WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT
DELTA-CLEARWATER RIVER WATERSHED PROJECT
Delta Junction, Alaska

ABSTRACT:

This document describes a plan to reduce the threat of flooding and associated erosion on the tributaries of the Delta-Clearwater River. This plan will protect the unique coho salmon and arctic grayling found in the Delta-Clearwater River by eliminating the threat of fishery habitat destruction from sediment deposition. The Delta-Clearwater River fisheries provide significant benefits not only to commercial and sport catch but also to the subsistence way of life in numerous, downstream villages. The plan also will reduce other flood damage to cropland, the Alaska Highway, local roads, and general recreation areas.

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Summary

Project Name: Delta-Clearwater River Watershed Project

Location: Delta Junction, Alaska

Sponsors: Salcha-Big Delta Soil and Water Conservation District
Alaska State Department of Fish and Game
Alaska State Department of Environmental Conservation
Alaska State Department of Natural Resources

Description of Recommended Plan:
This plan is to reduce flooding and sediment damage in the Delta-Clearwater River. Protection of the unique fisheries habitat of the Delta-Clearwater River is of prime importance. The plan includes structural and nonstructural measures to reduce flooding and the subsequent erosion that takes place in the Delta-Clearwater River's two main subwatersheds (see Project Map). Waterspreading diversions and vegetated waterways will be built in the Rhoads/Granite Creek subwatershed. Floodplain and wetland areas within the Sawmill Creek subwatershed will be purchased to enlarge the existing greenbelt. Some of these lands will be re-vegetated with herbaceous and woody vegetation. Some areas will require grade stabilization structures to repair active gully erosion.

Resource Information:

Size of watershed: 232,000 acres

Land Cover:

- Forest and Woodlands 113,100 acres
- Agriculture (including CRP) 58,600 acres
- Shrubland and Tundra 47,700
- Urban Lands 20 acres
- Other Cultural (Roads, Pits) 580 acres
- Barren Land (Snow and Ice, Rock) 10,000 acres
- Water (Streams, Ponds, Aquatic Veg.) 2,000 acres

Land Ownership

- Private 59,400 acres
- State 134,600 acres
- Federal 38,000 acres

Number of Farms: 22

Wetlands: 39,840 acres

Endangered Species: American peregrine falcon

Cultural Resources: Thirteen identified sites

Problem Identification:
This project addresses the protection of the fishery habitat provided by the Delta-Clearwater River. The main threat to degrade this unique spring-fed habitat of the Delta-Clearwater is from the delivery of fine sediments during flood events. This fishery provides unique sports fishing opportunities for coho salmon and grayling. In addition, it is one of the main spawning streams in the Yukon and Tanana River system which supports subsistence and commercial fishing. Other problems include flood damage of agricultural crops, flooding damage to area roads, interruption of local and tourist traffic, and hindered provision of emergency services.

Alternative Plans Considered:
Alternative plans were formulated to control flooding problems stemming from both the Sawmill Creek and Rhoads/Granite Creek subwatersheds. Off-stream sediment retention structures (both excavated and earthfilled), flood conveyance structures, waterspreading diversions, floodwater retarding structures, waterways, land treatment (water bars, gully plugs, etc.), and basin transfer of runoff were examined during planning.

Project Purpose: Flood prevention.

Principal Project Measures:

Structural Measures for flood prevention:

- Four 5,000 foot long waterspreading diversions.
- One 16,000 foot long diversion between Granite and Rhoads Creeks
- 3.8 miles of grassed waterways
- Ten grade stabilization structures
- 1,200 acres of vegetative stabilization structures

Non-Structural Measures for flood prevention:

- 2,400 acres of wetland and floodplain easements

Project Costs:

	PL-566 Funds		Other Funds		Total	
Items	Dollars	Percent	Dollars	Percent	Dollars	Percent
Structural Measures	$5,058,800	99.5	$ 27,500	0.5	$5,086,300	100.0
Non-Structural Measures	189,000	50.0	189,000	50.0	378,000	100.0
Total Installation Costs	$5,247,800	96.0	$216,500	4.0	$5,464,300	100.0

In average annual terms, project costs total $510,500 including $501,000 in amortized installations costs (7.75% for 25 years) and $9,500 in annual operation and maintenance costs.

Project Benefits:

Items	Average Annual Benefits
Fisheries	$526,800
Agriculture	40,700
General Recreation	1,500
Transportation	12,500
Total Benefits	$581,500

Environmental Effects:

Sediment delivery to the Delta-Clearwater River will be reduced on an average annual basis by 3,900 tons (84%). Rate of loss of fishery habitat will be reduced 88 percent. Wetland acreage and quality will be increased.

