APPENDIX C

SEDIMENT SAMPLING ACTIVITIES - FIELD SUMMARY REPORTS AND TECHNICAL MEMORANDA
APPENDIX C-1

FIELD REPORT
SEDIMENT SAMPLING ACTIVITIES FOR THE
ASSESSMENT OF SEDIMENT TOXICITY TO
WHITE STURGEON
JUNE 22 – 27, 2010
Upper Columbia River

Field Report
Sediment Sampling Activities for the Assessment of Sediment Toxicity to White Sturgeon
June 22 - 27, 2010

Prepared for:
Teck American Incorporated
501 N. Riverpoint Boulevard, Suite 300
Spokane, Washington 99202

Prepared by:
URS Corporation
920 N. Argonne Road, Suite 300
Spokane, Washington 99212

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URS Project No. 36310061
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<td>Colville Confederated Tribes</td>
</tr>
<tr>
<td>cfs</td>
<td>cubic feet per second</td>
</tr>
<tr>
<td>CB</td>
<td>China Bend - Sampling Location</td>
</tr>
<tr>
<td>COPC</td>
<td>contaminants of potential concern</td>
</tr>
<tr>
<td>DME</td>
<td>Deadmans Eddy – Sampling Location</td>
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<td>ELS</td>
<td>early life stages (white sturgeon)</td>
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<td>Ecology</td>
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<tr>
<td>EPA</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Gravity</td>
<td>Gravity Environmental, LLC</td>
</tr>
<tr>
<td>HAZWOPER</td>
<td>Hazardous Waste Operations and Emergency Response</td>
</tr>
<tr>
<td>HDPE</td>
<td>high density polyethylene</td>
</tr>
<tr>
<td>IDW</td>
<td>investigation derived wastes</td>
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<tr>
<td>LD</td>
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<td>Lower Marcus Flats – Sampling Location</td>
</tr>
<tr>
<td>NP</td>
<td>Northport – Sampling Location</td>
</tr>
<tr>
<td>NPS</td>
<td>National Park Service, U.S. Department of the Interior</td>
</tr>
<tr>
<td>QAPP</td>
<td>Quality Assurance Project Plan for the Assessment of Sediment Toxicity to White Sturgeon</td>
</tr>
<tr>
<td>RI/FS</td>
<td>remedial investigation/feasibility study</td>
</tr>
<tr>
<td>RM</td>
<td>river mile</td>
</tr>
<tr>
<td>RV</td>
<td>research vessel</td>
</tr>
<tr>
<td>SOPs</td>
<td>standard operating procedures</td>
</tr>
<tr>
<td>Teck</td>
<td>Teck American Incorporated</td>
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<tr>
<td>UCR</td>
<td>Upper Columbia River</td>
</tr>
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<td>UMF</td>
<td>Upper Marcus Flats - Sampling Location</td>
</tr>
<tr>
<td>UTM</td>
<td>Universal Transverse Mercator, North American Datum 1983 (NAD 83)</td>
</tr>
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1 INTRODUCTION

1.1 PROJECT BACKGROUND

This document presents a summary report for field sediment sampling conducted by URS Corporation (URS) under the Quality Assurance Project Plan for the Assessment of Sediment Toxicity to White Sturgeon (“the study”, QAPP, May 2010, Amended June 2010). This work was conducted as part of the Upper Columbia River (UCR) (the Site) Remedial Investigation and Feasibility Study (RI/FS) on behalf of Teck American Incorporated (Teck). Primary objectives of the RI/FS are to investigate the nature and extent of unacceptable risk at the Site, to provide information to support baseline risk assessments for human health (to be completed by the U.S. Environmental Protection Agency [EPA]) and the environment (to be completed by Teck); and to develop and evaluate potential remedial alternatives for the Site.

The QAPP presented the approach and rationale for conducting a study to assess the toxicity of contaminants of potential concern (COPCs) associated with granulated slag from sediments in the UCR to early life stages (ELS) of white sturgeon. Data obtained during this work will be used in the baseline ecological risk assessment and overall RI/FS. Sediment toxicity to ELS of white sturgeon will be evaluated using field collected sediments from areas hypothesized and confirmed as suitable white sturgeon habitat, and containing a range of slag-related COPC concentrations.

During the sediment field sampling program, samples were collected at four primary and two alternate sampling locations spatially distributed along the UCR, in accordance with the QAPP. The following report presents the scope of work, collection procedures and methodologies, and summary of the below-water sediment sampling program conducted.

1.2 SITE DESCRIPTION

The sampling program consisted of collecting below-water sediment samples from within four primary and two alternate locations as defined by the QAPP. Primary locations include: Lower Marcus Flats, Upper Marcus Flats, China Bend, and Deadmans Eddy. Alternate locations include Northport and Little Dalles.

Each of the four primary and two alternate locations includes three separate stations with center position Easting and Northing coordinates provided by the QAPP using the Universal Transverse Mercator (UTM) system using Zone 11 of the 1983 North American Datum (NAD83) data set. Each of the three stations within each location consisted of a 20-meter (66-foot) diameter sample area around the station center coordinate. General sampling locations and stations are described below and are illustrated on Map 1.

Each of the three stations within the six locations was assigned a suffix consisting of the sequential numbers 1 through 3, as defined below.
• **Lower Marcus Flats (LMF).** UMF is a primary sampling location positioned approximately at river mile (RM) 705, consisting of the following three stations:
  
  LMF-01 - Easting 419566.598, Northing 5389522.361  
  LMF-02 - Easting 418470.318, Northing 5390165.566  
  LMF-03 - Easting 418534.187, Northing 5389414.844  

• **Upper Marcus Flats (UMF).** UMF is a primary sampling location positioned approximately at RM 707 consisting of the following three stations:
  
  UMF-01 - Easting 422651.955, Northing 5391668.047  
  UMF-02 - Easting 420593.484, Northing 5390655.659  
  UMF-03 - Easting 420027.511, Northing 5392090.602  

• **China Bend (CB).** CB is a primary sampling location positioned approximately at RM 725 consisting of the following three stations:
  
  CB-01 - Easting 431604.246, Northing 5407646.304  
  CB-02 - Easting 432120.704, Northing 5408773.751  
  CB-03 - Easting 431112.592, Northing 5407574.889  

• **Deadmans Eddy (DME).** DME is a primary sampling location positioned approximately at RM 737 consisting of the following three stations:
  
  DME-01 - Easting 446405.316, Northing 5420949.545  
  DME-02 - Easting 446795.613, Northing 5420448.714  
  DME-03 - Easting 446288.597, Northing 5420740.789  

• **Northport (NP).** NP is an alternate sampling location positioned approximately at RM 735, and was selected in the event that primary sampling stations were not capable of providing competent samples. The following three alternate stations within NP include:
  
  NP-01 - Easting 443442.450, Northing 5419135.820  
  NP-02 - Easting 444108.470, Northing 5419838.750  
  NP-03 - Easting 443302.500, Northing 5419361.440
• **Little Dalles (LD).** LD is an alternate sampling location positioned approximately at river mile 729 and was selected in the event that primary sampling stations were not capable of providing competent samples. The following three alternate stations within LD include:

  LD-01 - Easting 435417.180, Northing 5412544.520
  LD-02 - Easting 436606.680, Northing 5413599.700
  LD-03 - Easting 438123.570, Northing 5414445.120

Station coordinates were initially provided in the May 2010 QAPP and with the exception of four remain unchanged. Based on additional technical input, four station coordinates (CB-02, CB-03, LMF-03, and LD-3) were changed and the locations re-issued in the June 2010 QAPP Addendum. For the purposes of this effort, the four modified stations were considered “abandoned”. Map 1 illustrates the locations of the abandoned stations in reference to the new stations.

1.3 SAMPLING OVERVIEW

As outlined in the QAPP, 10 grab samples consisting of one 5-gallon high density polyethylene (HDPE) container each were to be collected from the 12 primary stations (three stations at each of the four primary locations). Six additional stations from within the two alternate locations (NP and LD) were selected for sampling if primary station sample conditions precluded or limited competent sample collection based on rejection criteria under QAPP Standard Operating Procedure No. 4 Below-Water Grab Sampling Procedures (SOP-4). The QAPP provided for collection of 120 containers (i.e., 5-gallon HDPE containers) from primary stations: 12 stations with 10 grab sample containers per station; or from the alternate locations to meet the sediment volume target, if necessary.

During the 2010 sediment sampling program, a total of 59 samples were collected from primary and alternate locations (Tables 1 through 6). The sampling program started on June 22, 2010 and was completed on June 27, 2010.

URS provided a field crew consisting of two geologists and one registered professional archaeologist. The field crew was responsible for completing, monitoring, and documenting the sampling process, physical descriptions of samples and conditions, and general observations.

Gravity Environmental LLC (Gravity) provided the sampling boat, the Research Vessel (RV) Palouse, from which all sampling activities were completed. In addition, Gravity provided an additional vessel (RV Monarch) under subcontract to Columbia Navigation, Inc. for safety and support of the sampling crew, and transporting technical and cultural resources observers (i.e., oversight).
1.4 CULTURAL RESOURCES

In accordance with the protocols outlined in Appendix E, Cultural Resources Coordination Plan, of the approved QAPP, a cultural resources monitor was present throughout the duration of the below-water sediment sampling program. Teck contracted with URS to provide a professional archaeologist meeting the Secretary of Interior’s Professional Qualification Standards (as outlined in 36 CFR Part 61) to be present in the event that cultural resources were encountered during sediment removal. In addition, the National Park Service (NPS) provided cultural resources personnel when sediment sampling occurred within the jurisdiction of the Lake Roosevelt National Recreation Area.

The monitoring archaeologist(s) visually examined each sample as it was released from the Power Grab Sampler and again when the sediment was manually transferred from the Lexan tub to the 5-gallon HDPE containers. No cultural resources were identified during the sampling program. The report summarizing archaeological monitoring is presented in Appendix A of this report.

1.5 TECHNICAL OVERSIGHT AND OBSERVERS

During sampling, various technical observers joined the field sampling team to monitor the sampling procedures. Observers included hydrogeologists, archaeologists, and other technical personnel representing EPA and the participating parties. During all times, observers were provided the opportunity to ask questions of the URS field lead, assistant field lead, and archaeologist; and to participate in open dialogue regarding the sampling procedures relative to the QAPP. A daily attendance record is provided in Appendix B. The following is a summary list of on-boat observers:

<table>
<thead>
<tr>
<th>Observer</th>
<th>Organization</th>
<th>Representing</th>
</tr>
</thead>
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<tr>
<td>Jon Edwards</td>
<td>NPS</td>
<td>NPS</td>
</tr>
<tr>
<td>Jim Retzer</td>
<td>NPS</td>
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</tr>
<tr>
<td>Jonathan Riehn</td>
<td>NPS</td>
<td>NPS</td>
</tr>
<tr>
<td>Craig Christian</td>
<td>Environment International</td>
<td>Colville Confederated Tribes and Washington Department of Ecology</td>
</tr>
<tr>
<td>Marcella Ripich</td>
<td>CH2M Hill</td>
<td>EPA</td>
</tr>
<tr>
<td>Nichole Badon</td>
<td>CH2M Hill</td>
<td>EPA</td>
</tr>
</tbody>
</table>

A NPS archaeologist was on-board the RV Palouse at all times during sampling within the Lake Roosevelt National Recreation Area jurisdiction. Other technical observers were on-board the RV Monarch. Depending on river conditions and safety requirements, the RV Monarch would moor to the RV Palouse or remain motorized within a safe observational distance from the RV Palouse. Decisions regarding the monitoring safety and boat maneuvers were decided by the respective boat captains.
2 SCOPE OF WORK AND SAMPLING METHODOLOGY

This work was implemented under the SOPs, listed in Appendix C of the QAPP (Teck 2010). The SOPs provide guidance and instructions on boat positioning, field documentation, below-water grab sampling procedures, sample labeling and management, equipment decontamination, and chain-of-custody protocols.

2.1 SCOPE OF WORK

The primary locations (LMF, UMF, CB, and DME) were first visited to collect samples. The alternate locations (LD and NP) were subsequently visited in an attempt to fulfill the sample volume requirements, as necessary.

The scope of work for the sediment sampling program included:

- Coordinating and scheduling the field sampling program with Teck, subcontractors, and technical observers or representatives from the various government agencies and participating parties.
- Obtaining and decontaminating 5-gallon HDPE containers, sampling equipment, materials, and supplies, monitoring equipment such as cameras, hand-held global positioning system (GPS) units, and decontamination supplies per the QAPP.
- Preparation of a project-specific Health and Safety Plan for URS and subcontractors.
- Obtaining and/or preparing field documentation, such as field sample logs, chain-of-custodies, field record notebooks, and related location and station coordinate references for field use.
- Mobilizing equipment, boats and sampling teams to the field.
- Conducting a daily review of sample procedures, boat operations, and health and safety protocols during each morning meeting prior to field activities.
- Collecting daily attendance records and health and safety signature acceptance from each of the participants (Appendix B).
- Conducting station sampling and recording pertinent field data as outlined in the QAPP.
- Transferring of sediment samples at the completion of each day’s field activities to representatives of the University of Saskatchewan Environmental Toxicology Center using chain-of-custody protocols outlined in the QAPP.
2.2 SAMPLING METHODOLOGY

This section describes the general methods used for sampling at each station of the four primary and two alternate locations. Site-specific observations and methods are discussed in Section 3.

2.2.1 SAMPLE LABELING

The sampling identification and labeling was derived from SOP-5. As previously referenced, each location was assigned an abbreviation (e.g., Little Marcus Flats was abbreviated to LMF). Tables 1 through 6 and Appendix C provide the sample labeling matrix based on the following description.

Each of the three stations at each of the six primary and alternate locations (LMF, UMF, CB, DME, NP, and LD) was assigned a suffix representing the 18 individual stations. For example, the three stations at LMF were labeled with sequential station numbers LMF-01 through LMF-03 (also referenced in Section 1.2 above). The three stations at each of the six primary and alternate locations were also assigned a sediment sample number SD0001 to SD0018, representing the 18 stations.

A separate sample identification matrix was also employed to label individual grab samples or aliquots. A unique sample identifier was assigned to each of the ten grab samples or aliquots for each of the three stations at the six locations. This unique sample identifier was comprised of three codes representing the location (e.g., LMF), the station number within that location (LMF-01), and a three digit sequential number for each of the 10 grab samples per station. For example, station LMF-01 consisted of ten grab samples which were labeled LMF-01-001 to LMF-01-010. Each grab sample consisted of the sample matrix contained in a single 5-gallon HDPE container. For reference, the 10 grab samples (containers) at LMF-01-001 to LMF-01-010 to be composited by the laboratory from station LMF-01 were also labeled under the common sample number SD0001.

The unique sample identifier was only used to provide a specific reference to the individual grab samples. This number was recorded on the daily field logs (Appendix C), but was not recorded on the chain of custodies.

In addition to the unique sample identifier, each of the 5-gallon HDPE containers was assigned a specific sequential container tag number. The container tag number consisted of the letter “T” followed by a sequential three digit number for each 5-gallon HDPE container. The container tag numbers ranged from T001 through T180. For reference, each unique sample identifier was linked to a specific container tag number. With 18 stations and ten grab samples or aliquots per station, there were up 180 individual container tag numbers required for the project. For example, the first of ten grab samples for sample number SD0001 at station LMF-01 was assigned the unique identifier LMF-01-001 and placed into a single 5-gallon HDPE container labeled T001. Tables 1 through 6 provide a complete summary of the correlating tag number with the respective station sample number and individual unique sample identifier.
The chain-of-custodies were completed with the station sample number (e.g., SD0001) and the container tag numbers, segregated by station on individual forms. For example, sample number SD0001 (from station LMF-01) consisted of ten container tag numbers T001 through T010.

2.2.2 DECONTAMINATION

Decontamination of field sampling equipment ensures sample integrity and minimizes cross-contamination during sample handling. Decontamination methods followed those outlined in SOP-8 (Appendix C of the QAPP). The following decontamination procedures were used for field equipment, including the pneumatic-operated stainless steel Power Grab Sampler (provided by Gravity), Lexan collection tubs and sample scoops, and 5-gallon HDPE containers:

- The 5-gallon HDPE containers and Lexan sample scoops were wrapped and sealed in plastic wrap prior to transport to the field.

- All sample equipment and the 5-gallon HDPE containers were decontaminated prior to sample collection at each of the stations. The decontamination procedure included spraying with a dilute Liquinox™ solution, followed by washing and scrubbing using a plastic brush with rigid bristles on the inside and outside surfaces. The wash procedure was followed by a de-ionized water rinse and plastic brush scrub. The sampling equipment was then rinsed with a dilute acid solution (5% nitric acid), followed by another de-ionized water rinse.

Decontamination rinse of the Power Grab Sampler using de-ionized water

- Decontamination fluids or investigation derived wastes (IDW) were collected into a plastic tub placed below the Power Grab Sampler and sampling equipment. The IDW was then transferred to a sealed container for waste management protocols.
The IDW container was labeled with information on the contents, dates, and URS contact information. IDW was transported to shore and managed off-site.

2.2.3 SAMPLING COLLECTION METHODS AND PROTOCOLS

Sampling methods and protocols used were defined in SOP-1 through SOP-6 and SOP-8 of the QAPP. The SOPs were developed is to ensure that high quality representative samples were collected.
**Boat Positioning at Sample Stations.** Accurate station positioning is required to help ensure quality and consistency in collecting samples and in data interpretation and analysis. The sample boat RV Palouse was maneuvered to the best of the captain’s ability to the center of the individual station GPS coordinates provided in the Amended QAPP (June 2010). Nobeltec™ marine navigation software and GPS antenna connected to a Panasonic Toughbook™ laptop was employed by the RV Palouse captain to manage the boat position.

Cabin view of GPS system used for navigation and station positioning
The GPS antenna was located on the top of the boat’s forward boom, directly over the Power Grab Sampler.

Several methods were employed by the Gravity boat captain to maintain navigation and sample collection positioning within the 20-meter (66-foot) diameter station.

- The boat captain maintained position within the station perimeter under power when slack water, eddy or slow river currents allowed for safe maneuvering; or river bottom composition prevented anchoring (e.g., cobbles and boulders).
- The boat captain set fore and aft anchors when slow to moderate river currents or other conditions required a more stable and safe position for sampling. The two anchor lines were alternately lengthened or shortened to move the boat within the station.
- The boat captain set a buoy to establish the center of the station coordinate or the edge of the 10-meter radius upstream of the station coordinate center when moderate to swift river currents and river bottom composition precluding safe anchorage.

**Sample collection.** The boat captain maneuvered the boat to the station and/or buoy marker, and then signaled the crew to lower the Power Grab Sampler. The Power Grab Sampler was lowered to the river bottom at an approximate rate of 30 centimeters per second (cm/sec) [one foot per second (ft/sec)]. Upon contact with the river bottom, the pneumatic-powered Power Grab Sampler was activated to close the clam-shell sides and collect the sediment sample.
The Power Grab Sampler was then raised to the surface at an approximate rate of 30 cm/sec (one ft/sec) and maneuvered over the deck using the boom. The Power Grab Sampler was then inspected by URS personnel for acceptability per the criteria provided in SOP-4.

Grab samples not meeting the criteria as detailed within SOP-4 were rejected and the steps repeated until a competent sample was collected. The deployments were completed within the station coordinate area of 20 meters (66 feet). A minimum of three attempts were made at each station based on the SOP-4 criteria. If the sample criteria were not met after three or more attempts, then the sampling was discontinued for that station.
Based on the 5-gallon sample volume, two to three Power Grab Sampler collections were required to fill the HDPE container.

**Sample documentation.** The sediment in the interior of the Power Grab Sampler was examined per SOP-4 after being maneuvered over the deck. If accepted, the sample was released into the Lexan tub and visual observations recorded using a station-specific field log. Each log was labeled with the location (e.g., DME), station (e.g., 01 through 03), grab sample number (e.g., 001 through 010), unique sample identifier (e.g., DME-01-010), and sequential container tag number (e.g., T001).

Photographs were taken of the grab samples and identified within the photographic record using a white board with date, time, station container tag number (e.g., T001), and field status (as applicable). Photographs for the samples and processes are provided in Appendix D.

Monitoring observations recorded for each sample included: physical characteristics such as color, textural classification (visual/manual method), visible organic matter, obvious abnormalities, sample penetration, presence or absence of cultural resources, boat and sampler information, sample date and time, and photographic directory and file name.

The grab sample UTM coordinates were obtained using two hand-held GPS units located in the RV Palouse cabin. The GPS readings were recorded when the Nobletec™ system positioning indicated the boat was within the coordinate boundary. River depths were recorded from the RV Palouse fathometer. Copies of the sediment field logs for the four primary and the two alternate location stations are provided in Appendix C.

Sediment was transferred from the Lexan tub to the grab sample 5-gallon HDPE container using a Lexan scoop. The HDPE container would be filled and the surface covered with residual river water from the Lexan tub. Each 5-gallon HDPE container was labeled on the lid and side with information on the date, time, sample number, container number, and sampler name.
The 5-gallon HDPE container lids were self-sealing, water and air-tight, and tamper-resistant. The lids are designed to only allow access through cutting the lip edge at several places with a knife or cutters, removing a tab encircling the lid’s circumference, and pulling upward.

Grab samples not meeting the criteria were temporarily placed in a separate tub until the station sampling was completed. Rejected materials were then placed back into the river at the approximate point of collection.

Field notes, observations, and activities were also documented using an environmental field notebook. A copy of the environmental field notebook is provided in Appendix E.

The URS registered professional archaeologist and other cultural resources technical observers observed the individual grab samples for evidence of potential cultural resources. Refer to Appendix A for a detailed summary of on-site cultural observations and records.

**Sample Handling and Chain-of-Custody Protocol.** At the close of the day’s sampling efforts, the grab sample containers were transported to shore and transferred to the boat dock to University of Saskatchewan personnel. The grab sample containers were placed into a refrigerated truck provided by the university. The refrigerated truck door was then closed and sealed with a keyed lock. A daily chain-of-custody was prepared for samples and signed by the URS sampler and the university representative. Copies of the chain-of-custodies are provided in Appendix F.
2.3 HEALTH AND SAFETY

All technical observers read and signed the UCR General Health and Safety Plan (August 25, 2009). URS personnel and subcontractors read and signed the URS project-specific Site Health and Safety Plan (May 10, 2010) for the UCR sediment sampling project. URS and subcontractor field personnel employed on this project have taken the Occupational Safety and Health Administration 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and were current on 8-hour HAZWOPER refresher training. Daily health and safety “tailgate” meetings were conducted during implementation of field activities. Appendix F presents health and safety agreement forms signed by the technical observers and URS field crews. There were no reportable, recordable, or near-miss health and safety incidents during implementation of the work.

3 SEDIMENT SAMPLE COLLECTION

This section describes specific river conditions and sampling at the individual locations, and stations within the locations. Field observations are presented in order of sampling, beginning with the primary locations LMF, UMF, CB, and DME; followed by the alternates NP and LD. Sample collection for each station followed the sampling methodology presented in Section 2.2 and outlined in the QAPP.

3.1 GENERAL FIELD CONDITIONS

In general, ambient air temperatures ranged from the low-50s to high-80s degrees Fahrenheit with partly sunny to sunny skies during the sampling event. Weather conditions allowed for a good sampling environment.
Locations were positioned within moving water areas of the UCR (Map 1). Daily river flows reported by the U.S. Geological Survey (USGS) ranged from 177,000 cubic feet per second (cfs) beginning on June 22 to 159,000 cfs on June 27, 2010 at the International Boundary (U.S./Canada) gauging station. Median and average flows reported during this time were 139,000 cfs and 150,000 cfs, respectively.

