agricultural drainage infrastructure) into areas that did not meet the definition of existing agriculture on May 13, 1996, including lands that were fallow on that date but had been in agricultural production within 5 years prior to that date, unless such expansion can comply with all of the requirements for critical areas protection found in Chapter 2 of the Jefferson County Unified Development Code (UDC), including but not limited to, the requirement to adhere to the standard critical areas buffers and setbacks.

(c) In this Section, the term “best management practices (BMPs)” refers to one or all definitions of that term in Appendix E, depending on which definition is relevant within the context used.

(3) No Harm or Degradation Standard.

(a) All existing agricultural activities shall be conducted so as not to cause harm or degradation to the existing functional values of fish and wildlife habitat in agricultural areas (the "no harm or degradation" standard). For purposes of this Section the term "no harm or degradation" shall mean the following:
(i) Meeting, or working towards meeting, the water quality standards required by Chapter 90.48 RCW (Water PollutionControl Act) and Chapter 173-201A WAC, including the provisions that apply if a natural or baseline condition already exceeds listed water quality standards; and
(ii) Meeting, or working towards meeting, the requirements of any total maximum daily load (TMDL) requirements established by the Department of Ecology (ECY) pursuant to Chapter 90.48 RCW; and
(iii) Meeting all applicable requirements of Chapter 77.55 RCW (Hydraulics Code) and Chapter 220-110 WAC; and
(iv) Meeting the specific stream protection measures for existing agriculture specified in Subsection (4) of this Section; and
(v) No evidence of significant degradation to the existing fish habitat characteristics of the stream that can be directly attributed to the agricultural activities that are described in this plan.

(b) The references to Chapters 77.55 and 90.48 RCW, and Chapters 173-201A and 220-110 WAC contained in this Subsection shall not be interpreted to replace Dept. of Ecology and the Washington Department of Fish and Wildlife (WDFW) authority to implement and enforce these State programs with County responsibility to do so, but rather are intended to provide County input and a supplemental County involvement as needed to implement the County's GMA obligations under this Plan.

(c) Owners or operators subject to this plan shall conduct their existing agricultural operations in a manner sufficient to meet the "no harm or degradation" standard of Subsection (3)(a) of this Plan, including, if necessary, developing and implementing BMPs to meet this standard. The owner or operator may choose to, but is not required to consult with the Jefferson Co. Conservation District (JCCD), Natural Resource Conservation Service (NRCS), an NRCS technical service provider, the Washington State University Extension Service or other qualified expert to determine what combination of BMPs are necessary to meet the "no harm or degradation" standard. BMPs must be designed for site specific conditions and shall include pollution prevention and control measures that effectively address the following management areas:
(i) Livestock and dairy management;
(ii) Nutrient and farm chemical management;
(iii) Soil erosion and sediment control management;
(iv) Agricultural drainage infrastructure management.

Section 4 of the Natural Resources Conservation Service (NRCS) "Field Office Technical Guide" (FOTG) contains a nonexclusive list of conservation practices (BMPs) to guide implementation of the requirements of this Subsection.

(d) An owner or operator is responsible only for those conditions caused by agricultural activities conducted by the owner or operator and is not responsible for conditions that do not meet the requirements of this Subsection resulting from the actions of others or from natural conditions not related to the agricultural operations. In those situations where the County is presented with data showing a violation of a State water quality standard at a particular location, but where the County cannot identify any condition or practice existing or occurring at a particular agricultural operation that is causing the violation, the County shall refer the information regarding the State water quality violation to ECY. Conditions resulting from unusual weather events (such as a storm in excess of 25-year, 24-hour storm), or other exceptional circumstances that are not the product of obvious neglect are not the responsibility of the owner or operator.

(4) <u>Agricultural Practice Standards for Stream Protection for Existing Agriculture.</u> Unless the emergency provisions apply, the following stream protection measures shall be required for existing agriculture within 200 feet of a stream, except for isolated ditches that have no channelized surface hydraulic connection or no piped hydraulic connection between the artificial stream and any natural or modified natural stream or any salt water. Drainage tile used to convey groundwater shall not be considered a piped hydraulic connection.

(a) Livestock and Dairy Management. Livestock and dairy operations shall be conducted so as not to contribute any wastes or sediments into a natural or modified natural stream in violation of adopted State water quality standards. Livestock and dairy operations shall meet the following minimum stream protection measures:

(i) Livestock access to streams shall be managed consistent with this Subsection. Access to a stream for livestock watering and/or stream crossings shall be limited to only the amount of time necessary for watering and/or crossing a stream. Livestock watering facilities or access shall be constructed consistent with applicable NRCS conservation practice standards, and shall not be constructed to provide access to agricultural land that does not meet the definition of existing agriculture unless that agricultural land and the crossing can meet all requirements of Chapter 14.24 SCC.

(ii) Dairy operations shall comply with the requirements of Chapter 90.64 RCW (Dairy Nutrient Management Act).

(iii) Livestock pasture shall be managed so as to maintain vegetative cover sufficient to avoid contributing sediments to a stream in violation of State water quality standards.

(iv) Any existing or new livestock confinement or concentration of livestock areas that is located up gradient from a stream which results in bare ground (such as around a watering trough) shall beconstructed and maintained to prevent sediment and/or nutrient runoff contaminants from reaching a stream in violation of State water quality standards.

(b) Nutrient and Farm Chemical Management.

(i) The owner or operator shall not place manure in a streams or in a location where such wastes are likely to be carried into a stream by any means. Spreading of manure within 50 feet of any stream and/or spreading of liquid manure on bare ground from October 31st to March 1st is prohibited; unless otherwise permitted pursuant to:

(A) An approved and implemented dairy nutrient management plan (DNMP) as prescribed by Chapter 90.64 RCW; or

(B) An approved and implemented Conservation Plan prepared by NRCS, Conservation District or qualified planner; or

(C) In a year when the County determines that conditions support an extension of the deadline as described in Subsection (4)(b)(ii) of this Section.

(ii) Agricultural operators shall apply crop nutrients at agronomic rates, which are recommended for that particular crop.

(iii) Farm chemicals shall be applied consistent with all requirements stated on the chemical container labels and all applicable Federal and State laws and regulations, such as Chapter 15.58 RCW (Pesticide Control Act), Chapter 17.21 RCW (Pesticide Application Act), and 7 United States Code (USC) 136 et seq. (Federal Insecticide, Fungicide, and Rodenticide Act).

(c) Soil Erosion and Sediment Control Management.

(i) Roads used for existing agricultural activities shall be designed such that road surfaces, fill and associated structures are constructed and maintained to avoid contributing sediment to streams.

(ii) Agricultural equipment operation shall not cause stream bank sloughing or other failure due to operation too close to the top of the bank.

(iii) Ditch construction and maintenance shall meet the requirements for drainage operation and maintenance described under Subsection (4)(d) of this Section.

(iv) All ditching shall be constructed to drain into a stream that does not contain salmonids, unless the topography of the field is such that the only alternative to drain the field by gravity is to drain the ditch into

a stream that does contain salmonids. When draining a ditch into a stream that does contain salmonids, appropriate BMPs should be used to avoid contributing excess amounts of sediment to the stream. For the purpose of determining whether a stream or ditch contains salmonids, the County will use the Dept. of Natural Resources water type maps.