Social and Other Effects:

Few economic opportunities exist in the Delta Junction area to generate income and employment. Agriculture, military spending (Fort Greely), sport fishing and hunting, and tourism associated with travel along the Alaska Highway support most of the area's economic activity. Flooding and erosion jeopardize these activities and indirectly other businesses (service stations, restaurants, motels, etc.). For example the "chain reaction" from the average annual $526,800 dollar loss to the Delta-Clearwater River fishery results indirectly in an additional $126,000 dollars loss. These represent dollars not available to be re-spent in the local economy on wages, food, shelter, etc. after the initial dollars to harvest the fishery are lost.

Perhaps the most important economic and social value furnished by the Delta-Clearwater River fishery is to support subsistence lifestyle in approximately 60 native villages downstream on the lower Yukon and Tanana Rivers. For rural Alaskans subsistence means the customary and traditional use of wild, renewable resources for direct personal or family consumption, barter, and customary trade. Salmon, including coho contributed from the Delta-Clearwater River, is the primary food fish available to people living in these remote areas. Without subsistence fishing the protein source in their diets would have to be imported at great expense. Opportunities to earn cash income in these villages are limited. Subsistence fishing and hunting is the mainstay of livelihood for these people. It is an important part of their cultural heritage.

CHAPTER 3
CRAFTING A WATERSHED PLAN

3.1 Introduction

A watershed plan is a framework for how and where management tools will be applied. This chapter outlines a process to develop and implement a watershed plan. The framework follows eight steps, starting with establishing a baseline in your watershed and ending with revisiting and updating the watershed plan (see Figure 3.1). The process is oriented toward developing a watershed plan in a rapid and low cost manner. The eight steps are:

Step 1. Establish a Watershed Baseline
What do I need to do to get started?
Gather basic information to determine a starting point to develop the plan. Information about possible stakeholders, current impervious cover, and technical, human and economic resources can help guide the first steps of the plan.

Step 2. Set up a Watershed Management Structure
Which management structure is best for my watershed?
Establish the organization responsible for the overall management of the watershed plan. The best structure depends on the interests of the community in the watershed. The ability of the community to secure funding, and the complexity of the watershed plan.

Step 3. Determine Budgetary Resources Available for Watershed Planning
Do I have sufficient resources to conduct and implement my plan?
Conduct an analysis to determine what level of human and other resources are available to conduct the plan. Balance the available resources against the estimated cost of developing the plan.

Step 4. Project Future Land Use Change in the Watershed and its Subwatersheds
What type of land use change is projected in my subwatershed?
Use zoning or other measures to forecast future impervious cover in each subwatershed. This analysis will influence the goal setting process in Step 5.

Step 5. Determine Goals for the Watershed and Its Subwatersheds
What goals are appropriate and achievable in my watershed and its component subwatersheds?
Use known information about impacts to the watershed, and the goals of larger units to develop goals for the smaller watershed. Determine objectives for each subwatershed to achieve watershed goals.

Step 6. Develop Watershed and Subwatershed Plans
How should the watershed protection tools be applied in each subwatershed?
Conduct basic analyses needed to characterize and assess the watershed and its subwatersheds. Use this information to effectively implement watershed protection tools.

Step 7. Adopt and Implement the Watershed and Subwatershed Plans
Can my plan actually be adopted and implemented?
Determine what steps are needed to effectively implement the plan. This may include ordinances and changes to current zoning.

Step 8. Revisit and Update the Watershed and Subwatershed Plans
How does my plan need to change over time?
Periodically update the plan based on new development in the watershed, or results from monitoring data.

It is important to remember that planning takes place at both the watershed and subwatershed scales. The watershed (up to 100 square miles) includes many individual subwatersheds (about 2 to 5 square miles). Plans for each subwatershed detail measures to effectively manage their drainage areas. To effectively meet overall management goals, these subwatershed plans need to be developed in the context of the larger watershed. Some of the steps in the process outlined in this chapter are conducted at the watershed level while others are conducted at the smaller subwatershed scale (see Figure 3.1). While

Step 1: Establish a Watershed Baseline

Define watershed and subwatershed boundaries. (W/S)
Identify possible stakeholders. (W)
Measure existing impervious cover. (W/S)
Assemble historical monitoring data. (W)
Assess existing mapping resources. (W)
Conduct an audit of local watershed protection capability. (W)

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Step 2: Set Up a Watershed Management Structure (W)