The relatively high river flow conditions created challenging boat maneuvering and sampling conditions, particularly in the narrower sections, upstream eddy flows, and reflective or side currents. The conditions required careful maneuvering by the boat captain to maintain positioning of the 28 foot RV Palouse within the 20 meter (66 feet) station diameter. Coarse river bottom composition in several areas created conditions that made anchoring and sediment sampling difficult.

Several conditions prevented the collection of competent samples and required the rejection of samples based on SOP-4 criteria. Samples with visual evidence of winnowing and washing within the Power Grab Sampler were rejected. Coarse materials such as gravels, cobbles, boulders limited or prevented sample collection by deflecting the Power Grab Sampler or preventing closure by blocking the closing mechanism and clam-shell sides. Wood debris also limited the collection of competent samples at several stations by blocking the sampler.

Tables 1 to 6 provide a summary of the sample identification and other relevant information for each location. Maps 2 through 7 provide plan views of the locations and
stations based on the QAPP coordinate centers and field-recorded grab sample coordinates. The GIS data is presented using ArcGIS 9.3.

3.2 LOWER MARCUS FLATS

Samples were collected at three stations (LMF-01 through LMF-03) at this location on June 22 and 23, 2010. Table 1 provides a summary of the individual grab sample field logs (Appendix C), including information on sample identifiers, coordinates, sediment characteristics, general field notes, sample success or rejection, and photographic record. Map 2 provides a plan view of the individual grab sample locations, including where samples were collected or refused per SOP-4 and related QAPP criteria.

3.2.1 SAMPLING RESULTS

A total of 16 grab samples were collected from stations LMF-01 through LMF-03. The following is a summary of observations from the three stations.

**LMF-01.** Station LMF-01 is labeled sample number SD0001. Ten grab samples were collected from station LMF-01 and assigned the unique identifiers LMF-01-001 to LMF-01-010 and the container tag numbers T001 to T010.

The predominant sediment characteristic for LMF-01 consisted of very dark gray to black silt (river mud) with low plasticity. Very fine sand was unevenly distributed in the samples. Decomposing organic matter and lighter yellowish brown streaking was observed within the samples. Small diameter (1 to 2 mm) roots were also observed. A slight musky or sewage-type odor was detected in most samples.

No obvious abnormalities, flora, or fauna was observed at LMF-01.

Water depths at LMF-01 ranged from approximately 18 to 20 meters (59 to 66 feet); with slow to slack water conditions based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

**LMF-02.** Station LMF-02 is identified sample number SD0002. Five grab samples were collected from station LMF-02 and assigned the unique identifiers LMF-02-001 to LMF-02-005 and the container tag numbers T011 to T015.

The predominant sediment characteristics for LMF-02 consisted of very dark grayish brown silt and black poorly graded fine sands. Sample recovery observations indicate the fine black sands were overlain by or mixed with silt deposits of low plasticity. Wood debris consisting of stems, bark, pine cones, other fragments was prevalent. The presence of wood debris limited or prevented obtaining competent grab samples according to SOP-4. Winnowing and washing was observed following recovery, therefore requiring sample rejection. Several attempts were made at each of the five successful grab sample locations at LMF-02-001 through LMF-02-005.

The subsequent attempts for the remaining grabs samples were rejected due to these materials blocking closure of the Power Grab Sampler. Winnowing and washing was
observed following recovery, therefore requiring sample rejection. Small diameter (1 to 2 mm) roots were observed and a slight musky or sewage-type odor was detected in most samples.

Red leeches were observed in several samples. There were no other obvious abnormalities, flora, or other fauna observed at LMF-02.

Water depths at LMF-02 ranged from approximately 41 to 46 meters (135 to 151 feet); with flows ranging from slow to slack water conditions based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

**LMF-03.** Station LMF-03 is labeled sample number SD0003. One grab sample was collected from station LMF-03 and assigned the unique identifier LMF-03-001 and the container tag number T021.

The predominant sediment characteristic for LMF-03 consisted of dark grayish brown to dark yellowish brown silt and a variable color matrix of sands and gravels of mixed parent materials. The sample recovery observations indicate the sands and gravels were overlain or mixed with the silt deposits. Larger cobbles were also present. Wood debris consisting of stems and branches, and other organic litter was prevalent on or under the surface. No odors were detected in the samples.

No obvious abnormalities, flora, or fauna was observed at LMF-03.

Water depths at LMF-03 ranged from approximately 27 to 29 meters (89 to 95 feet); with flows ranging from slow to slack water conditions based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists. A small piece of lumber was recovered in unique sample identifier LMF-03-001, but was not considered of importance to the archaeological monitors.

The presence of wood debris, gravels, and cobbles limited or prevented obtaining additional competent grab samples at LMF-03. The subsequent grab samples were rejected due to these materials blocking closure of the Power Grab Sampler. Winnowing and washing was observed following recovery, requiring sample rejection.

3.3 **UPPER MARCUS FLATS**

Samples were collected at three stations (UMF-01 through UMF-03) at this location on June 23 and 24, 2010. Table 2 provides a summary of the individual grab sample field logs (Appendix C); including information on sample identifiers, coordinates, sediment characteristics, general field notes, sample success or rejection, and photographic record. Map 3 provides a plan view of the individual grab sample locations, including where samples were collected or refused per SOP-4 and related QAPP criteria. A total of 30 grab samples were collected from stations UMF-1 through UMF-3. The following is a summary of observations from the three stations.
**UMF-01.** Station UMF-01 is labeled sample number SD0004. Ten grab samples were collected from station UMF-01 and assigned the unique identifiers UMF-01-001 to UMF-01-010 and the container tag numbers T031 to T040.

The predominant sediment characteristic for UMF-01 consisted of very dark gray to very dark grayish brown well-graded sands. The sand matrix was comprised of mixed parent materials, with varying amounts of lighter colored sands with darker sands, giving a “salt and pepper” appearance. Samples included varying amounts of low-plasticity silt. The sand component was generally overlain by or layered with the silt deposits. Decomposing organic matter and wood debris consisting of stems, bark, roots, and other fragments were prevalent on or under the surface. No odors were detected in the samples.

A freshwater mussel was observed in grab sample UMF-01-005. There were no other obvious abnormalities, flora, or other fauna observed.

Water depths at UMF-01 ranged from approximately 29 to 30 meters (95 to 98 feet); with flows ranging from slow to slack water conditions based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

**UMF-02.** Station UMF-02 is labeled sample number SD0005. Ten grab samples were collected from station UMF-02 and assigned the unique identifiers UMF-02-001 to UMF-02-010 and the container tag numbers T041 to T050.

The predominant sediment characteristic for UMF-02 consisted of very dark grayish brown silt or river mud of low plasticity. Decomposing organic matter and dark streaking was observed within the samples. Dark reddish brown mottling or streaking was observed in several samples. Small amounts of fine wood debris (e.g., leaves) were observed within the samples. A slight sulfur odor was detected in most samples.

Sparse growth of short, green grasses was observed on the sediment surface in most samples. Red leeches were observed in several samples. There were other no obvious abnormalities, flora, or fauna observed at UMF-02.

Water depths at UMF-02 ranged from approximately 10 to 11 meters (33 to 36); with flows ranging from slow to slack water conditions based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

**UMF-03.** Station UMF-03 is labeled sample number SD0006. Ten grab samples were collected from station UMF-03 and assigned the unique identifiers UMF-03-001 to UMF-03-010 and the container tag numbers T051 to T060.

The predominant sediment characteristic for UMF-03 consisted of very dark gray silt or river mud of low plasticity. Decomposing organic matter and dark streaking was observed within the samples. Dark reddish brown mottling or streaking was observed in several samples. Small amounts of fine wood debris (e.g., leaves, pine needles) were observed within the samples. A slight musky odor was detected in most samples.
No obvious abnormalities, flora, or fauna was observed at UMF-03.

Water depths at UMF-03 ranged from approximately 16 to 19 meters (53 to 62 feet); with flows ranging from slow to slack water conditions based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

3.4 CHINA BEND

Field sampling at the three stations (CB-01 through CB-03) was conducted on June 25, 2010. Table 3 provides a summary of the individual grab sample field logs (Appendix C), including information on sample identifiers, coordinates, sediment characteristics, general field notes, sample success or rejection, and photographic record. Map 4 provides a plan view of the individual grab sample locations, including where samples were collected or refused per SOP-4 and related QAPP criteria.

3.4.1 SAMPLING RESULTS

No competent grab samples could be collected from stations CB-01 through CB-03. The following is a summary of observations from the three stations.

CB-01. Station CB-01 is labeled sample number SD0007. No competent grab samples could be collected from station CB-01.

The predominant sediment characteristic for CB-01 was difficult to define based on field conditions. Limited amounts of dark grayish brown sand were partially recovered in several Power Grab Sampler deployments. A cobble/boulder was observed in one sample attempt. The presence of odors could not be observed based on the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at CB-01 ranged from approximately 17 to 18 meters (56 to 59 feet); with moderate flows based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

River flows and depths in conjunction with the presence of gravels, cobbles or boulders contributed to the unsuccessful attempts to collect competent samples. Winnowing and washing of sample material was observed in recovery, requiring sample rejection.

CB-02. Station CB-02 is labeled sample number SD0008. No competent grab samples could be collected from station CB-02.

The predominant sediment characteristic for CB-02 was difficult to define based on field conditions. A trace amount of dark grayish brown sand and some silt was partially recovered in one deployment attempt. Boulders and/or cobbles were also suspected as a primary component of the river bottom based on recovery of a cobble/boulder in CB-01. The presence of odors could not be detected based on the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed.
Water depths at CB-02 ranged from approximately 16 to 17 meters (53 to 56 feet); with moderate flows based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

Several sample collection methods and samplers were attempted at CB-02 to obtain competent samples. River flows and depths and the possible presence of cobbles or boulders appeared to limit the ability of the Power Grab Sampler (please insert the dimensions) to maintain a proper scope or to settle onto the river bottom. Similar unsuccessful attempts were encountered in deploying a messenger-type van Veen sampler (please insert the dimensions – L and W).

A buoy was also used to mark the station center coordinate with the Power Grab Sampler, which was lowered from that position. However, the river current and depth limited the ability to maintain boat position within the 20 meter (66 feet) diameter. A second method was employed with the buoy placed at the station radius boundary, marked at 10 meters (33 feet) upstream from the station coordinate center. However, both techniques did not improve on the ability to collect samples.

**CB-03.** Station CB-03 is labeled sample number SD0009. No competent grab samples could be collected from station CB-03.

The predominant sediment characteristic for CB-03 was difficult to define based on the field conditions. Dark grayish brown sands and silt were partially recovered; while gravels and cobbles of mixed parent material were primarily recovered and appeared to represent the larger volume. Wood debris was also prevalent at CB-03, and included large limbs and branches. The presence of odors could not be detected based on the sampling conditions.

Vegetation (unclassified) was recovered in several sample attempts. The presence of other obvious abnormalities, flora, or fauna was not or could not be observed based on sampling conditions.

Water depths at CB-03 ranged from approximately 13 to 14 meters (43 to 46 feet); with slow to moderate flows based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

The presence of gravel, cobbles, and wood debris however adversely affected sampling efforts and contributed to the rejected attempts. Winnowing and washing of the sample was present in recovery attempts.

### 3.5 DEADMANS EDDY

Three stations identified as DME-01 through DME-03 were sampled at this location on June 26, 2010. Table 4 provides a summary of the individual grab sample field logs (Appendix C), including information on sample identifiers, coordinates, sediment characteristics, general field notes, sample success or rejection, and photographic record.
Map 5 provides a plan view of the individual grab sample locations, including where samples were collected or refused per SOP-4 and related QAPP criteria.

### SAMPLING RESULTS

No competent grab samples collected from stations DME-01 through DME-03. The following is a summary of observations from the three stations.

#### DME-01
Station DME-01 is labeled sample number SD0010. No competent grab samples could be collected from station DME-01.

The predominant sediment characteristic for DME-01 was cobble to boulder sized materials of varying colors and parent sources. Limited amounts of mixed color sands were partially recovered in a few deployments. The presence of odors could not be detected based on the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at DME-01 ranged from approximately 3 to 4 meters (10 to 13 feet); with moderate flows based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

There were several attempts made at DME-01 to obtain competent samples. The river flow and bottom composition however contributed to the rejected attempts to collect competent samples.

#### DME-02
Station DME-02 is labeled sample number SD0011. No competent grab samples could be collected from station DME-02.

The predominant sediment characteristic for DME-02 was cobble sized materials of varying colors and parent sources. Limited amounts of mixed color sands were partially recovered in a few deployments. The presence of odors could not be detected based on the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at DME-02 ranged from approximately 10 to 11 meters (33 to 36 feet); with slow to moderate flows based on visual observations.

No cultural resources were observed by the URS archaeologist.

River flow and bottom composition however contributed to the rejected attempts to collect competent samples.

#### DME-03
Station DME-03 is labeled sample number SD0012. No competent grab samples could be collected from station DME-03.

The predominant sediment characteristic for DME-03 could not be determined. Boulders and bedrock were suspected on the river bottom based on onshore observations of the surrounding area parent material. The presence of odors could not be detected based on
the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at DME-03 ranged from approximately 5 to 6 meters (16 to 20 feet); with moderate flows based on visual observations.

No cultural resources were observed by the URS archaeologist.

River flow and bottom composition however contributed to the rejected attempts to collect competent samples.

3.6 NORTHPORT

Three stations, NP-01 through NP-03, were sampled at this location on June 27, 2010. Table 5 provides a summary of the individual grab sample field logs (Appendix C), including information on sample identifiers, coordinates, sediment characteristics, general field notes, sample success or rejection, and photographic record. Map 6 provides a plan view of the individual grab sample locations, including where samples were collected or refused per SOP-4 and related QAPP criteria.

3.6.1 SAMPLING RESULTS

Three competent grab samples were collected from stations NP-1 through NP-3. The following is a summary of observations from the three stations.

**NP-01.** Station NP-01 is labeled sample number SD0016. No competent grab samples could be collected from station NP-01.

The predominant sediment characteristic for NP-01 was well graded yellowish brown and black sands with gravels, cobbles, and boulder sized materials of varying colors and mixed parent materials. The presence of odors could not be detected based on the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at NP-01 ranged from approximately 8 to 9 meters (26 to 30 feet); with relatively slow flows based on visual observations.

No cultural resources were observed by the URS archaeologist.

River bottom composition however contributed to the rejected attempts.

**NP-02.** Station NP-02 is labeled sample number SD0017. No competent grab samples could be collected from station NP-02.

The predominant sediment characteristic for NP-02 could not be determined. Boulders and bedrock of varying parent materials were identified as comprising the river bottom based on observations of the onshore ground surfaces and visible river bottom. Limited amounts of mixed color sands were partially recovered in a few deployments. The presence of odors could not be detected based on the sampling conditions. Similarly, the
presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at NP-02 ranged from approximately 5 to 7 meters (16 to 23 feet); with moderate flows based on visual observations.

No cultural resources were observed by the URS archaeologist.

River flow and bottom composition however contributed to the rejected attempts to collect competent samples.

**NP-03.** Station NP-03 is labeled sample number SD0018. Three grab samples were collected from station NP-03 and assigned the unique identifiers NP-03-001 to NP-03-003 and the container tag T171 to T173.

The predominant sediment characteristic for NP-03 was poorly graded dark brown sands with gravel sized materials of varying colors and parent sources. Wood debris comprised of bark and other litter was observed. No odors were detected in the samples. No obvious abnormalities, flora, or fauna were observed.

Water depths at NP-03 ranged from approximately 5 to 6 meters (16 to 20 feet); with slow flows based on visual observations.

No cultural resources were observed by the URS archaeologist.

Coarse substrate (i.e., gravels) prevented closure of the sampler and contributed to the rejected attempts.

### 3.7 LITTLE DALLES

Three stations, LD-01 through LD-03, were sampled at this location on June 27, 2010. Table 6 provides a summary of the individual grab sample field logs (Appendix C), including information on sample identifiers, coordinates, sediment characteristics, general field notes, sample success or rejection, and photographic record. Map 7 provides a plan view of the individual grab sample locations, including where samples were collected or refused per SOP-4 and related QAPP criteria.

#### 3.7.1 SAMPLING RESULTS

Ten competent grab samples were collected from stations LD-01 through LD-03. The following is a summary of observations from the three stations.

**LD-01.** Station LD-01 is labeled sample number SD0013. Ten grab samples were collected from station LD-01 and assigned the unique identifiers LD-01-001 to LD-01-010, and the container tag numbers T121 to T130.

The predominant sediment characteristic for LD-01 consisted of poorly graded black fine sands. Limited amounts of yellowish brown sand grains were also present. Decomposing
wood debris consisting primarily of bark and other small fragments were present. No odors were detected in the samples.

Small snails and shells (5 to 15 mm) were observed in most of the grab samples. A tennis shoe was recovered in one grab sample (LD-01-006). There were no other obvious abnormalities, flora, or other fauna observed.

Water depths at LD-01 ranged from approximately 20 to 23 meters (66 to 75 feet); with slow to slack flows noted based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

**LD-02.** Station LD-02 is labeled sample number SD0014. No competent grab samples were collected from station LD-02.

The predominant sediment characteristic for LD-02 was gravel to cobble sized materials of varying colors and mixed parent materials. Limited amounts of well-graded very dark grayish brown sands were observed. The presence of odors could not be detected based on the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at LD-02 ranged from approximately 22 to 23 meters (72 to 75 feet), with moderate flows based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

River flow and bottom composition however contributed to the rejected attempts to collect competent samples.

**LD-03.** Station LD-03 is labeled as sample number SD0015. No competent grab samples were collected from station LD-03.

The predominant sediment characteristic for LD-03 was gravel- to cobble-sized materials of varying colors and mixed parent materials. Boulders were also visually observed on the river bottom. There were no sands or silt observed in the sample attempts. The presence of odors could not be detected based on the sampling conditions. Similarly, the presence of obvious abnormalities, flora, or fauna could not be observed based on the sampling conditions.

Water depths at LD-03 ranged from approximately 4 to 5 meters (13 to 16 feet), with moderate flows based on visual observations.

No cultural resources were observed by the URS or NPS archaeologists.

River flow and bottom composition however contributed to the rejected attempts to collect competent samples.
3.8 SAMPLE PROTOCOL DEVIATIONS

Deviations from the QAPP SOP-4 were implemented based on previously agreed-to sample collection methods due to field conditions.

**Lexan Sample Equipment.** The SOP-4 procedure for transferring the sediment sample from the sampler (e.g., van Veen) to the 5-gallon HDPE container is as follows (page 4, paragraph 1): “Next, a decontaminated stainless steel trowel or spoon may be used to collect only the upper 10 to 15 centimeters (4 to 6 inches) of sediment from inside the sampler, without touching the sidewalls.”

A large volume of sediment sample was required for the study and field procedures included the use of a stainless steel Power Grab or van Veen Sampler. The field procedure utilized in the UCR sediment program was based on the use of the pneumatic-actuated Power Grab Sampler. The Power Grab Sampler was raised to the deck and after visual observations for criteria acceptance, the sediment sample was released into a Lexan tub. The sediment sample from these large samplers was transferred to a Lexan tub and then to the 5-gallon HDPE containers with Lexan scoops.

Lexan is a brand of polycarbonate resin thermoplastic. Lexan resin formulations are approved for food-contact and biocompatibility in medical applications. It is an accepted inert sample equipment material, often used in place of stainless steel products. Lexan equipment is identified for use by the EPA (References - EPA, 2001 and 2003) and is an approved material for soil and sediment sample collection, including box samplers, core and piston samplers, core tubes and caps, and containers.

**Grab Sample Attempts.** The SOP-4 criteria for grab sample attempts is outlined as follows (page 3, paragraph 4): “Grab samples not meeting these criteria will be rejected near the location of sample collection and steps repeated until the criteria have been met or until three attempts at a location have rejected.”

Field conditions limited or prevented the collection of competent samples at many locations and the subset stations, including moderate river flows, gravel, cobble, and boulder river bottom composition, and the presence of wood debris.

The protocol was field-amended to include additional sample recovery attempts at the stations in addition to the minimum three attempts outlined in SOP-4, with the objective to obtain the large sediment volumes required for the study.

**GPS Satellite Acquisition.** A temporary and simultaneous loss of satellite acquisition for the two hand-held GPS units was encountered at two grab sample locations. The two episodes included the grab sample attempts at station CB-01, where no competent grab samples could be collected; and the UTM easting coordinate for station LD-01, specifically for unique sample identifier LD-01-006 (container tag number T126).

For these two events, the RV Palouse’s Nobeltec system was used by the captain to maneuver the boat to the coordinate center and then signal the release of the Power Grab Sampler. Due to the river current and depth (17 to 18 meters) a buoy marker was used at
CB-01 to assist mark the station coordinate. Sample coordinates for these two grab samples are reported in the attached table summaries as the station center.

4 LIMITATIONS

This report has been prepared for the exclusive use of Teck American Incorporated to provide a summary of the 2010 sediment study field work on the UCR for white sturgeon toxicity tests. The work conducted by URS is limited to the services agreed to with Teck, and no other services beyond those explicitly stated should be inferred or are implied.

This report is intended exclusively for the purposes outlined herein and the project and site indicated. It should be recognized that this work was not intended to be a definitive investigation of the site and the conclusions provided are not necessarily inclusive of all the possible conditions.

Opinions and recommendations presented herein apply to the conditions existing at the time of our investigations and cannot necessarily apply to changes of which URS is not aware and has not had the opportunity to evaluate. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control.

