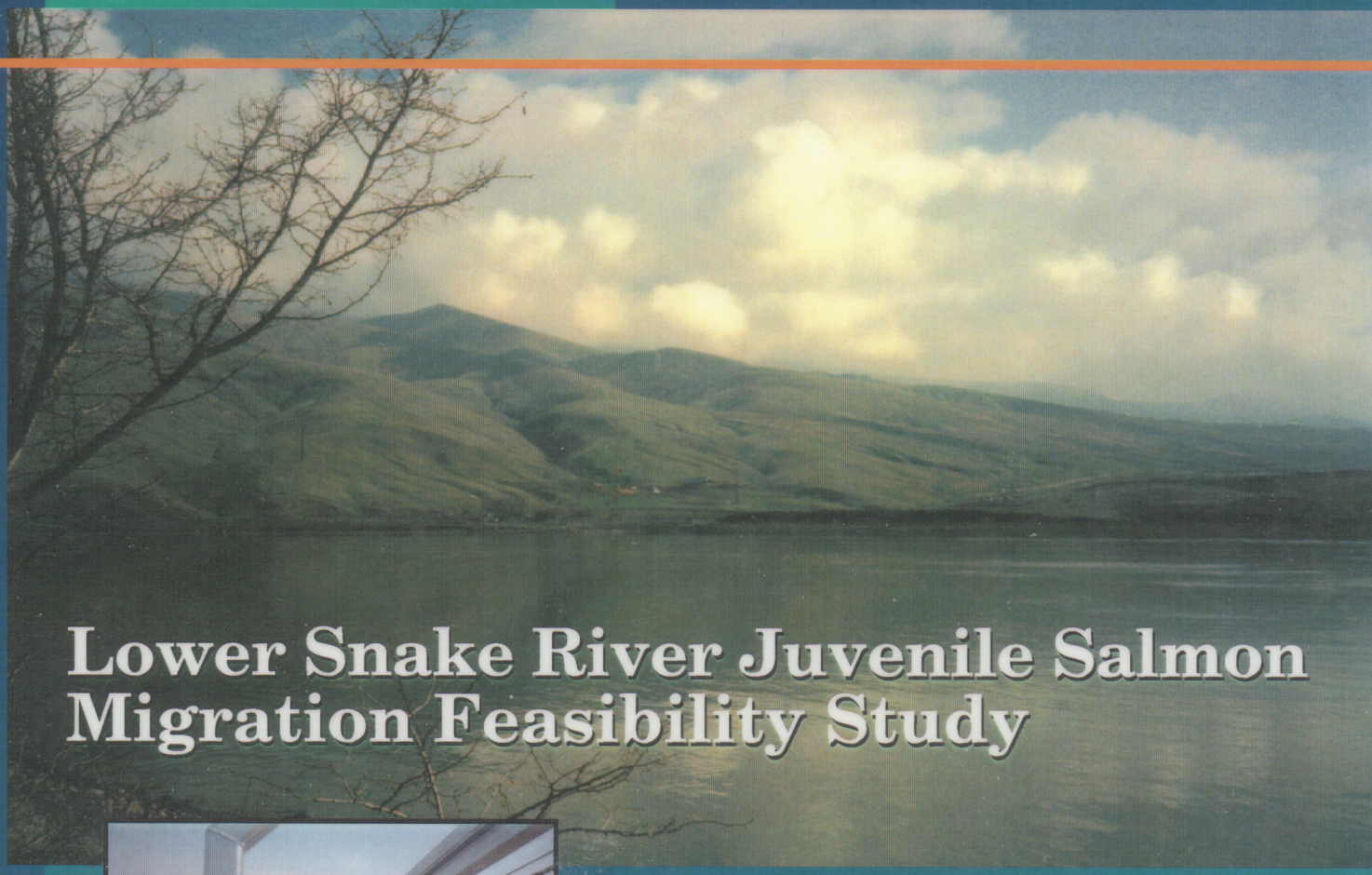
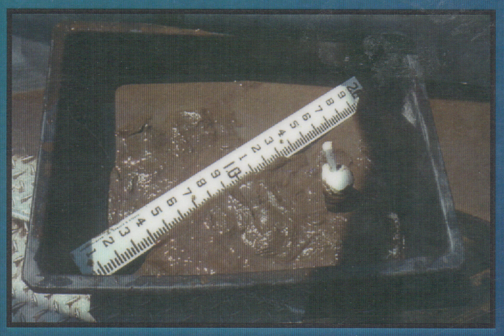


