APPENDIX C: Middle Fork Nooksack Sub-basin Report

WHATCOM COUNTY FISH PASSAGE ASSESSMENT SUBBASIN REPORT
MIDDLE FORK NOOKSACK RIVER

Description of Sub-basin

The Middle Fork Nooksack River originates at the Deming and Easton glaciers on the southwest side of Mount Baker and flows roughly 30 miles west and north to its confluence with the North Fork near Deming, WA (figure 1). The upper watershed of the Middle Fork flows down a confined valley dominated by step-pool cascades and boulder/cobble substrate. Steep gradient tributaries enter this section of the river from the north and south forming alluvial fans. These creeks include Green, Wallace, Warm, Clearwater, and Heister's, Creeks. The city of Bellingham's water diversion dam is located at river mile 7.2 and forms a barrier to anadromous fish passage.

From Heister's Creek northward, the river gradient decreases and the valley bottom becomes less confined. Here the river forms a braided channel system that is flanked by low relief river terraces. This braided reach extends to the confluence with the North Fork Nooksack near Deming. Several alluvial fan forming tributary streams are found along the braided portion of the Middle Fork, including Bear, Porter and Canyon Creeks, and several unnamed tributaries.

The primary landuse on the steep forested hillsides surrounding the Middle Fork is commercial logging. Agricultural and rural residential activities dominate the river tarraces and alluvial fans that border the lower river. Land use jurisdiction is split between Whatcom County in the low-lying areas; United States Forest Service east of Warm Creek (RM 13), and the state Department of Natural Resources in the foothills (Whatcom County, 1997).

Immediately north (downstream) of Heister's Creek, Bear Creek enters the river on the left bank, and drains a series of peat bog lakes formed in glacial deposits south of the river. Riparian vegetation is mixed deciduous/ conifer forest and channel substrate is gravel in the riffles and sand in the numerous pools. This creek supports an enormous pink salmon run and also supports coho salmon, and cutthroat and steelhead trout (Whatcom County, 1994, NWIFC, 2003).

Porter Creek and Canyon Lake Creek are large tributary streams to the Middle Fork Nooksack that have no artificial barriers to fish passage within the jurisdiction of Whatcom County. Therefore, no inventory efforts were undertaken. Historically, these streams have been important spawning areas for Chinook, chum, coho, and pink salmon; steelhead and cutthroat trout, and native char (Whatcom County, 1994, NWIFC, 2003).

Several small unnamed tributary streams originate on the foothills east of the Middle Fork, and form small alluvial fans on the floodplain margin. Streamside vegetation is mixed deciduous/conifer forest that becomes fragmented by pasture and residential development closer to the river. Channel substrate is gravel. Fish use is primarily coho salmon, cutthroat, and steelhead trout, and, in some of the larger tributaries, chum salmon (Whatcom County, 1994, NWIFC, 2003).

Data Integration from Previous Projects

In the Middle Fork Sub-basin, previous barrier data from Whatcom County (County roads), and Nooksack Salmon Enhancement Association is standardized and integrated into the Washington Department of Fish and Wildlife (WDFW) Fish Passage and Diversion Screening Inventory (FPDSI) data base format and is included in the final summary table.

Reach Prioritization Summary

Prior to contacting landowners for access permission, inventory staff met with tribal and state biologists, and local fisheries professionals to identify priority stream reaches that had not been previously inventoried. In the interest of efficiency, we did not include areas with previously completed inventories, or where barrier inventories are required by law, and focused on reaches where information was lacking.

Similar inventories have been completed by the U.S. Forest Service (USFS), Washington State Department of Transportation (WSDOT), and the Washington Department of Natural Resources (DNR) for their respective ownerships. The USFS does not have barriers in anadromous fish streams, WSDOT and Whatcom County Public Works will be repairing barriers on roadways as part of their ongoing maintenance and repair program, and DNR will be correcting barriers under their Road Maintenance and Abandonment Plan scheduling and implementation.

The following reaches were inventoried in the Middle Fork Nooksack Sub-basin:

- Mosquito Lake Road near MP 12: WRIA 01.0347 and 01.0348 tribs: Entire anadromous reach.
- WRIA 01.0349 tributary system: Entire anadromous reach.
- Bear Creek/Peat Bog Lake/Mosquito Lake/Jorgensen Lake System: WRIA 01.0352 and 01.0353 tributary systems. Entire anadromous reach.

Barrier Assessment

Prior to conducting fieldwork, landowners adjacent to stream inventory sites provided written or verbal permission for field crews to access their property. Field crews did not evaluate culverts or habitat conditions on land parcels in which property access was denied.