URS’ objective is to perform our work exercising the customary standard of care, in accordance with the standard for professional services for a national consulting firm at the time these services are provided. No expressed or implied representation or warranty is included or intended in our reports except that our work was performed, within the limits prescribed by our client, in accordance with the customary and professional standard of care described herein.
5 REFERENCES


TABLES

Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
Table 1 - Lower Marcus Flats

Sample Observations Summary
UCR White Sturgeon Sediment Toxicity Study

<table>
<thead>
<tr>
<th>Station Center Coordinates (NAD83)</th>
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**Table Notes**

1 North American Datum, 1983, Universal Transverse Mercator (UTM) Zone 11

2 Please refer to Appendix C Sediment Sample Log for sediment texture descriptions

3 Texture classification is based on professional opinion using visual observations of recovered sediments in sampler and other field conditions

River bottom composition and sediment texture and distribution may vary from visual observations of rejected samples

3 Munsell Soil Color Charts

4 NS = sample rejected based on failure to meet QAPP SOP-4 criteria

mm = millimeters

Meter = meters

\[ m = \text{meters} \]

\[ mm = \text{millimeters} \]
### Table 2 - Upper Marcus Flats

#### Sample Observations Summary

**UCR White Sturgeon Sediment Toxicity Study**

<table>
<thead>
<tr>
<th>Station Center Coordinates (NADES)</th>
<th>Sample Labeling</th>
<th>Grab Sample Coordinates</th>
<th>Sediment Characteristics</th>
<th>General Field Notes</th>
<th>Cultural Resources</th>
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**Table Notes**

1 North American Datum, 1983, Universal Transverse Mercator (UTM) Zone 11

2 Please refer to Appendix C Sediment Sample Field Logs for sediment texture descriptions

3 Sediment texture classification is based on professional opinion using visual observations of recovered sediments in sampler and other field conditions

River bottom composition and sediment texture and distribution may vary from visual observations of rejected samples

4 Munsell Soil Color Charts

5 NS = sample rejected based on failure to meet QAPP SOP-4 criteria

6 mm = millimeters

---

**9/20/2010**
Table 3 - China Bend

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<tr>
<th>Station No.</th>
<th>Coordinates (NAD83)</th>
<th>Sample Number</th>
<th>Container Tag No.</th>
<th>Date Collected</th>
<th>Time Collected</th>
<th>UTM EASTING</th>
<th>UTM NORTHING</th>
<th>Sediment Characteristics</th>
<th>Field Observations</th>
<th>Cultural Resources</th>
<th>Photographic Record</th>
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<td>5040097 T05</td>
<td>SD0007</td>
<td>T001</td>
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<td>431004</td>
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**Table Notes**

2. Please refer to Appendix C Sediment Sample Field Logs for sediment texture descriptions
3. River bottom composition and sediment texture and distribution may vary from visual observations of rejected samples
5. Munsell Soil Color Charts
6. NS = sample rejected based on failure to meet QAPP SOP-4 criteria
7. m = meters
8. mm = millimeters

9/20/2010
### Table 4 - Deadmans Eddy Sample Observations Summary

**UCR White Sturgeon Sediment Toxicity Study**

Table Notes:

2. Please refer to Appendix C Sediment Sample Field Logs for sediment texture descriptions
3. Texture classification is based on professional opinion using visual observations of recovered sediments in sampler and other field conditions
4. River bottom composition and sediment texture and distribution may vary from visual observations of rejected samples
5. Munsell Soil Color Charts
6. NS = sample rejected based on failure to meet QAPP SOP-4 criteria
7. m = meters
8. mm = millimeters

#### Table 4 Notes:

- **General Field Notes**
  - UTM EASTING
  - UTM NORTHING
  - DME-01
  - DME-02
  - DME-03
  - Station Identifier (DME-01, DME-02, DME-03)
  - Station Center Coordinates
    - [NAD83] 446105.316
    - 5420489.540
  - Unique Identifier
  - Sample Number
  - Container Tag No.
  - Water Depth (m)
  - Predominant Sediment Texture (ASTM/USCS)
  - Predominant Grain Size <= 2 mm
  - Predominant Color < 2 mm
  - Field Observations
  - Number of Grab Samples Collected
  - Cultural Resources
  - Photographic Record
  - Field Notes
  - Cultural Resources
  - Photographic Record

#### Table 4 Observations:

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<th>Number of Grab Samples Collected</th>
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</table>

Note: The table continues with similar observations for DME-03 and provides detailed field notes, sediment characteristics, and cultural resources information.
Table 5
Northport
Sample Observations Summary
UCR White Sturgeon Sediment Toxicity Study

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<tr>
<th>Station Center</th>
<th>Sample Observations Summary</th>
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<td>UCR White Sturgeon Sediment Toxicity Study</td>
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<table>
<thead>
<tr>
<th>Sample Labeling</th>
<th>TableNotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Sample Coordinates (NAD83)</td>
<td>Northport</td>
</tr>
<tr>
<td>Grab Sample Unique Identifier</td>
<td>Sample No.</td>
</tr>
<tr>
<td>Container Tag No.</td>
<td>Date Collected</td>
</tr>
<tr>
<td>Water Depth (m)</td>
<td>Sediment Texture (ASTM/USCS)</td>
</tr>
<tr>
<td>Field Observations</td>
<td>Number of Grab Samples Collected</td>
</tr>
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<td>Photograph Record</td>
<td>Cultural Resources</td>
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<td>Field Observations</td>
<td>Cultural Resources</td>
</tr>
<tr>
<td>Number of Grab Samples Collected</td>
<td>Photographs Record</td>
</tr>
<tr>
<td>Sediment Characteristics</td>
<td>Cultural Resources</td>
</tr>
<tr>
<td>Lands with gravel, cobble, and boulders of mixed parent materials. Moderate river flow and river bottom composition prevent collection of competent samples per SOP-A.</td>
<td>Lands with gravel, cobble, and boulders of mixed parent materials. Moderate river flow and river bottom composition prevent collection of competent samples per SOP-A.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 North American Datum, 1983, Universal Transverse Mercator (UTM) Zone 11</td>
</tr>
<tr>
<td>2 Please refer to Appendix C Sediment Sample Field Logs for sediment texture descriptions</td>
</tr>
<tr>
<td>3 Texture classification is based on professional opinion using visual observations of recovered sediments in sampler and other field conditions</td>
</tr>
<tr>
<td>River bottom composition and sediment texture and distribution may vary from visual observations of rejected samples</td>
</tr>
<tr>
<td>4 River sediment composition difficult to define based on poor recovery. Trace amounts of mixed sands. Few small grasses in sand. Possible boulder and/or solid bedrock bottom. Moderate river flow and river bottom composition prevent collection of competent samples per SOP-A.</td>
</tr>
<tr>
<td>5 Few short grasses. Woody debris. Coarse materials prevent closure of sampler and collection of competent samples per SOP-A.</td>
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<tr>
<td>6 Few short grasses. Woody debris. Coarse materials prevent closure of sampler and collection of competent samples per SOP-A.</td>
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9/20/2010
### Table 6 - Little Dalles Sample Observations Summary

UCR White Sturgeon Sediment Toxicity Study

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<th>Container Tag No.</th>
<th>Date Collected</th>
<th>Time Collected</th>
<th>Easting (UTM)</th>
<th>Northing (UTM)</th>
<th>Water Depth (m)</th>
<th>Sediment Texture (ASTM/USCS)</th>
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<th>Predominate Color &lt; 2 mm</th>
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<th>Number of Grab Samples Collected</th>
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</table>

**Table Notes**

1 North American Datum, 1983, Universal Transverse Mercator (UTM) Zone 11

2 Please refer to Appendix C Sediment Sample Field Logs for sediment texture descriptions

3 Munsell Soil Color Charts

**URS**
Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

Legend
- Primary Sediment Sampling Station
- Alternate Sediment Sampling Station
- Abandoned Sediment Sampling Station
- Water Depth Contour (12m interval)
- River Reach Delineations (USGS)
- Station Number

Source: GIS base layer information provided by Parametrix Inc.
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

URS Corporation
Source: GIS base layer information provided by Parametric Inc.

Map 2 Sediment Sample Locations - Lower Marcus Flats
Upper Columbia River, WA
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

URS Corporation
Source: GIS base layer information provided by Parametrix Inc.

Map 3  Sediment Sample Locations
- Upper Marcus Flats
Upper Columbia River, WA

Legend
- Sediment Grab Sample
- Grab Sample Rejected
- Primary Sediment Sampling Station
- Alternate Sediment Sampling Station
- Abandoned Sediment Sampling Station
- Water Depth Contour (12m interval)
- River Reach Delineations (USGS)
UMF-02 Station Number
T004 Container Tag Number
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

URS Corporation
Source: GIS base layer information provided by Parametric Inc.

Map 4 Sediment Sample Locations - China Bend

Upper Columbia River, WA
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

URS Corporation

Map 5 Sediment Sample Locations - Deadmans Eddy

Upper Columbia River, WA

Source: GIS base layer information provided by Parametric Inc.
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

Station LD-01
Easting - 435417.180
Northing - 5412544.520

Station LD-02
Easting - 436006.680
Northing - 5413598.700

Station LD-03
Easting - 438123.570
Northing - 5414445.120

Legend
- Sediment Grab Sample
- Grab Sample Rejected
- Primary Sediment Sampling Station
- Alternate Sediment Sampling Station
- Abandoned Sediment Sampling Station
- Water Depth Contour (12m interval)
- River Reach Delineations (USGS)

Source:
GIS base layer Information provided by Parametric Inc.

URS Corporation
Map 7 Sediment Sample Locations - Little Dalles
Upper Columbia River, WA
APPENDIX A

Cultural Resources Report

Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
Upper Columbia River

Appendix A

Cultural Resources Monitoring Report

Sediment Sampling Activities for the Assessment of Sediment Toxicity to White Sturgeon

June 22 - 27, 2010

Prepared for:

Teck American Incorporated
501 N. Riverpoint Boulevard, Suite 300
Spokane, Washington 99202

Prepared by:

Sarah McDaniel, MA, RPA

URS Corporation
111 SW Columbia, Suite 1500
Portland, Oregon, 97201

September 2010

URS Project #36310061

Confidential

To avoid vandalism, restrict information in this report about the location of archaeological sites, as provided for by Section 304 of the National Historic Preservation Act, and Washington law, RCW 27.53.070 and RCW 42.56.30
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STATION MAPS

Map 1  Sediment Sample Locations Overview Map
Map 2  Sediment Sample Locations – Deadmans Eddy and Northport
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Map 5  Sediment Sample Locations – Upper and Lower Marcus Flats

APPENDICES

Appendix A  Daily Field Notes
1 INTRODUCTION

1.1 PROJECT BACKGROUND

Archaeological monitoring of field sediment sampling was conducted by URS Corporation (URS) under the Quality Assurance Project Plan for the Assessment of Sediment Toxicity to White Sturgeon (QAPP, May 2010, Amended June 2010), as approved by the U.S. Environmental Protection Agency (EPA). This work was conducted as part of the Upper Columbia River (UCR or Site). Remedial Investigation and Feasibility study (RI/FS), on behalf of Teck American Incorporated (Teck). Primary objectives of the RI/FS are to investigate the nature and extent of unacceptable risk at the Site, to provide information to support baseline risk assessments for human health (to be completed by the U.S. Environmental Protection Agency [EPA]) and the environment (to be completed by Teck), and to develop and evaluate potential remedial alternatives for the Site.

The QAPP presented the approach and rationale for conducting a study to assess the toxicity of contaminants of potential concern (COPCs) associated with granulated slag from sediments in the UCR to early life stages (ELS) of white sturgeon. Data obtained during this work will be used in the baseline ecological risk assessment and overall RI/FS. Sediment toxicity to ELS of white sturgeon will be evaluated using field collected sediments from areas hypothesized as suitable white sturgeon habitat and containing a range of slag-related COPC concentrations.

The following report presents the results of archaeological monitoring of the below-water sediment sampling program conducted in June 2010, in accordance with the protocols outlined in Appendix E, Cultural Resources Coordination Plan, of the approved QAPP.

1.2 PROJECT LOCATION AND DESCRIPTION

The sampling program consisted of collecting below-water sediment samples from within the four primary and two alternate locations as defined by the QAPP. The primary locations were Lower Marcus Flats (LMF), Upper Marcus Flats (UMF), China Bend (CB), and Deadmans Eddy (DME). The alternate locations were Northport (NP) and Little Dalles (LD). The sample locations are between river miles (RM) 737 (DME) and 705 (LMF), generally extending from the towns of Northport to the north and Kettle Falls to the south.

Each of the four primary and two alternate locations includes three separate stations with center position Easting and Northing coordinates provided by the QAPP using the Universal Transverse Mercator (UTM) system using Zone 11 of the 1983 North American Datum (NAD83) data set. Each of the three stations within each location consisted of a 20-meter (66-foot) diameter sample area around the station center coordinate. The three stations within the six locations were assigned a suffix consisting of the sequential numbers 1 through 3 (i.e. LMF-01). Information on the primary and alternate locations and respective stations are described in Table 1 and illustrated on Map 1.
As outlined in the QAPP, 10 grab samples consisting of one 5-gallon high density polyethylene (HDPE) container each were to be collected from the 12 primary stations (3 stations at each of the 4 primary locations). Six additional stations from within the two alternate locations (NP and LD) were selected for sampling if primary station sample conditions precluded or limited competent sample collection based on criteria under QAPP Standard Operating Procedure (SOP) No. 4, Below-Water Grab Sampling Procedures. The QAPP provided for collection of 120 containers from primary stations: 12 stations with 10 grab sample containers per station, or from the alternate locations to meet the sediment volume target, if necessary.

During the 2010 sediment sampling program, a total of 59 samples were collected from primary and alternate locations. The sampling program started on June 22, 2010 and was completed on June 27, 2010.

2 BACKGROUND RESEARCH

2.1 ENVIRONMENTAL SETTING

The Site is located within the Okanogan Highlands physiographic province, which is characterized by moderately-sloped mountainous topography cut by major north-to-south oriented river valleys, including the Okanogan, Sanpoil, Columbia, Colville, and Pend Oreille rivers. Because nearly the entire province was covered by glacial ice during the Pleistocene, in some of the main valleys, glaciolacustrine sediments form a series of terraces on valley walls. The Okanogan Highlands contain a variety of parent rock material, but most abundant are granitics. Soils at lower elevations associated with margins of river valleys reflect the drier climate and transitional forest-grassland vegetation, with the most abundant parent material being glacial till. Soils found at the lowest elevations along terraces and flood plains of major rivers are formed from glacial outwash sands and gravels parent material (Franklin and Dyrness 1988:26-27). Sediments found in this valley are geologically mapped as tertiary intrusive rocks and Pleistocene continental glacial drift (Schuster 2005). Predominant vegetation type includes the *Pinus ponderosa* climax association (Franklin and Dyrness 1988:168-184).

Paleoenvironmental data which relate trends affecting the resource productivity of the region such as availability of salmon and foraging resources, suggest climatic transitions occurred throughout this region at 6500-7000 B.C., 4300-4500 B.C., 2500 B.C. and 800 B.C.-A.D. 1 (Chatters 1998). In general, the warmest and driest period of the Holocene occurred from 9000-7500 B.C., after glacial ice had mostly melted. Timberlines were elevated as much as 200 meters (656 feet) by the end of the period, and grasses and other steppe plants dominated regional flora; few forest patches existed within the Okanogan Highlands. The upper Columbia River was still eroding through glacial outwash at this time. Conditions in the Okanogan Highlands became more arid from 7500 to 4400 B.C., and grasses were replaced by sagebrush steppe, which may reflect a change from a continental to more maritime environment, characterized by warmer, wetter winters. The period between 4500 and 2500 B.C. was characterized by a cooling period and the descent of timberlines; ponderosa pine forests began to develop within the Okanogan Highlands. The coldest and wettest period of the Holocene abruptly occurred between 2500 and 2100 B.C. with further expansion of evergreen forests. Temperatures warmed after 800 B.C., and grass again replaced ponderosa pine woodland on valley floors. Due to a drought between 800 B.C. and A.D. 400, rivers aggraded to a final
Holocene floodplain; a decline in salmon productivity may have occurred. No major climatic-induced environmental changes have occurred in the past 2000 years.

2.2 CULTURAL SETTING-REGIONAL OVERVIEW

2.2.1 CULTURAL CHRONOLOGY

The Site falls near the southern boundary of the Northern Plateau culture area, which incorporates the intermountain zone of south-central British Columbia and north-central Washington (Pokotylo and Mitchell 1998). The cultural chronology that has been in widespread use for the past 30 years is based on the results of archaeological investigations along the Columbia River at the Kettle Falls area (Chance and Chance 1977, 1982, 1985). However, the Confederated Tribes of the Colville Reservation History/Archaeology Program has recently posited a new sequence which differs in that it is predicated on cultural continuity rather than ethnic repopulation, though it still relies upon archaeological sites found in the Kettle Falls vicinity (Pouley 2009).

The newly proposed temporal periods are consistent with Plateau trends and utilize names after legendary figures prominent in tribal oral traditions (Pouley 2009:82-83). Though sites dating to this period are scarce, the earliest Coyote (sn’k’lip) Period (8000 to 4800 years Before Present [BP]) is defined by a toolkit with a large portion of expedient tools, potential house structures, and mostly Cascade series and Mahkin Shouldered projectile points types. The procurement strategy, for which food processing and logistical organization indicate considerable planning, appears consistent with foraging activities, and is more complex than usually attributed to early assemblages (Pouley 2009:83-90).

The Salmon (ntitiya?x) Period (4800 to 3500 BP) corresponds to a typological shift in projectile points, the inception of tabular knives, and a presumed inception of housepits as occurred elsewhere within the Plateau culture area. Greater salmon availability, attributed to environmental changes, occurred around 3300 and 2200 BP, and the development of a collector subsistence strategy appears supportable by the relative projectile points and tabular quartzite knives patterns of use (Pouley 2009: 90-98).

The Eagle (melganups) Period (3500 to 2200 BP) is characterized by an increase in tabular quartzite knife frequency and relative Plateau diagnostic point types. This period corresponds to the adoption of the collector subsistence strategy, and the presence of storage features and fire-modified rock feature frequency. An rise in the abundance of salmon is supported by the increase in tabular quartzite knives, which are thought to have functioned as salmon processing tools. Projectile point types including Mahkin Shouldered, Nespelem Bar, Rabbit Island Stemmed series, Wallula Rectangular Stemmed, Columbia Corner Notched series, and Quilomene Bar series types are represented (Pouley 2009:98-100).

The Turtle (?ara?sikw) Period (2200 to 200 BP) is similar to the preceding Eagle Period, but demonstrates an increase in tabular quartzite knife frequency, the inception of the bow and arrow, and a population increase. Overlapping projectile point styles include: Rabbit Island Stemmed, Columbia Corner-notched A, Quilomene Bar Corner Notched, and Quilomene Bar Basal Notched B types. Turtle Period points consist of Wallula Rectangular Stemmed, Columbia Corner Notched B,
Quilimene Bar Basal Notched A, Columbia Stemmed series and Plateau Side Notched series, the latter two representing bow and arrow technology. Fire-modified rock features are abundant (Pouley 2009:100-107).

2.2.2 ETHNOGRAPHIC CONTEXT

The Site and vicinity was within the traditional territory used by a variety of Interior Salish-speaking Okanagan- Colville groups, inclusive of Okanagan, Lakes, and Colville, and the Spokane Indians (Bouchard and Kennedy 1984; Kennedy and Bouchard 1998; Ross 1998). Of these groups, the Lakes and Colville proper appear to have used the area most intensively (Figure 1).

The Lakes, or Sinixt or Senijextee, were an interior Salishan-speaking people who occupied a series of interconnecting lakes and rivers surrounded by high mountain ranges, broadly from the Kettle Falls area in Washington to the lower Kootenay River in Canada, and along the Arrow Lakes region (Figure 2) (Bouchard and Kennedy 1984; Pearkes 2002; Ray 1936:115; Ruby and Brown 1992:188-189). Although often lumped with Columbia Plateau groups, the Sinixt occupied a temperate rainforest environ rather than the typical desert-like plateau area, contributing to the distinctiveness of their culture and the subsequent difficulty of ethnographers and historians to define this group as part of a culture area (Pryce 1999). The name appears to mean ‘a small speckled fish’, referring to either lake trout or Dolly Varden char (Pryce 1999:16). The Sinixt were closely related to the Colvilles and are recognized in the United States as part of the Colville Confederated Tribes, but their traditional territory was disrupted after the establishment of the Canadian boundary, which bisected their ancestral lands.

Several aspects of culture and technology of the Sinixt differ from the Colville and Northern Okanagan. The Sinixt were more mobile and relied upon the canoe for travel, and subsistence activities had a greater emphasis placed on hunting rather than fishing or plant gathering (Kennedy and Bouchard 1998:239-241). The Sinixt utilized sturgeon-nosed canoes made from the bark of white pine and constructed a variety of styles of basketry distinctive from that of other groups. Traditional housing was characterized by circular semisubterranean dwellings with radiating poles lacking a central post, with temporary conical mat lodges used during hunting and gathering activities (Kennedy and Bouchard 1998:242-243). Both conical and oblong-shaped mat lodges were common. Principal game species included deer, which were hunted individually with a flat bow or sometimes driven collectively over a cliff’s edge. Caribou, elk, moose, mountain goats and sheep, as well as a variety of smaller mammals, were hunted. Weirs were used for catching salmon on the Slocan and Kootenay rivers. Huckleberries were important and stored for winter consumption (Kennedy and Bouchard 1998:241-242).

The Colville proper, or Scheulpi/Chalpay/Skoyelpi, alternately Chaudieres or Kettles, were a Salishan people that lived at Kettle Falls on the Columbia River and south along the Columbia as far as Hunters Washington, as well as within the Colville River valley to the east (Bouchard and Kennedy 1984; Kennedy and Bouchard 1998:238-243; Ruby and Brown 1992:35-36). The name Colville is derived from a Hudson’s Bay Company governor, for whom Fort Colville was established in 1825. These people were known for their large baskets used to net salmon at Kettle Falls. Most of the Colville villages were located along major waterways, particularly the Columbia River, and subsistence was centered on fishing, though upland areas were visited for hunting, root digging, and berry picking.
The Colville Valley also appears to have been an important camas harvesting and processing location (Emerson 2004:3). Structures may have included pit houses prior to 1800 A.D., but more commonly used were conical and oblong mat lodges. Skin- and canvas-covered lodges were later utilized by the Colville after the adoption of the horse and bison hunting excursions to the Plains. The Colville population was estimated to number 1000 in 1780, 7 in 1882, and 321 in 1904 (Ruby and Brown 1992).

Figure 1. General ethnographic locations of the Sinixt and Colville/Skoyelpi in relation to the Site (in red). Map is from Pryce (1999:xxii).
In summary, this section of the Columbia River was utilized by autonomous Lakes, Colville, Spokane, and other Salishan-speaking groups who shared hunting, fishing and root digging grounds, and thus the boundaries of territory used by these groups was fluid. The influence of fur traders, missionaries, the military and settlers disrupted aboriginal lifestyles, and resulted in major modifications to the traditional subsistence economy that was predicated on seasonal movements. The Colville Reservation was created in 1872 for upper Columbia River Salishans and relocated to the west side of the Columbia River following a second Executive Order later that same year (Kennedy and Bouchard 1998:238-243; Ruby and Brown 1992:35-36). In 1892, the North Half of the Colville Indian Reservation was ceded to the United States, resulting in its present configuration. Other federal policies including the Reservation Allotment Act of 1887, the McLaughlin Agreement of 1905, and two Presidential Proclamations in 1900 and 1916 further affected tribal lands (Confederated Tribes of Colville Reservation 2010).

Clair Hunt’s Homestead Map of the North Half of the Colville Reservation (http://content.wsulibs.wsu.edu/u/?/maps.720), dated 1900, depicts numerous Indian allotments along the west bank of the Columbia River at the UCR Site; many of these allotments correspond to ethnographic places cited in Ray (1936) and Bouchard and Kennedy (1979), further highlighting the importance of this area to ancestral and contemporary Colville and Lakes peoples.
2.2.3 HISTORIC CONTEXT

The Columbia River was important as a major transportation corridor, initially for the Native Americans, and later for white explorers and settlers. Permanent Euro-American settlement by fur traders in the Pacific Northwest occurred within five years of the departure of Lewis and Clark expedition of 1805-1806. The North West Company established a number of subsidiary posts throughout the interior, including the Kootenae House at the headwaters of the Columbia in 1807; the Spokane House at the mouth of the Spokane River in 1810; Fort Okanogan at the mouth of the Okanogan River in 1811; and later Fort Nez Perces at the mouth of the Walla Walla River in 1818. These efforts did much to open the interior Pacific Northwest to eventual settlement (Meinig 1968:36, 50-51, 63; Schwantes 1996:69).