Lower Snake River Juvenile Salmon Migration Feasibility Study



Sediment Sampling Particle Size Sampling Task

Contract DACW68-94-D-0006,
Delivery Order #17

Submitted to
U.S. Army Corps of Engineers
Walla Walla District

Submitted by
CH2MHILL
July 1997

DATA REPORT

Lower Snake River Juvenile Salmon Migration Feasibility Study

Sediment Sampling Particle Size Sampling Task

Contract DACW68-94-D-0006,
Delivery Order #17

Prepared for
U.S. Army Corps of Engineers
Walla Walla District

JULY 1997

CH2MHILL

Report Summary

This report contains particle size distribution data, field notes, and annotated maps associated with the Sediment Particle Size Sampling Task under the Lower Snake River Juvenile Salmon Migration Feasibility Study. The study was conducted for the Walla Walla District Corps of Engineers (COE) as Delivery Order 17, contract number DACW68-94-D-0006. The 11-inch by 17-inch maps showing the sediment sampling zones are included under a separate cover as Appendix A.

Photo documentation of the sampling event and sampling sites are presented separately. The photo documentation consists of photo compact disks (CDs), negatives, and a Microsoft Access database file that is linked to the CD and contains all the descriptions as well as the particle size distribution data included in this report.

Particle Size Data

The first section of the report contains the particle size distribution data. A Shipek Sediment Sampler and Standard Ponar Grab sampler were used to collect five to ten sediment samples in each sediment zone. The sediment zones are labeled on the maps included in Appendix A. The focus of this task was to locate areas with fine sediment that could be cored during future sampling. These areas consisted primarily of very fine sand, silt, and clay. Therefore, samples that were all gravel or cobble were not sieved. If a sample consisted of gravel and cobble, it was photographed and noted in the field notes, but not sieved. If a sample attempt resulted in no sample recovery, it was also noted in the field notes. Typically at least two attempts were made in the same general location if the first attempt resulted in no recovery. In this instance, the same sample identification number would be used for the repeat sample attempts (e.g., see Sample ID# IHR24.6-1 in the Particle Size Data tables and the associated field notes). This was done to confirm the absence of collectible substrate, likely due to bedrock or boulder substrate. The depth sounder was always checked to confirm that a hard bottom was present whenever two or three samples resulted in no recoveries. Table 1 provides a summary of the number of samples collected during this task.

TABLE 1
Particle Size Data

Reservoir	Number of Samples Sieved	Number of Samples Not Sieved	Number of Sediment Zones
McNary	7	24	3
Ice Harbor	41	27	8
Lower Monumental	77	26	13
Little Goose	127	28	17
Lower Granite	104	26	13
Total	**356**	**131**	**54**

In the enclosed Particle Size Data tables, each sample has two identification numbers associated with it—one based on the river mile and one based on the notation used in the field during the sampling effort. The COE's sample identification numbers are based on a three-letter acronym for each reservoir followed by the river mile and -1, -2, -3, etc., which represents the individual sampling locations within the sediment zone. There are up to 12 individual sample locations per sediment zone. The mouth of the Snake River is considered River Mile 0.0.

The field notes sample identification numbers are based on a sequential numbering of the sediment zones, instead of using the river mile, beginning with 1 at the most downstream sampling location within each reservoir. Like the COE's sample identification numbering system, the individual sampling locations within each sediment zone are indicated by -1, -2, -3, etc. Slightly different acronyms than those used for the COE's sample identification were used to identify the reservoirs.