Two levels of assessment are included in this report. The first is a road inventory conducted by Whatcom County Public Works staff that identified fish blocking culverts on the County road system for known and possible fish bearing streams. The second level of assessment was a stream based inventory by NooksackTribe and Nooksack Salmon Enhancement Association field crews on priority stream reaches identified in the reach prioritization effort described above. All human made features in priority stream reaches were geo-referenced using GPS and evaluated for their ability to pass fish. Field evaluation and data collection followed the methodologies described in the *Fish Passage Barrier and surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW 2000).

Summary of Results

Figure 1 is a map of the Middle Fork Sub-basin showing the location and site ID number of each feature inventoried. Table 1 summarizes the inventory results sequentially by site ID number for the Middle Fork Nooksack Sub-basin. Table 2 summarizes the details associated with identified fish passage barriers and is sorted by Priority Index number (PI). Due primarily to property access restrictions, some blockages did not have PI's calculated. However, this project captured the vast majority of fish passage barriers for a reasonably complete inventory of all passage barriers to anadromous fish in this sub-basin.

Table 1. Stream features inventoried in the Middle Fork Nooksack Sub-basin, sorted by Site ID number.

Site ID	Sequencer[1]	Stream	Tributary To	Owner Type	Feature	Repair[2] Status	% Passable	Additional Barriers		Survey Type[3]	Total PI
								Upstream	Downstream		
01.0339 7.20		MF Nooksack R	MF Nooksack R	City	Dam	RR	0			TD	
01.0352 0.50		Bear Cr	MF Nooksack R	State	Fishway	RR	67			LME	
01.0353 0.30		Unnamed	Bear Cr	State	Fishway	OK	100			LME	
1280056	1.1	Bear Cr	MF Nooksack R	Private	Culvert	OK	100				
1280314	1.1	Unnamed	MF Nooksack R	Private	Culvert	RR	33	1	1	RSFS	10.28
1280315	1.2	Unnamed	MF Nooksack R	Private	Culvert	LG	33			TD	
370365	1.1	Unnamed	MF Nooksack R	County	Culvert	OK	100				
370382	1.1	Unnamed	Jorgenson Lk	County	Culvert	RR	33	0	0	FS	1.67
370386	1.1	Unnamed	MF Nooksack R	County	Culvert	RR	33	2	0	RSFS	12.97
370387	1.1	Unnamed	MF Nooksack R	County	Culvert	RR	33	0	0	RSFS	8.26
370388	1.1	Heiser Cr	MF Nooksack R	County	Culvert	OK	100				
370389	1.1	Unnamed	Canyon Lk Cr	County	Culvert	RR	67			TD	

[1] Sequencer: 1:2 – One culvert of two, 1:3 - One culvert of three, etc.

[2] Repair Status: OK – No action needed, RR – Repair required, LG – Habitat gain is less than 200 m., UD – Habitat gain undetermined, FX – Fixed, Blank – No fish use potential.

[3] Survey Type: TD – Threshold Determination, LME – Lineal Map Estimate, ETD – Expanded threshold determination, UETD – Unexpanded Threshold Determination, FS, PS – Full habitat Survey, RSFS – Reduced Sampling Physical Survey.