The first fur trader to explore the UCR was David Thompson of the Canadian North West Company, who traveled through Kettle Falls in June 1811 (Bohn and Holstine 2006:6). Also in 1811, rival Pacific Fur Company opened Fort Spokane; after the Hudson’s Bay Company (HBC) merged with the North West Company in 1821, the trading post was relocated to Kettle Falls in 1825. The area of Kettle Falls was selected because of its critical location along the Columbia River and potential for self-sufficiency given the natural farming advantage, abundance of fish, and facility of trade with the at least nine tribes who already coalesced at the falls (Bohn and Holstine 2006:6; Pankonin and McCullor 2009:45-46).

The operation was named Fort Colvile after one of the governors of the HBC, and was the largest post between the Rockies and the Cascades, supplying other forts of the Upper Columbia with grain. The Indians almost exclusively provided the furs to the traders, and some began to practice agriculture as a result of this settlement. As many of the traders intermarried with local tribal women (Jackson 1996), interactions were generally peaceable until the intrusion of military units and American miners in the mid-1800s. During its 46 years of operation, Fort Colvile (Figures 3 and 4) played an important role in regional history and settlement; as part of the U.S.-Canadian boundary settlement, the HBC retained Fort Colvile until 1871, when it was relinquished to the United States (Bohn and Holstine 2006:7-9). Archaeological remains of Fort Colvile (45ST97), now submerged beneath Lake Roosevelt, are found approximately one mile from the nearest UCR sediment sampling area at Lower Marcus Flats.

Besides the fur traders and explorers, between the 1820s and 1850s, a number of missionaries, and government officials also began to travel through the region. Protestant missionaries Elkanah Walker and Cushing Ells, with the help of Chief Big Head of the Spokane, established the first mission in Stevens County at Tshimakain, about 25 miles northwest of Spokane, in 1839 (Bohn and Holstine 2006:9; Ruby and Brown 2006:63-64). Later, as Superior of Oregon Missions, Jesuit Pierre Jean DeSmet founded a number of missions throughout the Pacific Northwest and British Columbia from 1841 to 1846. While traveling the region, at the Chaudieres, or Kettle Falls, DeSmet observed 800-900 Indians, including Colville, San Poils, and Spokanes, assembled for salmon fishing (Durham 1912:125). DeSmet created maps of his travels, noting the locations of major villages and missions, including those around Fort Colvile and Kettle Falls (DeSmet 1846). The St. Paul Mission was established on the plateau overlooking the Kettle Falls in 1847 shortly following DeSmet’s visit; this log structure served as a place of worship until the end of the 19th century (Bohn and Holstine 2006:11).
Figure 3. Indian Camp at Fort Colvile, by Paul Kane, 1847. Royal Ontario Museum.

Figure 4. Hudson’s Bay Company Fort Colvile, 1860. United States Library of Congress. (Source: http://fortwiki.com/Image:Colvile_1860_LOC_3g11420u_Closeup.jpg). This area is now submerged beneath Lake Roosevelt at Marcus Flats.
The discovery of gold in 1858 led to an influx of miners and settlers to the region, including the Colville and Metaline districts. Most early efforts were centered upon extracting placer gold from sandbars and stream beds along the Columbia River and its major tributaries. Placer mining attracted many Chinese, who often worked claims abandoned by whites; names such as China Bend near Northport and China Creek near Marcus are reminiscences of these miners (Bohn and Holstine 2006:20-21).

In 1859, a “new” Fort Colville (spelled with two “l”s, perhaps an intentional American misspelling of the British spelling with one “l” [Bohn and Holstine 2006:13-14]) was founded as a military outpost, farther east of the HBC Fort Colville, in order to protect miners in the Colville country, quell uprisings attributed to “Canadian Indians,” and provide military support for the upcoming international boundary survey (Bohn and Holstine 2006:13). Pinkney City, named for one of the fort’s commanders, developed around the military fort by 1861. The fort and Pinkney City were abandoned in the 1880s, when the modern town site of Colville, located a few miles south of the historic military site and originally inhabited by miners of the 1850s gold rush, became the county seat (Bohn and Holstine 2006:13-20; Washington Place Names 2010).

While HBC’s Fort Colvile and the U.S. Military’s Fort Colville were regional focal points of activity early on, by the later 19th century both had been abandoned, and many small towns began to emerge in response to mining booms and railroad construction. The difficulty of transportation kept Stevens County relatively isolated throughout most of the 1880s, though river boats traveled the Columbia River into British Columbia. By 1889, the Spokane Falls and Northern Railroad Company began laying rail from Spokane to the Upper Columbia River, eventually connecting to productive mines in British Columbia. Another mining boom occurred in the 1890s, especially after the North Half of the Colville Indian Reservation was opened up to white settlement. A smelter was built in Northport for use by the Le Roi Company of British Columbia, and operated as one of the largest smelters on the West Coast by 1909 (Bohn and Holstine 2006:23).

Railroad transportation also facilitated the growth of the logging and lumber industry in Stevens County. Over a hundred sawmills were operational by 1910, as lumber could then be profitably exported to eastern markets (Bohn and Holstine 2006:87). The lumber industry and agricultural pursuits, which began with the HBC’s farming operations, increased steadily throughout the late-19th and early-20th centuries, except during the Great Depression of the 1930s, during which time many homesteads and farms were abandoned. Ultimately, the U.S. Forest Service obtained much of these lands. During this era, the Civilian Conservation Corps established a number of camps in the region, built trails and lookouts, and planted trees throughout the national forests (Bohn and Holstine 2006:114-115).

Also during the Depression, construction of Grand Coulee Dam along the Columbia River was initiated as a public works project under President Roosevelt to allow for widespread irrigation of the region, as well as generation of electricity. The 1942 completion of Grand Coulee Dam caused a large lake, known as Franklin D. Roosevelt Lake, to form that extended upriver for 150 miles (240 kilometers), almost to the Canadian border, flooding Native peoples’ traditional use areas and altering salmon runs (Bouchard and Kennedy 1984). On the day the river rose over Kettle Falls, the Indians gathered on the bank and held a Ceremony of Tears to mourn the loss of the ancient fishery. The post-dam salmon run is no longer sufficient to sustain the indigenous peoples (Bohn and Holstine 2006:115-116). Although some attempts were made to address the impacts of the dam to
towns, archaeological sites and cemeteries prior to inundation (Ball 1941; Collier, Hudson, and Ford 1942), much cultural information was lost as a result of subsequent reservoir flooding (Gough 1990). Historical town sites such as “Old” Marcus and the Hudson’s Bay Company’s Fort Colville were inundated, as were countless pre-contact and historic period sites associated with traditional groups. Because of the intensive historic and pre-contact use of the area, as well as known density of archaeological resources, the potential exists for there to be cultural resources within the reservoir sediments that are the subject of the in-water UCR RI/FS sampling program.

2.3 CULTURAL SETTING – SAMPLE LOCATIONS

From north to south, the UCR sample locations include: DME, NP, LD, CB, UMF, and LMF (Map 1). Each of these locations has specific associated ethnographic place-names (Bouchard and Kennedy 1979, 1984; Kennedy and Bouchard 1998; Pearkes 2002) and has been the site of unique historic developments that highlight the potential for cultural resources to be found within the below-water sample locations. The following section presents a synthesis of specific ethnographic place names, historic setting, and known archaeological sites at each of these UCR sample locations.

Regional ethnographic, historic, and archaeological references were consulted as part of this pre-field review. An archaeological records search was conducted by URS to identify any previously-recorded archaeological sites, historic resources, or cultural surveys within the Site. The May 2010 search was conducted via the online Washington State Department of Archaeology and Historic Preservation (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD) database. This restricted-access, searchable GIS database depicts locations of the following: 1) previously-recorded archaeological sites, 2) cultural resource surveys conducted after 1995, 3) historic register properties, and 4) cemeteries.

2.3.1 DEADMANS EDDY

Ethnographic literature describes a few ethnogeographic locales in the general area of Deadmans Eddy (Map 2). For example, a small Lakes village was reportedly located about three miles upriver from Northport, which would put it in the vicinity of the DME sample stations. The sample stations may also be at or near the locale of an “aboriginal campsite,” described as being located across the river from Deadmans Eddy, that was occupied until around 1910 (Bouchard and Kennedy 1979:320; Chance 1967:77).

The origin of the name “Deadmans Eddy” has not been ascertained via common historic references (e.g., Washington Place Names 2010). Local informant Eric Weatherman, of Columbia Navigation Inc., believed the name may relate to an historic train derailment, but was uncertain as to the accuracy of this information (personal communication, May 27, 2010).

Results of the records search indicate that there are no previously-recorded archaeological resources within approximately 0.25 mile of the DME sample stations. Previously-recorded site types in the broader vicinity (e.g., 45ST89 and 45ST90) include pre-contact period resources, such as shell, bone, caches, sweatlodges, hearths, and stone tool materials, as well as historic period resources.
related to mining and homesteading. In this portion of the UCR, the sites appear to be found at slightly higher elevations than, but also found eroding into, the Columbia River.

2.3.2 NORTHPORT

The Northport region (Map 2) has several associated ethnogeographic placenames as well as documented archaeological locales (Bouchard and Kennedy 1979, 1984; Chance 1967; Pearkes 2002). There are reported Lakes winter villages on both sides of the river at Northport (see Figure 2), some of which were occupied year-round. Northport townsite was the location of Nts’ets’erism, or “having Kingfishers,” formerly home of the Lakes chief (Bouchard and Kennedy 1979:316-318).

The historic town of Northport is found along the Columbia River several miles south of the Canadian border. Early miners camped at this location for several years until the Spokane Falls and Northern Railway was completed in 1892 and a town was consequently platted by railroad magnate D.C. Corbin and the Northport Townsite Company. Incorporated in 1898, the name was selected by the railroad because of the town’s northerly location along the Canadian border (Washington Place Names 2010). Prior to the arrival of the railroad, there were only three log cabins and a trail through the mountains; not even a wagon road was present, and only a dozen persons inhabited the area (Steele 1904:137-138). But by 1893, one thousand railroad workers arrived in Northport, which became important as a port-of-entry town. Though floods and fires affected the community in the 1890s, there were 1,500 residents at the time of incorporation in 1898. Miners and prospectors began populating the town after the opening of the North Half of the Colville Indian Reservation to mineral entry in February 1896. Construction of the smelter to serve the Le Roi Mines began in 1897, the town having been selected because of the readily-available lime rock. The industry employed hundreds as of the turn of the century, and Northport was known thereafter as “Smelter City.” By 1904, Northport was the most populous city of Stevens County (Steele 1904:137-150).

Chance (1967:65-68, 71-74) recorded 10 archaeological sites in the vicinity of Northport scattered from two to three miles along both sides of the river. There are three previously-recorded archaeological sites within 0.25 mile of, but none are located within, the NP sampling area. Nearby are sites 45ST415, a pre-contact period camp with stone tools and fire-cracked rock; 45ST88, a pre-contact period site with housepits, ovens, and historic mining features; and 45ST682, an historic debris scatter found in proximity to the historic LeRoi Smelter operation.

2.3.3 LITTLE DALLES

The narrow area of the Columbia River known as the Little Dalles (Map 3) was the site of stsiixwlhk’w, or “swift water,” a fishing grounds and site of one of the principal Lakes villages (Bouchard and Kennedy 1979:316; Teit 1930:210).

The name “Little Dalles” refers to the pre-dam era rapids as referred to by French-Canadian voyageurs. There was once a town established in the later 1800s at this site, which was destroyed by fire in 1881 but was renewed by the building of the Spokane Falls and Northern Railway. Its historical population was about 60 (Washington Place Names 2010).
Chance (1967:65-68, 71-74) recorded a number of archaeological sites on both sides of the river in the vicinity of the Little Dalles. The nearest documented archaeological sites are more than 0.25 mile from the LD sample stations and include 45ST69, a short-term occupation site, and 45ST76, a pre-contact camp and historic placer mining features.

2.3.4 CHINA BEND

China Bend (Map 4) was the site of an Indian place-name meaning “disappears-from-sight water,” a well-known fishing ground and year-round residence for Lakes Indians who resided from the mouth of Flat Creek to Fifteenmile Creek until the early 1900s. Mythological significance is also associated with this place (Bouchard and Kennedy 1979:313-314).

China Bend was the site of considerable placer mining from the 1860s through the 1890s. The name relates to the many Chinese who washed gravel and ran sluice boxes at this locale (Washington Place Names 2010).

Three archaeological sites are found less than 0.25 mile from the CB sample stations. These include: 45ST65, a large pre-contact lithic scatter and historic homestead site; 45ST113, a pre-contact period camp with ovens and fire-cracked rock; and 45ST84, a pre-contact village with housepits and lithic materials.

2.3.5 UPPER AND LOWER MARCUS FLATS

At least four ethnographic places are found within or near Upper Marcus Flats (Map 5): sk’lh7allkwa7, or “reach the river”, which refers to the now inundated Old Marcus Town on the east side of the Columbia, was one of the main Lakes villages; lhektsin, or “brushy area at edge; mouth,” an inundated site directly across from Old Marcus, was a winter village (Collier, Hudson and Ford 1942:31, 33; Chance 1970:40-43); n7axwtwula7xw, or “inlet ground”, refers to a slough that was a good place to catch fish; and nxwiya71hpitkw refers to the entire area of the Kettle River, which was occupied mostly by Lakes peoples (Bouchard and Kennedy 1979:296-301).

At least six ethnographic places are found within or near Lower Marcus Flats (Map 5) (Bouchard and Kennedy 1979:290-295), including Snxelak, a village around the now-inundated Marcus Flats that was the site of an encampment where foot racing, horse racing, and gambling activities took place, and Npepkwltiskwwm, a village and popular meeting grounds for Colville, Lakes, and Kalispel groups. A rocky area of mythological importance (sntkelu?tixntx), a waterfall of importance for fishing (skwekwant), and a former Lakes winter village (nkwekwulhkwelh-la7xw) are all found along the Columbia River in this area.

In 1860, the British Boundary Survey Commission built barracks at what would become known as Marcus, and used this base of operations for two years (Steele 1904:175). After its abandonment, settlers moved into the log structures and operated a store until the buildings were removed in 1881. The town of Marcus was then platted in 1890, and it developed as a base of operations for miners and as a southern terminus for steamboats until the railroad was completed through the region.
When the Grand Coulee Dam was constructed in the 1940s, the entire community of “Old” Marcus was moved to its present higher elevation location in anticipation of flooding by Franklin D. Roosevelt Lake (Steele 1904:175; Washington Place Names 2010) (Figures 5 and 6). Older structures unsuitable for moving were burned or demolished in place.¹

At least eight previously-recorded archaeological resources are found within 0.25 mile of the UMF and LMF sample stations, and overall site density is high in this general area. Of these, only the Old Marcus Town Site/Ntsiltsilik (45ST37) is projected to occur within the sampling area. This large site consists of the historic town of Old Marcus, with house foundations, roads, and cellars still present beneath the waters of Lake Roosevelt. A Lakes village was also located here, and artifacts including tool fragments and earth ovens have been observed even though historic disturbances have been extensive. Additional sites which are near but outside of the LMF and UMF sampling areas include: Chinese “dugouts” (45ST180), pre-contact period camps (45FE57, 45FE58, and 45ST103), and the ca. 1890s-1920s historic Williams townsite (45ST115).

Figure 5. Remnants of the old Marcus town site (foreground) after its removal to the new townsite (background) in anticipation of inundation by the Grand Coulee dam. This area is submerged beneath Lake Roosevelt at the UMF-02 sampling station (Source: http://content.lib.washington.edu/u/?grandcoulee,34).

3 METHODS

In accordance with the protocols outlined in Appendix A, Cultural Resources Coordination Plan, of the approved QAPP, a cultural resources monitor was present throughout the duration of the below-water sediment sampling program. Teck contracted with URS to provide a professional archaeologist meeting the Secretary of Interior’s Professional Qualification Standards (as outlined in 36 CFR Part 61) to be present in the event that cultural resources were encountered during sediment removal. In addition, the National Park Service (NPS) provided cultural resources personnel when sediment sampling occurred within the jurisdiction of the Lake Roosevelt National Recreation Area. Rotating URS archaeological monitors included Michael Kelly, Sarah McDaniel, and Michelle Stegner; NPS archaeological monitors included Jim Retzer and Jonathan Riehn.

For the sampling program, Gravity Environmental LLC provided the sampling boat, Research Vessel (RV) Palouse, used for sample collection (Photograph 1). In addition, Gravity provided an additional vessel (RV Monarch) for transportation of technical observers monitoring the sampling
procedures. The NPS archaeologists were on-board the RV Palouse at all times within the Lake Roosevelt National Recreation Area, while other technical observers were on-board the RV Monarch during the course of the whole field program.

At each of the sampling stations, the RV Palouse’s boat captain would maneuver to the center coordinate and/or buoy marker, and then signal the crew to lower the Power Grab Sampler (Photograph 2). Upon contact with the river bottom, the pneumatic-powered Power Grab Sampler was activated to close the clam-shell sides and collect the sediment sample. The Power Grab Sampler was then raised and maneuvered over the deck using the boom and released into Lexan tubs (Photograph 3). The monitoring archaeologist(s) visually examined each sample as it was released from the Power Grab Sampler and again when the sediment was manually transferred from the Lexan tub to the 5-gallon containers (Photograph 4). The main UCR Sediment Sampling Activities Field Report (URS 2010) to which this report is attached contains further detail regarding site positioning and specific collection methods.

Prior to sampling investigations, the monitoring archaeologist provided an overview of the protocol outlined in the Cultural Resources Coordination Plan to the field crew, boat operators, and technical observers. A pre-approved archaeological monitoring form was filled out for each sampling station (e.g. LMF-01). Copies of the monitoring forms, which substitute daily field notes, are attached as Appendix A.

Photograph 1. RV Palouse (left), used for sampling activities, and support RV Monarch (right).
Photograph 2. Lowering the Power Grab Sampler into the water from the overhead boom.

Photograph 3. Release of sediment sample into Lexan tub
4 RESULTS

The Site is subject to fluctuating, dam-controlled water levels. At the time of the June 2010 sampling effort, all sample locations were within moving water areas of the Columbia River, which had maximum river flows ranging from 177,000 cubic feet per section (cfs) to 159,000 cfs. The relatively high river flow conditions created challenging boat maneuvering and sampling conditions, particularly in the narrower sections, upstream eddy flows, and reflective or side currents. The conditions required careful maneuvering by the boat captain to maintain positioning of the RV Palouse within the 20-meter (66-foot) diameter sample station.

During the 2010 sediment sampling program, which occurred from June 22 to 27, 2010, a total of 59 of the projected 120 samples were collected from primary and alternate locations. Several conditions prevented the collection of competent samples and required the rejection of samples based on QAPP criteria. Coarse materials such as gravels, cobbles, and boulders, and woody debris limited or prevented sample collection by deflecting the Power Grab Sampler or preventing closure by blocking the closing mechanism and clam-shell sides (Photograph 5). The presence of bedrock or large boulders is suspected of preventing the collection of competent samples at stations DME-03 and NP-02.

Recovered sediment was variable, and representative samples primarily included river mud or silts, sands, and cobbles (Photographs 6 - 8). Samples that did not meet the standard operating procedures
of the QAPP were rejected for sample collection; these materials were examined for evidence of cultural modification prior to being released into the river.

No cultural resources were identified during monitoring of the below-water sediment sampling program. Table 1 provides a summary of station information and cultural resource observations. Though several of the sample stations are found in proximity to known archaeological sites, only one sample station, UMF-02, is projected to have fallen within a site boundary, that of the Old Marcus Townsite (45ST37). No archaeological resources were observed within the sediment recovered at this sample station. Modern debris, including one fragment of cut lumber (Photograph 5) at station LMF-03, and an athletic shoe (Photograph 8) and beer can at station LD-01 were observed, but no items of historic relevance were noted.

Although no cultural resources were observed during this effort, additional monitoring would be appropriate for similar below-water sediment sampling activities due to the overall high site density and intensive historic and ethnographic use of the UCR Site prior to inundation by Lake Roosevelt.

Photograph 5. Cut lumber and cobble in sampler at station LMF-03.
Photograph 6. Sample washing and poor recovery at station CB-03.