Table 2 contains an excerpt from the Particle Size Data tables to illustrate the sample identification numbering system. This example is the most downstream, or first, sediment zone in Lower Monumental Reservoir. The sediment zone is located 41.8 statute miles upstream of the Snake River mouth. There are seven sample locations within the sediment zone, and two sample attempts were made in the first location.

TABLE 2
Example Sample Identification Numbering System

USCOE Sample ID#	Field Notes Sample ID#
LMN41.8-1	LM1-1
LMN41.8-1	LM1-1
LMN41.8-2	LM1-2
LMN41.8-3	LM1-3
LMN41.8-4	LM1-4
LMN41.8-5	LM1-5
LMN41.8-6	LM1-6
LMN41.8-7	LM1-7

Unless otherwise indicated on the maps in Appendix A, or in the field notes, the typical sampling procedure within each sediment zone was to begin at the right bank (based on a downstream orientation) and work across the river. Samples were taken at relatively evenly spaced intervals from bank to bank. Every sample location has World Geodetic System 84 (WGS-84) latitude and longitude coordinates, and Washington State Plane Northing and Easting coordinates associated with it.

Field Notes

The field notes indicate the sample identification number, date and time of sample collection, number of sample attempts at each sampling point, type of equipment used (either Shipek or Ponar), and miscellaneous notes associated with the sampling effort. In addition, the water depth at all sample locations from the upstream end of Ice Harbor to the upstream end of Lower Granite is listed in the field notes. General observations about the morphology of the samples are noted as well. Table 3 provides a glossary of the acronyms used in the field notes.

TABLE 3
Glossary of Acronyms Used in the Field Notes

Acronym	Definition
BIH	Below Ice Harbor Lock and Dam
C	Cobble
G	Gravel
GP	Poorly-graded gravel and sand
GW	Well-graded gravel and sand
LGO	Little Goose
LM	Lower Monumental
M-C	Medium and Course
ML	Sandy silt
No rec	No sample recovery
P	Standard Ponar Grab Sampler used
S	Shipek Bottom Sampler used
SM	Silty-sand (fine sand)
SP	Poorly graded (fine-medium)

Appendix A—Sediment Zone/Sample Location Maps

These maps illustrate the location of each sediment zone, and for those zones that are irregularly shaped, the individual sampling locations are labeled. Unless otherwise noted on the maps, the location of the individual samples within each zone are relatively evenly spaced across the river from right bank to left bank beginning with sample -1 at the right bank. The location of the individual samples noted on the map were estimated in the field. Refer to the GPS coordinates listed in the particle size distribution data tables to find the exact location of each sample.

Particle Size Data

McNary

SEDIMENT PARTICLE SIZE SAMPLING DATA

LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

McNARY RESERVOIR

PARTICLE SIZE DISTRIBUTION - PERCENTAGE OF TOTAL SAMPLE BY WEIGHT

USCOE LOCATION				USCOE	Field Notes	Gravel	Very Fine Gravel	Very Course Sand	Course Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay		
WGS-84		WA State Plane				*Captured by No. 5 Sieve*	*Through No. 5 Sieve*	*Through No. 10 Sieve*	*Through No. 18 Sieve*	*Through No. 35 Sieve*	*Through No. 60 Sieve*	*Through No. 120 Sieve*	*Through No. 230 Sieve*		Sample
Latitude	Longitude	Easting	Northing	Sample ID#	Sample ID#	>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm	0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	Total %	not Sieved
46.2051	119.0348	2,371,246	321,414	MCN1.1-1	BIH1-1	0%	0%	0%	4%	25%	33%	18%	20%	100%	
46.2046	119.0341	2,371,426	321,232	MCN1.1-2	BIH1-2										1
46.2045	119.0341	2,371,424	321,171	MCN1.1-2	BIH1-2										1
46.2042	119.0328	2,371,757	321,075	MCN1.1-3	BIH1-3										1
46.2038	119.0315	2,372,076	320,928	MCN1.1-4	BIH1-4										1
46.2038	119.0314	2,372,123	320,957	MCN1.1-4	BIH1-4										1
46.2037	119.0302	2,372,423	320,912	MCN1.1-5	BIH1-5										1
46.2035	119.0289	2,372,753	320,857	MCN1.1-6	BIH1-6										1
46.2034	119.0283	2,372,900	320,801	MCN1.1-7	BIH1-7	0%	0%	0%	1%	81%	20%	1%	0%	103%	
46.2034	119.0275	2,373,104	320,814	MCN1.1-8	BIH1-8	0%	0%	0%	0%	6%	48%	41%	6%	100%	
46.2252	119.0111	2,377,092	328,850	MCN3.0-1	BIH2-1										1
46.2251	119.0111	2,377,105	328,803	MCN3.0-1	BIH2-1										1
46.2249	119.0111	2,377,108	328,729	MCN3.0-1	BIH2-1										1
46.2246	119.0087	2,377,710	328,627	MCN3.0-2	BIH2-2	0%	0%	0%	0%	7%	81%	11%	1%	100%	
46.2246	119.0087	2,377,718	328,634	MCN3.0-2	BIH2-2										1
46.2242	119.0082	2,377,856	328,500	MCN3.0-3	BIH2-3	89%	0%	0%	0%	8%	3%	0%	0%	101%	
46.2243	119.0082	2,377,847	328,537	MCN3.0-3	BIH2-3										1
46.2235	119.0082	2,377,843	328,221	MCN3.0-4	BIH2-4										1
46.2230	119.0073	2,378,077	328,064	MCN3.0-5	BIH2-5	96%	0%	0%	0%	3%	0%	0%	0%	99%	
46.2215	119.0089	2,377,687	327,510	MCN3.0-6	BIH2-6										1
46.2214	119.0073	2,378,091	327,485	MCN3.0-7	BIH2-7										1
46.2391	118.9803	2,384,808	334,050	MCN4.5-1	BIH3-1										1
46.2391	118.9803	2,384,807	334,053	MCN4.5-1	BIH3-1										1
46.2384	118.9797	2,384,963	333,816	MCN4.5-2	BIH3-2	97%	0%	0%	1%	1%	0%	0%	0%	99%	
46.2381	118.9797	2,384,954	333,683	MCN4.5-3	BIH3-3										1
46.2375	118.9795	2,385,004	333,481	MCN4.5-4	BIH3-4										1
46.2370	118.9792	2,385,099	333,278	MCN4.5-5	BIH3-5										1

USCOE LOCATION				USCOE	Field Notes	Gravel	Very Fine Gravel	Very Course Sand	Course Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay		
WGS-84		WA State Plane				*Captured by*	*Through*	*Through*	*Through*	*Through*	*Through*	*Through*	*Through*		
Latitude	Longitude	Easting	Northing	Sample ID#	Sample ID#	*No. 5 Sieve*	*No. 5 Sieve*	*No. 10 Sieve*	*No. 18 Sieve*	*No. 35 Sieve*	*No. 60 Sieve*	*No. 120 Sieve*	*No. 230 Sieve*	Total %	Sample not Sieved
						>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm	0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm		
46.2364	118.9789	2,385,193	333,074	MCN4.5-6	BIH3-6										1
46.2358	118.9785	2,385,286	332,870	MCN4.5-7	BIH3-7										1
46.2353	118.9781	2,385,379	332,666	MCN4.5-8	BIH3-8										1
46.2349	118.9772	2,385,610	332,550	MCN4.5-9	BIH3-9										1

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 09:48 e:\cd1\img0001.bmp

CD #: 1 CD Photo #: 1 Roll #: 1 Neg. #: 1 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	321232	2371426	46.2046	119.0341