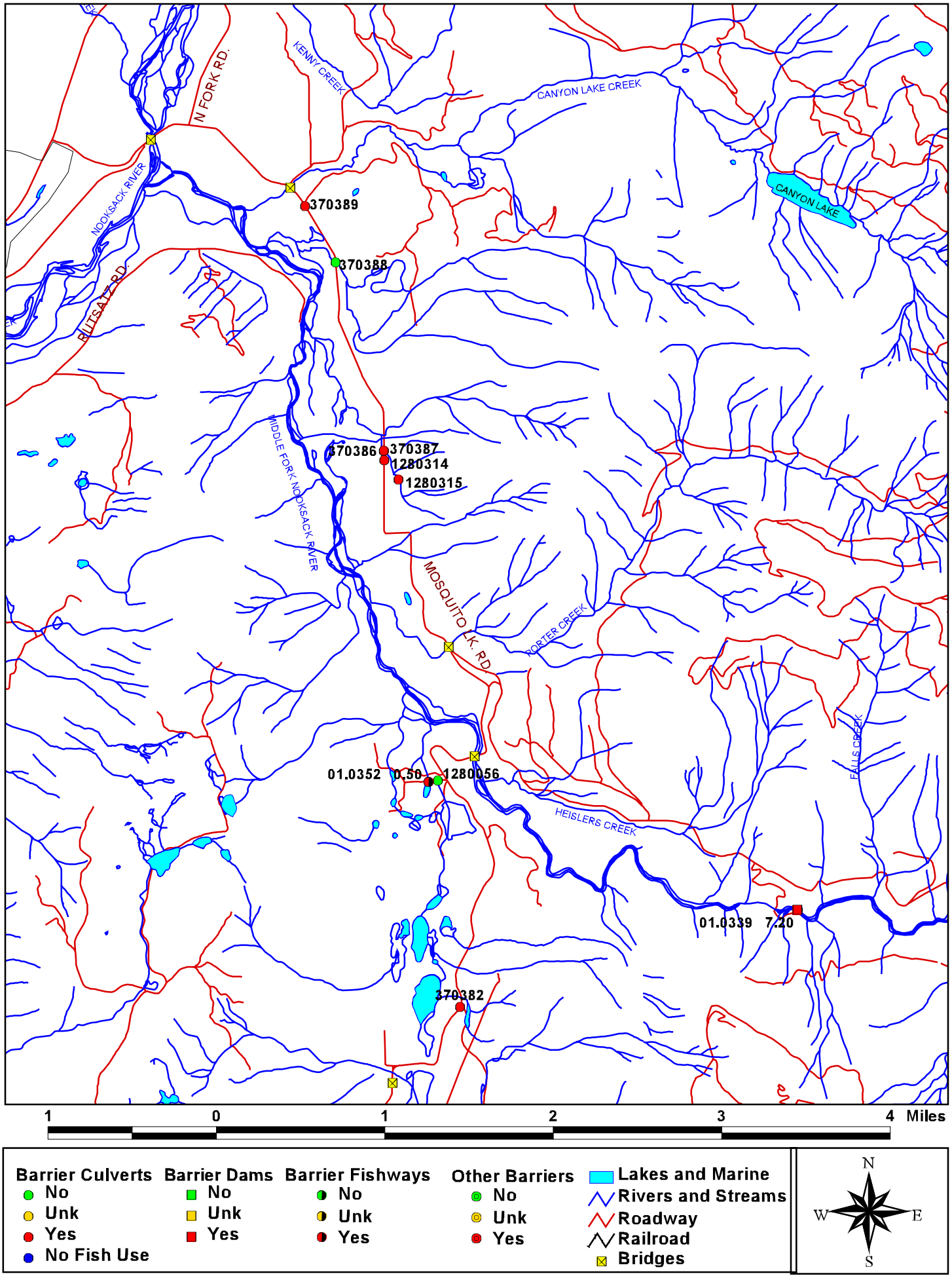

Figure 1. Middle Fork Nooksack River Features.

Middle Fork Nooksack Culvert Barriers:

PI TOTAL: **12.97**

No Image Available

GENERAL INFORMATION

Site ID:	370386
Stream:	Unnamed
Trib To:	MF Nooksack R
Owner:	County

CULVERT ATTRIBUTES

Shape:	RND
Material:	PCC
Span (m):	0.91
Length (m):	12.50

BARRIER STATUS

Problem:	Slope
Ds Barriers:	0
Us Barriers:	2

HABITAT GAIN

Lineal Gain (m):	373
Spawn Area (m2):	14
Rear Area (m2):	546

PI TOTAL: **10.28**

GENERAL INFORMATION

Site ID:	1280314
Stream:	Unnamed
Trib To:	MF Nooksack R
Owner:	Private

CULVERT ATTRIBUTES

Shape:	RND
Material:	PCC
Span (m):	0.60
Length (m):	9.10

BARRIER STATUS

Problem:	Slope
Ds Barriers:	1
Us Barriers:	1

HABITAT GAIN

Lineal Gain (m):	295
Spawn Area (m2):	0
Rear Area (m2):	519

PI TOTAL: **8.26**

GENERAL INFORMATION

Site ID:	370387
Stream:	Unnamed
Trib To:	MF Nooksack R
Owner:	County

CULVERT ATTRIBUTES

Shape:	RND
Material:	PCC
Span (m):	0.76
Length (m):	10.06

BARRIER STATUS

Problem:	Slope
Ds Barriers:	0
Us Barriers:	0

HABITAT GAIN

Lineal Gain (m):	598
Spawn Area (m2):	0
Rear Area (m2):	217

PI TOTAL: **1.67**

GENERAL INFORMATION

Site ID:	370382
Stream:	Unnamed
Trib To:	Jorgenson Lk
Owner:	County

CULVERT ATTRIBUTES

Shape:	RND
Material:	PCC
Span (m):	0.91
Length (m):	14.94

BARRIER STATUS

Problem:	Slope
Ds Barriers:	0
Us Barriers:	0

HABITAT GAIN

Lineal Gain (m):	162
Spawn Area (m2):	74
Rear Area (m2):	144

Culvert Shape: RND = Round, BOX = Rectangular, ARCH = Bottomless arch, SQSH = Pipe arch, ELL = Ellipse, OTH = Other.