Photograph 7. Gravel and cobble sample at station DME-02; sample attempt rejected.
Photograph 8. Rejected sample attempt at station LD-01, with athletic shoe.
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TABLE

Cultural Resources Monitoring Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
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<td>Boundary</td>
<td>3.5</td>
<td>Cobble to boulder-sized materials of mixed parent materials. Trace amounts of mixed sands. Macro-invertebrate observed in sand matrix. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>No known sites at or near this sampling location. No sediment recovered for observation.</td>
<td>S. McDaniel (URS) 6/26/10</td>
</tr>
<tr>
<td></td>
<td>DME-02</td>
<td>5420448.714 446795.613</td>
<td>Boundary</td>
<td>10.5</td>
<td>Cobbles of mixed parent materials. Trace amounts of sand. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>No known sites at or near this sampling location. No sediment recovered for observation.</td>
<td>S. McDaniel (URS) 6/26/10</td>
</tr>
<tr>
<td></td>
<td>DME-03</td>
<td>5420740.789 446288.597</td>
<td>Boundary</td>
<td>5.5</td>
<td>River sediment composition difficult to define based on poor recovery. Possible boulder and/or solid bedrock bottom. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>No known sites at or near this sampling location. No sediment recovered for observation.</td>
<td>S. McDaniel (URS) 6/26/10</td>
</tr>
<tr>
<td>Northport</td>
<td>NP-01</td>
<td>5419135.820 443442.450</td>
<td>Northport</td>
<td>8.5</td>
<td>Sands with gravels, cobble, and boulders of mixed parent materials. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>Historic and pre-contact sites are nearby but little sediment was recovered for observation at this location.</td>
<td>S. McDaniel (URS) 6/27/10</td>
</tr>
<tr>
<td></td>
<td>NP-02</td>
<td>5419838.750 444108.470</td>
<td>Northport</td>
<td>6</td>
<td>River sediment composition difficult to define based on poor recovery. Trace amounts of mixed sands. Few small grasses in sand. Possible boulder and/or solid bedrock bottom. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>Historic and pre-contact sites are nearby but little sediment was recovered for observation at this location.</td>
<td>S. McDaniel (URS) 6/27/10</td>
</tr>
<tr>
<td></td>
<td>NP-03</td>
<td>5419361.440 443302.500</td>
<td>Northport</td>
<td>5.5</td>
<td>Sands, gravels, and boulders. Wood debris. Coarse materials prevent closure of sampler and collection of competent samples.</td>
<td>No sites at or near this location. No observed resources, but little sediment was recovered for observation.</td>
<td>S. McDaniel (URS) 6/27/10</td>
</tr>
<tr>
<td>Location</td>
<td>Station</td>
<td>Station Center Coordinates (NAD83)</td>
<td>USGS Topographic Quadrangle</td>
<td>Average Water Depth (m)</td>
<td>Sediment Characteristics</td>
<td>Cultural Resource Observations</td>
<td>Cultural Monitor/Date</td>
</tr>
<tr>
<td>-----------</td>
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<td>----------------------</td>
</tr>
<tr>
<td>Little Dalles</td>
<td>LD-01</td>
<td>5412544.520 435417.180</td>
<td>China Bend</td>
<td>21</td>
<td>Poorly graded sand. Decomposing organic matter and wood debris. Small snails and shells (5 to 15 mm).</td>
<td>No sites at or near this location. Modern athletic shoe and beer can recovered.</td>
<td>M. Stegner (URS); J. Riehn (NPS); 6/27/10</td>
</tr>
<tr>
<td></td>
<td>LD-02</td>
<td>5413599.700 436606.680</td>
<td>Onion Creek</td>
<td>22.5</td>
<td>Gravels and cobbles, with limited sands of mixed parent materials. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>No sites at or near this location. No sediment recovered for observation.</td>
<td>M. Stegner (URS); J. Riehn (NPS); 6/27/10</td>
</tr>
<tr>
<td></td>
<td>LD-03</td>
<td>5414445.120 438123.570</td>
<td>Northport</td>
<td>4.5</td>
<td>Gravels and cobbles. Boulders observed on river bottom. No recovery of sands or silt. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>No sites at or near this location. No sediment recovered for observation.</td>
<td>M. Stegner (URS); J. Riehn (NPS); 6/27/10</td>
</tr>
<tr>
<td>China Bend</td>
<td>CB-01</td>
<td>5407646.304 431604.246</td>
<td>China Bend</td>
<td>17.5</td>
<td>River sediment composition difficult to define base on poor recovery. Trace amounts of sand. One boulder recovered in a sample attempt – possible cobbles and boulders. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>Near boundary of pre-contact and historic period site. No sediment was recovered for observation.</td>
<td>S. McDaniel (URS); J. Riehn (NPS); 6/25/10</td>
</tr>
<tr>
<td></td>
<td>CB-02</td>
<td>5408773.751 43210.704</td>
<td>China Bend</td>
<td>16.5</td>
<td>River sediment composition difficult to define based on poor recovery. Trace amounts of sand and silt recovered. Possible cobbles and boulders. Moderate river flow and river bottom composition prevent collection of competent samples.</td>
<td>Near boundary of pre-contact and historic period site. No sediment was recovered for observation.</td>
<td>S. McDaniel (URS); J. Riehn (NPS); 6/25/10</td>
</tr>
<tr>
<td></td>
<td>CB-03</td>
<td>5407574.889 431112.592</td>
<td>China Bend</td>
<td>13.5</td>
<td>River sediment composition difficult to define based on poor recovery. Trace amounts of sand and silt. Gravels and cobbles. Large wood debris. Wood debris, gravels, and cobbles prevent collection competent samples.</td>
<td>Near boundary of pre-contact and historic period site. No sediment was recovered for observation.</td>
<td>S. McDaniel (URS); J. Riehn (NPS); 6/25/10</td>
</tr>
<tr>
<td>Location</td>
<td>Station</td>
<td>Station Center Coordinates (NAD83)</td>
<td>USGS Topographic Quadrangle</td>
<td>Average Water Depth (m)</td>
<td>Sediment Characteristics</td>
<td>Cultural Resource Observations</td>
<td></td>
</tr>
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<td>------------</td>
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<td>------------------------</td>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Upper Marcus Flats</td>
<td>UMF-01</td>
<td>5391668.047 422651.955</td>
<td>Marcus</td>
<td>29</td>
<td>Varying silt content mixed with predominate mixed sand matrix. Decomposing organic matter and woody debris.</td>
<td>Near Old Marcus townsite (45ST37) and Marcus Island. No cultural materials observed in recovered materials.</td>
<td></td>
</tr>
<tr>
<td>Lower Marcus Flats</td>
<td>LMF-01</td>
<td>5389522.361 419596.598</td>
<td>Marcus</td>
<td>19</td>
<td>Silt. Decomposing organic matter. Black and yellowish brown streaking.</td>
<td>No sites at or near sampling location. No cultural materials observed within samples.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LMF-02</td>
<td>5390165.566 418470.318</td>
<td>Marcus</td>
<td>43</td>
<td>Varying silt content mixed with black sands. Decomposing matter and wood debris of varying type and size. Red leeches. Poor recovery.</td>
<td>No sites at or near sampling location. Dense woody debris on river floor; area within an area used to store log rafts for 50+ years related to old lumber mill nearby.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LMF-03</td>
<td>5389414.844 418534.187</td>
<td>Marcus</td>
<td>28</td>
<td>Sand, gravels, and cobbles, with few silts/fines. Wood debris, gravels, and cobbles block sampler and prevent collection of competent samples.</td>
<td>Several sites are found nearby but above drop-off into channel. One fragment of cut lumber recovered from grab sampler, probably modern.</td>
<td></td>
</tr>
</tbody>
</table>
Cultural Resources Monitoring Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
Northport
Deadmans Eddy
Little Dalles
China Bend
Upper Marcus Flats
Lower Marcus Flats
River Mile 712
River Mile 700
River Mile 745
U.S. - Canadian Border
Kettle River
Mill Creek
Deep Creek
Colville River
Big Sheep Creek
Middle Fork Mill Creek
South Fork Deep Creek
Marcus
Northport
Kettle Falls
395
25
20
251
Aladdin
Culcreek
Onion Creek
Mills Lake
Joe Creek
0
5
2.5
3
Km
0 1.5
Miles
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010
Source: GIS base layer information provided by Parametrix Inc.
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

Source:
GIS base layer information provided by Parametrix Inc.

Map 2
Primary and Alternate Sample Locations - Northport and Deadmans Eddy
Upper Columbia River, WA
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

Source:
GIS base layer information provided by Parametrix Inc.
URS Corporation

Map 4 Primary and Alternate Sample Locations - China Bend
Upper Columbia River, WA
Assessment of Sediment Toxicity to White Sturgeon
June 22 to 27, 2010

Legend
- Proposed Sediment Sampling Locations
- Proposed Alternate Sampling Locations
- Abandoned Proposed Sampling Locations
- Water Depth Contour (12m interval)
- River Reach Delineations (USGS)
- DME-04 Station Number

Source:
GIS base layer information provided by Parametrix Inc.

URS Corporation

Map 5 Primary and Alternate Sample Locations - Lower and Upper Marcus Flats
Upper Columbia River, WA
APPENDIX A

Daily Field Notes

Cultural Resources Monitoring Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010

Confidential

To avoid vandalism, restrict information in this report about the location of archaeological sites, as provided for by Section 304 of the National Historic Preservation Act, and Washington law, RCW 27.53.070 and RCW 42.56.30
Cultural Resource Monitoring Form-

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/25/10

Location being sampled: Deadman's Eddy (DME) -02 (also DME-01, DME-03)

Archaeological Monitor(s) present: S. McDaniel (URS)

Sampling Team Representative present: Jeff Lappo (URS)

Any known archaeology at location of event: No archaeological sites in a near (i.e. 50 m)

DME 1, 2, or 3

Total number of sample locations (probes) at specific location being sampled: 

Range of depth of samples taken: Approx. 5-10 m

General observations of sediment (color, texture, etc.): Current too fast. Couldn't grab sufficient samples at any DME locations due to: 1) fast current 2) Rock at bottom of river prevents grab from getting anything but trace sand of mixed parent material

Any observations of cultural material during this sampling event? Please explain: None
Any disturbances/erosion observed at sampling location? Please explain briefly: ____________________________

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
- Move the location of the actual probe if necessary to avoid cultural or archaeological areas,
- Assistance from the sampling team(s) for the relocation of sampling areas should it be necessary,
- Documentation and recordation of daily observations, including field notes and photographs, to record the character of on-site sampling activities,
- Should a discovery be made, the field sampling team is instructed to cease field work at the respective sampling location and make the appropriate contacts

CONTACT INFORMATION FOR Principal Investigator

MICHAEL KELLY, URS

111 SW Columbia, Suite 1500, Portland, OR 97201

Home: (406) 600-3859, cell: (503) 475-2426

Email: mike_kelly@urscorp.com
Cultural Resource Monitoring Form

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/27/10

Location being sampled: Northport Alternate NP-01

Archaeological Monitor(s) present: S. McDaniell (URS)

Sampling Team Representative present: Jeff Lippo (URS)

Any known archaeology at location of event: 45ST 415 to Northeast. (C5, tools, for-camp)

45ST 482 to immediate south of sample. (Hx debris scatter in proximity to Le loi Sidtee complex (45ST 568), along shoreline)

Total number of sample locations (probes) at specific location being sampled: 0

Range of depth of samples taken: 6.8 m

General observations of sediment (color, texture, etc.): Failed after 6 attempts. Some coarse sand and small cobbles, one boulder; prevents grab from closing.

Any observations of cultural material during this sampling event? Please explain: None.
Cobbles examined for use wear; none exhibited evidence for cultural modification.

Any disturbances/erosion observed at sampling location? Please explain briefly:

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Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/27/10

Location being sampled: Northport (Alternate) O2

Archaeological Monitor(s) present: S. McDaniel (URS)

Sampling Team Representative present: J. Leppe (URS)

Any known archaeology at location of event: No sites within or near sample location

Total number of sample locations (probes) at specific location being sampled: 0

Range of depth of samples taken: ~ 5 m

General observations of sediment (color, texture, etc.): Couldn't get reasonable sample. Seems there are large rocks preventing grab from taking a sample. Only trace amount of sand recovered. Abandoned after 3 attempts.

Any observations of cultural material during this sampling event? Please explain: None
Any disturbances/erosion observed at sampling location? Please explain briefly:

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
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Cultural Resource Monitoring Form-

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/24/10

Location being sampled: Northwest Ahumou NP-03

Archaeological Monitor(s) present: S. McDaniel (UWS)

Sampling Team Representative present: J. Keppo (UWS)

Any known archaeology at location of event: No site at or near ±500 m sample area

Total number of sample locations (probes) at specific location being sampled: 3 out of 10 proposed

Range of depth of samples taken: 3 - 5 m

General observations of sediment (color, texture, etc.): poorly graded fine to medium sand, occasional cobbles, mixed pebbled material, some gravel picked up rounded cobbles of various pebbled material, some organic material - small roots, branches. Abandoned NP-03 after several further attempts - grab kept getting insufficient samples, surface of sample "washed" in sample report.

Any observations of cultural material during this sampling event? Please explain: none
Any disturbances/erosion observed at sampling location? Please explain briefly:

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
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Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/27/2010

Location being sampled: LD-01 (Little Dalles)

Archaeological Monitor(s) present: Michelle Stegner (URS) Jonathan Riehn (NPS)

Sampling Team Representative present: Jef Leppo (URS)

Any known archaeology at location of event: No archaeological sites located within vicinity of sampling location.

Total number of sample locations (probes) at specific location being sampled: 10 5-gallon buckets (SD0013 F121-130)

Range of depth of samples taken: 20 - 23 m

General observations of sediment (color, texture, etc.): Black siltly sand with misc. organic debris

Any observations of cultural material during this sampling event? Please explain: Modern shoe and beer can.
Any disturbances/erosion observed at sampling location? Please explain briefly:

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

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Cultural Resource Monitoring Form -

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/27/2010

Location being sampled: LD-02 (Little Bites)

Archaeological Monitor(s) present: Michelle Stagner (URS) Jonathan Richn (NPS)

Sampling Team Representative present: Try Leppo (URS)

Any known archaeology at location of event: No archaeology was located within the vicinity of the sampling location.

Total number of sample locations (probes) at specific location being sampled: 0

Range of depth of samples taken: 0-20 m

General observations of sediment (color, texture, etc.): Cobbles prevented sampling

Any observations of cultural material during this sampling event? Please explain: No.
Any disturbances/erosion observed at sampling location? Please explain briefly:

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
- Move the location of the actual probe if necessary to avoid cultural or archaeological areas,
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Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/27/2010

Location being sampled: LD-03 (Little Dilles)

Archaeological Monitor(s) present: Michelle Stogner (URS) Jonathan Richa (NPS)

Sampling Team Representative present: Tiff Lepp (URS)

Any known archaeology at location of event: No archaeological sites located within the vicinity of sampling location.

Total number of sample locations (probes) at specific location being sampled: 6

Range of depth of samples taken: 4.5 to 3 m

General observations of sediment (color, texture, etc.): No sampling obtained due to cobbles

Any observations of cultural material during this sampling event? Please explain: No.
Any disturbances/erosion observed at sampling location? Please explain briefly:

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
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Cultural Resource Monitoring Form-

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 01/25/10

Location being sampled: CB-02 - (also CB-01 & CB-03)

Archaeological Monitor(s) present: Sarah McDonald (URS) John Richn (NPS)

Sampling Team Representative present: Jeff Leppa (URS)

Any known archaeology at location of event: Just outside boundary for 455T (05) submerged a large structure plus house, ST84 into east and to side of several housepits, village.

Total number of sample locations (probes) at specific location being sampled: 10

Range of depth of samples taken: Approx. 19.5-14.5ft

General observations of sediment (color, texture, etc.): Couldn’t get samples; current too fast + bucket won’t grab. Pulled up few cobbles, sticks, etc, but not sediment. Exhusted all methods of trying to sample – quit China Bend.

Any observations of cultural material during this sampling event? Please explain: No.
Any disturbances/erosion observed at sampling location? Please explain briefly:

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
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Cultural Resource Monitoring Form-

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 10/24/10

Location being sampled: UMF 1  E391647 N422645 E

Archaeological Monitor(s) present: Sarah McDaniel (URS) John Riehn (NPS)

Sampling Team Representative present: Jeff Lepp (URS)

Any known archaeology at location of event: ST 87 - Old Marcus tumor - is submerged near sample area (large and variously defined site boundary)

ST 180 - at or near - close to shoreline (should be outside); hexamine dugout,

Total number of sample locations (probes) at specific location being sampled: 10 total buckets

Range of depth of samples taken: 29.3 m

General observations of sediment (color, texture, etc.): Very dark gray, thin layer of silt over well-graded sands

natural wood debris, roots, stems, leaves, mixed in upper profile. Mixed sand.

mixed plant materials

Any observations of cultural material during this sampling event? Please explain: none (except decomposing toilet paper in win sample)
Any disturbances/erosion observed at sampling location? Please explain briefly:

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
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Cultural Resource Monitoring Form-

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 6/23/10

Location being sampled: UNpte - O2

Archaeological Monitor(s) present: M. Kelly (URS), T. Rotzer (NIK)

Sampling Team Representative present: J. Legu, C. Pannier (URS)

Any known archaeology at location of event: Sampling location at SW boundary of site 51-37, old Marcus Townsite

Total number of sample locations (probes) at specific location being sampled: 2 - 5 gallon buckets collected

Range of depth of samples taken: Water depth 10.5 - 10.9 m

General observations of sediment (color, texture, etc.): Dark green/gray, silty sand & gravel with some organic debris

Sampling at this location will be continued tomorrow

Any observations of cultural material during this sampling event? Please explain: None
Any disturbances/erosion observed at sampling location? Please explain briefly:  

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that an archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
- Move the location of the actual probe if necessary to avoid cultural or archaeological areas,
- Assistance from the sampling team(s) for the relocation of sampling areas should it be necessary,
- Documentation and recordation of daily observations, including field notes and photographs, to record the character of on-site sampling activities,
- Should a discovery be made, the field sampling team is instructed to cease field work at the respective sampling location and make the appropriate contacts

CONTACT INFORMATION FOR Principal Investigator

MICHAEL KELLY, URS

111 SW Columbia, Suite 1500, Portland, OR 97201

Home: (406) 600-3859, cell: (503) 475-2426

Email: mike_kelly@urscorp.com
Cultural Resource Monitoring Form -

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 06/24/10

Location being sampled: UMF - 2 (Upper Main Flat)  

Archaeological Monitor(s) present: [Signature] (NPS), Sarah McDaniel (URS)

Sampling Team Representative present: Jeff Leppo (URS), Gary Panther (URS)

Any known archaeology at location of event: Marcus townsite 45ST37 at or near.

Trinocular often GPS units having trouble initially. Assume with townsite, which was removed to current location ca. 1941. Remaining structures were burned/razed. Also site of enume village.

Total number of sample locations (probes) at specific location being sampled: 10 (8 today, 12 yesterday)

Range of depth of samples taken: 35’

General observations of sediment (color, texture, etc.): Very dark brown silt, very little sand, some pieces of short grass in a few of the grabs - thought to have settled from previous source.

Any observations of cultural material during this sampling event? Please explain: None.
Any disturbances/erosion observed at sampling location? Please explain briefly: N/A - unable

to dream

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
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Email: mike_kelly@urscorp.com

photos

1. sample extraction, facing N
2. 
3. close up bucket
4. overview of boat @ location
Cultural Resource Monitoring Form

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 01/24/10

Location being sampled: UMF - 3  E39.2082° N42.0017

Archaeological Monitor(s) present: S. McDaniel · URS - Jori Riehn (NPS)

Sampling Team Representative present: Jeff Leppo

Any known archaeology at location of event: outside site borders of ST 103 and ST 45, near Kettle Falls R. District,

Total number of sample locations (probes) at specific location being sampled: 10

Range of depth of samples taken: 10 - 20 m

General observations of sediment (color, texture, etc.): very dark gray, silt with dumpling organs like pine needles, river mud, occasional small sticks

Any observations of cultural material during this sampling event? Please explain: none
Any disturbances/erosion observed at sampling location? Please explain briefly: \( \text{n/a} \)

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
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CONTACT INFORMATION FOR Principal Investigator

MICHAEL KELLY, URS

111 SW Columbia, Suite 1500, Portland, OR 97201

Home: (406) 600-3839, cell: (503) 475-2426

Email: mike_kelly@urscorp.com
Date of sampling event: 6/32/10

Location being sampled: LMF-01

Archaeological Monitor(s) present: M. Kelly (UAS); J. Retzke (APS)

Sampling Team Representative present: T. Long (Co. Manager)

Any known archaeology at location of event: No previously recorded archaeological sites within sampling location

Total number of sample locations (probes) at specific location being sampled: 20 sample probes, 10 5-gallon buckets

Range of depth of samples taken: 19 - 19.5 meters

General observations of sediment (color, texture, etc.): Sample LMF-01-001 brown darkgray, no block silt/clay. 10 additional grabs required to fill 10 buckets. All sampled similar black/grey silt of same fine sand classified as river mud

Any observations of cultural material during this sampling event? Please explain: None
Any disturbances/erosion observed at sampling location? Please explain briefly: __________

Note: Water depth exceeds 19 ft.

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

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MICHAEL KELLY, URS
111 SW Columbia, Suite 1500, Portland, OR 97201
Home: (406) 600-3859, cell: (503) 475-2426
Email: mike_kelly@urscorp.com
Cultural Resource Monitoring Form-

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event:  6/9/10

Location being sampled: LMF - O2

Archaeological Monitor(s) present: M. Kellogg (URS); J. Reist (AB)

Sampling Team Representative present: J. Lepp; C. Parshley

Any known archaeology at location of event: No previously recorded sites in vicinity

at sampling location

Total number of sample locations (probes) at specific location being sampled: 5.50 S-gal bucket 5.0-2.5
grabs per bucket

Range of depth of samples taken: Wells depth 45.5 ft

General observations of sediment (color, texture, etc.): Samples LMF - O2 - 001 & 002 returned

muddy dark gray sands and silts with an extremely high quantity of wood debris (bark, sticks, etc.). Some minor adjustment at sampling location required to improve collection of sediments. Sampling location abandoned after multiple failures, due to wood debris.

Any observations of cultural material during this sampling event? Please explain: None
Any disturbances/erosion observed at sampling location? Please explain briefly: Dense wooded debris on river floor, backing sample collection area off shore at old lumber mill site used to store logs for 50+ years.

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that a archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
- Move the location of the actual probe if necessary to avoid cultural or archaeological area,
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Home: (406) 600-3859, cell: (503) 475-2426

Email: mike_kelly@urscorp.com
Cultural Resource Monitoring Form

Upper Columbia River Remedial Investigation and Feasibility Study (UCR RI/FS) – 2010 Sampling for the Assessment of Sturgeon Toxicity to White Sturgeon QAPP/Amendment No. 1

Date of sampling event: 5/23/10

Location being sampled: LME 03

Archaeological Monitor(s) present: M. Kelly (URS), J. Rezke (AIS)

Sampling Team Representative present: J. Lepo, C. Pardue (URS)

Any known archaeology at location of event: FE-16, FE-157, FE-158. All sites located 100+ m to the west, above drop-off into original creek channel. Sampling location is within channel

Total number of sample locations (probes) at specific location being sampled: 5-gal bucket collected

Range of depth of samples taken: 28.5 m

General observations of sediment (color, texture, etc.): Dark gray silty sand and gravel, cobble. Cobble prevented sampling unit from closing. Sampling location abandoned after multiple attempts and frequent repositioning

Any observations of cultural material during this sampling event? Please explain: None
Any disturbances/erosion observed at sampling location? Please explain briefly: [None observed]

Per Cultural Resource Coordination Plan (CRCP), on site tasks include:

- At the discretion of the monitor, sampling may be slowed or halted at any time that an archaeological resource is suspected or encountered,
- Visual examination of the ground by a cultural resource monitor prior to placement of a sample probe,
- Move the location of the actual probe if necessary to avoid cultural or archaeological areas,
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Home: (406) 600-3859, cell: (503) 475-2426
Email: mike_kelly@urscorp.com
APPENDIX B

Daily Attendance and Health and Safety Records

Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
SITE HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT

This general SHSP is approved by the Consultants for use at the Site. This general SHSP is the minimum health and safety standard for the Site and will be strictly enforced for Consultants personnel and other subcontracted personnel where applicable. Subcontracted personnel may request to adopt the general SHSP in lieu of a subcontractor-specific SHSP, but must obtain prior written approval by the contracting Consultants and provide written concurrence from the subcontractor that the subcontractor will assume direct responsibility and liability for administering the plan for its employees.

I have reviewed this general SHSP dated August 25, 2009, for the Site RI/FS fieldwork. I have had an opportunity to ask any questions I may have and have been provided with satisfactory responses. I understand the purpose of the plan, and I consent to adhere to its policies, procedures, and guidelines.

[Signatures and dates]

Employee signature

[Company]

Date

Employee signature

[Company]

Date

Employee signature

[Company]

Date

Employee signature

[Company]

Date

Employee signature

[Company]

Date

Employee signature

[Company]

Date

Employee signature

[Company]

Date
12. SAFETY AND HEALTH PLAN AGREEMENT

By their signature, the following undersigned site workers or visitors certify that this plan has been read, or otherwise communicated to them. They further certify that they completely understand this plan and will follow its procedures for the protection of the health and safety of all persons entering this site.

<table>
<thead>
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<tbody>
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<td>Michael Kelly</td>
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<td>Dan Lanthier</td>
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<td>Sarah McDaniel</td>
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Arrival @ Polage / Northport Boot Launch: 12:30
APPENDIX C

Photographs with Descriptions

Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
Health and safety meeting at Kettle Falls Boat Launch, June 22, 2010

Morning mobilization for sediment sampling at Kettle Falls Boat Launch, June 23, 2010
RV Palouse work deck with sample and decontamination equipment

Power Grab Sampler
Lowering the Power Grab Sampler into the water from the overhead boom.

Power Grab Sampler on bottom and ready for pneumatic-actuation. Grab sample in Lexan tub.
Power Grab Sampler retrieved over work deck and ready for release into Lexan tub

Release of sediment sample into Lexan tub
Transferring sediment sample to the 5-gallon HDPE containers

De-ionized water rinse step of Power Grab Sampler decontamination
Liquinox™ soap wash of Lexan tub with brush

Red leech from sample at station LMF-02
Mollusk from sample at station UMF-01

Grasses on sediment surface in sampler at station UMF-02
Macro-invertebrate in sampler at station DME-1, top edge of photo.