↓

Step 3: Determine Budgetary Resources Available for Watershed Planning (W)

↓

Step 4: Project Future Land Use Change in the Watershed and Each Subwatershed (W/S)

↓

Step 5: Determine Goals for the Watershed and Its Subwatersheds

Interpret goals at the basin and subbasin levels that impact the watershed. (W)
Develop specific goals for the watershed. (W)
Develop specific management objectives for each subwatershed. (S)
Assess if subwatershed objectives can be met with existing zoning. (S)
Determine if land use patterns need to be shifted among subwatersheds. (S)

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Step 6: Develop the Watershed and Subwatershed Plans

Select watershed indicators. (W/S)
Conduct special watershed-wide analyses and subwatershed surveys where needed. (W/S)
Prepare subwatershed and aquatic corridor management maps. (S)
Adapt and apply other subwatershed protection tools. (S)

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Step 7: Adopt and Implement the Watershed and Subwatershed Plans (W/S)

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Step 8: Revisit and Update the Watershed and Subwatershed Plans (W/S)

Figure 3.1 The Eight Rapid Steps of a Local Watershed Plan
(W = Watershed Scale S= Subwatershed Scale)

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

1994 STATEWIDE WATER QUALITY ASSESSMENT

NAME OF WATERBODY: Clearwater Creek / River

Location or Lat/Long: Mouth is at Latitude 64° 06 N + Longitude 145° 34' W. Enters Tanana River 12 miles upstream from the Richardson Hwy bridge crossing.

Is the waterbody in a national or state park, monument, refuge, preserve, or similar area?:

[X] Yes / [ ] No / Name: Clearwater Recreation Site / Campground

Waterbody Type:	Waterbody Size:	Segment of Waterbody Addressed:
[X] River/Stream	20 Miles	From: whole creek
[ ] Lake	____ Acres	To:
[ ] Fresh Wetland	____ Acres	Other Description:
[ ] Tidal Wetland	____ Acres	
[ ] Estuary	____ Square Miles	Size of Segment:
[ ] Coastal Shoreline	____ Miles	
[ ] Groundwater		

Period of Assessment, From: 1978 **To:** 1992

Assessment completed by: Henry Muth Salcha-Big Delta SWCD

Type of Documentation (attach if possible):

[ ] Water quality data
[ ] Documented oil spill
[ ] NOV / Enforcement action
[ ] Photos with documentation
[ ] Fish / Habitat survey
[X] Written report
[ ] Field notes
[ ] Overflight
[ ] Observation
[ ] Other (please describe below)

RECEIVED
FEB 25 1994
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Assessment based on: [X] Monitored water quality data [ ] Evaluated (Best professional judgement)

Describe Source and Nature of Pollution, Documentation Provided and Other Comments:

Sediment.
Attaching copy of Water Quality Monitoring Project Interim Report - Jan. 5, 1993.

The SCS along with local sponsors are working on a Small Watershed Project plan to prevent sedimentation etc from degrading the Clearwater.

RESPONDENT INFORMATION:

Name: Joanne Kuykendall **Phone:** 895-4241 **Date:** 2/22/94
Employer: USDA-SCS **Dept:** ____ **Title:** District Conservationist
Address: P.O. 547 Delta Jct AK 99737
Education/Experience: worked for SCS for 7 years as Soil Conservationist + District Conservationist

TYPES OF POLLUTANTS (Please indicate relative severity; H= High, M= Medium, S= Slight):

Any of these pollutants will cause severe problems. with the pristine quality + fishery significance of creek. Therefore total prevention is the goal of Watershed project.

___ Cause unknown
___ Unknown toxicity
___ Pesticides: _____
M Priority organics: Septic
___ Nonpriority organics: _____
___ Metals: _____

___ Ammonia
___ Chlorine
___ Other inorganics
M Nutrients
___ pH
H ~~M~~ Siltation/sedimentation
___ Low dissolved oxygen
___ TDS/Salinity/Chlorides

___ Temperature modifications
___ Flow alterations
___ Other habitat alterations
___ Pathogens
___ Radiation
___ Oil and Grease
___ Taste and odor
___ Suspended solids

___ Noxious aquatic plants
___ Filling and draining
___ Total toxics
___ Turbidity
___ Exotic species
___ Debris, foam, scum, etc.
___ Insufficient stream structure
___ Arsenic

Other: _____

SOURCES OF POLLUTANTS (Please indicate relative severity; H= High, M= Medium, S= Slight):

Potential pollutants if nothing is done include the following checked items.

Point Sources:
___ Industrial
___ Municipal

Urban Runoff:
___ Storm sewers
___ Combined sewers
___ Surface runoff

Agriculture:
S ✓ Non-irrigated crop production
___ Irrigated crop production
S ✓ Pasture land
___ Range land
___ Feedlots
___ Aquaculture
___ Animal waste/holding areas
___ Manure lagoons

Silviculture:
H ✓ Timber harvest
___ Stream restoration projects
___ Road construction/maintenance
___ Elimination of stream thermal cover
___ Log Transfer Facilities (estuary)
___ Log Sort Yard (land)

Construction:
S ✓ Highway/road
___ Bridge construction/repair
___ Land development

Resource Exploration/extraction:
___ Surface mining
___ Subsurface mining
___ Placer mining
___ Dredge mining
___ Petroleum activities
___ Mill tailings
___ Mine tailings
___ Gravel mining
___ Injection wells

Waste Disposal:
___ Sludge
___ Wastewater
___ Landfills Industrial land treatment
___ Onsite wastewater systems
___ Hazardous waste
___ Sewage disposal
M ✓ Septic tank leak

Hydrologic Modification:
___ Stream channelization
___ Dredging
___ Dam construction
___ Flow regulation/modification
___ Bridge construction
___ Removal of riparian vegetation
H ✓ Streambank modification/destabilization
H ✓ Draining/filling of wetlands – filling in of bog area

Marinas:
___ Small boat harbors (up to 10 slips)
___ Harbors (recreational/commercial)
___ Loading facilities (commercial)

Other:
___ Atmospheric deposition
___ Waste storage tank leaks
___ Highway maintenance/runoff
___ Petroleum/chemical spills, leaks
___ In-place containments
H ✓ Natural sources
H ✓ Recreational activities
___ Upstream impoundment
___ Salt storage sites
___ Fire damage/restoration
___ Underground storage tanks
___ Aboveground storage tanks
___ Saltwater intrusion
___ Road salting
___ Fish, shellfish wastes
___ UNKNOWN SOURCE

END

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1992 STATEWIDE WATER QUALITY ASSESSMENT

NAME OF WATERBODY: CLEARWATER CREEK

Location or Lat/Long: LOCATED NEAR DELTA JUNCTION, ALASKA IS ACCESSED FROM THE JACK WARREN ROAD

Is the waterbody in a national or state park, monument, refuge, preserve, or similar area?:
[ ] Yes / [X]No / Name:

Waterbody Type:	Waterbody Size:	Segment of Waterbody Addressed:
[X] River/Stream	21 Miles	From: GROUNDWATER UPWELLINGS
[ ] Lake	Acres/Hectares	To: MOUTH OF CREEK
[ ] Fresh Wetland	Acres/Hectares	Other Description: AGRICULTURAL LANDS SURROUND UPWELLINGS (WETLANDS)
[ ] Tidal Wetland	Acres/Hectares	
[ ] Estuary	Square Miles	Size of Segment: POLLUTANTS AND SEDIMENTS CAN ENTER THE CREEK FROM HEADWATERS TO THE MOUTH.
[ ] Coastal Shoreline	Miles	
[ ] Groundwater		

Period of Assessment, From: 1978 **To:** PRESENT

Type of Documentation (attach if possible):

- [X] Water quality data
- [ ] Documented oil spill
- [ ] NOV / Enforcement action
- [ ] Photos with documentation
- [ ] Photos without documentation
- [X] Written report
- [ ] Field notes
- [ ] Overflight
- [ ] Observation
- [ ] Other

Describe Source and Nature of Pollution, Documentation Provided and Other Comments:
AGRICULTURAL LANDS SURROUNDING THE HEADWATERS OF THIS GROUNDWATER CREEK CAN CONTRIBUTE PRODUCTS FROM APPLICATIONS OF FERTILIZERS, HERBICIDES, AND PESTICIDES. FLOOD WATERS FROM THE GRANITE MOUNTAINS WATER SHED HAVE AN INCREASED LIKELYHOOD OF BEING INTRODUCED INTO THE CREEK. THE SURROUNDING BUFFER STRIP OF WET LANDS IS THOUHGT TO BE INADEQUATE TO ABSORB AND FILTER THE SURFACE WATER IT RECEIVES AS A CONSEQUENCE TURBID WATER HAVE BEEN REPORTED IN 1990 AND 1991 FROM SNOW MELT ALONE. MUCH OF THIS INFORMATION AND SUMMARY OF DATA COLLECTED CAN BE FOUND IN A ADEC SPECIAL CORRESPONDENCE REPORT DATED FEB 28, 1992, "SUMMARY OF WATER QUALITY MONITORING AT CLEARWATER CREEK, DELTA JCT, AK." BY JOYCE BEELMAN. WE RECOMMEND THAT WATER MONITORING CONTINUE AS IS RECOMMENDED BY THE REPORT; THIS RIVER IS AN IMPORTANT RECREATIONAL FISHERY AND PROVIDES NEARLY A MILLION DOLLARS A YEAR TO THE DELTA JCT ECONOMY.