Sediment Zone: MCN1.1 COE SID#: MCN1.1-2 CH SID#: BIH1-2

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 09:48

e:\cd1\img0002.bmp

CD #: 1 CD Photo #: 2 Roll #: 1 Neg. #: 2 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☑ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	321232	2371426	46.2046	119.0341

Sediment Zone: MCN1.1

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 09:48 e:\cd1\img0003.bmp

CD #: 1 CD Photo #: 3 Roll #: 1 Neg. #: 3 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☑ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	321232	2371426	46.2046	119.0341

Sediment Zone: MCN1.1

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 09:48 e:\cd1\img0004.bmp

CD #: 1 CD Photo #: 4 Roll #: 1 Neg. #: 4 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☑ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

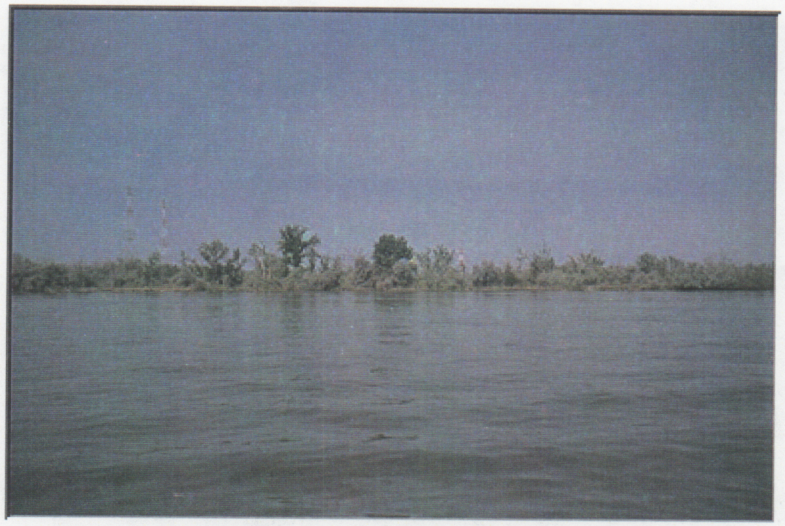
Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	321232	2371426	46.2046	119.0341

Sediment Zone: MCN1.1

Description: Photo used for referencing sample location



Date & Time Taken: 05/11/97 09:48 e:\cd1\img0005.bmp

CD #: 1 CD Photo #: 5 Roll #: 1 Neg. #: 5 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☑ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:

Northing	Easting	Latitude	Longitude
321232	2371426	46.2046	119.0341

Sediment Zone: MCN1.1

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 09:59 e:\cd1\img0006.bmp

CD #: 1 CD Photo #: 6 Roll #: 1 Neg. #: 6 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	321075	2371757	46.2042	119.0328

Sediment Zone: MCN1.1 COE SID#: MCN1.1-3 CH SID#: BIH1-3

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 10:04 e:\cd1\img0007.bmp

CD #: 1 CD Photo #: 7 Roll #: 1 Neg. #: 7 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Ponar ☐ Other

☐ Composite ☐ Sectioned

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	320957	2372123	46.2038	119.0314

Sediment Zone: MCN1.1 COE SID#: MCN1.1-4 CH SID#: BIH1-4

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 10:09 e:\cd1\img0008.bmp

CD #: 1 CD Photo #: 8 Roll #: 1 Neg. #: 8 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Ponar ☐ Other

☐ Composite ☐ Sectioned

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	320912	2372423	46.2037	119.0302

Sediment Zone: MCN1.1 COE SID#: MCN1.1-5 CH SID#: BIH1-5

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	Total %

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 10:13 e:\cd1\img0009.bmp

CD #: 1 CD Photo #: 9 Roll #: 1 Neg. #: 9 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Ponar ☐ Other

☐ Composite ☐ Sectioned

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	320857	2372753	46.2035	119.0289

Sediment Zone: MCN1.1 COE SID#: MCN1.1-6 CH SID#: BIH1-6

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 11:57 e:\cd1\img0010.bmp

CD #: 1 CD Photo #: 10 Roll #: 1 Neg. #: 10 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	328537	2377847	46.2243	119.0082

Sediment Zone: MCN3.0 COE SID#: MCN3.0-3 CH SID#: BIH2-3

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 12:02 e:\cd1\img0011.bmp

CD #: 1 CD Photo #: 11 Roll #: 1 Neg. #: 11 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	328221	2377843	46.2235	119.0082

Sediment Zone: MCN3.0 COE SID#: MCN3.0-4 CH SID#: BIH2-4

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	Total %

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 12:22 e:\cd1\img0016.bmp

CD #: 1 CD Photo #: 16 Roll #: 2 Neg. #: 3 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☑ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:

Northing	Easting	Latitude	Longitude
328221	2377843	46.2235	119.0082

Sediment Zone: MCN3.0

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 12:22 e:\cd1\img0017.bmp

CD #: 1 CD Photo #: 17 Roll #: 2 Neg. #: 4 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☑ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

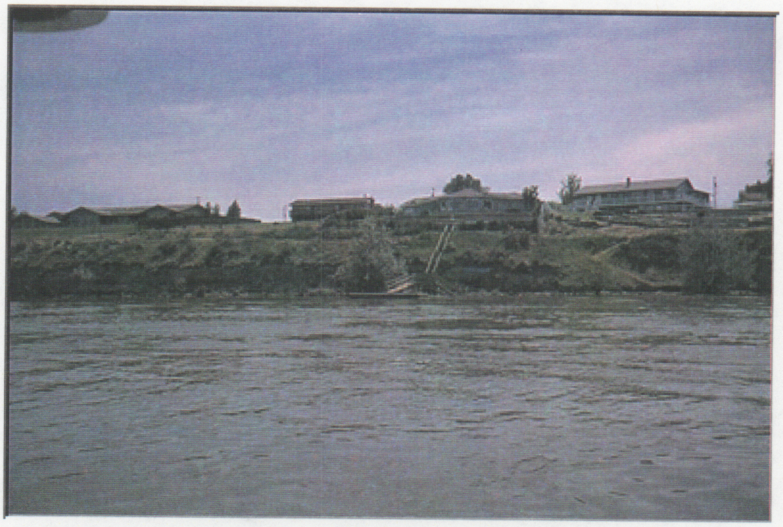
Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	328221	2377843	46.2235	119.0082

Sediment Zone: MCN3.0

Description: Photo used for referencing sample location



Date & Time Taken: 05/11/97 12:22 e:\cd1\img0018.bmp

CD #: 1 CD Photo #: 18 Roll #: 2 Neg. #: 5 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☑ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	328221	2377843	46.2235	119.0082

Sediment Zone: MCN3.0

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 12:22 e:\cd1\img0019.bmp

CD #: 1 CD Photo #: 19 Roll #: 2 Neg. #: 6 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☑ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	328221	2377843	46.2235	119.0082

Sediment Zone: MCN3.0

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 12:22 e:\cd1\img0014.bmp

CD #: 1 CD Photo #: 14 Roll #: 2 Neg. #: 1 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	327510	2377687	46.2215	119.0089

Sediment Zone: MCN3.0 COE SID#: MCN3.0-6 CH SID#: BIH2-6

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	Total %

Description: Sample

Date & Time Taken: 05/11/97 12:22 e:\cd1\img0015.bmp

CD #: 1 CD Photo #: 15 Roll #: 2 Neg. #: 2 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:

Northing	Easting	Latitude	Longitude
327510	2377687	46.2215	119.0089

Sediment Zone: MCN3.0 COE SID#: MCN3.0-6 CH SID#: BIH2-6

Particle Size Distribution - Percentage of Total Sample by Weight

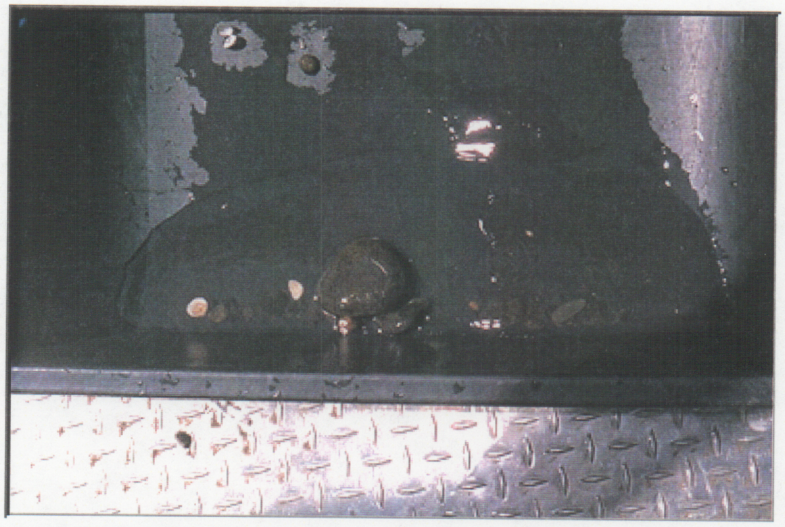
>= Gravel Captured by No. 5 Sieve	***Very Fine Gravel Through No. 5 Sieve***	***Very Coarse Sand Through No. 10 Sieve***	***Coarse Sand Through No. 18 Sieve***
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	***Fine Sand Through No. 60 Sieve***	***Very Fine Sand Through No. 120 Sieve***	***Silt Clay Through No. 230 Sieve***	***Total %***
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample



Date & Time Taken: 05/11/97 12:27 e:\cd1\img0020.bmp

CD #: 1 CD Photo #: 20 Roll #: 2 Neg. #: 7 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	327485	2378091	46.2214	119.0073

Sediment Zone: MCN3.0 COE SID#: MCN3.0-7 CH SID#: BIH2-7

Particle Size Distribution - Percentage of Total Sample by Weight

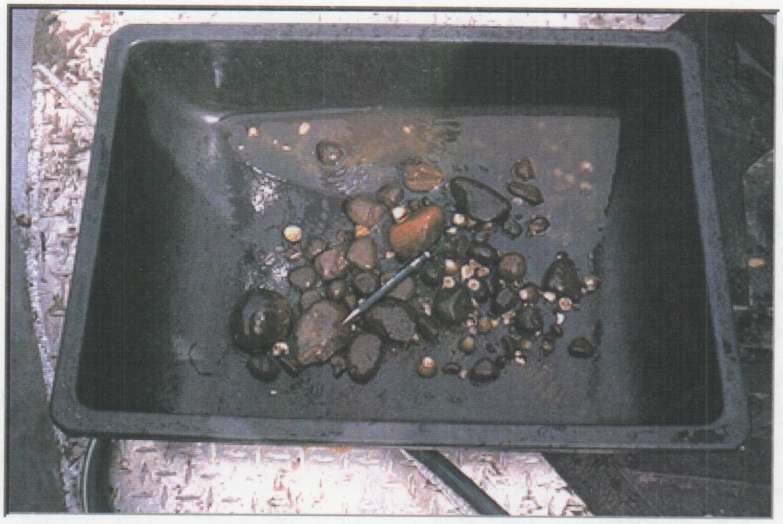
>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample



Date & Time Taken: 05/11/97 14:20 e:\cd1\img0021.bmp

CD #: 1 CD Photo #: 21 Roll #: 2 Neg. #: 8 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Ponar ☐ Other

☐ Composite ☐ Sectioned

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	334053	2384807	46.2391	118.9803

Sediment Zone: MCN4.5 COE SID#: MCN4.5-1 CH SID#: BIH3-1

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 14:36 e:\cd1\img0022.bmp

CD #: 1 CD Photo #: 22 Roll #: 2 Neg. #: 9 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	333683	2384954	46.2381	118.9797