Snails on sediment surface at station LD-01
Sample aliquot for unique sample identifier LMF-01-001

Close-up view of sample aliquot for unique sample identifier LMF-01-001
Wood debris in sample preventing closure of sampler, sample attempt rejected

Sample aliquot for unique sample identifier LMF-02-002
Sample aliquot for unique sample identifier LMF-02-003

Sample aliquot for unique sample identifier LMF-02-003 in decontaminated 5-gallon HDPE container (Container Tag No. T012)
Sample aliquot for unique sample identifier LMF-03-001

Wood debris and cobble in sampler at station LMF-03, sample attempt rejected.
Sample aliquot for unique sample identifier UMF-02-004

Close-up view of sample aliquot for unique sample identifier UMF-02-005
Sample aliquot for unique sample identifier UMF-02-009 in sampler

Sample aliquot for unique sample identifier UMF-01-003 in sampler
Close-up view of sample aliquot for unique sample identifier UMF-01-010

Sample aliquot for unique sample identifier UMF-03-007
Sample aliquot for unique sample identifier UMF-03-009

Sample washing and poor recovery at station CB-02, sample attempt rejected
Preparation for use of van Veen Sampler at station CB-02

Use of anchored buoy for marking station coordinate boundary at station CB-02
Appendix C

Water-only recovery at station CB-01

Sample washing and poor recovery at station CB-01, sample attempt rejected
Boulder-only recovery at station CB-01, sample attempt rejected

Wood debris in sampler at station CB-03, sample rejected
Sample washing and poor recovery at station CB-03, sample attempt rejected

Gravels and cobbles blocking sampler with sample washing at station CB-03, sample attempt rejected
Appendix C

General view of Deadman’s Eddy river section, looking north

Boulder in sampler at station DME-02, sample attempt rejected
Gravel, cobble, and boulder sample at station DME-02, sample attempt rejected

Gravels, cobbles and boulders in sampler at station DME-01, sample attempt rejected
Water-only in sampler at station DME-03

General view at station DME-03 river section, looking south
Water and trace sand in sampler at station NP-02

General view of station NP-02 river section, looking north
Sample aliquot for unique sample identifier NP-03-001

Close-up view of sample aliquot for unique sample identifier NP-03-003
Cobbles and boulders with washing in sample aliquot attempt for unique sample identifier NP-03-004, sample rejected

Boulders at station NP-01
General river view of station LD-03, looking north

Boulder in sampler at LD-03, sample attempt rejected
Gravels and cobbles blocking sampler at station LD-02

Sample in Lexan tray at LD-02, sample rejected due to sampler blocking and washing
General river view of Station LD-01, looking southeast

Sample aliquot for unique sample identifier LD-01-004 in sampler
Rejected sample attempt at unique sample identifier LD-01-006, with athletic shoe.

Sample aliquot for unique sample identifier LD-01-009 in sampler.
APPENDIX D

Sediment Sample Field Logs

Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample No.**: SD00  **Sample Tag**: T

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
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<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>NP</td>
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<td>STATION NO.</td>
<td>01</td>
<td>02</td>
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**GRAB SAMPLE NO. (001 THROUGH 010)**: 001  **SAMPLE IDENTIFIER**: LMF 01 001

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<tr>
<th>WATER DEPTH</th>
<th>19.4 (M. FT)</th>
<th>UTM Northing (NAD83)</th>
<th>5389530</th>
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<tbody>
<tr>
<td>UTM Easting (NAD83)</td>
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<td>419591</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**
- Wet: Very dark gray to black 10 YR 3/1
- Dark brown 10 YR 3/3

**Visible Organic Matter**
- Yes  Yes  No  No
- Description: Decomposed, musky organic odor

**Odors**
- Yes  Yes  No  No
- Description: Decomposed, musky organic odor

**Obvious Abnormalities** (wood, shells, organisms, etc.): Yes  No

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly  Sarah McDaniel

**Cultural Resources Observed**: Yes  No

**Other Notes**: Decomposed organic material appears to contribute to dark coloration.

**Boat**: Palouse (Gravity Environmental)  **Photo Directory**: UCR Sed 6-22-2010  **Photo File**: 033-036

**Sampler Type**: Power Grab (Gravity Environmental)

**Sampler Name**: Jeff  **Sample Signature**: [Signature]

**Date**: 6-22-2010  **Time**: 15:00

**Sample Labeling (Refer to QAPP and Sample Key)**
- Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and line. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)
# FIELD SAMPLE LOG - SEDIMENTS

Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

## Sample No.: SD00-02

### LOCATION NAME
- [ ] Deadman's Eddy
- [ ] China Bend
- [ ] Upper Marcus Flats
- [ ] Lower Marcus Flats
- [ ] Alternate

### LOCATION CODE
- [X] DME
- [ ] CB
- [ ] UMF
- [X] LMF

### STATION NO.
- [X] 01
- [ ] 02
- [ ] 03

### GRAB SAMPLE NO. (001 THROUGH 010)*
- [X] 002

### SAMPLE IDENTIFIER
- LMF . 01 . 002

### WATER DEPTH
- [ ] (M) FT
- 19.0

### UTM Northing (NAD83)
- 5389529

### UTM Easting (NAD83)
- 419587

### PHYSICAL CHARACTERISTICS

- [ ] SW: Well graded sand, gravelly sand, little to no fines.
- [ ] SM: Silty sands, sand-silt mixtures.
- [ ] GW: Well graded gravels, gravel-sand mixtures, little to no fines.
- [ ] SP: Poorly graded sand, gravelly sand, little to no fines.
- [ ] SC: Clayey sands, sand-clay mixtures.
- [ ] GP: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- [X] ML: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
- [ ] CL: Clayey sands, sand-clay mixtures.
- [ ] GM: Silty gravels, gravel-sand-silt mixtures.
- [ ] GC: Clayey gravels, gravel-sand-clay mixtures.

### Color (Munsell)
- Dark greyish brown 10 YR 3/1

### Visible Organic Matter
- Yes [X] No [ ]
- Description: Decomposed organic

### Odors
- Yes [X] No [ ]
- Description: Decomposed musky

### Obvious Abnormalities (wood, shells, organisms, etc.)
- Yes [X] No [ ]

### Cultural Resources Notes:
- URS Archaeologist - Mike Kelly [X] Sarah McDaniel [ ]

### Other Notes:
- River muds, some very fine sands. Primarily silts & clayey, low plasticity.

### Boat:
- Palouse (Gravity Environmental)

### Sampler Type:
- Power Grab (Gravity Environmental)

### Photo Directory:
- UCR Sed 6-22-2010

### Photo File:
- 037-039

### Sample Labeling (Refer to QAPP and Sample Key)
- Sample No. = LMF - SD0001 through SD0003, DME - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Exemples - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)

## June 2010
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No. : SD00  Sample Tag : T 003

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman’s Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GRAB SAMPLE NO. (001 THROUGH 010)* 003  SAMPLE IDENTIFIER LMF  01  003
*Grab Sample = One Bucket

WATER DEPTH 19.3 (M / FT)
UTM Northing (NAD83) 5389529  UTM Easting (NAD83) 419591

PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th>SW</th>
<th>SM</th>
<th>GW</th>
<th>GP</th>
<th>SC</th>
<th>GM</th>
<th>GM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Well graded sand, gravelly sand, little to no fines.</td>
<td>Silty sands, sand-silt mixtures</td>
<td>Well graded gravels, gravel-sand mixtures, little to no fines</td>
<td>Poorly graded gravels, gravel-sand mixtures, little to no fines</td>
<td>Clayey sands, clay-sand mixtures</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
<td>Clayey gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Color (Munsell) Black 10 YR 3/1
Color (Munsell) Dark yellowish brown 10 YR 4/6

Visible Organic Matter Yes ☑ No ☐
Description: Decomposed organic matter

Odors Yes ☑ No ☐
Description: Decomposed organic matter

Sampler Penetration: 25 cm

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☑

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☑ / Sarah McDaniel ☐

(Please refer to URS archaeologist field monitoring notes)

Other Notes:

Cultural Resources Observed: Yes ☑ No ☐

Boat: Palouse (Gravity Environmental)
Photo Directory: UCR Sed 6-22-2010
Sampler Type: Power Grab (Gravity Environmental)
Photo File: 040-041

Sampler Name: Jeff Lego
Sample Signature: [Signature]
Date: 6/22/2010
Time: 15:25

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
### FIELD SAMPLE LOG - SEDIMENTS

*Upper Columbia River - White Sturgeon Sediment Toxicity Study*
*United States Locations/Stations*

**Sample No.: SD00**

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman’s Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LOCATION CODE</th>
<th>DME</th>
<th>CB</th>
<th>UMF</th>
<th>LMF</th>
<th>N = Northport Lower Dalles</th>
</tr>
</thead>
</table>

| STATION NO.         | 01                | 02           | 03                  |                    | D = Dalles                |

<table>
<thead>
<tr>
<th>GRAB SAMPLE NO. (001 THROUGH 010)*</th>
<th>004</th>
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</thead>
</table>

*Grab Sample = One Bucket*

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
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</thead>
<tbody>
<tr>
<td>19.6 ft</td>
<td>5389529</td>
<td>419594</td>
</tr>
</tbody>
</table>

#### PHYSICAL CHARACTERISTICS

- **SW** | Well graded sand, gravelly sand, little to no fines.
- **SM** | Silty sands, sand-silt mixtures
- **GW** | Well graded gravels, gravel-sand mixtures, little to no fines
- **SP** | Poorly graded sand, gravelly sand, little to no fines.
- **SC** | Clayey sands, sand-clay mixtures
- **GP** | Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML** | Inorganic silt, very fine sands, rock flour, silt or clay silt with low plasticity
- **CL** | Clayey sands, sand-clay mixtures
- **GM** | Silty gravels, gravel-sand-silt mixtures
- **GC** | Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell):** **Black/Dark Greenish Br. 10 YR 2.5/1**

**Color (Munsell):**

- **Visible Organic Matter:** Yes ☑ No ☐
- **Description:** Decomposed organic

- **Odors:** Yes ☑ No ☐
- **Description:** Slight
- **Decomposed, sewage odor**

**Sampler Penetration:** 10-15 cm

**Cultural Resources Notes:** URS Archaeologist - Mike Kelly ☑ Sarah McDaniel ☐

(Several line notes and signatures)

**Other Notes:**

**Boat:** Pelouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo Directory:** UCR Sed 6-22-2010

**Photo File:** No photo collected or sample info 042-043

**Sample Labeling (Refer to QAPP and Sample Key):**

- Sample No. = EAF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 0410 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00  Sample Tag: T 005

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<thead>
<tr>
<th>LOCATION NAME</th>
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<tbody>
<tr>
<td>☐ Deadman's Eddy</td>
<td>☐ China Bend</td>
<td>☐ Upper Marcus Flats</td>
<td>☐ Lower Marcus Flats</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOCATION CODE</th>
<th>STATION NO.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>DME</td>
<td>☐ 01</td>
<td>☐ 02</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>GRAB SAMPLE NO. (001 THROUGH 010)*</th>
<th>SAMPLE IDENTIFIER</th>
<th>LOCATION - STATION NO. - GRAB NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>005</td>
<td>LMF . 01 . 005</td>
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</table>

*Grab Sample = One Bucket

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
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<tbody>
<tr>
<td>19.7 M / FT</td>
<td>5389530</td>
<td>419598</td>
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</table>

<table>
<thead>
<tr>
<th>PHYSICAL CHARACTERISTICS</th>
<th></th>
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<tbody>
<tr>
<td>☐ SW</td>
<td>Well graded sand, gravelly sand, little to no fines.</td>
</tr>
<tr>
<td>☐ SM</td>
<td>Silty sands, sand-silt mixtures</td>
</tr>
<tr>
<td>☐ GW</td>
<td>Well graded gravels, gravel-sand mixtures, little to no fines</td>
</tr>
<tr>
<td>☐ SP</td>
<td>Poorly graded sand, gravelly sand, little to no fines.</td>
</tr>
<tr>
<td>☐ SC</td>
<td>Clayey sands, sand-clay mixtures</td>
</tr>
<tr>
<td>☐ GP</td>
<td>Poorly graded gravels, gravel-sand mixtures, little to no fines</td>
</tr>
<tr>
<td>☐ ML</td>
<td>Inorganic siltys, very fine sands, rack flour, silt or clay silts with low plasticity</td>
</tr>
<tr>
<td>☐ CL</td>
<td>Clayey sands, sand-clay mixtures</td>
</tr>
<tr>
<td>☐ GM</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td>☐ GC</td>
<td>Clayey gravels, gravel-sand-clay mixtures</td>
</tr>
</tbody>
</table>

Color (Munsell)  Dark grayish gray 7.5G 3/1
Color (Munsell)  Dark yellowish brown 7.5YR 4/4

Matrix Color / Grain Size Notes:
Lamal (light streaky) of yellowbrown

Visible Organic Matter Yes ☐ No ☑ Description: Decomposed organic matter (Slight sign of yellowbrown)

Odors Yes ☐ No ☑ Description: Savage odor, silvery

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☑

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☑ Sarah McDaniel ☐
Cultural Resources Observed: Yes ☐ No ☑

(Unless referred to URS archaeologist field monitoring notes)

Other Notes:
River mud, silt, organic matter, few very fine sands

Boat: Palouse (Gravity Environmental) Photo Directory: UCR Sed 6-22-2010
Sampler Type: Power Grab (Gravity Environmental) Photo File: 044 - 046

Sampler Name: Jeff Degro Photo Directory: UCR Sed 6-22-2010
Sample Signature: Jeff Degro

Date: 6.22.2010
Time: 15.54

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
Sample No.: SD00  
Sample Tag: T  

LOCATION NAME:  
☐ Deadman's Eddy  ☐ China Bend  ☐ Upper Marcus Flats  ☐ Lower Marcus Flats  ☐ Alternate

LOCATION CODE:  
☐ DME  ☐ CB  ☐ UMF  ☐ LMF  

STATION NO.:  
☐ 01  ☐ 02  ☐ 03

GRAB SAMPLE NO. (001 THROUGH 010)*: 006
*Grab Sample = One Bucket

SAMPLE IDENTIFIER: LMF. 01 . 006

WATER DEPTH: 19.0 (M/FT)

UTM Northing (NAD83): 5384530

UTM Easting (NAD83): 419605

PHYSICAL CHARACTERISTICS:

☐ SW  ☐ SM  ☐ GW  ☐ GC  
Well graded sand, gravelly sand, little to no fines.  Silty sands, sand-silt mixtures  Well graded gravels, gravel-sand mixtures, little to no fines  Clayey gravels, gravel-sand-clay mixtures

☐ SP  ☐ SC  ☐ GP  ☐ GM  
Poorly graded sand, gravelly sand, little to no fines.  Clayey sands, sand-clay mixtures  Poorly graded gravels, gravel-sand mixtures, little to no fines  Silty gravels, gravel-sand-silt mixtures

☐ ML  ☐ CL  ☐  
Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity  Clayey sands, sand-clay mixtures

Color (Munsell): 10 YR Very dark gray  10 YR 3.1

Visible Organic Matter: Yes ☐ No ☐
Description: Decomposing organic matter

Odors: Yes ☐ No ☐
Description: Slight sewage to sulfur smell, decomposing organic matter

Sampler Penetration: 25 cm

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☐

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ Sarah McDaniel ☐
(Please refer to URS archaeologist field monitoring notes)

Other Notes:

Boat: Palouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6-22-2010

Photo File: No Photo of Sample - Info Only

Sample Labeling (Refer to QAPP and Sample Key):
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120, Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>NP = Northport</td>
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<tr>
<td>STATION NO.</td>
<td>001</td>
<td>02</td>
<td>03</td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRAB SAMPLE NO. (001 THROUGH 010)*</th>
<th>007</th>
<th>SAMPLE IDENTIFIER</th>
<th>LMF: 01: 007</th>
<th>LOCATION - STATION NO. - GRAB NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER DEPTH</td>
<td>18.9</td>
<td>UTM Northing (NAD83)</td>
<td>5389529</td>
<td>UTM Easting (NAD83)</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures.
- **SC**: Clayey sands, sand-clay mixtures.
- **CL**: Clayey sands, clayey mixtures.
- **ML**: Inorganic silt, very fine sand, rock flour, silt or clay silt with low plasticity.
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines.
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- **GM**: Silty gravels, gravel-sand-silt mixtures.

**Color (Munsell)**: Very dark gray + black

**Visible Organic Matter**: Yes

**Odor**:
- **NO**: No
- **DEC**: Decomposing Organic Matter
- **SLG**: Slight sewage + slight odor + decomposing organic matter

**Sampler Penetration**: 20 cm

**Other Notes**:

- **Cultural Resources Notes**: URS Archaeologist - Mike Kelly / Sarah McDaniel
- **Photo Directory**: UCRC Sed 6_22_2010
- **Sampler Name**: Jeff Leppo
- **Sample Signature**:
- **Date**: 6/22/2010
- **Time**: 16:30
- **Boat**: Palouse (Gravity Environmental)
- **Sampler Type**: Power Grab (Gravity Environmental)
- **Sample Labeling (Refer to QAPP and Sample Key)**
  - Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
  - Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
  - Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No. : SD00    Sample Tag : T 08

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
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<tr>
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<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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</tr>
<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
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GRAB SAMPLE NO. (001 THROUGH 010)* 008

SAMPLE IDENTIFIER LMF - 01 - 008
LOCATION - STATION NO. - GRAB NO.

WATER DEPTH 19.3 (M. FT) UTM Northing (NAD83) 5389530 UTM Easting (NAD83) 419592

PHYSICAL CHARACTERISTICS

- **SW** Well graded sand, gravelly sand, little to no fines.
- **SM** Silty sands, sand-silt mixtures
- **GW** Well graded gravels, gravel-sand mixtures, little to no fines
- **SP** Poorly graded sand, gravelly sand, little to no fines.
- **SC** Clayey sands, clay-silt mixtures
- **GP** Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML** Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL** Clayey sands, clay-silt mixtures
- **GM** Silty gravels, gravel-sand-silt mixtures

Color (Munsell) Very dark gray to black 10YR 3/1

Visible Organic Matter Yes ✔ No ☐ Description: Decomposing organic matter

Odors Yes ☐ No ✔ Description: Slight sewage odor, sulfurous

Sampler Penetration: 10 to 15 cm

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ✔

Cultural Resources Notes: URS Archaeologist - Mike Kelly ✔ Sarah McDaniel ☐ Cultural Resources Observed: Yes ☐ No ✔

(Please refer to URS archaeologist field monitoring notes)

Other Notes:

Boat: Palouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR SED 6-22-2010
Photo File: 052-053

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

Sampler Name: [Signature]
Sample Signature: [Signature]
Date: 6/3/2010
Time: 16:35
**FIELD SAMPLE LOG - SEDIMENTS**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  

**Sample No.**: SD00  
**Sample Tag**: T 009

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Band</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
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<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td>NP = Northport</td>
<td>LD = Lower Dalles</td>
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</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)***: 009  
*Grab Sample = One Bucket  
**SAMPLE IDENTIFIER**: LMF. 01.009  
**LOCATION - STATION NO. - GRAB NO.**

**WATER DEPTH**: 19.2 (M) FT  
**UTM Northing (NAD83)**: 5389527  
**UTM Easting (NAD83)**: 419592

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.  
- **SM**: Silty sands, sand-silt mixtures  
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines  
- **SP**: Poorly graded sand, gravelly sand, little to no fines  
- **SC**: Clayey sands, clay-sand mixtures  
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines  
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity  
- **CL**: Clayey sands, clay-sand mixtures  
- **GM**: Silty gravels, gravel-sand-silt mixtures  
- **GC**: Clayey gravels, gravel-sand-clay mixtures  

**Color (Munsell)**: Very dark grayish brown 10 YR 3 2

**Visible Organic Matter**: Yes  
**Description**: Decomposed organic material

**Odors**: Yes  
**Description**: Sewage/sulfur odor, very slight

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes  
- Occasional fish writhed roots, 1 to 2 mm in diameter

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly  
Sarah McDaniel  
**Cultural Resources Observed**: Yes

**Other Notes**:

**Boat**: Palouse (Gravity Environmental)  
**Photo Directory**: UCR Sed 6-22-2010  
**Sampler Type**: Power Grab (Gravity Environmental)  
**Photo File**: No photo + sample info only

**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (1 per station)

**Sampler Name**: Jeff Lopez  
**Sample Signature**:  
**Date**: 6/22/2010  
**Time**: 16:50

Sediment Field Form U/S rev 2.1.0
### FIELD SAMPLE LOG - SEDIMENTS

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**
**United States Locations/Stations**

**Sample No.:** SD00  
**Sample Tag:** T  

| LOCATION NAME | | | | |
|---------------|---------------|---------------|---------------|
| ☐ Deadman’s Eddy | ☐ China Bend | ☐ Upper Marcus Flats | ☑ Lower Marcus Flats | ☐ Alternate |

<table>
<thead>
<tr>
<th>LOCATION CODE</th>
<th>STATION NO.</th>
<th>GRAB SAMPLE NO. (001 THROUGH 010)*</th>
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</thead>
<tbody>
<tr>
<td>DME</td>
<td>☑ 01</td>
<td>010</td>
</tr>
<tr>
<td>CB</td>
<td>☐ 02</td>
<td></td>
</tr>
<tr>
<td>UMF</td>
<td>☐ 03</td>
<td></td>
</tr>
</tbody>
</table>

**WATER DEPTH:** 19.6 (M / FT)  
**UTM Northing (NAD83):** 419590  
**UTM Easting (NAD83):** 5389529

### PHYSICAL CHARACTERISTICS

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures.
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines.
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, clay-sand mixtures.
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
- **CL**: Clayey sands, clay-sand mixtures.
- **GM**: Silty gravels, gravel-sand-silt mixtures.
- **GC**: Clayey gravels, gravel-sand-clay mixtures.

**Color (Munsell):** Very dark grayish brown 10 YR 3 2

**Visible Organic Matter:** Yes ☑ No ☐  
**Description:** Decomposing organic matter

**Odors:** Yes ☑ No ☐  
**Description:** Sewage/sulfur odor

**Obvious Abnormalities (wood, shells, organisms, etc):** Yes ☐ No ☑

### Cultural Resources Notes:

- **URS Archaeologist:** - Mike Kelly  
- **Sarah McDaniel:** ☑  
- **Cultural Resources Observed:** Yes ☑ No ☐

**Other Notes:** River mud - more silt/high liquid to solids content

### Boat:

- **Palouse (Gravity Environmental)**

### Sampler Type:

- **Power Grab (Gravity Environmental)**

### Photo Directory:

- **UCB Sed 6. 22. 2010**

### Sampler Name:

- **Jeff Lappo**

### Sampler Signature:

- **[Signature Image]**

**Date:** 6 / 22 / 2010  
**Time:** 17:05

### Sample Labeling (Refer to QAPP and Sample Key)

- **Sample No.:** LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- **Sample Tag No. Example:** T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- **Grab Sample No. Example:** 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  
June 2010

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<th>WATER DEPTH</th>
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<th>UTM Northing (NAD83)</th>
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<table>
<thead>
<tr>
<th>UTM Easting (NAD83)</th>
<th>418461</th>
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**PHYSICAL CHARACTERISTICS**

| SW | Well graded sand, gravelly sand, little to no fines. |
| SM | Silty sands, sand-silt mixtures |
| SP | Poorly graded sand, gravelly sand, little to no fines. |
| SC | Clayey sands, sand-clay mixtures |
| ML | Inorganic silt, very fine sands, rock flour, silt or clay silt with low plasticity |
| CL | Clayey sands, sand-clay mixtures |
| GW | Well graded gravels, gravel-sand mixtures, little to no fines |
| GP | Poorly graded gravels, gravel-sand mixtures, little to no fines |
| GM | Silty gravels, gravel-sand-silt mixtures |
| GC | Clayey gravels, gravel-sand-clay mixtures |

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<th>Color (Munsell)</th>
<th>10YR Black 10 YR 2 1</th>
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<tr>
<th>Visible Organic Matter</th>
<th>Yes</th>
<th>No</th>
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<table>
<thead>
<tr>
<th>Description</th>
<th>roots, cones, sticks</th>
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<table>
<thead>
<tr>
<th>Odors</th>
<th>Yes</th>
<th>No</th>
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<table>
<thead>
<tr>
<th>Description</th>
<th>musty odor</th>
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| Obvious Abnormalities (wood, shells, organisms, etc): Yes | No |

| See "other Notes" | Reddish colored - leech, worm. Placed in bucket |

<table>
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<tr>
<th>Cultural Resources Notes: URS Archaeologist - Mike Kelly</th>
<th>Yes</th>
<th>Sarah McDaniel</th>
</tr>
</thead>
</table>

| Cultural Resources Observed: Yes | No |

**Other Notes:**

- Reject first power grab - stick stuck inside of clam jars. Woody debris - stick size 2 to 15 mm diameter. Pine cones, decomposed.