(d) Operation and Maintenance of Public and Private Agricultural Drainage Infrastructure.
The following practices shall apply to any stream that is part of drainage infrastructure:
(i) Regularly scheduled agricultural drainage infrastructure maintenance that includes dredging or removal of accumulated sediments in any ditch or ditched stream shall be conducted between June 15th and October 31st, unless this work window is changed as described in Subsection (4)(d)(A) of this Plan. If an approved hydraulics project permit provides for a different work window, those requirements shall control. If presence of fall or over-winter crops prevents regularly scheduled maintenance during this time period, then the maintenance may be conducted outside this work window; provided, that the person or entity proposing to conduct the maintenance outside the work window can demonstrate that the presence of crops prevents maintenance within the work window and provided the maintenance is conducted using best management practices to minimize sediment or other impacts to water quality.
(ii) Unless there is no feasible alternative, regularly-scheduled maintenance that includes dredging or removal of accumulated sediments in any stream should be conducted at those times when there is no or minimal water flow in the stream being maintained to minimize potential for distributing sediments to salmonid-bearing waters.
(iii) Excavation spoils shall be placed so as not to cause bank failures and so that drainage from such spoils will not contribute sediment to the stream.
(iv) Mowing or cutting of vegetation located within a stream that is part of drainage infrastructure may be conducted at any time; provided, that the cutting is above the ground surface within the channel and in a manner that does not disturb the soil or sediments; and provided, that the cut vegetation does not block water flow. Stream bank vegetation shall be preserved or planted as soon as practicable after drainage construction and maintenance are completed to stabilize earthen ditch banks.

(e) Riparian Management

(i) Existing riparian vegetation will be managed to continue to provide soil and streambank stability, shade, filtration, and habitat for fish and wildlife in such a manner that it does not impact existing agricultural operations.

(ii) Landowners are encouraged to plant riparian vegetation to improve fish and wildlife habitat by providing shade, cover, organic debris and by helping to control reed canarygrass. Programs that can assist with planting and maintenance of riparian vegetation are listed in Appendix D. The Conservation District and Natural Resources Conservation Service can provide technical assistance and help locate funding for riparian planting.

(iii) Reed canarygrass can be problematic in low gradient reaches of the watershed, where it can fill in the stream channel. An introduced species, it provides poor habitat for wildlife and can impact fish by causing passage problems and low levels of dissolved oxygen in the water. A long-term, watershed wide reed canarygrass control plan is needed to address these concerns. As trees/shrubs are planted along streambanks to improve fish/wildlife habitat the ability to control reed canarygrass in the stream channel by mechanical methods is eliminated. In these areas the only alternative left for reed canarygrass control is use of an herbicide registered for aquatic use applied by licensed applicators. An annual program of spot spraying will be needed to keep the channel open until such time as adequate shade develops that controls reed canarygrass (20-25 years after planting).

(iv) It is important that funding be available to assist with this riparian planting and maintenance. Revegetating riparian areas is difficult, time consuming, expensive and in most instances is beyond the means of landowners to accomplish on their own.

(v) A "Riparian Management Guide" should be developed that provides information on watershed-based management objectives and techniques derived from landowner's experience.

(5) Resource Management System (RMS) Plan/Conservation Program Participation.

(a) This plan does not require landowners or operators to obtain an approved RMS Plan from Jefferson Co. Conservation District (JCCD) or the USDA Natural Resources Conservation Service (NRCS). However, lands upon which owners or operators have sought and implemented an approved RMS Plan or landowners or operators who, since May 13, 1996, have implemented one or more of the Local, State or Federal programs to protect critical areas and promote environmental stewardship listed in Appendix C shall be entitled to a presumption of compliance with the "no harm or degradation" standards described in subsection (3) above for that portion of the land or farm operation that has been enrolled and/or included in the DNMP or RMS Plan.

(6) Voluntary Compliance

1. Water qaulity will be monitored by the Jefferson Co. Conservation District Water Quality Monitoring Program (dependent on funding) using existing stations. Additional stations will be added as needed if funding is available. See Appendix F for details of the JCCD water quality monitoring program.

2. The purpose of the monitoring efforts will be to detect a trend or condition that is occurring in any one or more of the reaches, that is considered detrimental to fish and wildlife.

3. In the event such a condition is detected in any reach or reaches, the Conservation District shall contact all property owners along the involved reach or reaches. The purpose of contacting the property owners will be to arrange a meeting where the detected problem can be identified to the property owners.

4. Once the problem has been identified it shall become the responsibility of the property owners to work together to eliminate the problem. Some of the ways that property owners can work together and with the county solve a detected problem are as follows:

   4A. Additional monitoring stations within the reach to further isolate the problem.

   4B. Property owners that have had experience with the cause of the problem will share ideas with those who haven't. The county will arrange for outside help with relevent expertise, to assist the landowners with this process as requested.

   4C. All property owners involved may need to be reminded by the County that for this plan to work and protect agriculture, they must work together to avoid harming fish & wildlife habitat with agricultural activities, or potentially be subject to additional regulation.

5. The County and Conservation District will help identify funding sources to assist landowners in addressing problems that are identified.

6. Non-compliance with this plan resulting in degradation of existing fish and wildlife habitat may result in the loss of the exemption from the requirements for critical areas protection found in Chapter 2 of the Jefferson County Unified Development Code (UDC), including but not limited to, the requirement to adhere to the standard critical areas buffers and setbacks.

(7) Habitat Improvements

Over the last 20 years numerous improvements to fish and wildlife habitat have been implemented throughout the Chimacum Creek watershed. Landowners, community groups and agencies are actively involved in the planning, funding and implementation of additional habitat improvement projects, primarily

focused on salmonids and trumpeter swans. Landowner participation in these programs continues to be on a voluntary basis, and the level of participation is excellent. Since 1985:

- 30 agricultural landowners have worked with local agencies and community groups to implement improvements to fish & wildlife habitat on their property, not including stream fencing and undocumented work done by other landowners on their own.
- 70+ acres of riparian area have been planted with trees and shrubs.
- 185 riparian acres have been protected in the agricultural area through conservation easements and enrollment in the Conservation Reserve Enhancement Program.
- 13.5+ miles of streambank have been fenced through various programs, not including undocumented fencing done at landowner expense.
- Over 3.5 miles of salmon habitat improvement projects have been implemented.

Community groups and agencies working on fish and wildlife habitat issues have a backlog of fish habitat improvement projects in various stages of planning in the Chimacum watershed. The main impediment to additional improvements is lack of funding for habitat protection, project planning and implementation. Projects that can be implemented, dependent on adequate funding, are:

- Planting and maintenance of trees and shrubs in riparian areas to improve water temperature.
- Streambank channel reconfiguration to add habitat complexity
- Addition of large woody debris and spawning gravels.
- Reed canarygrass control.
- Additional riparian fencing.

(8) Funding:

1. Elements needing funding:

- Habitat improvement projects: Existing projects planned but not funded: $250,000.00
- Habitat protection through conservation easements and acquisition. Existing projects planned but not funded: $50,000
- Long term maintenance of riparian plantings. $130,000/year
- A long term reed canarygrass control program. $25,000/yr.
- Conservation Plan preparation. $45,000/ yr. (Additional Conservation Dist. staff)
- BMP cost-share funding. $5,000 - $20,000/yr.
- Development of a Riparian Management Guide providing information on watershed-based management objectives and techniques derived from landowner's experience. $10,000

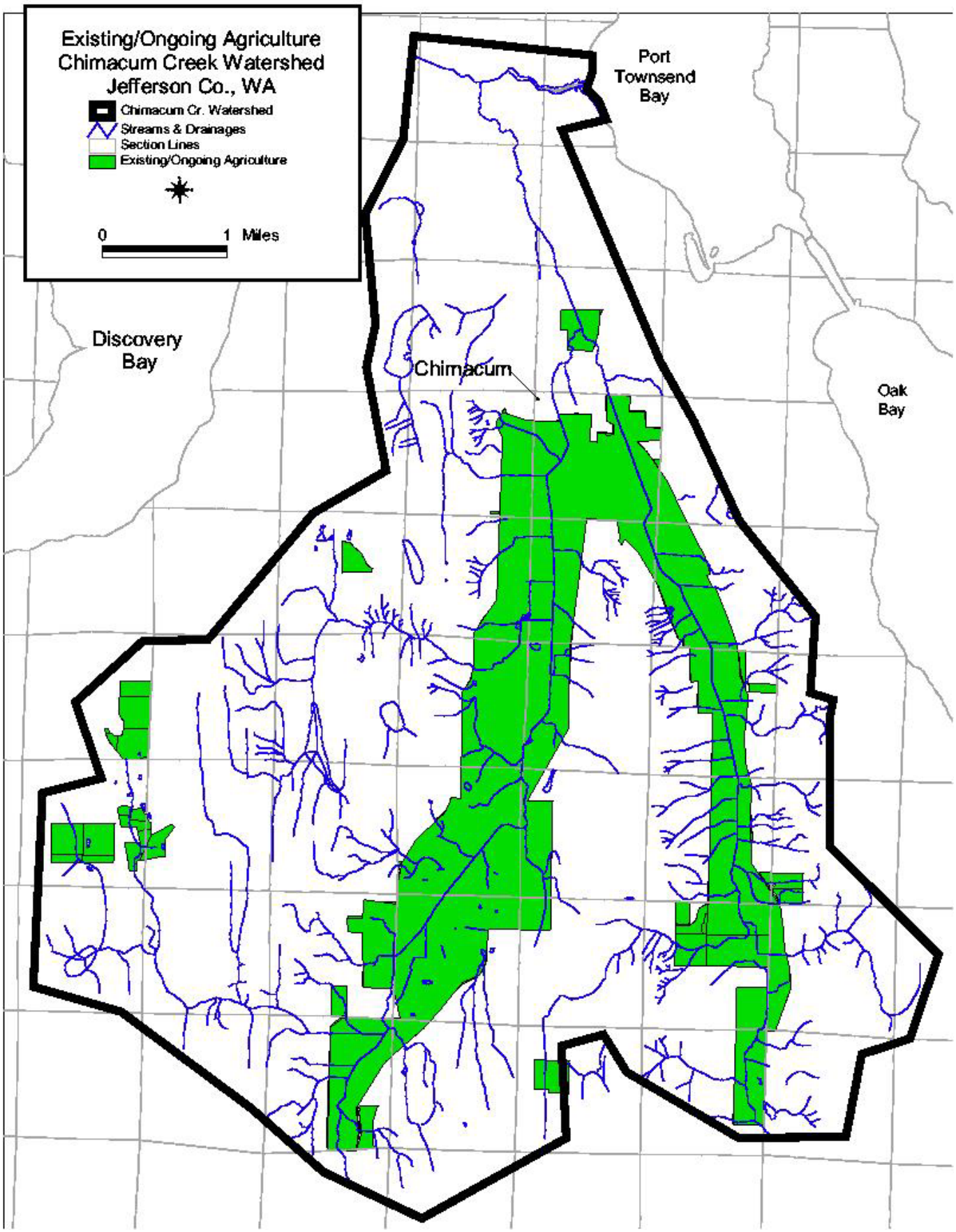
2. Funding Sources

There are a number of state, federal and private programs that provide funding for implementation of fish & wildlife habitat protection/improvement projects and BMP implementation. It is important to note that although these programs exist they are often underfunded, or unavailable in the Chimacum Cr. watershed due to statewide or regional prioritization processes.

- **Existing sources include**:
  - North Olympic Salmon Coalition (a Regional Fisheries Enhancement Group). Funds salmon habitat improvement projects through grants.

- WA Salmon Recovery Funding Board: Provides grants for salmon habitat improvement/protection projects.
- National Fish & Wildlife Foundation. Provides grants for salmon habitat improvement/protection projects.
- USDA Farm Bill Programs (EQIP, WHIP, WRP, CREP): Provides funding for BMP implementation and fish/wildlife habitat protection/improvement projects.
- Jefferson Co. Conservation Futures Program: Funding for acquisition or conservation easements for locally important fish/wildlife habitat.
- Jefferson Co. funding for Conservation District Programs: Provides funding for the continuation of Conservation District programs assisting landowners with fish/wildlife habitat protection/improvement and water quality monitoring.
- WA Conservation Commission grants to Conservation Districts: Provides funding for Conservation District programs assisting landowners with fish/wildlife habitat protection/improvement and water quality monitoring.
-

- **Potential Funding Sources include**:
  - Chimacum Cr. Drainage District: Currently inoperative. Has assessment potential. Could provide funding for reed canarygrass control.
  - Jefferson Co. Surface Water Mgmt. Program: Development of a surface water management plan is in process. Potential funding for water quality protection/improvement will depend on how implementation of the plan is funded.
  - Conservation District Special Assessment (RCW 89.08.400). Provides for a special assessment to fund conservation of natural resources. Not implemented to date.
  - Jefferson Co. Noxious Weed Control Board. Potential assistance with reed canarygrass control


Existing/Ongoing Agriculture
Chimacum Creek Watershed
Jefferson Co., WA
Chimacum Cr. Watershed
Streams & Drainages
Section Lines
Existing/Ongoing Agriculture
0
1 Miles
Port Townsend Bay
Discovery Bay
Chimacum
Oak Bay

3-12-04

APPENDIX A
WASHINGTON STATE WATER QUALITY STANDARDS FOR SURFACE WATERS
From Chapter 173-201A WAC

Aquatic life TEMPERATURE criteria. Except where noted, water temperature is measured by the 7-day average of the daily maximum temperatures (7-DADMax). Table 200 (1)(c) lists the temperature criteria for each of the aquatic life use categories.

Table 200 (1)(c) Aquatic Life Temperature Criteria in Fresh Water, Category Highest 7-DADMax

- Salmon and Trout Spawning, **Core** Rearing, and Migration 16°C (60.8°F)

Aquatic life DISSOLVED OXYGEN (D.O.) criteria. The D.O. criteria are measured in milligrams per liter (mg/L). Table 200 (1)(d) lists the 1-day minimum D.O. for each of the aquatic life use categories.

Table 200 (1)(d) Aquatic Life Dissolved Oxygen Criteria in Fresh Water, Category Lowest 1-Day Minimum

- Salmon and Trout Spawning, **Core** Rearing, and Migration 9.5 mg/L

Aquatic life TURBIDITY criteria. Turbidity is measured in "nephelometric turbidity units" or "NTUs." Table 200 (1)(e) lists the maximum turbidity criteria for each of the aquatic life use categories.

Table 200 (1)(e) Aquatic Life Turbidity Criteria in Fresh Water, Category NTUs

- Salmon and Trout Spawning, **Core** Rearing, and Migration Same as above.

Aquatic life pH criteria. Measurement of pH is expressed as the negative logarithm of the hydrogen ion concentration. Table 200 (1)(g) lists the pH levels for each of the aquatic life use categories.

Table 200 (1) (g) Aquatic Life pH Criteria in Fresh Water Use Category pH Units

- Salmon and Trout Spawning, **Core** Rearing, and Migration, pH shall be within the range of 6.5 to 8.5, with human-caused variation within the above range of less than 0.2 units.

Water contact recreation BACTERIA criteria. Table 200 (2)(b) lists the bacteria criteria to protect water contact recreation in fresh waters.

Table 200 (2)(b) Water Contact Recreation Bacteria Criteria in Fresh Water
Category Bacteria Indicator

- **Extraordinary Primary Contact Recreation**: Fecal coliform organism levels must not exceed a geometric mean value of 50 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 100 colonies/100 mL.

APPENDIX B: Reference List

Ames, James and Bucknell, Patrick 1981. A Catalog of Washington Streams and Salmon Utilization. Washington State Department of Fisheries.

Ames, Jim et al. 2000. Summer Chum Salmon Conservation Initiative. Washington Department of Fish and Wildlife and Point-No-Point Treaty Tribes.

Bahls, Peter and Rubin, Judith 1996. Chimacum Watershed Coho Salmon Restoration Assessment.

Correa, Ginna, 2002, Salmon & Steelhead Habitat Limiting Factors, WRIA 17

Gately, Glenn 2001, 2003. Water Quality Screening Report. Washington Conservation Commission.

Labbe, Ted, Bahls, Peter, and Bernthal, Carol 2002. Patterns of summer stream temperature maxima in north Hood Canal, Washington, 1992-2001. No. 02-A.

Lichatowich, Jim 1993. The Status of Anadromous Fish Stocks in the Streams of Eastern Jefferson County, Washington. Jamestown S'Klallam Tribe, Dungeness-Quilcene Pilot Project.

May, Christopher & Peterson, Gretchen, 2003, Landscape Assessment and Conservation Prioritization of Freshwater and Nearshore Salmonid Habitat in E. Jefferson County.

Parametrix, Inc, Pacific Groundwater Group, Inc, Montgomery Water Group, Inc., and Caldwell and Assoc. 2000. Stage 1 Technical Assessment as of February 2000 Water Resource Inventory Area 17.

Parametrix, Inc 2000. Fish Habitat and Salmonid Stock Data Summary, WRIA 17.

Seiter, Ann, Newberry, Linda, Young, Cindy, Clark, Linn, and Kovach, Nancy 1994. The DQ Plan: The Dungeness-Quilcene Water Resources Management Plan. Jamestown S'Klallam Tribe.

Simmons, Donna and Hood Canal Technical Work Group 1995. Shellfish and Finfish, Resources at Risk in the Hood Canal Watershed. Hood Canal Coordinating Council; Washington Dept of Ecology.

Skagit County, Draft Ag/Critical Areas Ordinance 2/12/03

Stumbaugh, Darcy, Dyba, Suzanne, and Joehnk, Lisa. Chimacum Creek Project Report, East Fork. 2001.

Till, Laura, Soncarty, Chris, and Barber, Mike 2000. Jefferson County Barrier Culvert Inventory and Prioritization. Washington Department of Fish and Wildlife.

Watson, Jay 2001. Salmon Habitat Recovery Strategy for the Hood Canal and the Eastern Strait of Juan de Fuca.

Washington Dept. of Ecology, 2003, Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A WAC

APPENDIX C: BMP (Best Management Practices) REFERENCES

1. “Guidelines for Northwest Washington Conservation Plans,” October 2002

Draft (or future approved versions) prepared by the Agriculture Fish and Water Forum. (“AFW Guidelines”). These AFW Guidelines are being considered for adoption by Natural Resource Conservation Service as new Conservation Practice Standards for the Field Office Technical Guides (FOTG’s) to guide development of Farm Management Plans.

2. "Field Office Technical Guide", Natural Resources Conservation Service

3. Managing Nonpoint Pollution - An Action Plan Handbook for Puget Sound Watersheds. Puget Sound Water Quality Authority, June, 1989

4. Manure Management - Guidelines for Western Washington. WA State Univ. et al. April 1995

5. Fish Habitat Rehabilitation Procedures. Watershed Restoration Technical Circular No. 9. Watershed Restoration Program, British Columbia 1997

6. Integrated Streambank Protection Guidelines 2003. Washington State Aquatic Habitat Guidelines Program, 2002

APPENDIX D: PROGRAMS FUNDING HABITAT IMPROVEMENT AND PROTECTION

1. US Dept. of Agriculture

A. Wetland Reserve Program (WRP)

B. Conservation Reserve Enhancement Program (CREP)

C. Conservation Reserve Program (CRP)

D. Wildlife Habitat Incentive Program (WHIP)

E. Environmental Quality Incentive Program (EQIP)

2. Jefferson County

A. Conservation Futures Program

B. Conservation District Program Support

3. State of Washington

A. Salmon Recovery Funding Board
B. IAC
C. WRP
D. ALEA
E. Landowner Incentive Program (WDFW)
F. Dairy Nutrient Management Cost Share (Conservation Commission)
G. Conservation Reserve Enhancement Program (Conservation Commission)

4. OTHER

A. North Olympic Salmon Coalition
B. Jefferson Land Trust

APPENDIX E: Definitions

Artificial stream: ditches and other water conveyance systems, not constructed from natural streams, which are artificially constructed and actively maintained for irrigation and drainage. Artificial streams include lateral field ditches used to drain farmland where the ditch did not replace a natural stream.

Best Management Practices (BMPs), agricultural: practices or structures designed to reduce the quantities of pollutants such as sediment, nitrogen, phosphorus, and animal wastes that are washed by rain and snow melt from farms into nearby surface waters such as lakes, creeks, streams, rivers, and estuaries. Agricultural BMPs can include fairly simple changes in practices such as fencing cows from streams to keep animal waste out, planting grass in gullies where water flows off a planted field to reduce the amount of sediment that runoff picks up as it flows to rivers and lakes, reducing the amount of plowing in fields where row crops are planted to reduce soil erosion and nitrogen and phosphorus loss from fertilizers applied to the crop land. BMPs can also involve building structures, such as large animal waste storage tanks that allow farmers to choose when to spread manure on their fields as opposed to spreading it based on accumulated volume. No mention of riparian management?

Conservation plan: a site-specific plan designed to conserve and/or productively utilize available resources while reducing adverse impacts to critical areas or their buffers caused by agricultural activities. Development of conservation plans typically includes inventory and analysis of available resources, and plans must specify the BMPs necessary to achieve the objectives of this Chapter.

Diking and drainage system: any lawfully constructed combination of dike, levee, and drainage which actually does or is designed to prevent inundation and facilitate drainage of land upland of the Ordinary High Water mark.

Existing and on-going agriculture: Agricultural activities on lands enrolled in the Jefferson Co. Open Space Tax Program for agriculture or designated as Agricultural Lands of Long-Term Commercial significance on the Jefferson Co. Comprehensive Plan Land Use Map

Farm operation: conditions or activities which occur on a farm in connection with the commercial production of land-based farm products, and includes, but is not limited to, market produce at roadside stands or farm markets; preparation for market, delivery to storage or to market, or to carriers for transportation to market; transportation of equipment; noise, dust, fumes, operation of machinery and irrigation pumps; ground and aerial seeding or spraying; application of chemical and organic fertilizers, conditioners, insecticides, pesticides and herbicides and associated drift of such materials; and the employment and use of labor.

Functional values: means those functions which are highly beneficial to the maintenance of the aquatic system and surrounding environment. As used in this Chapter, "functional values" for wetlands, streams and buffers are limited to the following elements:
(a) Streams: Fish and wildlife habitat, water quality maintenance, water supply and water conveyance.
(b) Wetlands: Fish and wildlife habitat, water quality maintenance, pollution assimilation, shore stabilization, sediment retention, runoff and floodwater storage and conveyance, runoff control, stream base-flow maintenance, and groundwater discharge/recharge.
(c) Buffers: Fish and wildlife habitat, runoff absorption, pollution assimilation, streambank stabilization, sediment entrapment, water quality maintenance including shading for maintenance of temperature, noise and visual screening, upland flood protection, recreation, and provision of nutrients and woody debris for streams.

Growing season: the portion of the year when soil temperatures are above biologic zero (41 degrees Fahrenheit) as defined by the Washington State Wetlands Identification and Delineation Manual, Washington State Department of Ecology publication #96-94.

Large woody debris (LWD) recruitment: standing timber which has the potential, during the course of natural events, to contribute organic materials to the stream, thus providing stream bank protection and

in-stream habitat. LWD includes woody material (logs, rootwads, etc.) that are greater than 10 centimeters in diameter and 1 meter or greater in length.

Modified natural stream: that segment of a natural stream that has been modified and is maintained by landowner/operator

Natural stream: any stream in existence prior to settlement that originated from a natural source. An example of a natural stream is a stream that originates in the foothills, flows through agricultural and/or urban land, and empties into a saltwater bay or another stream.

Operation and maintenance of diking and drainage systems: the clearing of vegetation, the planting and maintenance of sod covering, the use of rock armor, floodwalls, sandbags, and other flood fighting materials to prevent inundation, and the making of necessary repairs to restore existing structures and facilities, such as dikes, levees, ditches, drains, and pump stations within specific areas identified under SCC 14.24.100(9).

Ordinary high water mark (OHWM): the mark on the shores of all water which is found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation; provided that, in any area where the ordinary high-water mark cannot be found, the ordinary high-water mark adjoining saltwater shall be the line of mean highest high tide and the ordinary high-water mark adjoining freshwater shall be the line of mean high-water. (WAC 173-22-030)

Perennial stream: means a stream, the natural flow of which is normally continuous at any given location.

Resource Management System Conservation Plan. A Resource Management System Conservation Plan (RMS Plan) is a plan that has been prepared in consultation with the SCD or NRCS and includes resource management objectives determined appropriate to protect fish and wildlife habitat and water quality concerns, consistent with the NRCS Field Office Technical Guide.

Riparian or riparian area: the portion of habitat extending from the ordinary high-water mark (OHWM) of a stream (i.e., a flowing body of water) to that part of the upland influenced by elevated water tables or flooding and beyond, to include the area that directly influences the aquatic ecosystem (e.g. providing temperature moderation, sediment and pollutant filtration, litterfall and nutrient input, bank stabilization and erosion control [i.e., to maintain intact stream banks and keep eroded soil out of the stream], shading, large woody debris [e.g., trees falling in streams which create pools and riffles vital to salmon survival and protection from predators] and instream habitat [including habitat for insects and other species that provide food for salmon and smaller fish upon which salmon prey); provided, that riparian areas associated with an existing system of dikes and levees shall not extend beyond the toe of the slope on the landward side of the dike or levee structure.

Riparian vegetation: means vegetation that tolerates and/or requires moist conditions and periodic free flowing water, thus creating a transitional zone which provides shade and food sources of aquatic and terrestrial insects for fish. Riparian vegetation and their root systems stabilize river and stream banks, attenuate high water flows, and provide limbs and other natural debris which, in turn, stabilize river and stream beds. The benefits of vegetation cover and food sources and the availability of water in riparian corridors mean that they are likely to be preferentially used by wildlife and enable wildlife movement between wetlands and along streams, rivers and lakes.

Stream: Any stream, types 1-5, indicated on the Water Type Maps maintained by Dept. of Natural Resources.

V-ditching: the practice of cutting ditches into a field after the crop has been harvested in the fall where necessary to drain surface and ground water from the field during the winter months. This practice is necessary to allow sufficient time in the spring for the fields to dry out before planting and to prevent the inundation of overwinteringcrops. V-ditches are then plowed under when the field is planted in the spring.

APPENDIX F: Jefferson County Conservation District Surface Water Quality Monitoring Program.

Jefferson County Conservation District (JCCD) will continue to monitor the trends or conditions of water quality through their existing water quality monitoring program, dependent on available funding. Data are collected for a 12 month period every other year.

(a) This monitoring program shall monitor:

(1) bacteria
(2) nutrients (nitrate nitrogen and total phosphorous)
(3) sediments (total suspended solids and/or turbidity)
(4) dissolved oxygen
(5) temperature
(6) conductivity
(7) pH

(b) JCCD shall conduct water quality monitoring according to the protocols established for their existing water quality monitoring program.

(c) JCCD shall expand the total number of monitoring locations as needed, depending on funding.

(d) JCCD will coordinate its monitoring efforts under this section with monitoring efforts of other government agencies, Tribal entities, community groups and volunteers conducting water quality monitoring.

(e) JCCD's existing core monitoring program [(a) 1-7 above] is conducted every other year for a 12 month period (Oct 1. - Sept 30).

(f) JCCD shall prepare a biannual report of its monitoring efforts and submit the report to the Jefferson County Commissioners for their information, with copies made available to other interested parties. The annual report shall include any recommendations regarding any additions or revisions to the monitoring locations deemed appropriate to better assess water quality if the monitoring data supports the need to collect additional information from a specific Stream or drainage basin.

Sample Locations for Jefferson County Conservation District Water Quality Monitoring Program - Chimacum Cr. Watershed (Type code: T=Temperature; WQ= Water Quality)

Waterbody Name	StationID	Type
Chimacum Creek (17-0203)	CH/0.1	T
Chimacum Creek	CH/1.1	T, WQ
Chimacum Creek	CH/3.4	WQ
Chimacum Creek	CH/3.9	T, WQ
Chimacum Creek	CH/5.3	T, WQ
Chimacum Creek	CH/6.1	T
Chimacum Creek	CH/6.7	T, WQ
Chimacum Creek	CH/7.0	T
Chimacum Creek	CH/7.8	WQ
Chimacum Creek	CH/8.8	WQ
Chimacum Creek	CH/9.0	T
Chimacum Creek	CH/9.3	WQ
Chimacum Creek	CH/9.4	T
S. Fork Chimacum Cr. (17-0213)("Barnhouse" Cr.)	BH/0.0	T
S. Fort Chimacum Cr. (17-2013) ("Barnhouse" Cr.)	BH/1.0	T

Waterbody Name	StationID	Type
Naylors Creek (17-0208)	NA/0.1	WQ
Naylors Creek	NA/0.2	T
Naylors Creek	NA/0.7	T, WQ
Putaansuu Creek	PU/0.0	T, WQ
Putaansuu Creek	PU/0.4	WQ
Putaansuu Creek	PU/0.5	T
East Chimacum Creek (17-0205)	ECH/0.1	T
East Chimacum Creek	ECH/0.2	WQ
East Chimacum Creek	ECH/1.0	T, WQ
East Chimacum Creek	ECH/1.2	T
East Chimacum Creek	ECH/2.8	T
East Chimacum Creek	ECH/3.3	T, WQ
East Chimacum Creek	ECH/4.8	WQ
East Chimacum Creek	ECH/5.3	WQ
East Chimacum Creek	ECH/5.4	T

Appendix G: Watershed Characterization

Chimacum Creek – WRIA 17.0203 (*(Note: Italicsized sections from Limiting Factors Analysis)*

"*Chimacum Creek originates in a number of spring fed tributaries and lakes in the forested hills of east Jefferson County on the northeast side of the Olympic Peninsula. The mouth of the stream enters Admiralty Inlet approximately five miles south of the City of Port Townsend. The mainstem divides into two forks at approximately river mile 2.9. The east fork continues southeast for 6.5 miles through Beaver Valley and the west fork continues southwest and then west at Eaglemount Road for 11.3 miles through Center Valley (Ames and Bucknell 1981). The Chimacum watershed is approximately 33 square miles in area, with a combined stream length of about 30 miles (Ames et al 2000).*

Chimacum Creek flows into two glacially carved lowland valleys dominated by pastureland with peat and muck soils. The surrounding hills are used for rural residences and logging of second and third growth timber and the lowland valleys are dominated by agricultural use, primarily pastureland. Near the confluence of the east and west forks of Chimacum Creek at RM 2.9, are the towns of Chimacum, Port Hadlock, and Irondale with rapidly growing residential and commercial development. The mainstem enters a moderately confined and forested ravine below RM 1.3. At RM 0.2, the stream continues through a comparatively unimpacted estuarine lagoon, salt marsh and relatively deep inlet of Port Townsend Bay to the open saltwater of Admiralty Inlet. The creek empties into a short, partially forested tidal floodplain but has no distinct tidal delta (Ames et al 2000).

In the rain shadow of the Olympic Mountains, the watershed generally receives from 35 inches of rain in its headwaters to less than 22 inches at the mouth (Ames et al 2000). Jefferson County Conservation District measured high flows ranging from 210 to 250 cfs in January and February of 1998 and 1999; in 2000 the highest flow was 125 cfs measured in January. Low flows for the three years occurred in July and August. The lowest flows recorded for 1999 and 2000 were 4.22 cfs and 0.32 cfs respectively (Gately, G. 2001)

Land use in the upper Chimacum watershed is forestry, both public and private, while the middle section is characterized by agriculture, rural residences, commercial enterprise, industry and parks. Commercial zoned lands comprise 41.7 percent of the watershed while 39.9 percent is zoned rural residential, 14 percent agriculture, 3.6 percent parks and 0.7 percent commercial (Jeff Miller, unpublished data, 2002).

While much of the habitat in the lower mile is public ownership or protected by conservation easements through the Jefferson Land Trust, habitat in the upper Chimacum watershed has decreased dramatically both in quantity and quality over the past 145 years. Removal of beaver ponds, wetlands and channel meanders by extensive ditching to create farmland has eliminated over 90% of the coho juvenile rearing habitat from the watershed. Since European settlement in the 1850s, an estimated 6% of summer rearing habitat, 3% of winter rearing habitat and 88% of spawning habitat remains. Of this remaining habitat, most has been further degraded in terms of low oxygen and elevated stream temperatures associated with lack of forested riparian zones, heavy siltation of spawning and rearing areas and loss of channel complexity and structure, particularly the loss of large woody debris (Bahls and Rubin 1996). Approximately 1.5 to 1.75 miles of stream have been rehabilitated since 1998."
(From Salmon & Steelhead Habitat Limiting Factors (LFA), WRIA 17, Correa, 2002)

Agricultural practices have had a large impact on salmonid habitat in the Chimacum Creek watershed. The major impacts by agriculture occurred from the late 1800's through the 1960's when the creek was channelized, wetlands drained, beaver dams were removed, reed canarygrass was introduced, irrigation instituted and riparian vegetation removed. Since the mid 1980's voluntary efforts by the landowners,

government agencies, and community groups have improved and protected water quality and salmon habitat throughout the watershed.

HISTORY:

Farming has been practiced in the rich bottomland along Chimacum Creek since the late 1800's. Through the years landowners cleared the forested sections, burned and pulled stumps and drained the wetland soils. To facilitate drainage the creek was straightened and deepened throughout the APD. By the late 1950's most of the agricultural development and related impacts on fish and wildlife habitat had occurred, including the introduction of reed canarygrass. Over the years agriculture transitioned from numerous small commercial farms (mostly beef and dairy) to the 2002 situation of 5 dairies, a few commercial beef operations, a small number of market garden operations but mostly part-time beef, sheep and horse farms on small acreages. Throughout this period of agricultural development the salmonid stocks remained in a viable, self sustaining condition until the mid 1980's. In the 1980's the culmulative effects of habitat loss, ocean conditions, harvest, farming, logging, and other factors decreased many salmon populations to critically low levels, with the Chimacum summer chum disappearing in the mid 1980's.

In the Chimacum Creek watershed the coho, steelhead and cutthroat trout populations that utilize habitat in the APD maintained themselves at sustainable levels through this period and have been on the upswing in recent years. The summer chum stock (which does not utilize habitat in the APD) disappeared in the mid 1980's but summer chum have been re-introduced by a Wild Olympic Salmon project.

Since the mid 1980's private landowners, government agencies and community groups have worked together to improve and protect salmon habitat on ag lands of the Chimacum Creek watershed. Key agencies have been the Jefferson County Conservation District, US Dept of Agriculture Natural Resources Conservation Service and Farm Service Agency, Washington Dept. of Fish and Wildlife, WSU Cooperative Extension, Jefferson County and the Port Gamble S'Klallam Tribe. Key community groups have been Wild Olympic Salmon, North Olympic Salmon Coalition and Jefferson Land Trust. These voluntary efforts have resulted to date (12/03) in:

- 30 agricultural landowners have worked with local agencies and community groups to implement improvements to fish & wildlife habitat on their property, not including stream fencing and undocumented work done by other landowners.
- 445 riparian acres have been protected in the in the watershed through conservation easements and enrollment in the Conservation Reserve Enhancement Program.
- 13.5+ miles of streambank have been fenced through various programs, not including undocumented fencing done at landowner expense.
- 3.6 miles of salmon habitat improvement projects have been implemented

These efforts to protect and improve salmon habitat are an existing process. As successful projects are implemented additional opportunities occur. The most difficult parts of the process are obtaining project funding and permits.

Salmon utilization: Chimacum Watershed

Salmonids utilizing the Chimacum Creek watershed include summer chum, fall chum, and coho salmon; steelhead and cutthroat trout. Summer chum salmon are ESA listed as "threatened", the coho stock is considered "healthy" and there is no documentation of the status of fall chum, steelhead and cutthroat trout.

Summer chum salmon (Oncorhynchus keta) utilize the lower mile of the watershed from RM 0 to RM 1. The Ag area begins at RM 3. They spawn in early September through mid-October, and the fry

move into the saltwater the following spring. In the mid-1980's the summer chum stock in Chimacum Creek was extirpated due to a combination of factors including ocean conditions, harvest and habitat degradation due to a road culvert and fill failing. Up until that point, through 80+ years of agricultural practices in the ag areas, the stock was viable. In 1996 Wild Olympic Salmon volunteers began a reintroduction of summer chum utilizing eggs from the Salmon Creek stock. "The first returning adult summer chum were observed in 1999 when a total of 38 fish returned. In 2000, 52 adults returned and, in 2001, 903 adults returned. It is likely that the majority of the returning adults are from the Chimacum Creek project with some straying from Salmon Creek. Otolith analysis will help determine adult origin beginning in brood year 2002. Until otolith examination determines adult origin, it cannot be assumed that a naturally-producing population is established in the stream (Thom Johnson, personal communication 2002). Rather, they are considered a range extension of the Discovery Bay summer chum stock. Consequently Chimacum Creek summer chum status is still considered Extinct (Ames et al 2000; Thom Johnson, SaSI contribution in review 2002)."

Impacts on summer chum by agriculture are minimal. High water temperatures that can be attributed to lack of riparian cover upstream do occur in the summer chum reach, though temperatures are within AA (extraordinary) water criteria during the time of summer chum utilization. Impacts of water withdrawal for irrigation is not known. The main limiting factor for summer chum in this watershed is a high level of fines in the spawning gravel – how much of this is due to agriculture is difficult to determine. Parent material in the lower reach of the creek is characterized by a high level of fines. The fact that the majority of the ag area is in organic soils, hay fields and pasture with stable grass covered banks indicates that the amount of fine material introduced to the summer chum reach by agriculture practices is not great.

Coho

SASSI lists Chimacum Creek coho as a separate stock of mixed origin and composite production with a status rating of Healthy (WDFW and WWTribes 1994). The index season-cumulative redd count experienced an increasing trend in the mid to late 1990s time period, so the stock has again been healthy. This is a provisional rating, as there are concerns regarding the overall health of the coho population in the basin that the index data may not adequately represent, given the survey index is likely representative of only the better quality coho spawning habitat in the stream basin (Thom Johnson, SaSI contribution in review, 2002). Escapement has remained steady throughout the past twenty five years (see Figure 13). WDFW montitors cumulative redd counts at two index sites, river mile 8.3 to 9.2 and river mile 9.4 to 10.2. Beginning in the year 2000, the lower index area was shortened to river mile 8.9 to 9.2. An additional population statistic available for this stock is stratified random sampling based estimates of total adult coho escapement for the Chimacum Creek for the 1998 to 2000 return years (1998 = 550 coho, 1999= 711 and 2000= 1,054). These estimates are based on a selection of survey areas stratified by geographic region and habitat type (Randy Cooper, personal communication, 2002).

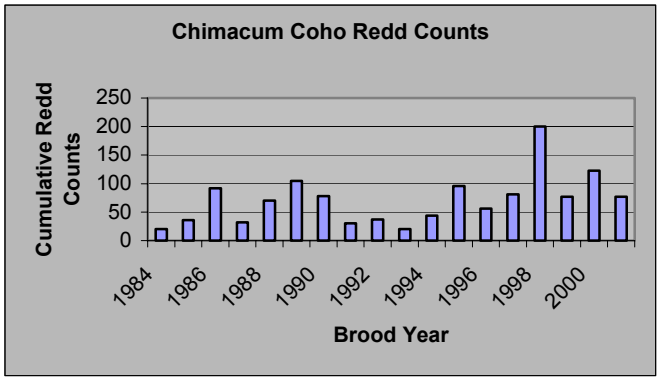


Figure 1. Chimacum Coho Cumulative Redd Counts, 1984 to 2001. Data provided by Randy Cooper, WDFW

Chimacum High School initiated a small hatchery on Chimacum Creek in 1971 and began incubating and rearing coho using Quilcene stock. The project ended in the late 1980s, the last three years of which used Dungeness stock (Ray Lowry, personal communication 2002). Wild Olympic Salmon collected eggs from local broodstock for two years in the early 1990s and observed an extended run time possibly due to the infiltration of the early Quilcene stock and the later run Dungeness stock. McHenry and

Lichatowich (1996) speculate that the early returning fish probably could not survive the low flow conditions in Chimacum Creek during most years. All fish captured at the Wild Olympic Salmon weir were wild in origin (Wild Olympic Salmon, unpublished data 1994)."

*Coho and Fall Chum Salmon, Steelhead and cutthroat trout utilize the entire watershed that is accessible to them. Much of the ag production District is comprised of organic soils (mucks and peats) which are not utilized for spawning but are utilized for juvenile rearing. Factors in the ag production District affecting these species are lack of riparian vegetation and associated high water temperature in the summer; lack of LWD and channel complexity, periods of low levels of dissolved oxygen, reed canarygrass and reduced juvenile rearing habitat (from historic levels). Despite these problems the populations of these species are healthy in this watershed. Impacts due to agricultural practices have been stable for many years and have been improving in recent years, except for the negative impacts of reed canarygrass. Given this stability and the improvements that have been made to water quality and habitat the biggest threats to the stability of the salmonid stocks comes from reed canarygrass impacting reaches in the APD, and factors outside the ag production District – forest practices and development in violation of current regulations, ocean conditions and harvest. (**from LFA)***

Appendix H: Stream Reach descriptions/habitat improvement recommendations. ***This section not complete as of 3-12-04***

Following are descriptions of different reaches in the agricultural areas of Chimacum Creek and tributaries, plus recommendations for fish and wildlife habitat protection and improvement.

Mainstem, RM 2.3 - 3.4

Description: This reach is low gradient and was channelized many years ago. Some meander has formed. Stream flow is south to north. It is utilized by coho salmon and cutthroat trout for spawning and rearing. Some fall chum salmon may utilize the reach. Agriculture in this reach depends on good field drainage and any flow restrictions cause negative effects to farm operations, especially in the reach RM2.3-2.7. The stream is fenced through fields being used for pasture. Reed canarygrass is problematic in the very low gradient sections of this reach.

Salmon Habitat evaluation and recommendations:

- Fish passage: no culverts causing fish passage problems associated with this reach. Reed Canarygrass taking over segments of the channel could create fish passage problems if not controlled.
- Habitat structure: There is very little LWD present in this reach. LWD placement has to be done carefully so it doesn't backup water and raise the water table in adjacent fields or increase flooding.
- Pools: There are some pools in this reach. Additional LWD would help with pool development.
- Bank Stability: Good. Livestock exclusion fencing has kept livestock off streambanks.
- Riparian condition: 40% poor to moderate due to lack of shading/cover, though streambanks are grassed and stable. 60% moderate to good forest cover.
- Temperature: Poor in summer months due to upstream influences. Measures listed in Riparian condition above will improve temperature conditions.
- Dissolved Oxygen: moderate

Efforts to date:

Livestock exclusion fencing has been constructed where livestock are present. Landowners considering LWD placement, tree planting and engineered livestock crossings.

Potential Salmon Habitat Improvements

1. Improve water temperature through reach by additional plantings of trees and shrubs to provide shade. The main temperature problem comes from direct sunlight on the water in this reach.
2. Develop and fund a channel maintenance plan to control reed canarygrass where banks have been planted with trees/shrubs. Existing reed canarygrass control depends on the ability to remove it using tracked excavators or spray it with appropriate herbicides. Once trees/shrubs are planted on the banks it is difficult to use the excavator option and control may have to rely on herbicide applications. This will be most crucial during the 10 - 15 years after planting, before the shade from trees reduces canarygrass growth. Without a canarygrass maintenance program the creek channel will be clogged with canarygrass causing problems for salmon, landowners and drowning out trees/shrubs.
3. Improve structural fish habitat. In appropriate areas LWD can be added in conjunction with other structural changes such as re-meandering the channel. This must be done in a way that does not reduce flow/channel capacity that impacts the drainage of ag land.

Funding:

Funding should be found to cover the cost of salmon habitat improvement. Federal programs such as CREP, EQIP, WRP and WHIP may be useful for different components of habitat improvement and protection.

Mainstem, RM 3.4 - 5.8

Description: This reach is extremely low gradient and channelized through hydric soils. Stream flow is south to north. It is utilized by salmon for transport to-and-from upstream spawning areas, and for juvenile rearing. There is no spawning habitat in this reach as the soils are predominantly muck type with no gravel and not enough gradient to support pools and riffles. Agriculture in this reach depends on good field drainage and any flow restrictions causes negative effects to farm operations. The entire reach has been fenced voluntarily by landowners. The downstream end of this reach experiences the highest water temperatures during the summer months. It would be the only reach in the watershed not in compliance with the proposed changes in the DOE temperature criteria for freshwater. In the late 1970's this reach was clogged with reed canarygrass to the point that it was difficult to identify the channel, and there was virtually no open water. It was problematic for both juvenile and adult fish passage and probably experienced poor DO levels associated with decaying vegetation. The canarygrass was cleaned out of the channel in the early 1980's. Since then a maintenance program conducted by local farmers has kept the channel open. If this maintenance program is discontinued the creek channel will become clogged with reed canarygrass within 10 years. This will increase flooding, reduce agricultural production, reduce DO levels and causing passage problems for salmonids.

Salmon Habitat evaluation and recommendations:

- Fish passage: no culverts causing fish passage problems associated with this reach. Reed Canarygrass taking over extensive segments of the channel could create fish passage problems if not controlled.
- Habitat structure: There is very little LWD present in this reach. It would be useful for cover and habitat but is not needed to affect geomorphic processes. LWD placement has to be done carefully so it doesn't backup water and raise the water table in adjacent fields or increase flooding. Existing bridges and culverts are heavily utilized by fish for cover. Additional log/wood structures spanning the stream would be beneficial.
- Pools: Most of reach is one long pool. Gradient/soils not conducive to pool/riffle complexes. Dug pools tend to fill in as there is not enough flow to keep them open.
- Bank Stability: Good. Livestock exclusion fencing has kept livestock off streambanks.
- Riparian condition: Poor due to lack of shading/cover. Streambanks are grassed and stable. Three sites have trees/shrubs on both banks (10% of reach) with canopy shading stream, and three sites have trees/shrubs planted on one side of creek (20% of reach)..
- Temperature: Poor in summer months. Measures listed in Riparian condition above will improve temperature conditions.
- Dissolved Oxygen: Variable

Efforts to date:

Landowners, agencies and community groups have been working on water quality protection and salmon habitat improvements for many years. Livestock exclusion fencing has been constructed throughout this reach. Trees and shrubs have been planted on the streambanks to provide shade, cover and reed canarygrass control in several sections, with mixed results.

Potential Salmon Habitat Improvements

4. Improve water temperature through reach by additional plantings of trees and shrubs to provide shade. The main temperature problem comes from direct sunlight on the water in this slow moving, low gradient reach.

5. Develop and fund a channel maintenance plan to control reed canarygrass where banks have been planted with trees/shrubs. Existing reed canarygrass control depends on the ability to remove it using tracked excavators or spray it with appropriate herbicides. Once trees/shrubs are planted on the banks it is difficult to use the excavator option and control may have to rely on herbicide applications. This will be most crucial during the 10 - 15 years after planting, before the shade from trees reduces canarygrass growth. Without a canarygrass maintenance program the creek channel will be clogged with canarygrass causing problems for salmon, landowners and drowning out trees/shrubs.
6. Improve structural fish habitat. In appropriate areas LWD can be added in conjunction with other structural changes such as re-meandering the channel. This must be done in a way that does not reduce flow/channel capacity that impacts the drainage of ag land.

Funding:

Funding should be found to cover the cost of salmon habitat improvement. Federal programs such as CREP, EQIP, WRP and WHIP may be useful for different components of habitat improvement, protection.

Mainstem, RM 5.8 –6.2

Description: This reach was channelized for agricultural purposes but has been the subject of recent salmon habitat improvement projects. It is utilized by coho salmon for spawning and rearing. In 1997 a 600 foot reach was the subject of habitat improvements that included changing the bank configuration to promote meandering, and anchoring in Large woody debris (LWD). At that time a buffer was planted that ranged from 25' to 100' which is now being expanded to 180' on each side through the Conservation Reserve Enhancement Program (CREP). In 2002 the remainder of the reach was improved for salmon habitat, including channel re-meandering, replacement of a cement box culvert with a bridge, addition of LWD, pools and spawning gravels. A buffer ranging from 25' to 180' was planted in winter 2002-2003.'

Salmon Habitat evaluation and recommendations:

- Fish Passage: no fish passage problems are associated with this reach.
- Habitat structure: Habitat structure has been improved through the salmon habitat improvement projects.
- Pools: Pools and riffles have been added through the improvement projects.
- Bank Stability: Good
- Riparian condition: Poor at present but will improve as buffer plantings grow.
- Temperature: Fair to Poor for short periods in summer. This problem is being addressed by buffer planting.
- Dissolved Oxygen: Good.

Efforts to date: **Entire reach has been improved for salmon habitat**.

Potential Salmon Habitat Improvements

1. Entire reach has been improved for salmon habitat. Monitor these projects to determine if additional work is necessary, and applaud landowners participation.
2. Develop and fund a channel maintenance plan to control reed canarygrass where banks have been planted with trees/shrubs. Existing reed canarygrass control depends on the ability to remove it using tracked excavators or spray it with appropriate herbicides. Once trees/shrubs are planted on the banks it is difficult to use the excavator option and control may have to rely on herbicide applications. This will be most crucial during the 10 - 15 years after planting, before the shade from trees reduces canarygrass growth. Without a canarygrass maintenance program the creek channel will be clogged with canarygrass causing problems for salmon, landowners and drowning out trees/shrubs.

Mainstem, RM 6.2 - 6.9

Description: This reach was channelized for agriculture. Trees and shrubs have been allowed to grow along the creek so it is well shaded. Though channelized many years ago meander has developed in some locations, and pools and riffles have formed. It is utilized by salmonids for spawning and rearing. This reach has the some of the best fish habitat in the agricultural production District.

Salmon habitat evaluation and recommendations:

- Fish Passage: Fish passage could be improved at the Center Rd. crossing (RM 6.7). It is not a major problem and should be addressed when the existing culverts are replaced as part of the county road maintenance plans.
- Habitat structure: Generally good. Additional LWD would be beneficial but only if it can be added without comprimising the good riparian condition.
- Pools: Pool composition and freqency is fair.
- Bank stability: good
- Riparian condition: good
- Temperature: good
- Dissolved oxygen: good

Efforts to date: This reach has not been intensively used for agriculture for many years. Landowners have maintained a good riparian zone that is beneficial to fish and wildlife.

Potential Salmon Habitat Improvements

1. Maintain as is letting natural events improve habitat.
2. Thank the landowners for maintaining this reach in such good condition.

Mainstem, RM 6.9 - 8.4

Description: This reach is very low gradient and channelized through hydric soils – similar to RM 3.4 to 5.8. It is utilized by salmon for transport to-and-from upstream spawning areas, and for juvenile rearing. There may be some spawning habitat in the uppermost stream segment. Agriculture in this reach depends on good field drainage and any flow restrictions causes negative effects to farm operations. The entire reach has been fenced voluntarily by landowners. In the late 1970's this reach was clogged with reed canarygrass to the point that it was difficult to identify the channel, and there was virtually no open water. It was problematic for both juvenile and adult fish passage and probably experienced poor DO levels associated with decaying vegetation. The canarygrass was cleaned out of the channel in the early 1980's. Since then little channel maintenance has been done and the channel is becoming clogged with reed canarygrass, increasing flooding, reducing agricultural production, affecting DO levels and potentially causing passage problems for salmonids.

Salmon Habitat evaluation and recommendations:

- Fish passage: no fish passage problems associated with this reach.
- Habitat structure: There is very little LWD present in this reach. It would be useful for cover and habitat but is not needed to affect geomorphic processes. LWD placement has to be done carefully so it doesn't backup water and raise the water table in adjacent fields or increase flooding. Existing bridges and culverts are utilized by fish for cover. Additional log/wood structures spanning the stream would be beneficial.
- Pools: Most of reach is one long pool. Gradient/soils not conducive to pool/riffle complexes. Dug pools tend to fill in as there is not enough flow to keep them open.
- Bank Stability: Good. Livestock exclusion fencing has kept livestock off streambanks.

- Riparian condition: Poor due to lack of shading/cover. Streambanks are grassed and stable.
- Temperature: Poor in summer months. Measures listed in Riparian condition above will improve temperature conditions.
- Dissolved Oxygen: Variable

Efforts to date:

Landowners, agencies and community groups have been working on water quality protection and salmon habitat improvements for many years. Livestock exclusion fencing has been constructed throughout this reach.

Potential Salmon Habitat Improvements

1. Improve water temperature through reach by additional plantings of trees and shrubs to provide shade. The main temperature problem comes from direct sunlight on the water in this slow moving, low gradient reach.
2. Develop and fund a channel maintenance plan to control reed canarygrass where banks have been planted with trees/shrubs. Existing reed canarygrass control depends on the ability to remove it using tracked excavators or spray it with appropriate herbicides. Once trees/shrubs are planted on the banks it is difficult to use the excavator option and control may have to rely on herbicide applications. This will be most crucial during the 10 - 15 years after planting, before the shade from trees reduces canarygrass growth. Without a canarygrass maintenance program the creek channel will be clogged with canarygrass causing problems for salmon, landowners and drowning out trees/shrubs.
3. Improve structural fish habitat. In appropriate areas LWD can be added in conjunction with other structural changes such as re-meandering the channel. This must be done in a way that does not reduce flow/channel capacity that impacts the drainage of ag land.

Funding:

Funding should be found to cover the cost of salmon habitat improvement. Federal programs such as CREP, EQIP, WRP and WHIP may be useful for different components of habitat improvement, protection.

- **Appendix I: Riparian Management Guide: To Be Developed**.