Sediment Zone: MCN4.5 COE SID#: MCN4.5-3 CH SID#: BIH3-3

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 14:44 e:\cd1\img0023.bmp

CD #: 1 CD Photo #: 23 Roll #: 2 Neg. #: 10 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Ponar ☐ Other

☐ Composite ☐ Sectioned

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	333481	2385004	46.2375	118.9795

Sediment Zone: MCN4.5 COE SID#: MCN4.5-4 CH SID#: BIH3-4

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 14:55 e:\cd1\img0026.bmp

CD #: 1 CD Photo #: 26 Roll #: 2 Neg. #: 13 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☑ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	333481	2385004	46.2375	118.9795

Sediment Zone: MCN4.5

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 14:55

e:\cd1\img0027.bmp

CD #: 1 CD Photo #: 27 Roll #: 2 Neg. #: 14 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	333481	2385004	46.2375	118.9795

Sediment Zone: MCN4.5

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 14:55 e:\cd1\img0028.bmp

CD #: 1 CD Photo #: 28 Roll #: 2 Neg. #: 15 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☑ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	333481	2385004	46.2375	118.9795

Sediment Zone: MCN4.5

Description: Photo used for referencing sample location

Date & Time Taken: 05/11/97 14:55 e:\cd1\img0029.bmp

CD #: 1 CD Photo #: 29 Roll #: 2 Neg. #: 16 Nav. Chart #: S-01

Equipment Sample Type

☐ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other

☐ Left Bank* ☑ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

No Sample Sieved

General Location:	Northing	Easting	Latitude	Longitude
	333481	2385004	46.2375	118.9795

Sediment Zone: MCN4.5

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 14:48 e:\cd1\img0024.bmp

CD #: 1 CD Photo #: 24 Roll #: 2 Neg. #: 11 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Composite ☐ Sectioned

☐ Ponar ☐ Other

Photo Location

Photo Orientation ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	332666	2385379	46.2353	118.9781

Sediment Zone: MCN4.5 COE SID#: MCN4.5-8 CH SID#: BIH3-8

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm

Medium Sand Through No. 35 Sieve	Fine Sand Through No. 60 Sieve	Very Fine Sand Through No. 120 Sieve	Silt-Clay Through No. 230 Sieve	Total %
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm	

SEDIMENT PARTICLE SIZE SAMPLING DATA
LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY

Contract#: DACW68-94-D-0006 Author: CH2M Hill, Inc. Delivery Order No.: 17

Description: Sample

Date & Time Taken: 05/11/97 14:55 e:\cd1\img0025.bmp

CD #: 1 CD Photo #: 25 Roll #: 2 Neg. #: 12 Nav. Chart #: S-01

Equipment Sample Type

☑ Shipek ☐ Core ☐ Ponar ☐ Other

☐ Composite Sectioned

Photo Location

Photo Orientation: ☐ Up Stream ☐ Down Stream ☐ Other ☐ Left Bank* ☐ Right Bank*

*Left Bank/Right Bank designation always oriented in the downstream direction.

Sample Data

Sample Sieved

Sample Location:	Northing	Easting	Latitude	Longitude
	332550	2385610	46.2349	118.9772

Sediment Zone: MCN4.5 COE SID#: MCN4.5-9 CH SID#: BIH3-9

Particle Size Distribution - Percentage of Total Sample by Weight

>= Gravel Captured by No. 5 Sieve	Very Fine Gravel Through No. 5 Sieve	Very Coarse Sand Through No. 10 Sieve	Coarse Sand Through No. 18 Sieve
>4 mm	2 - 4 mm	1 - 2 mm	0.5 - 1 mm
Medium Sand Through No. 35 Sieve	**Fine Sand Through No. 60 Sieve**	**Very Fine Sand Through No. 120 Sieve**	**Silt Clay Through No. 230 Sieve**
0.25 - 0.5 mm	0.125 - 0.25 mm	0.062 - 0.125 mm	<0.062 mm

Total %