Culvert Material: PCC = Pre-cast concrete, CPC = Cast in place concrete, CST = Corrugated steel, SST = Smooth Steel, CAL = Corrugated aluminum, SPS = Structuural plate steel, SPA = Structural plate aluminum, PVC = Plastic, TMB = Timber, MRY = Masonary, OTH = Other

Middle Fork Nooksack Culvert Barriers:

PI TOTAL:

GENERAL INFORMATION

Site ID:	370389
Stream:	Unnamed
Trib To:	Canyon Lk Cr
Owner:	County

CULVERT ATTRIBUTES

Shape:	RND
Material:	CAL
Span (m):	0.91
Length (m):	12.19

BARRIER STATUS

Problem:	Slope
Ds Barriers:	
Us Barriers:	

HABITAT GAIN

Lineal Gain (m):	
Spawn Area (m2):	
Rear Area (m2):	

PI TOTAL:

No Image Available

GENERAL INFORMATION

Site ID:	370388
Stream:	Heiser Cr
Trib To:	MF Nooksack R
Owner:	County

CULVERT ATTRIBUTES

Shape:	ARCH
Material:	CST
Span (m):	3.35
Length (m):	24.99

BARRIER STATUS

Problem:	
Ds Barriers:	
Us Barriers:	

HABITAT GAIN

Lineal Gain (m):	
Spawn Area (m2):	
Rear Area (m2):	

PI TOTAL:

No Image Available

GENERAL INFORMATION

Site ID:	1280315
Stream:	Unnamed
Trib To:	MF Nooksack R
Owner:	Private

CULVERT ATTRIBUTES

Shape:	RND
Material:	CST
Span (m):	0.60
Length (m):	6.30

BARRIER STATUS

Problem:	Slope
Ds Barriers:	
Us Barriers:	

HABITAT GAIN

Lineal Gain (m):	
Spawn Area (m2):	
Rear Area (m2):	

PI TOTAL:

No Image Available

GENERAL INFORMATION

Site ID:	1280315
Stream:	Unnamed
Trib To:	MF Nooksack R
Owner:	Private

CULVERT ATTRIBUTES

Shape:	RND
Material:	CST
Span (m):	0.60
Length (m):	6.30

BARRIER STATUS

Problem:	Slope
Ds Barriers:	
Us Barriers:	

HABITAT GAIN

Lineal Gain (m):	
Spawn Area (m2):	
Rear Area (m2):	

Culvert Shape: RND = Round, BOX = Rectangular, ARCH = Bottomless arch, SQSH = Pipe arch, ELL = Ellipse, OTH = Other.

Culvert Material: PCC = Pre-cast concrete, CPC = Cast in place concrete, CST = Corrugated steel, SST = Smooth Steel, CAL = Corrugated aluminum, SPS = Structuural plate steel, SPA = Structural plate aluminum, PVC = Plastic, TMB = Timber, MRY = Masonary, OTH = Other

Middle Fork Nooksack Barrier Dams:

PI TOTAL:

GENERAL INFORMATION

Site ID:	01.0339 7.20
Stream:	MF Nooksack R
Trib To:	MF Nooksack R
Owner:	City

BARRIER STATUS

Fish passage (%):	0
Ds Barriers:	
Us Barriers:	

DAM ATTRIBUTES

Dam Name	City Diversion D
Height (m):	
Span:	

HABITAT GAIN

Lineal Gain (m):	
Spawn Area (m2):	
Rear Area (m2):	

Middle Fork Nooksack Barrier Fishways:

PI TOTAL:

GENERAL INFORMATION

Site ID:	01.0352 0.50
Stream:	Bear Cr
Trib To:	MF Nooksack R
Owner:	State

FISHWAY ATTRIBUTES

FW Type:	BC
Attached To:	Culvert
Weir No:	
Bed Control:	

BARRIER STATUS

Fish Passage(%):	67
Ds Barriers:	
Us Barriers:	

HABITAT GAIN

Lineal Gain (m):	322
Spawn Area (m2):	
Rear Area (m2):	

Fishway Type: BC = baffled culvert, PC = pool chute, RCC = roughened channel, SBC = streambed control, WP = weir pool

Bed Control: RC = Rock, CC = Concrete, GC = gabion , LC = Log, PLC = Plank.