RESPONDENT INFORMATION:

Name: ROBBY L BENSON **Phone:** 895-4656 **Date:** MAR 9, 1992
Employer: CITY OF DELTA JCT **Dept:** ADMIN **Title:** CLERK/TREASURER
Address: P.O. BOX 229 DELTA JUNCTION, AK 99737
Education/Experience:

TYPE AND SEVERITY OF POLLUTANTS AND SOURCES: (Severity; H= High, M= Medium, S= Slight)

POLLUTANTS:

__ 0 Cause unknown
__ 1 Unknown toxicity
S 2 Pesticides: POLLUTION POSSIBLY OCCURING AT TIME OF APPLICATION SPRAY CARRIED BY WIND
__ 3 Priority organics:
__ 4 Nonpriority organics:
S 5 Metals: ANIMAL WASTE
__ 6 Ammonia
__ 7 Chlorine
__ 8 Other inorganics
__ 9 Nutrients
__ 10 pH
M 11 Siltation/sedimentation
__ 12 Low dissolved oxygen
__ 13 TDS/Salinity/Chlorides
__ 14 Temperature Modifications
__ 15 Flow alterations
__ 16 Other habitat alterations
__ 17 Pathogens
__ 18 Radiation
__ 19 Oil and Grease
__ 20 Taste and odor
__ 21 Suspended solids
__ 22 Noxious aquatic plants
__ 23 Filling and draining
__ 24 Total toxics
__ 25 Turbidity
__ 26 Exotic species
__ 27 Debris, foam, scum, etc.
__ 28 Insufficient stream structure
__ 29 Arsenic
S 30 Other: PESTICIDES AND HERBICIDES

SOURCES OF POLLUTANTS (Severity; H= High, M= Medium, S= Slight):

Point Sources:
__ 1 Industrial
__ 2 Municipal
__ 3 Storm sewers
__ 4 Combined sewers

Agriculture:
S 11 Non-irrigated crop production
M 12 Irrigated crop production
__ 13 Specialty crop production
S 14 Pasture land
S 15 Range land
S 16 Feedlots
__ 17 Aquaculture
__ 18 Animal waste/holding areas
__ 19 Manure lagoons

Silviculture:
__ 21 Timber harvest
__ 21 Stream restoration projects
__ 22 Forest management
__ 23 Road construction/maintenance
__ 24 Elimination of stream thermal cover

Construction:
__ 31 Highway/road
__ 31 Bridge construction/repair
__ 32 Land development

Resource Exploration/extraction:
__ 51 Surface mining
__ 52 Subsurface mining
__ 53 Placer mining
__ 54 Dredge mining
__ 55 Petroleum activities
__ 56 Mill tailings
__ 57 Mine tailings
__ 58 Gravel mining
__ 58 Injection wells

Urban Runoff:
M 40 Surface runoff
__ 40 Storm sewers

Waste Disposal:
__ 61 Sludge
__ 62 Wastewater
__ 63 Landfills
__ 64 Industrial land treatment
__ 65 Onsite wastewater systems
__ 66 Hazardous waste
__ 67 Sewage disposal

Hydrologic Modification:
H 71 Stream channelization
__ 72 Dredging
__ 73 Dam construction
__ 74 Flow regulation/modification
__ 75 Bridge construction
__ 76 Removal of riparian vegetation
__ 77 Streambank modification
__ 78 Draining/filling of wetlands

Other:
__ 81 Atmospheric deposition
__ 82 Waste storage tank leaks
__ 83 Highway maintenance/runoff
__ 84 Petroleum/chemical spills, leaks
__ 85 In-place containments
__ 86 Natural sources
M 87 Recreational activities
__ 88 Upstream impoundment
__ 89 Salt storage sites
__ 91 Fire damage/restoration
__ 92 Underground storage tanks
__ 93 Aboveground storage tanks
__ 94 Saltwater intrusion
__ 95 Road salting
__ 96 Fish, shellfish wastes
__ 90 UNKNOWN SOURCE