- cm Silt over black sand. Roots and some woody debris in first sampler. Move boat.

**Boat:** Pelouse (Gravity Environmental)  
**Photo Directory:** UCR Sed 6-23-2010  
**Sampler Type:** Power Grab (Gravity Environmental)  
**Photo File:** 069-080

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<tr>
<th>Sampler Name</th>
<th>Jeff Lepp</th>
</tr>
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<table>
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<tr>
<th>Sample Signature</th>
<th>J.G. Apple</th>
</tr>
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<tr>
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<tr>
<th>Time</th>
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**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME- SD0010 through SD0012 (Three sample no. per location)  
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00
Sample Tag: T012

LOCATION NAME
☐ Deadman’s Eddy
☐ China Bend
☐ Upper Marcus Flats
☐ Lower Marcus Flats
☐ Alternate

LOCATION CODE
☐ DME
☐ CB
☐ UMF
☐ LMF

STATION NO.
☐ 01
☐ 02
☐ 03

GRAB SAMPLE NO. (001 THROUGH 010)* 002
SAMPLE IDENTIFIER
LMF 02 002
LOCATION - STATION NO. - GRAB NO.

WATER DEPTH
44.3
(M / FT) 5390160
UTM Northing (NAD83)
UTM Easting (NAD83) 418461

PHYSICAL CHARACTERISTICS
☐ SW
☑ SP
☐ ML
☐ SM
☐ SC
☐ CL
☐ GW
☐ GC
☐ GM
☐ GC

Well graded sand, gravelly sand, little to no fines.
Poorly graded sand, gravelly sand, little to no fines.
Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
Silty sands, sand-silt mixtures
Clayey sands, sand-clay mixtures
Clayey sands, sand-clay mixtures
Well graded gravels, gravel-sand mixtures, little to no fines
Clayey gravels, gravel-sand-clay mixtures
Silty gravels, gravel-sand-silt mixtures
Clayey gravels, gravel-sand-clay mixtures

Matrix Color / Grain Size Notes:
Very dark grayish brown
Block

Color (Munsell)

Brown silt over black sands

Visible Organic Matter
Yes ☐ No ☐ Description: Small woody sticks/stems

Odors
Yes ☐ No ☐ Description: Musky

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☐
Wood fragments - sticks

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☐
(Cultural Resources Observed: Yes ☐ No ☐)

Other Notes:
Varying silt thickness overlying black sand. Seeds are primarily
poorly graded medium. Silt thickness difficult to define, dependant
on location of grab. Poor recovery on sample, which are rejected.

Boat: Patouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Sampler Name: Jeff Lepp
Sample Signature: clark
Date: 6/23/2010
Time: 10:35

Photo Directory: UCR Sed 6.23.2010
Photo File: 081 - 084

Sample Labeling (Refer to QAPP and Sample Key)
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004
through SD0006, CB - SD0007 through SD0009, DME - SD0010
through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120, Sequential based on
collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
Sample No.: SD00 02
Sample Tag: T013

LOCATION NAME
☐ Deadman’s Eddy
☐ China Bend
☐ Upper Marcus Flats
☒ Lower Marcus Flats
☐ Alternate

LOCATION CODE
DME
CB
UMF
LMF

STATION NO.
☐ 01
☒ 02
☐ 03

GRAB SAMPLE NO. (001 THROUGH 010)*
003

SAMPLE IDENTIFIER
LMF. 02.003

LOCATION - STATION NO. - GRAB NO.

WATER DEPTH
45.2 (M / FT)

UTM Northing (NAD83)
5390158

UTM Easting (NAD83)
418460

PHYSICAL CHARACTERISTICS

☐ SW
Well graded sand, gravelly sand, little to no fines.

☐ SM
Silty sands, sand-silt mixtures

☐ GW
Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP
Poorly graded sand, gravelly sand, little to no fines.

☐ SC
Clayey sands, sand-clay mixtures

☐ GP
Poorly graded gravels, gravel-sand mixtures, little to no fines

☐ ML
Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity

☐ CL
Clayey sands, sand-clay mixtures

☐ GM
Silty gravels, gravel-sand-silt mixtures

Color (Munsell) Very dark grayish brown YR 3/1

Matrix Color / Grain Size Notes:

Visible Organic Matter
Yes ☒ No ☐ Description: organic litter

Odors
Yes ☒ No ☐ Description: musky

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☒
Clam, small organic debris (few)

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☒ Sarah McDaniel ☐
(If any remarks please refer to Cultural Resources field monitoring notes)

Other Notes:
Less silt within this sample. Primarily black sands, mixed with silts. Layered silt, but less on this grab

Boat: Pelouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: U12 Sed 6.23.2010

Sampler File: 085-087

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. - LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T021 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

Sample Name: Jeff Lapp
Sample Signature: J.L.
Date: 6.23.2010
Time: 10:55
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00 02
Sample Tag: T 0 1 4

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GRAB SAMPLE NO. (001 THROUGH 010)* 004
SAMPLE IDENTIFIER LMF . 02 . 004
LOCATION - STATION NO. - GRAB NO.

WATER DEPTH (M / FT) 43.9
UTM Northing (NAD83) 5390 150
UTM Easting (NAD83) 418467

PHYSICAL CHARACTERISTICS

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures

Color (Munsell) - **Black sand** 10 YR 2 1
Color (Munsell) - **Dark brown** 10 YR 3 3

Visible Organic Matter: Yes ☑
Description: Sticks, stems

Odors: Yes ☑
Description: Musky, nondescript

Obvious Abnormalities (wood, shells, organisms, etc.): Few sticks 10 to 20mm, chorga in and size limit grabs

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☑
Cultural Resources Observed: Yes ☑
(Please refer to URS archaeologist field monitoring notes)

Other Notes:
Black sand overlain by silt. 2 failed attempts on recovery due to sticks, clams.

Boat: Patouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6-23-2010
Photo File: U88-091

Sampler Name: Jeff Koop
Sample Signature: Jeff Koop
Date: 6/23/2010
Time: 11:15
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

June 2010

Sample No.: SD00 02  Sample Tag: T 01 5

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<th>☐ China Bend</th>
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GRAB SAMPLE NO. (001 THROUGH 010)* 005  SAMPLE IDENTIFIER LMF .02 .005

*Grab Sample = One Bucket

WATER DEPTH (M / FT) 41.7  UTM Northing (NAD83) 539061  UTM Easting (NAD83) 418463

PHYSICAL CHARACTERISTICS

☐ SW  Well graded sand, gravelly sand, little to no fines.
☐ SM  Silty sands, sand-silt mixtures
☐ GW  Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP  Poorly graded sand, gravelly sand, little to no fines.
☐ SC  Clayey sands, sand-clay mixtures
☐ GP  Poorly graded gravels, gravel-sand mixtures, little to no fines

☐ ML  Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
☐ CL  Clayey sands, sand-clay mixtures
☐ GM  Silty gravels, gravel-sand-silt mixtures

Color (Munsell)  Black  10 YR 2.1
Color (Munsell)  Dark brown  10 YR 4.3

Matrix Color / Grain Size Notes:
Silts over mixed sand matrix

Visible Organic Matter  Yes ☑ No ☐ Description:  Stems, sticks

Odors  Yes ☑ No ☐ Description:

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☑

Woody debris, sticks & branches limit closure, located @ surface

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ Sarah McDaniel ☑ Cultural Resources Observed: Yes ☐ No ☑
(Yes refer to URS archaeologist field monitoring notes)

Other Notes:

Dark brown silt over black sands, some yellowish brown sand grains (poorly). Sampler is draining.

Attempt 3 grabs to get 1/3 bucket, approx 2 gallons.

Continue for 3 odd. grabs w/ no success.

Sampler Type: Power Grab (Gravity Environmental)  Photo File: O92-095

Sampler Name: Jeff Leppo
Sample Signature: 

Date: 6/23/2010  Time: 11:35

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00 02
Sample Tag: T 016

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<td>GRAB SAMPLE NO.</td>
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<td>WATER DEPTH (M/FT)</td>
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<td></td>
<td>UTM Easting (NAD83)</td>
<td>418473</td>
</tr>
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PHYSICAL CHARACTERISTICS

- SW: Well graded sand, gravelly sand, little to no fines.
- SM: Silty sands, sand-silt mixtures
- GW: Well graded gravels, gravel-sand mixtures, little to no fines
- SP: Poorly graded sand, gravelly sand, little to no fines.
- SC: Clayey sands, sand-clay mixtures
- GP: Poorly graded gravels, gravel-sand mixtures, little to no fines
- ML: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- CL: Clayey sands, sand-clay mixtures
- GM: Silty gravels, gravel-sand-silt mixtures

Color (Munsell): Black 10 YR 2.1
Color (Munsell): Dark brown 10 YR 4/3

Visible Organic Matter: Yes ☑ No ☐
Description: See below

Odors: Yes ☑ No ☐
Description: Mixed

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☑

Woody debris prevalent - branches @ surface & near surface

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☑ Sarah McDaniel ☐ Cultural Resources Observed: Yes ☐ No ☑

(Unless refers to URS archaeologist field monitoring notes)

Other Notes:
Predominantly black sands w/ yellow grains, mixed, poorly graded. Unable to close sampler, continue until refusal for station (per SOP-4) > 3 attempts.

Boat: Palouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Sampler Name: Jeff Lappo
Sample Signature: 02 06 12 10
Date: 06 12 23 2010
Time: 11:45

Photo Directory: No photo
Photo File: No photo

Sample Labeling (Refer to QAPP and Sample Key)
Sample No.: LMF - SD0001 through SD0035, UMF - SD0036 through SD0065, CB - SD0066 through SD0095, DME - SD0096 through SD0102 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  

**Sample No.: SD00**  
Sample Tag: T 02 1  

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**GRAB SAMPLE NO. (001 THROUGH 010)***  
001  
SAMPLE IDENTIFIER: LMF.03.001  
LOCATION - STATION NO. - GRAB NO.  
WATER DEPTH: 28.9 (M / FT)  
UTM Northing (NAD83): 5389419  
UTM Easting (NAD83): 418537

**PHYSICAL CHARACTERISTICS**

- **SW** Well graded sand, gravelly sand, little to no fines.  
- **SM** Silty sands, sand-silt mixtures  
- **GW** Well graded gravels, gravel-sand mixtures, little to no fines  
- **SP** Poorly graded sand, gravelly sand, little to no fines.  
- **SC** Clayey sands, sand-clay mixtures  
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- **CL** Clayey sands, clay-silt mixtures  
- **GM** Silty gravels, gravel-sand-silt mixtures  
- **GC** Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**  
Dark yellowish brown 10YR 4/6  
Dark grayish brown 10YR 4/2  

**Visible Organic Matter**  
Yes [✓] No [ ] Description: Wood debris, sticks  

**Odors**  
Yes [✓] No [ ] Description: 

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes [✓] No [ ]  
Wood debris on surface. Dimensions of lumber piece - color?

**Cultural Resources Notes:** URS Archaeologist - Mike Kelly  
Sarah McDaniel  
(Cultural Resources Observed: Yes [✓] No [ ]  
NPS - Checked lumber lot. No artifacts, confirmed by Jim Petzer)

**Other Notes:**  
Matrix is yellowish brown silt over sand-gravel mixture, color dependent on parent materials for coarse materials. Frequent cobbles and boulders in sample collection - unable to close sampler. Collect enough for one (1) sediment bucket. Attempts approx 3rd 4.

**Boat:** Palouse (Gravity Environmental)  
**Photo Directory:** UCR Sed 6-23-2010  
**Sampler Type:** Power Grab (Gravity Environmental)  
**Photo File:** 096-109

**Sampler Name:**  
**Sample Signature:**  
**Date:** 6/23/2010  
**Time:** 13:25

---

**Sample Labeling (Refer to QAPP and Sample Key)**  
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)  
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.  
Grab Sample No. Example - 001 through 010 (10 per station)

---
**FIELD SAMPLE LOG - SEDIMENTS**

Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations

**June 2010**

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<td>LOCATION - STATION NO. - GRAB NO.</td>
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<td>WATER DEPTH (M / FT)</td>
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<td>UTM Northing (NAD83)</td>
<td>5389405</td>
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<tr>
<td></td>
<td></td>
<td>UTM Easting (NAD83)</td>
<td>418541</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- □ SW: Well graded sand, gravelly sand, little to no fines.
- □ SM: Silty sands, sand-silt mixtures
- □ GW: Well graded gravels, gravel-sand mixtures, little to no fines
- □ SP: Poorly graded sand, gravelly sand, little to no fines
- □ SC: Clayey sands, sand-clay mixtures
- □ GP: Poorly graded gravels, gravel-sand mixtures, little to no fines
- □ ML: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- □ CL: Clayey sands, sand-clay mixtures
- □ GM: Silty gravels, gravel-sand-silt mixtures

**Color (Munsell)**

- Dark yellowish brown 10YR 4/6

**Color (Munsell)**

- Dark grayish brown 10YR 4/2

**Visible Organic Matter**

- Yes ☑ No [ ]

**Description:** Wood debris

**Odors**

- Yes ☑ No [ ]

**Description:** None

**Obvious Abnormalities (wood, shells, organisms, etc):** Yes ☑ No [ ]

Wood debris present on surface & near surface - branches, stems

**Cultural Resources Notes:** URS Archaeologist - Mike Kelly  ☑ Sarah McDaniel [ ]

(Check your refer to URS archaeologist field monitoring notes)

**Other Notes:**

- Gravels and cobbles prevent sampler closing / samples per SOP 4
- Continue with attempts from T021 to total of approx 4 for this grab. Rejection on LMF 03

**Boat:** Palouse (Gravity Environmental)

**Photo Directory:** UCR Sed 6-23-2010

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo File:** 110-112

**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No. = LMF - SD0001 through SD0003; UMF - SD0004 through SD0006; CB - SD0007 through SD0009; DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)

**Sampler Name:** Jeff Leppo

**Sample Signature:** [Signature]

**Date:** 6/2/2010

**Time:** 13:40
**FIELD SAMPLE LOG - SEDIMENTS**

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**
**United States Locations/Stations**

**June 2010**

<table>
<thead>
<tr>
<th>Sample No. : SD00</th>
<th>Sample Tag : T 03 1</th>
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<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>□ Deadman's Eddy</th>
<th>□ China Bend</th>
<th>✓ Upper Marcus Flats</th>
<th>□ Lower Marcus Flats</th>
<th>□ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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</tr>
<tr>
<td>STATION NO.</td>
<td>✓ 01</td>
<td>□ 02</td>
<td>□ 03</td>
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</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)*** 001

*Grab Sample = One Bucket

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>(M/FT)</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
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</thead>
<tbody>
<tr>
<td>29.3</td>
<td></td>
<td>5391679</td>
<td>422645</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**

- Very dark gray 10 YR 3/1
- Yellowish brown 10 YR 5/4

**Visible Organic Matter**: Yes ✓ No □

**Odors**: Yes □ No ✗

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes □ No ✗

- Fine wood debris, roots, stems, bark, mixed in upper profile, more decomposition apparent w/depth?
- Freshwater clams.

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly ☑ Sarah McDaniel ✓ Cultural Resources Observed: Yes  No ☑

(Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

- Some silt mixed in profile, minor accumulation in upper profile (mixed)
- Mixed sand parent material - black sand w/ yellowish brown medium & coarse sands, silt & pebbles/fleck. Overall color very dark gray
- Predominate sands.

**Boat**: Palouse (Gravity Environmental)

**Sampler Type**: Power Grab (Gravity Environmental)

**Photo Directory**: UCR Sed G.24-10

**Sampler Name**: Jeff Logue

**Sample Signature**: On File

**Date**: 6/24/2010

**Time**: 12:10

**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No. = UMF - SD0001 through SD0003, UMF - SD0004 through SD0008, CB - SD0009 through SD0010, DME - SD0010 through SD0012 (three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and line. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**

Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

<table>
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<table>
<thead>
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<th>☐ China Bend</th>
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<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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</tr>
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<td>☑ 01</td>
<td>☐ 02</td>
<td>☐ 03</td>
<td></td>
<td></td>
</tr>
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</table>

GRAB SAMPLE NO. (001 THROUGH 010)*: 002
SAMPLE IDENTIFIER: UMF-01.002
LOCATION - STATION NO. - GRAB NO.

**WATER DEPTH**
29.4 ft

**UTM Northing (NAD83)**
5391680

**UTM Easting (NAD83)**
422648

**PHYSICAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th></th>
<th>Well graded sand, gravelly sand, little to no fines.</th>
<th>Silty sands, sand-silt mixtures</th>
<th>Well graded gravels, gravel-sand mixtures, little to no fines.</th>
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</thead>
<tbody>
<tr>
<td>SW</td>
<td>☑</td>
<td>SM</td>
<td>GW</td>
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<tr>
<td>SP</td>
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</tr>
<tr>
<td>ML</td>
<td>☐</td>
<td>CM</td>
<td>GM</td>
</tr>
</tbody>
</table>

**Color (Munsell)**

<table>
<thead>
<tr>
<th>Color (Munsell)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very dark grey</td>
</tr>
</tbody>
</table>

**Visible Organic Matter**

| Yes ☑ No ☐ |

**Description:**

- Severely decomposing organic matter
- Mixed sand materials

**Odors**

| Yes ☑ No ☐ |

**Description:**

- Small wood debris - stems, bark (decomposing), litter

**Obvious Abnormalities**

- Wood debris, stems, bark (decomposing), litter

**Cultural Resources Notes:**

- URS Archaeologist: Mike Kelly
- Sarah McDaniel

**Cultural Resources Observed:** Yes ☑ No ☐

(Refer to URS archaeologist field monitoring notes)

**Other Notes:**

Silt content in upper profile varied (%)

<table>
<thead>
<tr>
<th>Boat: Palouse (Gravity Environmental)</th>
<th>Photo Directory: UCR Sed G.24.10</th>
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<tbody>
<tr>
<td>Sampler Type: Power Grab (Gravity Environmental)</td>
<td>Photo File: 168-169</td>
</tr>
</tbody>
</table>

**Sample Labeling (Refer to QAPP and Sample Key)**
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012. (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)

**Sample Name:**

Jareld

**Sample Signature:**

Jareld

**Date:** 6/24/2010

**Time:** 12:20
### Field Sample Log - Sediments

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**

**United States Locations/Stations**

**Sample No.: SD00**

**Sample Tag:** T033

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<thead>
<tr>
<th>LOCATION NAME</th>
<th>☑ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☑ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
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</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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</tr>
<tr>
<td>STATION NO.</td>
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<td>03</td>
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**Grab Sample No. (001 through 010)***

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>UTILITY Northing (NAD83)</th>
<th>UTILITY Easting (NAD83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.3 (M/FT)</td>
<td>5391675</td>
<td>422647</td>
</tr>
</tbody>
</table>

**Physical Characteristics**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

- **Color (Munsell)**: Very dark gray (10 YR 3/1)
- **Visibility**: Mixed parent material

**Visible Organic Matter**: Yes □ No □
- **Description**: Decomposing organic matter/litter

**Odors**: Yes □ No □
- **Description**: Decaying/decomposing bark/stems

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes □ No □
- **Description**: Silt layers win sand profile, content varies. Predominate silt. Particle size relatively homogenous, layered by textural sand and silt. Overall mixed color is very dark gray. Not continuous.

**Boat:** Pelouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)

---

**Sample Signature:**

**Date:** 6/24/2010

**Time:** 12:40
## Field Sample Log - Sediments

### Upper Columbia River - White Sturgeon Sediment Toxicity Study

**United States Locations/Stations**

**Sample No.:** SD00  \( \square 4 \)  
**Sample Tag:** T  \( \square 0 3 4 \)

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<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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<tr>
<td>STATION NO.</td>
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<td>02</td>
<td>03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Grab Sample = One Bucket*

**WATER DEPTH** (M / FT) | 29.4 | **SAMPLE IDENTIFIER** | UMF. 01.004 |
**UTM Northing (NAD83)** | 5391679 | **LOCATION - STATION NO. - GRAB NO.** |
**UTM Easting (NAD83)** | 422645 |

### Physical Characteristics

- **SW** (Well graded sand, gravelly sand, little to no fines)
- **SM** (Silty sands, sand-silt mixtures)
- **GW** (Well graded gravels, gravel-sand mixtures, little to no fines)
- **SP** (Poorly graded sand, gravelly sand, little to no fines)
- **SC** (Clayey sands, sand-clay mixtures)
- **GP** (Poorly graded gravels, gravel-sand mixtures, little to no fines)
- **ML** (Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity)
- **CL** (Clayey sands, sand-clay mixtures)
- **GM** (Silty gravels, gravel-sand-silt mixtures)
- **GC** (Clayey gravels, gravel-sand-clay mixtures)

**Color (Munsell)**: Very dark gray 10 YR 3/1

**Matrix Color / Grain Size Notes:**

**Visible Organic Matter**: Yes \( \square \) No \( \square \)  
Description: Litter, debris

**Odors**: Yes \( \square \) No \( \square \)  
Description:

**Obvious Abnormalities (wood, shells, organisms, etc)**: Yes \( \square \) No \( \square \)  
Description: Decomposing litter & organic matter

### Cultural Resources Notes:

- **URS Archaeologist - Mike Kelly** \( \square \) / **Sarah McDaniel** \( \square \)  

(Please refer to URS archaeologist field monitoring notes)

### Other Notes:

Silt layered/mixed w/ profile, discontinuous - difficult to determine in situ the %silt in profile - cover.

### Boat:
Palouse (Gravity Environmental)

### Sampler Type:
Power Grab (Gravity Environmental)

**Photo Directory:** UCRC Sed 6.24.10

**Photo File:** 173 - 176

**Sampler Name:** Jeff 2000

**Sample Signature:**

**Date:** 6/24/2010

**Time:** 12:50

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**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicty Study
United States Locations/Stations

**Sample No.: SD00**

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<tbody>
<tr>
<td>☐ Deadman's Eddy</td>
<td>☐ China Bend</td>
<td>☐ Upper Marcus Flats</td>
<td>☐ Lower Marcus Flats</td>
<td>☐ Alternate</td>
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<table>
<thead>
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<td>CB</td>
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<td>UMF</td>
<td>03</td>
</tr>
<tr>
<td>LMF</td>
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</table>

**GRAB SAMPLE NO. (001 THROUGH 010)***
005

**SAMPLE IDENTIFIER**
UMF - 01 - 005

**WATER DEPTH**
29.2' (M / FT)

**UTM Northing (NAD83)**
54391679

**UTM Easting (NAD83)**
422645

**PHYSICAL CHARACTERISTICS**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ SW</td>
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<td>☐ SP</td>
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</tr>
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<td></td>
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<td>☐ SC</td>
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<td>☐ GW</td>
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<td>☐ GP</td>
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</tr>
<tr>
<td>☐ GM</td>
<td></td>
</tr>
<tr>
<td>☐ GC</td>
<td></td>
</tr>
</tbody>
</table>

**Color (Munsell):** very dark gray

**Color (Munsell):**

**Visible Organic Matter:** Yes [X] No [ ]
Description: Litter, debris

**Odors:** Yes [ ] No [X]
Description:

**Obvious Abnormalities (wood, shells, organisms, etc):** Yes [ ] No [X]
Description:
Some organic litter, decomposing bark, algae, freshwater clam.

**Cultural Resources Notes:**
URS Archaeologist - Mike Kelly [X] Sarah McDaniel [ ]
Cultural Resources Observed: Yes [ ] No [X]
(please refer to URS archaeologist field monitoring notes)

**Other Notes:**
Less silt w/ this grab sample. Salt pepper sized, well graded.

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo Directory:** UCR Sd 6-24-10

**Photo File:** 177 - 180

**Sampler Name:** Jeff Lepper

**Sample Signature:**

**Date:** 6/24/2010

**Time:** 13:00

**Sample Labeling (Refer to QAPP and Sample Key):**
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
# FIELD SAMPLE LOG - SEDIMENTS

Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

## Sample No.: SD00 04
Sample Tag: T 036

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<th>☑ Upper Marcus Flats</th>
<th>☑ Lower Marcus Flats</th>
<th>☑ Alternative</th>
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<td>CB</td>
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<tr>
<td>STATION NO.</td>
<td>☑ 01</td>
<td>☑ 02</td>
<td>☑ 03</td>
<td></td>
<td></td>
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</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)** [006]  **SAMPLE IDENTIFIER** [UMF 01 006]

**WATER DEPTH** 29.1 (M / FT)

**UTM Northing (NAD83)** 5391678

**UTM Easting (NAD83)** 422645

## PHYSICAL CHARACTERISTICS

- **SW**
  - Well graded sand, gravelly sand, little to no fines.

- **SM**
  - Silty sands, sand-silt mixtures

- **GW**
  - Well graded gravels, gravel-sand mixtures, little to no fines

- **SC**
  - Clayey sands, sand-clay mixtures

- **GP**
  - Poorly graded gravels, gravel-sand mixtures, little to no fines

- **CL**
  - Clayey sands, sand-clay mixtures

- **GM**
  - Silty gravels, gravel-sand-silt mixtures

- **GC**
  - Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**: Very dark gray 10 YR 3/2-

**Visible Organic Matter**: Yes [☑]  No [☐]
- Description: Decomposing organic matter

**Odors**: Yes [☑]  No [☐]
- Description: Mixed Parent Material

**Obvious Abnormalities** (wood, shells, organisms, etc.): Yes [☑]  No [☐]
- Description: Organic matter; wild roots, bark, stems

**Cultural Resources Notes**:
- URS Archaeologist: Mike Kelly [☐] Sarah McDaniel [☑]
- Cultural Resources Observed: Yes [☑]  No [☐]

(Please refer to URS archaeologist field monitoring notes)

**Other Notes**: Salt and pepper sand mixture, well graded

**Boat**: Palouse (Gravity Environmental)

**Sampler Type**: Power Grab (Gravity Environmental)

**Photo Directory**: UCR Sed 6-24-2010

**Photo File**: 181-182

**Sampler Name**: Jeff Legato

**Sample Signature**: [Signature]

**Date**: 6/24/2010

**Time**: 13:15

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**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0008, CB - SD0009 through SD0010, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example: T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example: 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample No. : SD00**

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<tr>
<th>LOCATION NAME</th>
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<th>☐ Lower Marcus Flats</th>
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**GRAB SAMPLE NO. (001 THROUGH 010)***
*Grab Sample = One Bucket*

<table>
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<tr>
<th>WATER DEPTH (M / FT)</th>
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<tbody>
<tr>
<td>UTM Northing (NAD83)</td>
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<td>UTM Easting (NAD83)</td>
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**PHYSICAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>SW</th>
<th>Well graded sand, gravelly sand, little to no fines.</th>
<th>SM</th>
<th>Silty sands, sand-silt mixtures</th>
<th>GW</th>
<th>Well graded gravels, gravel-sand mixtures, little to no fines</th>
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<tr>
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<td></td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>Poorly graded sand, gravelly sand, little to no fines.</td>
<td>☐</td>
<td>Clayey sands, sand-clay mixtures</td>
<td>☐</td>
<td>Poorly graded gravels, gravel-sand mixtures, little to no fines</td>
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<tr>
<td>☐</td>
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<tr>
<td>ML</td>
<td>Inorganic silts, very fine sands, silt or clay silts with low plasticity</td>
<td>☐</td>
<td>Clayey sands, clay-silt mixtures</td>
<td>☐</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td>☐</td>
<td></td>
<td>☐</td>
<td></td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

**Color (Munsell)**

<table>
<thead>
<tr>
<th>Color (Munsell)</th>
<th>Verdant greyish brown 10 3.2</th>
</tr>
</thead>
</table>

**Visible Organic Matter**

<table>
<thead>
<tr>
<th>Yes ☑ No ☐</th>
<th>Description: Few fire organic litter</th>
</tr>
</thead>
</table>

**Odors**

<table>
<thead>
<tr>
<th>Yes ☑ No ☐</th>
<th>Description: Decomposing organic litter/matt</th>
</tr>
</thead>
</table>

**Obvious Abnormalities (wood, shells, organisms, etc.):**

- Decomposing organic litter/matt

**Cultural Resources Notes:**

- URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☑
- Cultural Resources Observed: Yes ☑ No ☐
- (Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

- Less silt within this sample. Dark fire scatters mixed w/ yellowish brown sands (medium, coarse); soft and pepper appearance.

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo Directory:** UCR Sed 6-24-2010

**Sampler Name:** [Signature]

**Sample Signature:** [Signature]

**Date:** 6-24-2010

**Time:** 13:45

**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0008, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**

**United States Locations/Stations**

---

**Sample No.**: SD00 04  
**Sample Tag**: T 038

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☑ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☑ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)***: 008  
**SAMPLE IDENTIFIER**: UMF 01 008  
**LOCATION - STATION NO. - GRAB NO.**: UMF 01 008

**WATER DEPTH**: (M / FT) 29.2  
**UTM Northing (NAD83)** 5391678  
**UTM Easting (NAD83)** 422643

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **CL**: Clayey sand, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-silt mixtures

**Color (Munsell)**: Very dark gray brown 10 YR 3.2

**Visible Organic Matter**: Yes ☑  
**Description**: Few materials

**Odors**: Yes ☑  
**Description**: Motzer odor

**Obvious Abnormalities (wood, shells, organisms, etc)**: Yes ☐  
**Description**: Small debris - small leaves, stems, bark

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly ☐  
**Sarah McDaniel ☑**  
**Cultural Resources Observed**: Yes ☑  
**No ☐**

**Sampler Penetration**: 20 cm

**Other Notes**: Silt content, profile still variable. Sands well graded

---

**Boat**: Palouse (Gravity Environmental)  
**Photo Directory**: UCR Sed 6-24-2010

**Sampler Type**: Power Grab (Gravity Environmental)  
**Photo File**: 185 - 187

---

**Sampler Name**: Jeff Rogers  
**Sample Signature**: [Signature]

**Date**: 6/24/2010  
**Time**: 14:00

---

**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
**Sample Tag: T 039**

**Location Name:**
- [ ] Doadman's Eddy
- [ ] China Bend
- [x] Upper Marcus Flats
- [ ] Lower Marcus Flats
- [ ] Alternate

**Location Code:**
- [x] DME
- [ ] CB
- [x] UMFIN
- [ ] LMF

**Station No.:**
- [ ] 01
- [x] 02
- [ ] 03

**Grab Sample No. (001 Through 010)*:** 009

**Sample Identifier:** UMF-01 009

**Water Depth:** 29.2 ft

**UTM Northing (NAD83):** 5391679

**UTM Easting (NAD83):** 4222646

**Physical Characteristics:**
- [x] SW: Well graded sand, gravelly sand, little to no fines.
- [ ] SM: Silty sands, sand-silt mixtures
- [ ] GW: Well graded gravels, gravel-sand mixtures, little to no fines
- [ ] SP: Poorly graded sand, gravelly sand, little to no fines.
- [ ] SC: Clayey sands, clay-sand mixtures
- [ ] GP: Poorly graded gravels, gravel-sand mixtures, little to no fines
- [ ] ML: Inorganic silts, very fine sands, silt or clay silts with low plasticity
- [ ] CL: Clayey sands, clay-sand mixtures
- [ ] GM: Silty gravels, gravel-sand-silt mixtures
- [ ] GC: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell):**
- Verdyark gray brown 10 YR 3/2

**Visible Organic Matter:** Yes [x] No [ ]

**Description:** Decomposing litter

**Odors:** Yes [x] No [ ]

**Description:**

**Obvious Abnormalities (wood, shells, organisms, etc):** Yes [ ] No [x]

- Debris litter, scattered not few

**Cultural Resources Observations:**
- Yes [x] No [ ]

**Cultural Resources Notes:**
- URS Archaeologist: Mike Kelly [x] Sarah McDaniel [ ]

**Other Notes:**
- Variable silt content. Well graded sands

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo Directory:** UCR Sed 6-24-2010

**Photo File:** 188-189

**Sampler Name:** [Signature]

**Sample Signature:** [Signature]

**Date:** 6/24/2010

**Time:** 14:15

**Sample Labeling (Refer to QAPP and Sample Key):**
- Sample No.: EMF - SD0001 through SD0003, UMFIN - SD0004 through SD0008, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

### Sample No.: SD00  O 4  Sample Tag: T 0 4 0

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
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<tbody>
<tr>
<td>Deadman's Eddy</td>
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</tr>
<tr>
<td>China Bend</td>
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</tr>
<tr>
<td>Upper Marcus Flats</td>
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<td></td>
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<tr>
<td>Lower Marcus Flats</td>
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<td>UMF</td>
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<td>LMF</td>
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<tr>
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<tr>
<td>01</td>
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<td>02</td>
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<tr>
<td>03</td>
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</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)***  010  **SAMPLE IDENTIFIER**  UMF: 01  010

**WATER DEPTH**  29.0  **UTM Northing (NAD83)**  539 1677  **UTM Easting (NAD83)**  422 643

### PHYSICAL CHARACTERISTICS

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, silt-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines
- **SC**: Clayey sands, silt-sand mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silt, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, silt-sand mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures

**Color (Munsell)**  Very dark grayish brown 7Or 3.2

**Visible Organic Matter**: Yes  ☑  No  ☐
**Odors**: Yes  ☑  No  ☐
**Obvious Abnormalities (wood, shells, organisms, etc.)**: Yes  ☑  No  ☐
**Matrix Color / Grain Size Notes**: Mixed Parent Material

**Sampler Penetration**: 20 cm

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly  ☑  Sarah McDaniel  ☐
(Cultural Resources Observed: Yes  ☑  No  ☐)

**Other Notes**: Variable silt content, settle out when placed into lexon tubs

---

**Boat**: Palouse (Gravity Environmental)

**Sampler Type**: Power Grab (Gravity Environmental)

**Photo Directory**: UCB_Sed 6-24-2010

**Photo File**: 190-191

---

**Sample Labeling (Refer to QAPP and Sample Key)**
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, LMF - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120, Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

---

**Sample Name**: Jeff Lappo

**Sample Signature**

**Date**: 6/24/2010

**Time**: 14:20
### Field Sample Log - Sediments

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**

**United States Locations/Stations**

**Sample No.**: SD0005  
**Sample Tag**: 041

<table>
<thead>
<tr>
<th>Location Name</th>
<th>Deadman’s Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
</table>
| Location Code   | DME            | CB         | UMF                | LMF                | NP = Northport  
| Station No.     | 01             | 02         | 03                 |                  | LD = Lower Dalles |

**Grab Sample No.** (001 Through 010)*  
*Grab Sample = One Bucket*  
**Sample Identifier**: UFM 02 001

**Water Depth** (M / FT)  
**UTM Northing (NAD83)**: 5390649

**UTM Easting (NAD83)**: 420597

**Physical Characteristics**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures.
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines.
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures.
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
- **CL**: Clayey sands, sand-clay mixtures.
- **GM**: Silty gravels, gravel-sand-silt mixtures.
- **GC**: Clayey gravels, gravel-sand-clay mixtures.

**Color (Munsell)**: Very Dark Grayish Brown 10YR 3.2

**Matrix Color / Grain Size Notes**: Relatively uniform

- Visible Organic Matter: Yes □ No □  
  - Description: Some decomposed organic matter.
- Odori: Yes □ No □  
  - Description: None (mousy)
- Sampler Penetration: 15-20 cm

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes □ No □

- Grasses / Vegetation: Surface - few strands green / red leech observed

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly  
Sarah McDaniel □

(Cultural Resources Observed: Yes □ No □)

(Additional field recording)

**Other Notes**: Silt matrix, very fine sands (ML).

**Boat**: Palouse (Gravity Environmental)  
**Photo Directory**: UCIR Sed 6-23-2010

**Sampler Type**: Power Grab (Gravity Environmental)  
**Photo File**: 125-128

**Sampler Name**: Jeff  
**Sample Signature**: Jeff  
**Date**: 6/23/2010  
**Time**: 16:05

**Sample Labeling** (Refer to QAPP and Sample Key)

- Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)
### FIELD SAMPLE LOG - SEDIMENTS

Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample No.**: SD00 05 042  
**Sample Tag**: T 042

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☑ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>STATION NO.</td>
<td>☐ 01</td>
<td>☑ 02</td>
<td>☐ 03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)**: 002  
**SAMPLE IDENTIFIER**: UMF-02.002  
**LOCATION - STATION NO. - GRAB NO.**: UMF-02.002

**WATER DEPTH** (M / FT): 10.6  
**UTM Northing (NAD83)**: 5390654  
**UTM Easting (NAD83)**: 420588

### PHYSICAL CHARACTERISTICS

- **☐ SW**: Well graded sand, gravelly sand, little to no fines.  
- **☐ SM**: Silty sands, sand-silt mixtures  
- **☐ GW**: Well graded gravels, gravel-sand mixtures, little to no fines.

- **☐ SP**: Poorly graded sand, gravelly sand, little to no fines.  
- **☐ SC**: Clayey sands, sand-clay mixtures  
- **☐ GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.

- **☐ ML**: Inorganic silt, very fine sands, rock flour, silt or clay silts with low plasticity.  
- **☐ CL**: Clayey sands, sand-clay mixtures  
- **☐ GM**: Silty gravels, gravel-sand-silt mixtures.

**Color (Munsell)**: Very dark grayish brown 10YR 3/2

**Visible Organic Matter**: Yes ☑ No ☐  
**Description**: Decomposing organic matter (Grass/vegetation limited)

**Odors**: Yes ☐ No ☑  
**Description**: uniform color

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes ☐ No ☑  
**Description**: Red leeches, small grassed/vegetation 7-10 cm lengths (few)

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly ☑ Sarah McDaniel ☐  
**Cultural Resources Observed**: Yes ☑ No ☐

(Please refer to URS archaeologist field monitoring notes)

**Other Notes**:

<table>
<thead>
<tr>
<th>Boat: Pacleuse (Gravity Environmental)</th>
<th>Photo Directory: UCR SAD 6-23-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sampler Type</strong>: Power Grab (Gravity Environmental)</td>
<td><strong>Photo File</strong>: 129-132</td>
</tr>
</tbody>
</table>

**Sampler Name**: Jeff Long  
**Sample Signature**:  
**Date**: 6/23/2010  
**Time**: 16:15

**Sample Labeling (Refer to QAPP and Sample Key)**  
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)  
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  

**Sample No.**: SD00  
**Sample Tag**: T  

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☑ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☑ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
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<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
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<td>LMF</td>
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</tr>
<tr>
<td>STATION NO.</td>
<td>☑ 01</td>
<td>☑ 02</td>
<td>☐ 03</td>
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<td></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO.** (001 THROUGH 010)*  
*Grab Sample = One Bucket  
**SAMPLE IDENTIFIER**: UMF. 02. 003  
**LOCATION - STATION NO. - GRAB NO.**: UMF 02  
**UTM Northing (NAD83)**: 5390653  
**UTM Easting (NAD83)**: 420588  
**WATER DEPTH**: 10.5 ft

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.  
- **SM**: Silty sands, sand-silt mixtures  
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines  
- **SP**: Poorly graded sand, gravelly sand, little to no fines.  
- **SC**: Clayey sands, sand-clay mixtures  
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.  
- **ML**: Inorganic silt, very fine sands, rock flour, silt or clay silt with low plasticity.  
- **CL**: Clayey sands, sand-clay mixtures  
- **GM**: Silty gravels, gravel-sand-silt mixtures  
- **GC**: Clayey gravels, gravel-sand-clay mixtures  

**Color (Munsell)**: Very dark grayish brown 10 YR 3/2

**Visible Organic Matter**: Yes ☑  
**Description**: Small short grasses  
**Odors**: Yes ☑  
**Description**: Slight sewage/sulfur odor  

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes ☑  

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly ☑  
Sarah McDaniel ☑  
**Cultural Resources Observed**: Yes ☑  

**Other Notes**:  
Short grasses, sparse growth on sediments surface can be seen in sampler

**Boat**: Paicisse (Gravity Environmental)  
**Sampler Type**: Power Grab (Gravity Environmental)  
**Photo Directory**: UCR Sed 6-24-10  
**Photo File**: 137-141

**Sampler Name**: [Signature]  
**Sample Signature**: [Signature]  
**Date**: 6/24/2010  
**Time**: 10:00
# FIELD SAMPLE LOG - SEDIMENTS

Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  

June 2010

## Sample No.: SD00  
Sample Tag: T04Z490

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
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<th>☒ China Bend</th>
<th>☒ Upper Marcus Flats</th>
<th>☒ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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<tr>
<td>STATION NO.</td>
<td>01</td>
<td>☒ 02</td>
<td>☐ 03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)***: 004  
*Grab Sample = One Bucket  

**SAMPLE IDENTIFIER**  
LOCATION - STATION NO. - GRAB NO.  
UMF 004 004

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>(M / FT)</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.5</td>
<td></td>
<td>5390648</td>
<td>42093</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- ☐ SW Well graded sand, gravelly sand, little to no fines.  
- ☐ SM Silty sands, sand-silt mixtures  
- ☐ GW Well graded gravels, gravel-sand mixtures, little to no fines  
- ☐ SP Poorly graded sand, gravelly sand, little to no fines.  
- ☐ SC Clayey sands, sand-clay mixtures  
- ☐ GP Poorly graded gravels, gravel-sand mixtures, little to no fines  
- ☒ ML Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity  
- ☐ CL Clayey sands, sand-clay mixtures  
- ☒ GM Silty gravels, gravel-sand-silt mixtures  
- ☒ GC Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**  
Very dark grayish brown 10YR 3.2

**Visible Organic Matter**  
Yes ☒ No ☐  
Description:  
Sparsely distributed in samples  
Uniform color

**Odors**  
Yes ☒ No ☐  
Description:  
Slight sulfur

**Sampler Penetration**: 20 cm

**Obvious Abnormalities (wood, shells, organisms, etc)**: Yes ☐ No ☒

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly  
Sarah McDaniel  
Cultural Resources Observed: Yes ☒ No ☐

(please refer to URS archaeologist field monitoring notes)

**Other Notes**:  
Silt material has blocky consistency/structure

**Boat**: Palouse (Gravity Environmental)  
**Photo Directory**: UCR Sed 6-24-10  
**Sampler Type**: Power Grab (Gravity Environmental)  
**Photo File**: 142 - 145  

**Sampler Name**: Jeff Long  
**Sample Signature**: [Signature]  
**Date**: 6/24/2010  
**Time**: 10:10

**Sample Labeling (Refer to QAPP and Sample Key)**  
Sample No.: LMF - SD001 through SD003, UMF - SD004 through SD006, CB - SD007 through SD009, DME - SD010 through SD012 (three sample no. per location)  
Sample Tag No. Example: T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.  
Grab Sample No. Example: 001 through 010 (10 per station)
Sample No.: SD00  05  Sample Tag: T045

LOCATION NAME:  Upper Marcus Flats
LOCATION CODE:  UMF
STATION NO.:  02

GRAB SAMPLE NO. (001 THROUGH 010)*:  005
SAMPLE IDENTIFIER:  UMF.02.005

WATER DEPTH:  10.4 ft  UTM Northing (NAD83):  5390651

UTM Easting (NAD83):  420589

PHYSICAL CHARACTERISTICS

☐ SW  Well graded sand, gravelly sand, little to no fines.
☐ SP  Poorly graded sand, gravelly sand, little to no fines.
☐ ML  Inorganic silt, very fine sands, rock flour, silt or clay silt with low plasticity.
☐ SM  Silty sands, sand-silt mixtures
☐ SC  Clayey sands, sand-clay mixtures
☐ CL  Clayey sands, sand-clay mixtures
☐ GW  Well graded gravels, gravel-sand mixtures, little to no fines
☐ GP  Poorly graded gravels, gravel-sand mixtures, little to no fines
☐ GM  Silty gravels, gravel-sand-silt mixtures
☐ GC  Clayey gravels, gravel-sand-clay mixtures

Color (Munsell):  Very dark grayish brown 10YR 3/2

Visible Organic Matter:  Yes ☑ No ☐
Description:  Uniform color matrix with few orange lamellae/stripes

Odors:  Yes ☑ No ☐
Description:  Slight sulfur odor

Obvious Abnormalities (wood, shells, organisms, etc.):  Yes ☐ No ☑

Matrix Color / Grain Size Notes:  Uniform color matrix w/ few orange lamellae/stripes

Sampler Penetration:  20 cm

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ Sarah McDaniel ☑
(Please refer to URS archaeologist field monitoring notes)

Other Notes:  Orange/reddish brown mottling (iron?)

Boat:  Palouse (Gravity Environmental)
Sampler Type:  Power Grab (Gravity Environmental)

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

Sampler Name:  Jeff Lepp
Sample Signature:  
Date:  6/24/2010
Time:  10:30
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00 0 5  
Sample Tag: T 0 4 6

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Location Code</th>
<th>Station No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadman's Eddy</td>
<td>DME</td>
<td>01</td>
</tr>
<tr>
<td>China Bend</td>
<td>CB</td>
<td>02</td>
</tr>
<tr>
<td>Upper Marcus Flats</td>
<td>UMF</td>
<td>03</td>
</tr>
<tr>
<td>Lower Marcus Flats</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>Alternate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)*** 006  
SAMPLE IDENTIFIER: UMF 02 006  
LOCATION - STATION NO. - GRAB NO.

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.7 (M/FT)</td>
<td>5390648</td>
<td>420587</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW** Well graded sand, gravelly sand, little to no fines.
- **SM** