PROJECT PURPOSES/USES

~ ENHANCE AVAILABLE REARING AND SEASONAL REFUGE HABITATS TO ONE OF THE PRIMARY SALMONID SPAWNING AREAS IN WHATCOM CREEK

~ IMPROVE HABITAT CONDITIONS PRIMARILY FOR CUTTHROAT TROUT, WITH ADDITIONAL BENEFITS FOR COHO SALMON AND OTHER NATIVE FISH SPECIES

SALMON PARK

~ CREATE HIGH-FLOW FISH REFUGE AND REARING HABITAT ALONG WHATCOM CREEK

~ STREAMSIDE BERMS TO BE REMOVED AND THE STREAM BANKS MODIFIED TO RESTORE CHANNEL MIGRATION RATES, INCREASE FLOODPLAIN AREA, IMPROVE FLOOD STORAGE CAPACITY, AND FACILITATE NATURAL GENERATION OF SALMONID HABITAT

CEMETERY CREEK

~ CREATE A NEW STREAM CHANNEL AND THREE COLD WATER FISH REARING PONDS IN LOWER CEMETERY CREEK

~ IMPROVE THERMAL REFUGE HABITAT DURING PERIODS OF ELEVATED STREAM TEMPERATURES IN WHATCOM CREEK (SUMMERTIME)

~ PLACE LARGE WOODY DEBRIS IN PORTIONS OF CEMETERY CREEK AND WHATCOM CREEK TO IMPROVE HABITAT DIVERSITY AND COVER

~ CREATE MORE NATURALLY FUNCTIONING STREAM CORRIDORS

Aerial View
Enhancement Areas

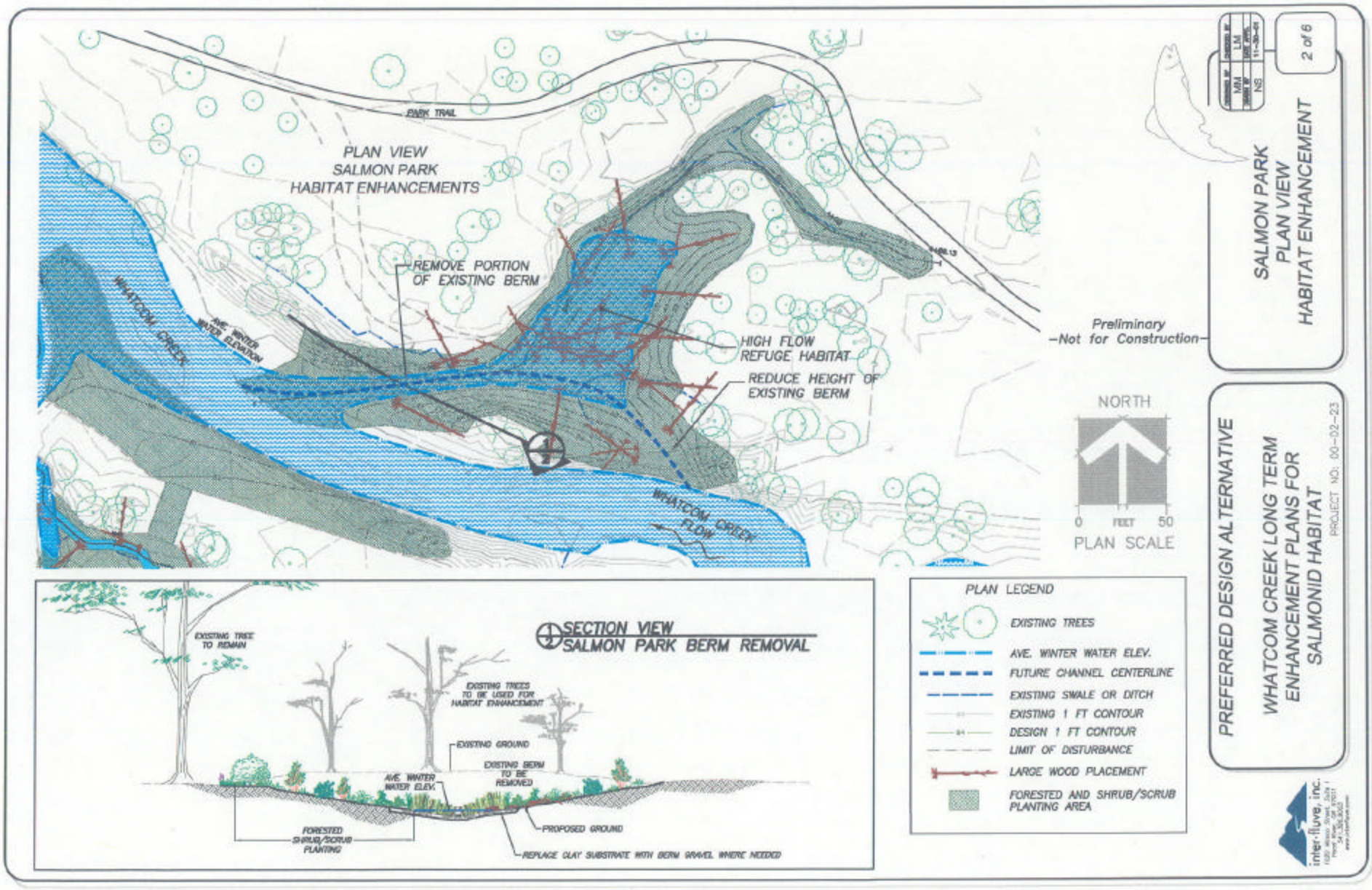
1 of 6

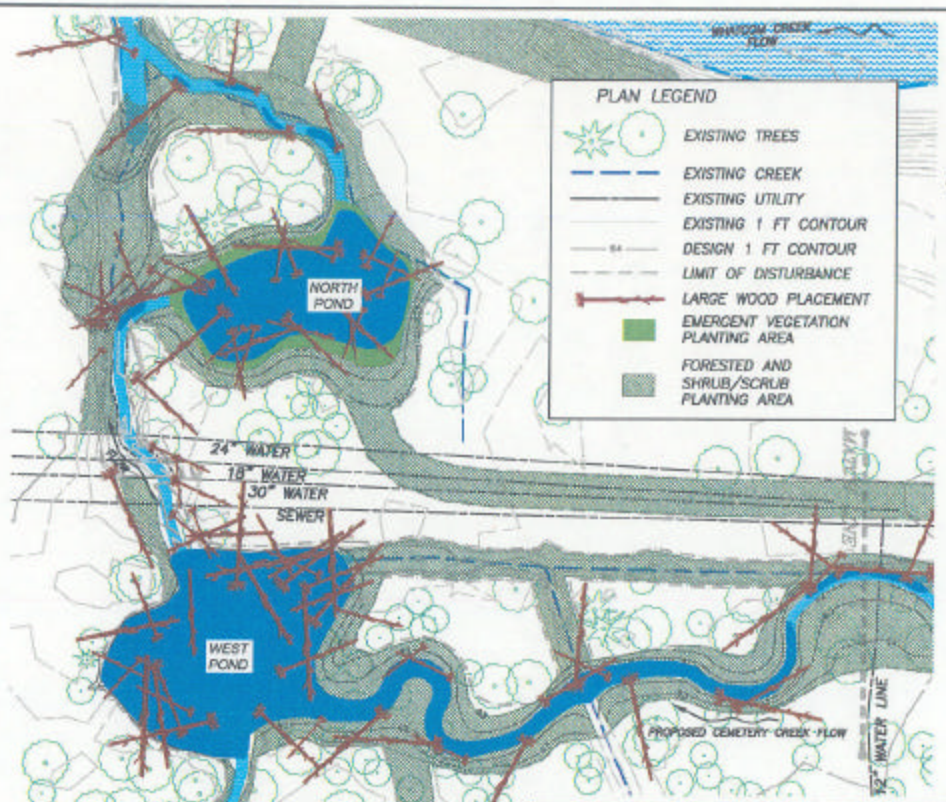
PREFERRED DESIGN ALTERNATIVE

WHATCOM CREEK LONG TERM ENHANCEMENT PLANS FOR SALMONID HABITAT

PROJECT NO: 00-02-23

inter-fluve, inc.


PLAN VIEW
SALMON PARK
HABITAT ENHANCEMENTS
PARK TRAIL
REMOVE PORTION
OF EXISTING BERM
HIGH FLOW
REFUGE HABITAT
REDUCE HEIGHT OF
EXISTING BERM
WHATCOM CREEK
AVE. WINTER
WATER ELEVATION
WHATCOM CREEK
FLOW
Preliminary
-Not for Construction-
NORTH
0 FEET 50
PLAN SCALE
SECTION VIEW
SALMON PARK BERM REMOVAL
EXISTING TREE
TO REMAIN
EXISTING TREES
TO BE USED FOR
HABITAT ENHANCEMENT
EXISTING GROUND
EXISTING BERM
TO BE
REMOVED
AVE. WINTER
WATER ELEV.
FORESTED
SHRUB/SCRUB
PLANTING
PROPOSED GROUND
REPLACE CLAY SUBSTRATE WITH BERM GRAVEL WHERE NEEDED
PLAN LEGEND
EXISTING TREES
AVE. WINTER WATER ELEV.
FUTURE CHANNEL CENTERLINE
EXISTING SWALE OR DITCH
EXISTING 1 FT CONTOUR
DESIGN 1 FT CONTOUR
LIMIT OF DISTURBANCE
LARGE WOOD PLACEMENT
FORESTED AND SHRUB/SCRUB
PLANTING AREA
SALMON PARK
PLAN VIEW
HABITAT ENHANCEMENT
2 of 6
PREFERRED DESIGN ALTERNATIVE
WHATCOM CREEK LONG TERM
ENHANCEMENT PLANS FOR
SALMONID HABITAT
PROJECT NO: 00-02-23
inter-fluve, inc.



PLAN LEGEND

- EXISTING TREES
- EXISTING CREEK
- EXISTING UTILITY
- EXISTING 1 FT CONTOUR
- 64 DESIGN 1 FT CONTOUR
- LIMIT OF DISTURBANCE
- LARGE WOOD PLACEMENT
- EMERGENT VEGETATION PLANTING AREA
- FORESTED AND SHRUB/SCRUB PLANTING AREA

PLAN VIEW
CEMETERY CREEK
HABITAT ENHANCEMENTS

NORTH

0 FEET 50

PLAN SCALE

SALMONID HABITAT FEATURES

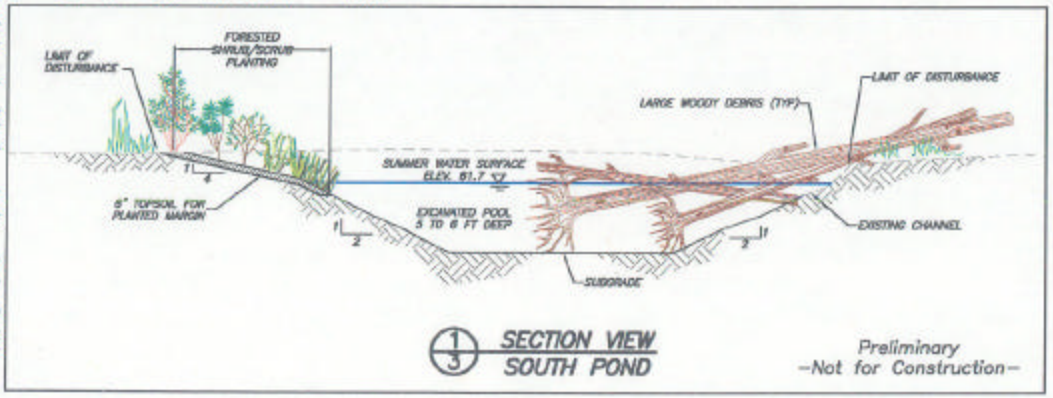
~ CREATION OF A MORE NATURALLY FUNCTIONING STREAM CORRIDOR AND THREE COLD-WATER FISH REARING PONDS IN LOWER CEMETERY CREEK

~ PROVIDES ADDITIONAL THERMAL REFUGE HABITAT DURING PERIODS OF ELEVATED WATER TEMPERATURES IN WHATCOM CREEK (SUMMERTIME)

~ NEAR STREAM VEGETATION PROVIDES SHADE AND FOOD CHAIN SUPPORT

~ LARGE WOOD PLACEMENTS FOR COVER, REFUGE, AND HABITAT DIVERSITY

~ ENLARGED CAPACITY FOR NATIVE SALMONIDS



1/3 SECTION VIEW
SOUTH POND

Preliminary
-Not for Construction-

PREFERRED DESIGN ALTERNATIVE

WHATCOM CREEK LONG TERM ENHANCEMENT PLANS FOR SALMONID HABITAT

PROJECT NO: 00-02-23

Cemetery Creek
Plan View
Habitat Plan West

3 of 6

DESIGNED BY	LM
DRAWN BY	MM
CHECKED BY	NS
DATE (PLOTTED)	11-30-05

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Preliminary
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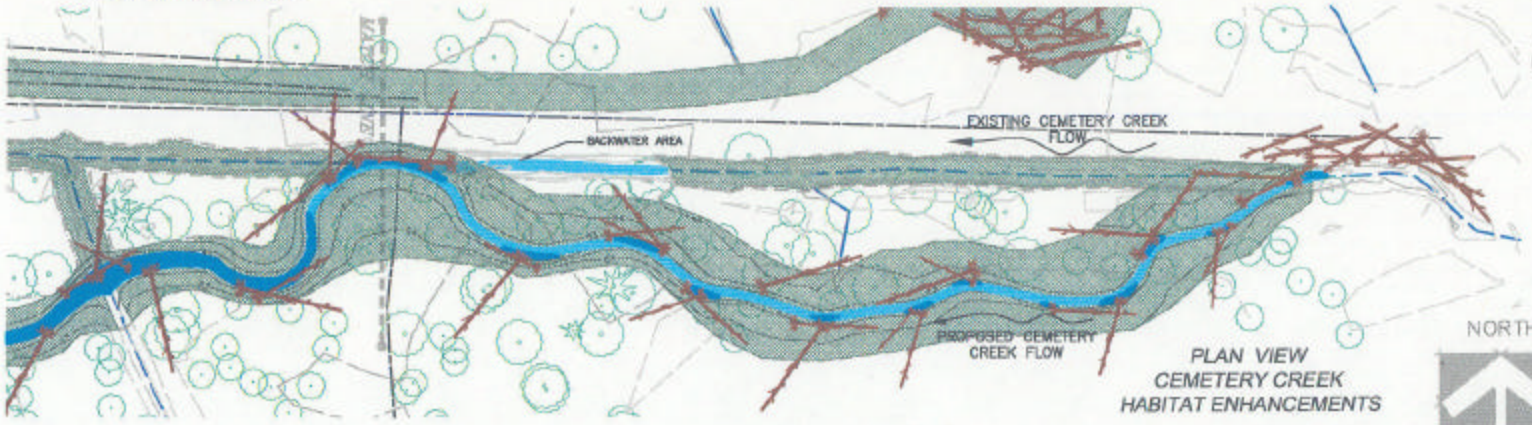

PLAN VIEW
CEMETERY CREEK
HABITAT ENHANCEMENTS

NORTH

0 FEET 50
PLAN SCALE

PLAN LEGEND

- EXISTING TREES
- EXISTING CREEK
- EXISTING UTILITY
- EXISTING 1 FT CONTOUR
- DESIGN 1 FT CONTOUR
- LIMIT OF DISTURBANCE
- DESIGN POOL
- LARGE WOOD PLACEMENT
- FORESTED AND SHRUB/SCRUB PLANTING AREA

CEMETERY CREEK HABITAT FEATURES

~ CREATION OF A MORE NATURALLY FUNCTIONING STREAM CORRIDOR

~ LARGE WOOD PLACEMENTS FOR COVER AND HABITAT DIVERSITY

~ BANK VEGETATION PROVIDES FOOD CHAIN SUPPORT, BANK STABILITY AND SHADE

~ EXISTING OVERHANGING TREES PROVIDE SHADE AND KEEP WATER TEMPERATURES LOW

~ IMPROVED NATURAL STREAM FUNCTION AND RIPARIAN INTERACTION

~ ENLARGED CAPACITY FOR CUTTHROAT TROUT

DESIGNED BY	DRAWN BY	CHECKED BY
MM	NS	LM
		DATE APRIL 11-30-01

4 of 6

CEMETERY CREEK
PLAN VIEW
HABITAT PLAN EAST

PREFERRED DESIGN ALTERNATIVE

WHATCOM CREEK LONG TERM
ENHANCEMENT PLANS FOR
SALMONID HABITAT

PROJECT NO: 00-02-23

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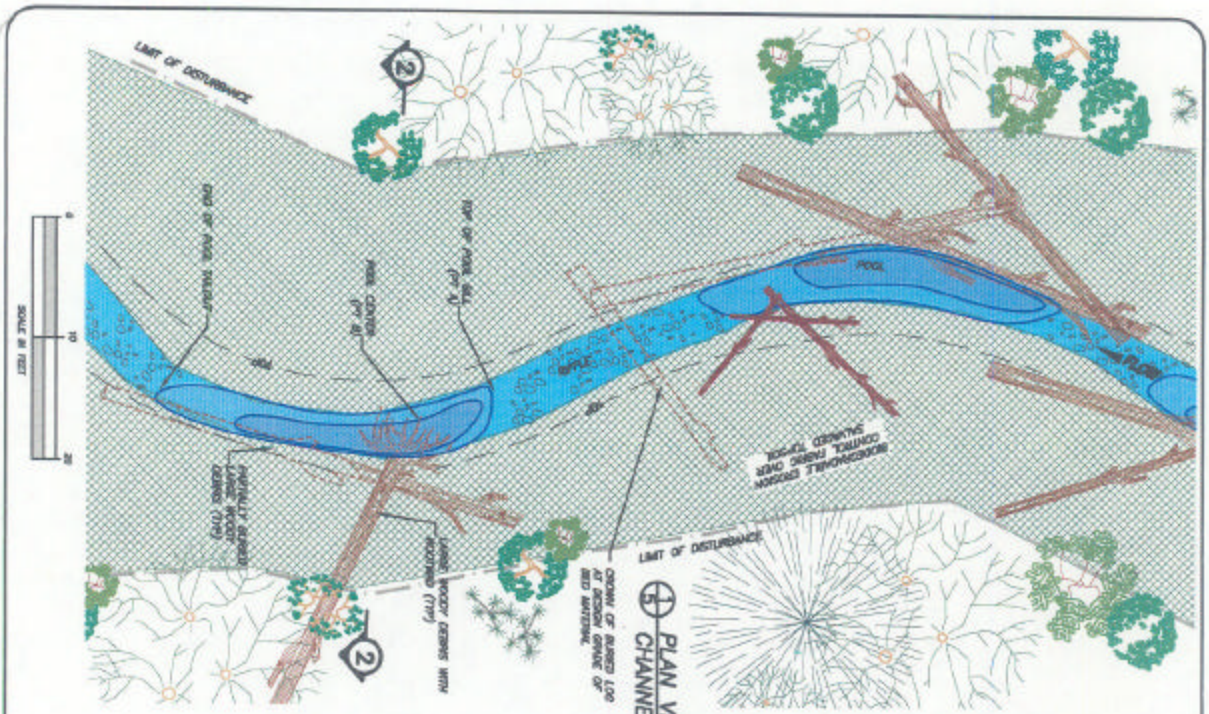


1/5 PLAN VIEW
CHANNEL DETAILS

2/5 TYPICAL SECTION VIEW
POOL

PREFERRED DESIGN ALTERNATIVE

WHATCOM CREEK LONG TERM ENHANCEMENT PLANS FOR SALMONID HABITAT

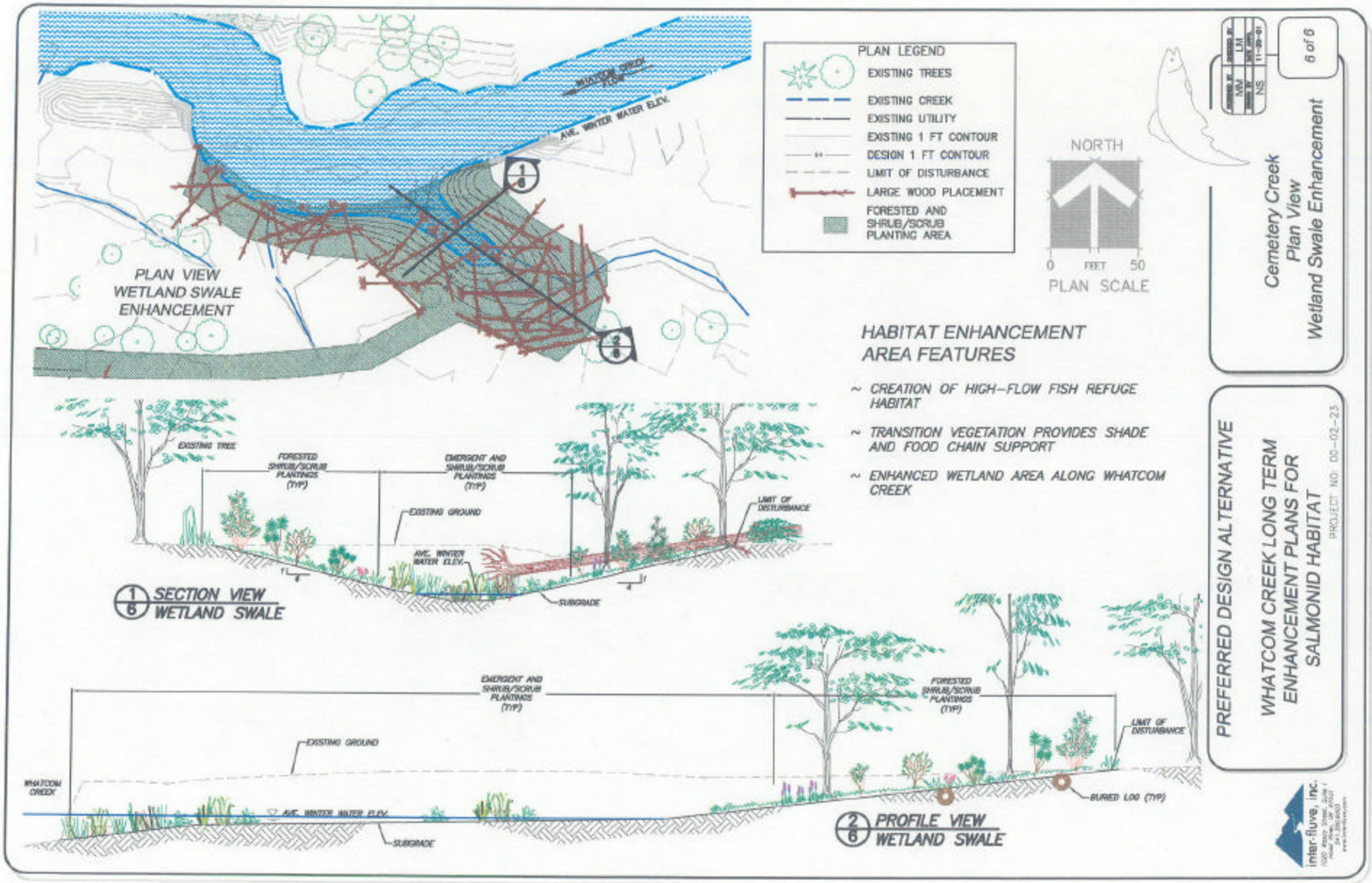
PROJECT NO: 00-02-23

CEMETERY CREEK
TYPICAL CHANNEL DETAILS

DESIGNED BY	CHECKED BY
MM	LM
DRAWN BY	DATE APPR.
NS	11-30-01

5 of 6

inter-fluve, inc.
1020 Wayne Street, Suite 1
Hood River, OR 97031
541.386.9003
www.interfluve.com


PLAN VIEW
WETLAND SWALE
ENHANCEMENT
WHATCOM CREEK FLOW
AVE. WINTER WATER ELEV.
PLAN LEGEND
EXISTING TREES
EXISTING CREEK
EXISTING UTILITY
EXISTING 1 FT CONTOUR
DESIGN 1 FT CONTOUR
LIMIT OF DISTURBANCE
LARGE WOOD PLACEMENT
FORESTED AND SHRUB/SCRUB PLANTING AREA
NORTH
0 FEET 50
PLAN SCALE
HABITAT ENHANCEMENT AREA FEATURES
~ CREATION OF HIGH-FLOW FISH REFUGE HABITAT
~ TRANSITION VEGETATION PROVIDES SHADE AND FOOD CHAIN SUPPORT
~ ENHANCED WETLAND AREA ALONG WHATCOM CREEK
EXISTING TREE
FORESTED SHRUB/SCRUB PLANTINGS (TYP)
EMERGENT AND SHRUB/SCRUB PLANTINGS (TYP)
EXISTING GROUND
AVE. WINTER WATER ELEV.
LIMIT OF DISTURBANCE
SUBGRADE
1/6 SECTION VIEW WETLAND SWALE
EMERGENT AND SHRUB/SCRUB PLANTINGS (TYP)
FORESTED SHRUB/SCRUB PLANTINGS (TYP)
EXISTING GROUND
WHATCOM CREEK
AVE. WINTER WATER ELEV.
SUBGRADE
LIMIT OF DISTURBANCE
BURIED LOG (TYP)
2/6 PROFILE VIEW WETLAND SWALE
Cemetery Creek
Plan View
Wetland Swale Enhancement
6 of 6
PREFERRED DESIGN ALTERNATIVE
WHATCOM CREEK LONG TERM ENHANCEMENT PLANS FOR SALMONID HABITAT
PROJECT NO: 00-02-23
inter-fluve, inc.

11.0 Figures and Photographs

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11.0 Figures and Photographs

Figure 1: Incident Location

Figure 2: Break Site

Figure 3: Excavation of Pipe

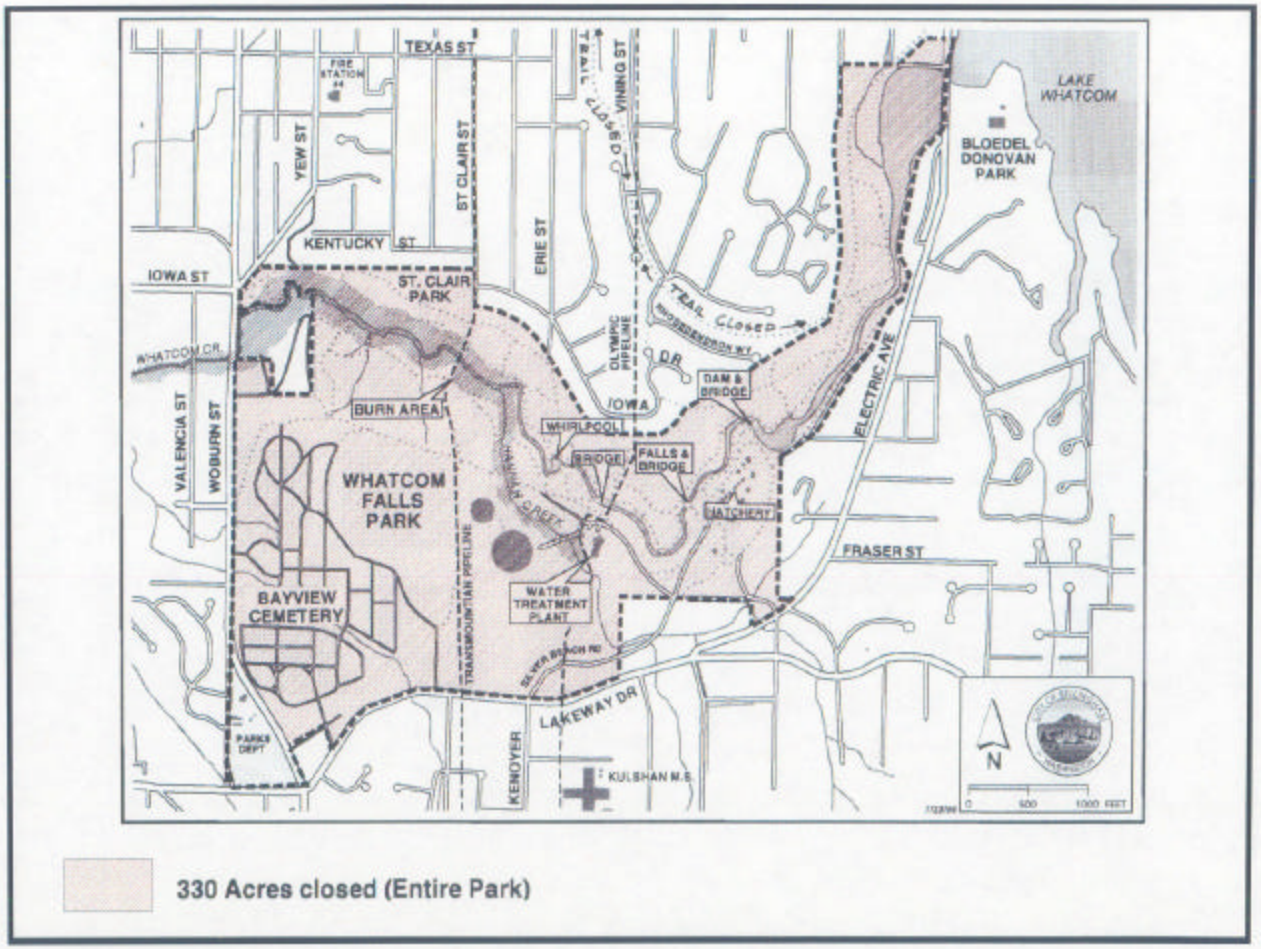

Figure 4: Map of Whatcom Falls Park Area. Closures from June 10-17, 1999

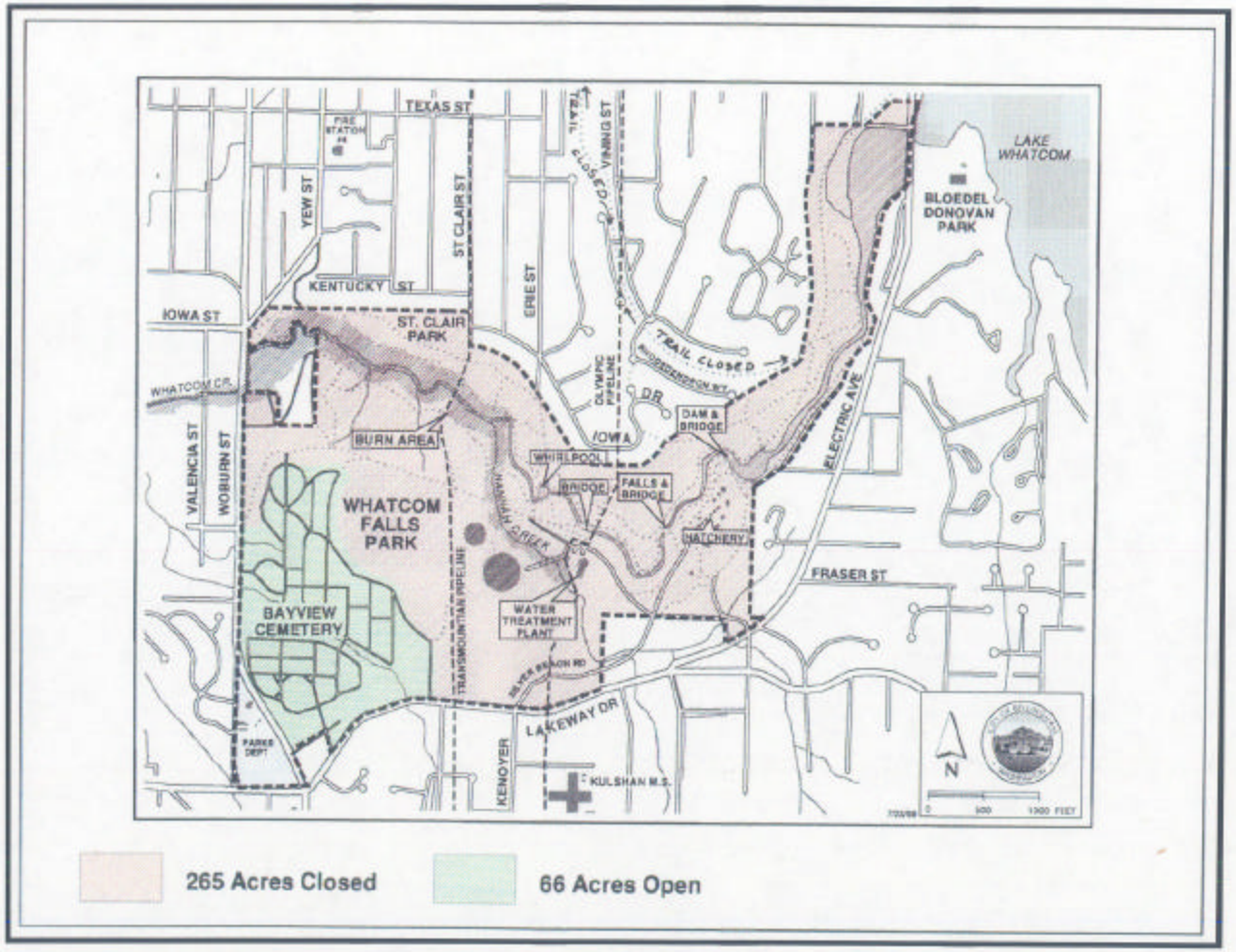

Figure 5: Map of Whatcom Falls Park. Closures from June 17-July 10, 1999

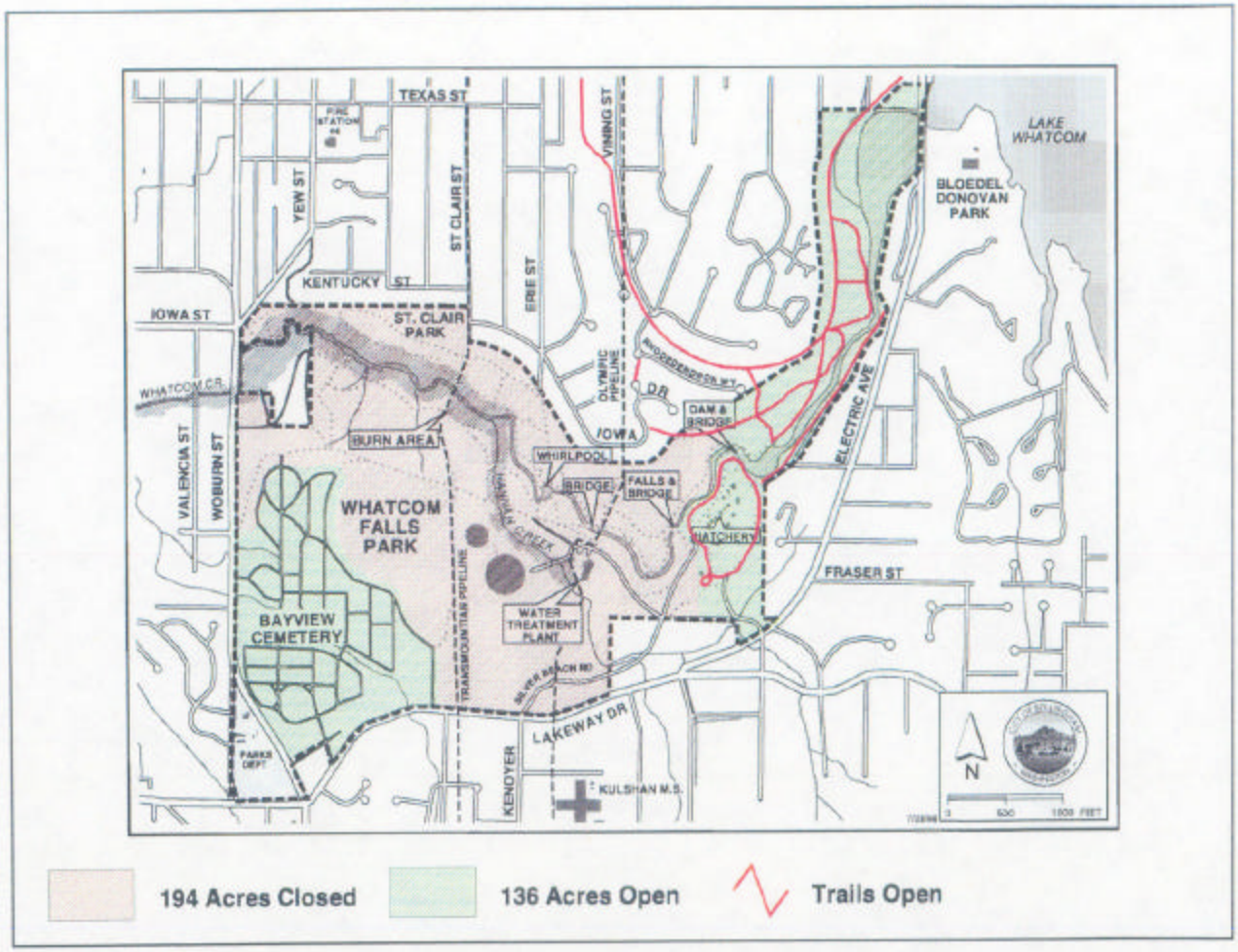

Figure 6: Map of Whatcom Falls Park. Closures from July 10-15, 1999

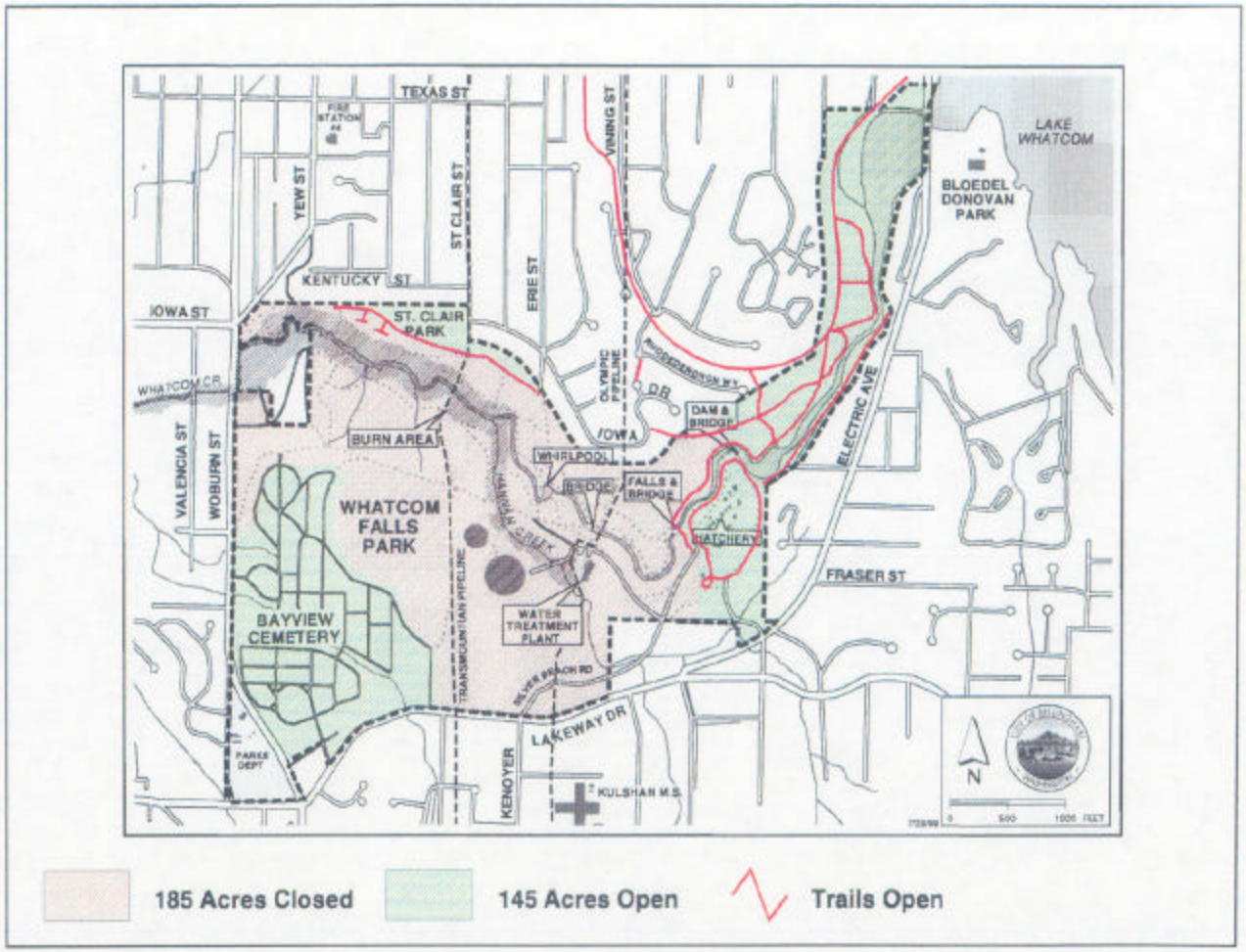

Figure 7: Map of Whatcom Falls Park. Closures from July 16-23, 1999

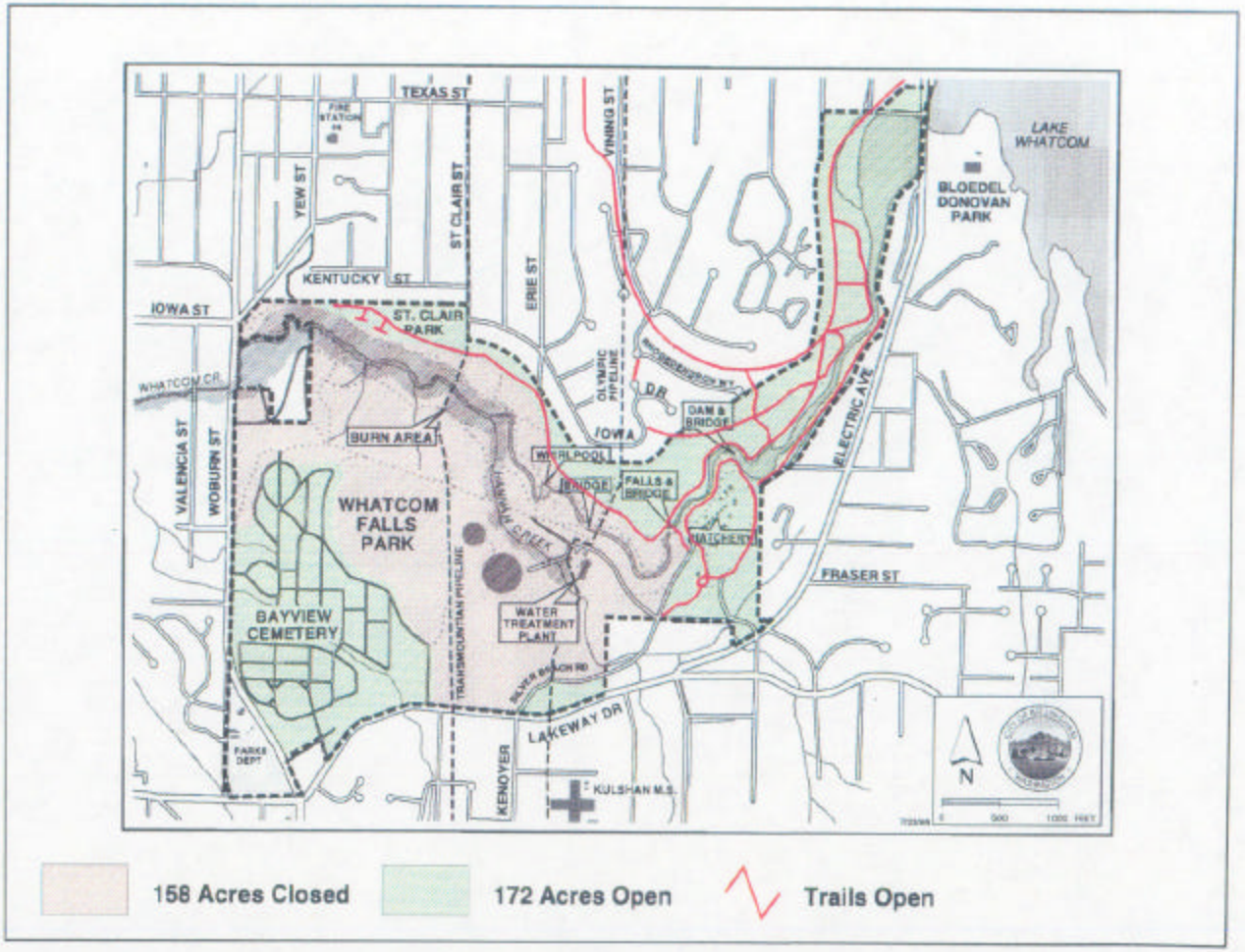

Figure 8: Map of Whatcom Falls Park. Closures from July 23-September 22, 1999

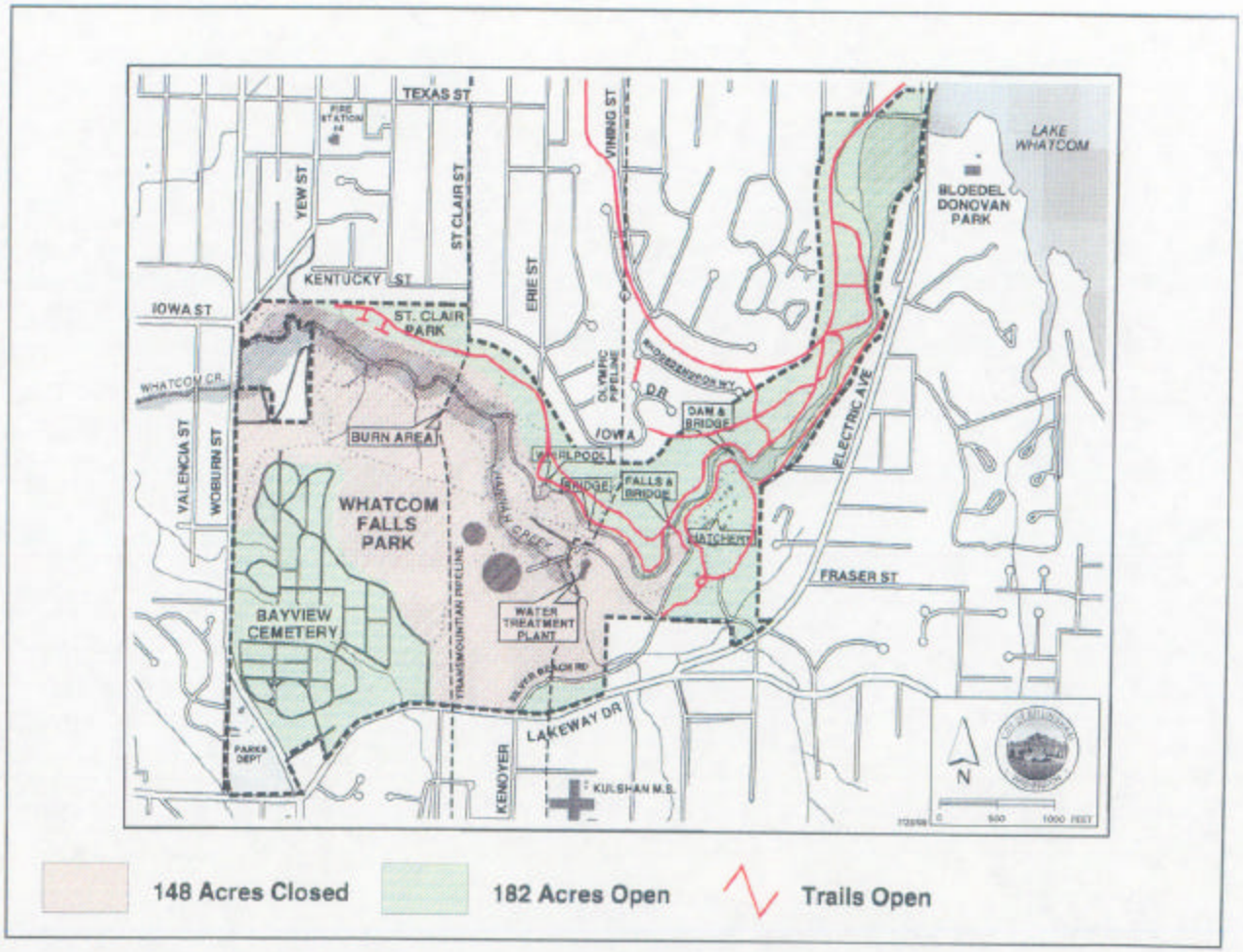

Figure 9: Map of Whatcom Falls Park. Closures from September 22-November 21, 1999

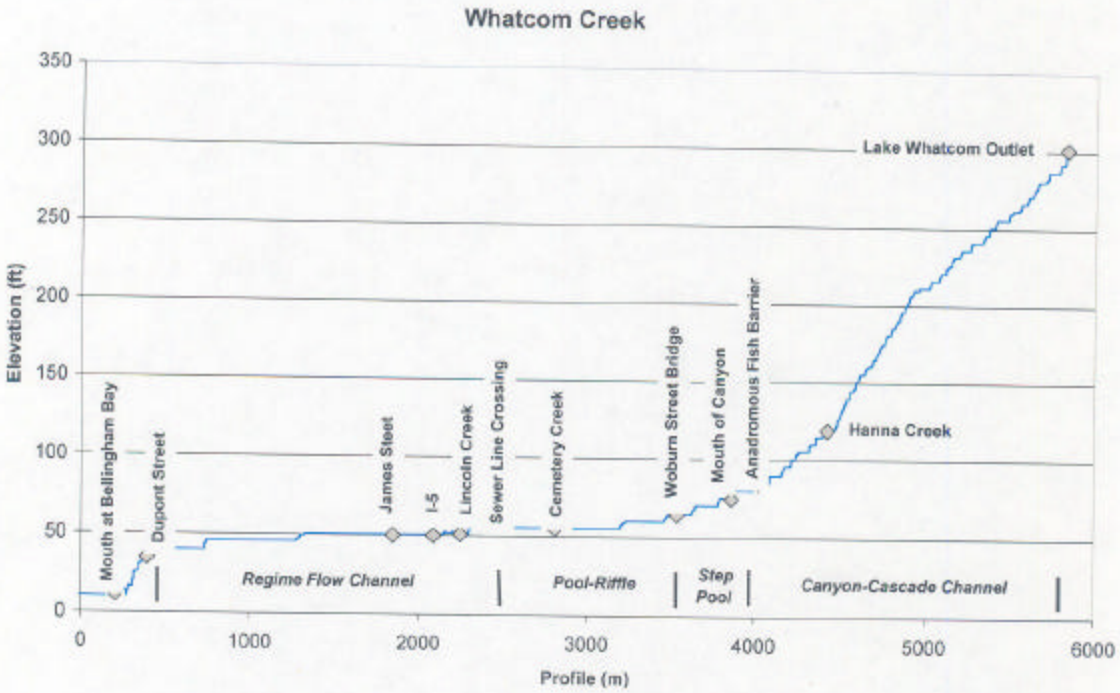

Figure 10: Whatcom Creek Vertical Profile

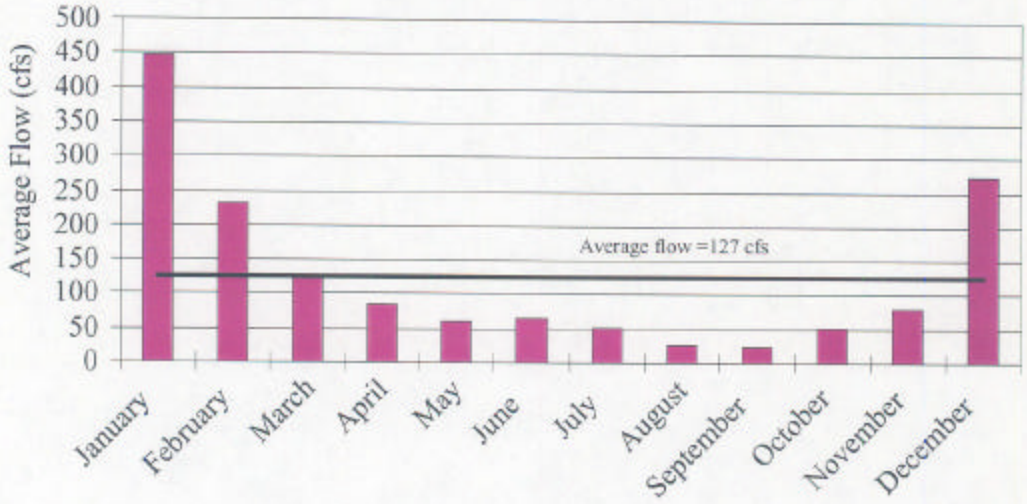

Figure 11: Average Monthly Flows for Whatcom Creek

Exhibit 4-1

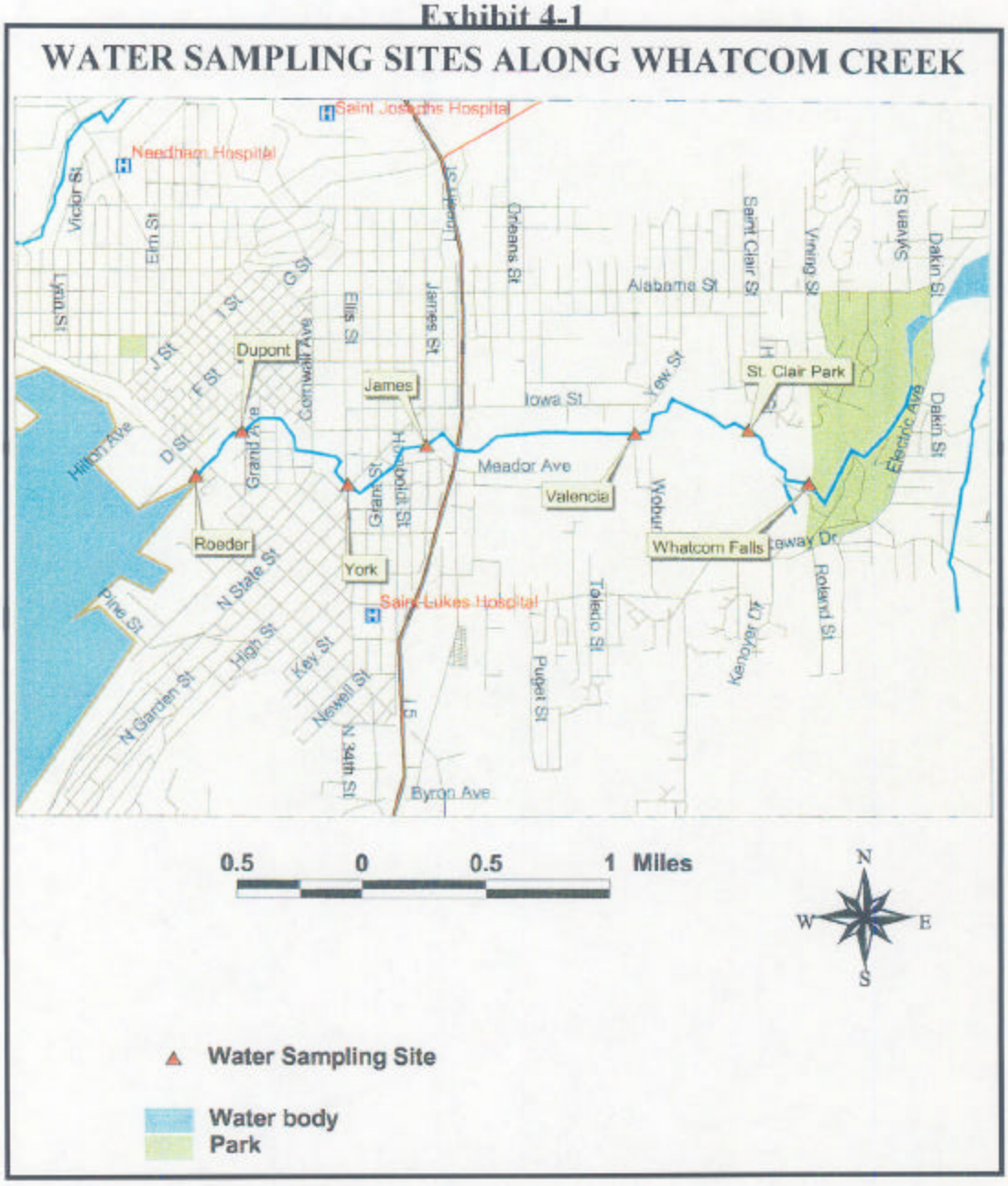

Figure 12: Map of Water Sampling Stations in Creek

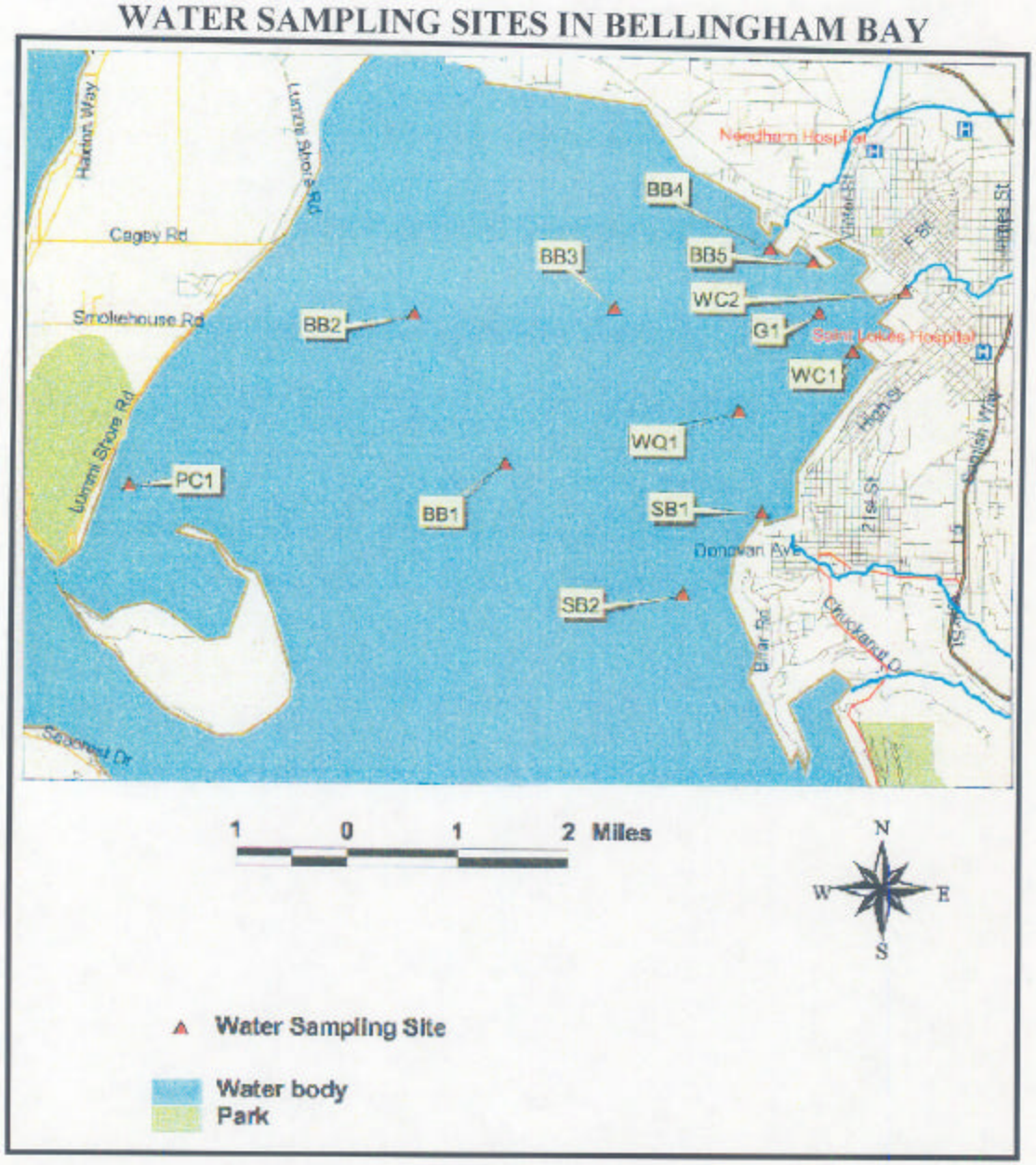

Figure 13: Map of Water Sampling Stations in Bellingham Bay

Figure 14: Spawning areas

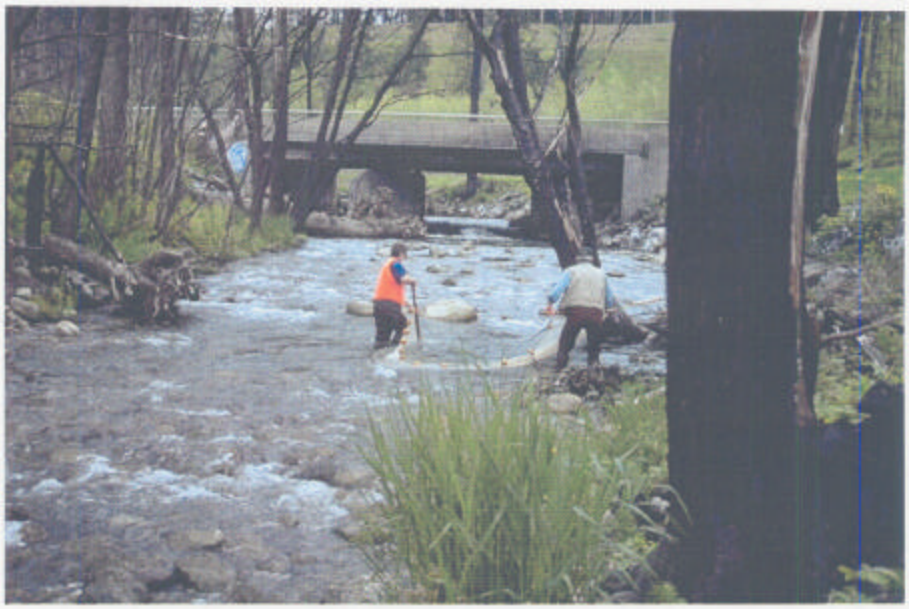

Figure 15: Beach Seine Surveys, May 2000

Figure 16: Dead Lamprey in the Whatcom Waterway

Figure 17: Deer in Whatcom Creek

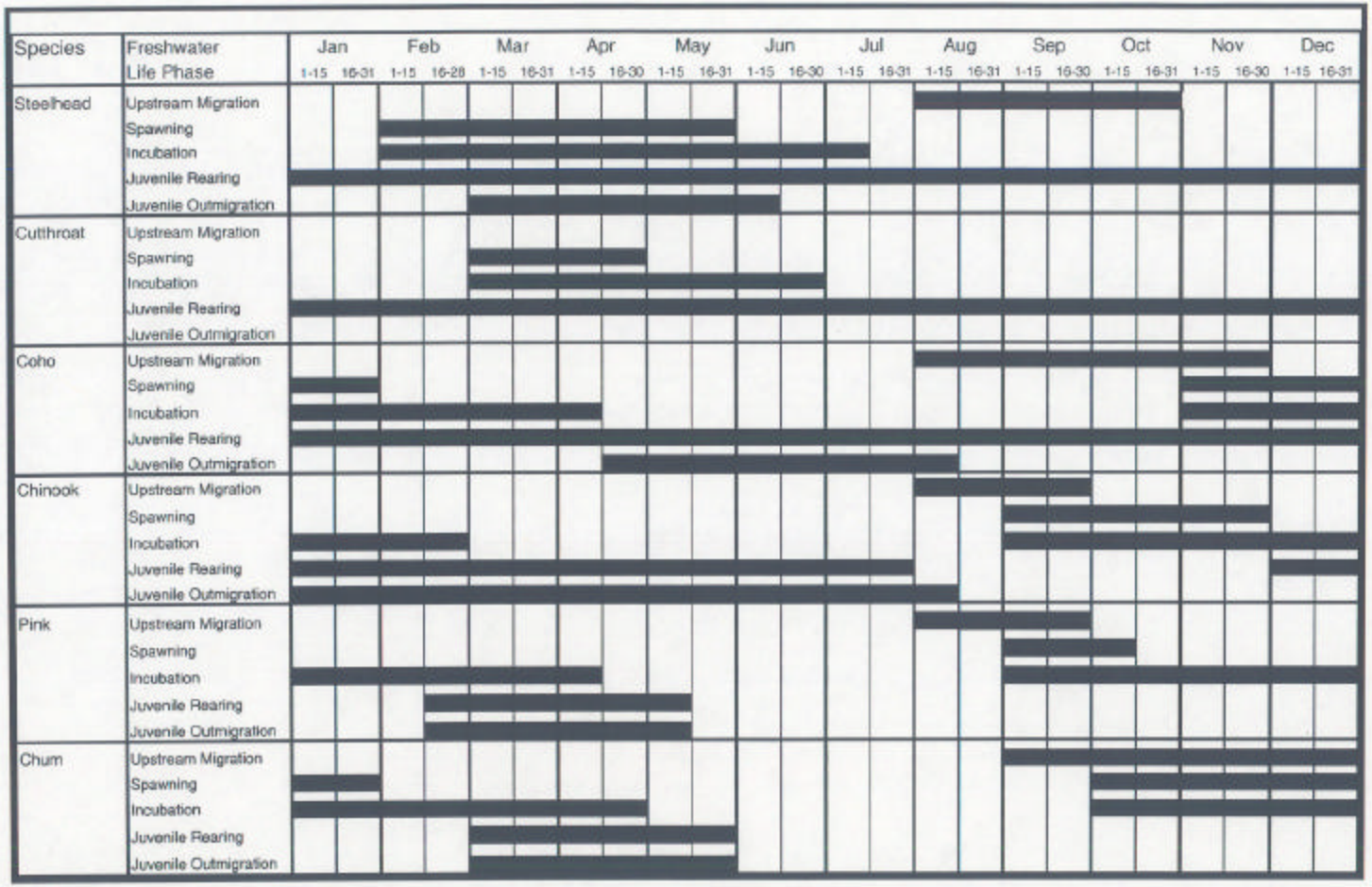

Figure 18: Seasonality of Salmonid Utilization

Figure 19: Hanna Creek Remediation (Before)

Figure 20: Hanna Creek Remediation (After)

Figure 21: Aerial photograph of burn zone

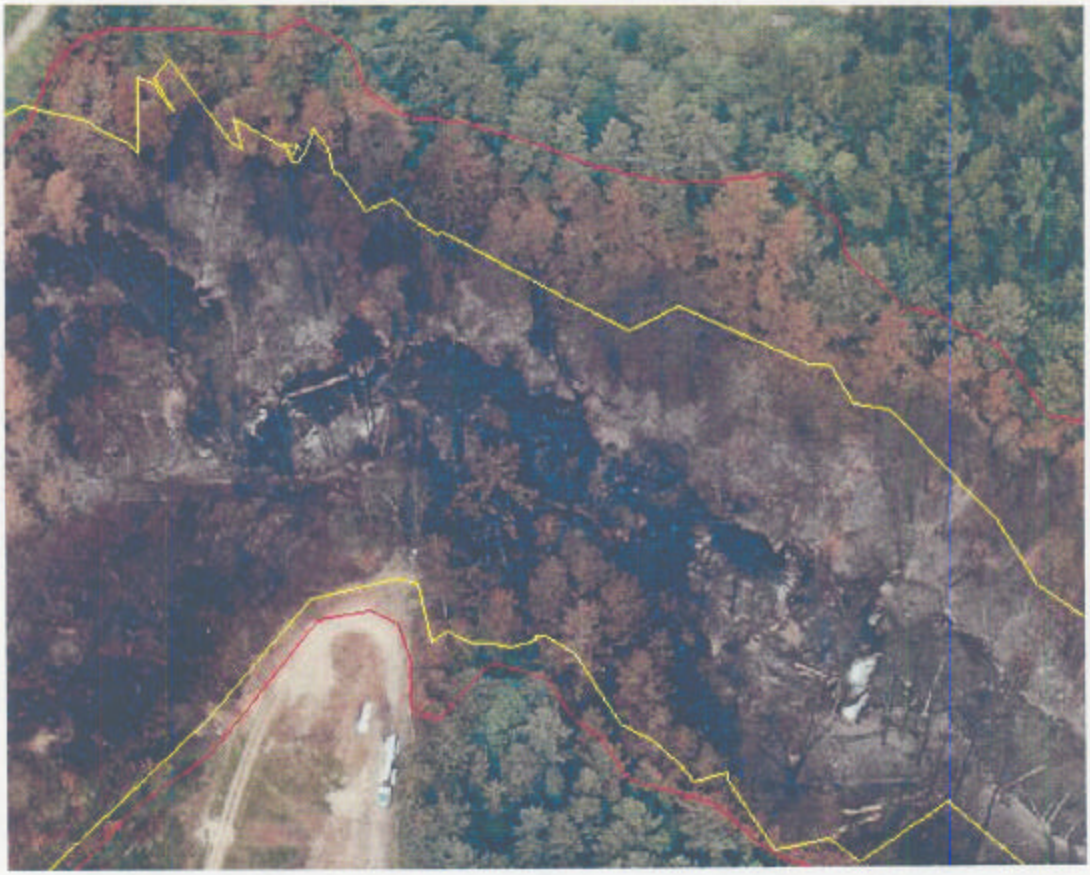

Figure 22: Close-up of burn zone

Figure 23: Hydroseeding

Figure 24: Sampling with pipette

Figure 25: Fires in Creek

Figure 26: Creation of Pool Habitats

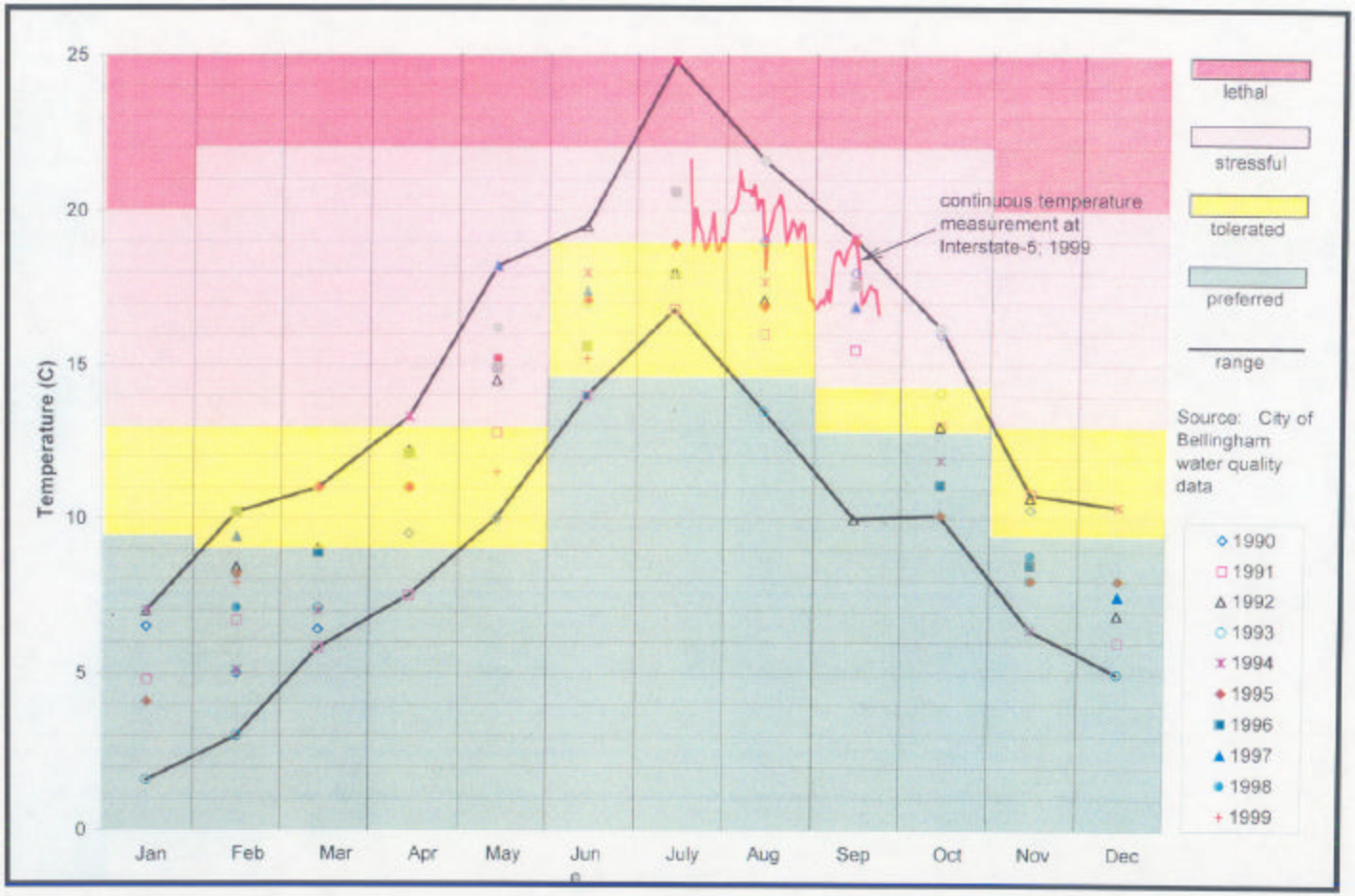

Figure 27: Chart of Fish thermal stress

Figure 28: Heavy Equipment Working in Stream

Figure 29: Completed placement of woody debris in stream

Figure 30: Closure sign in park

Figure 31: Newly Planted Tree

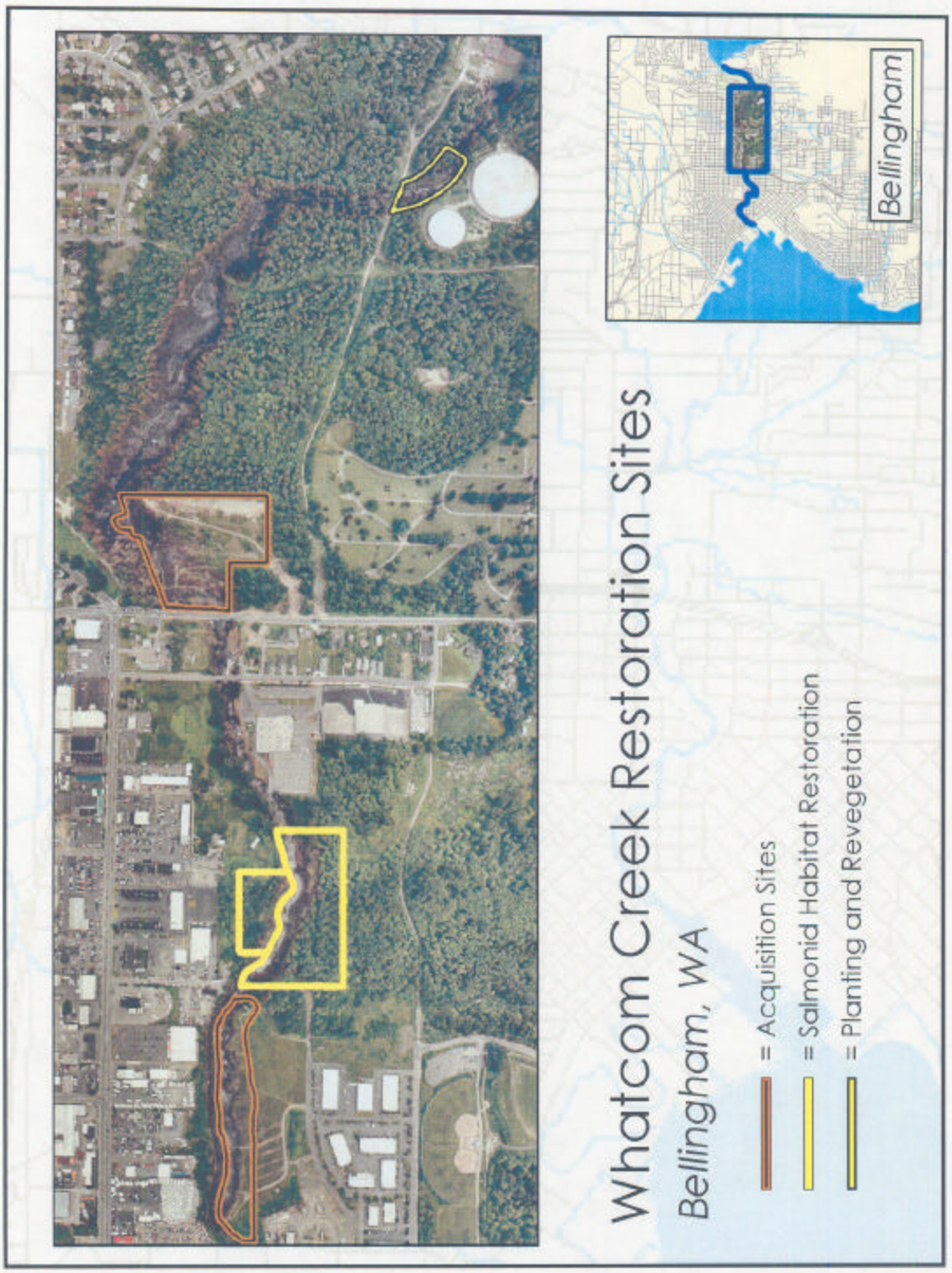

Figure 32: Map of Long-Term Restoration Sites

Figure 33: Picture of Whatcom Reach project site (August 2001)

Figure 34: Picture of Haskell project site (May 2000)

Figure 35: New Fever Creek Bridge

Figure 36: New Valencia Street Bridge

Figure 37: Salmon Park Location Map

Figure 38: Cemetery Creek Project Location Map

Figure 39: 4-Acre Acquisition Site

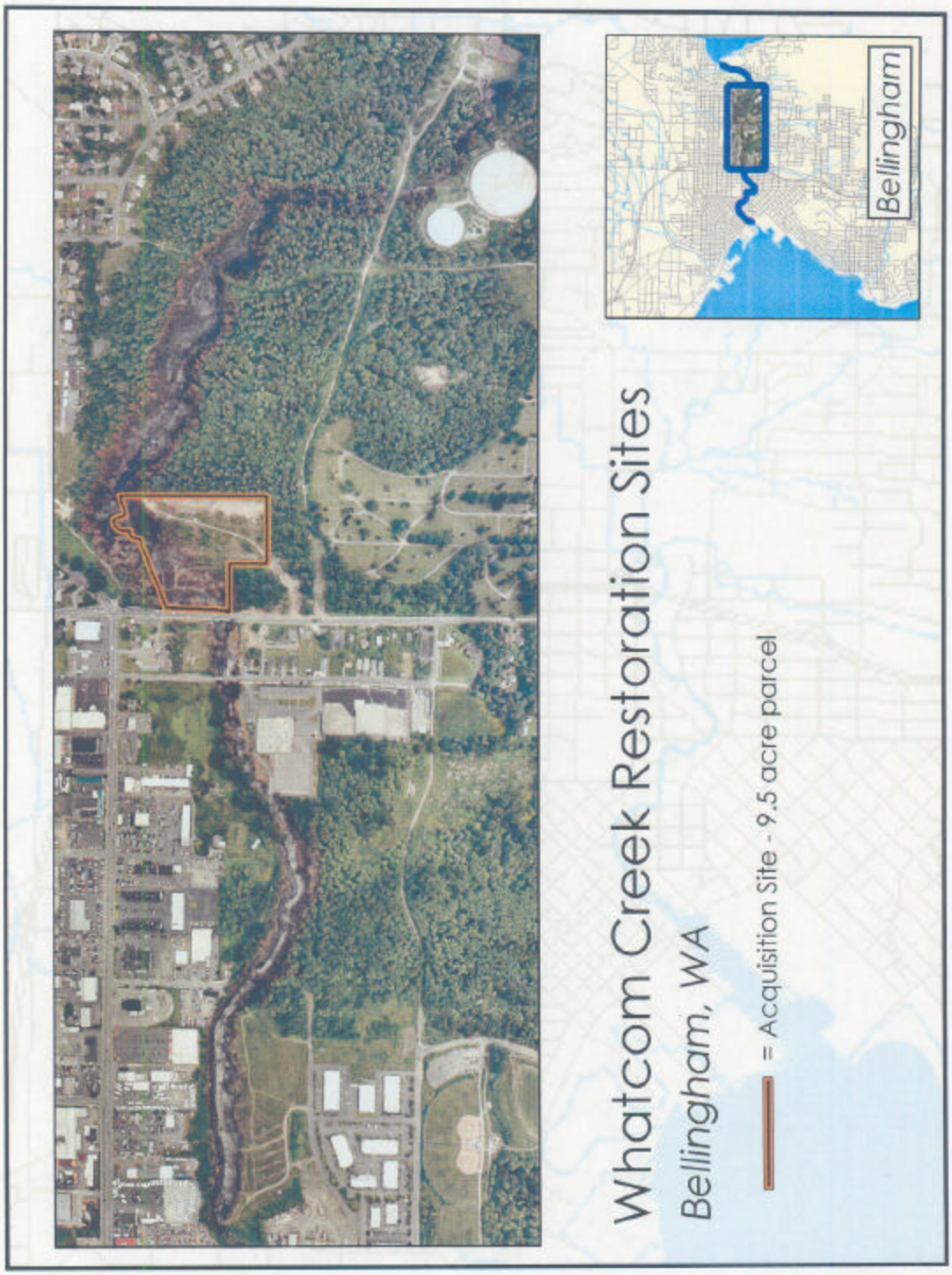

Figure 40: 9.5-Acre Acquisition Site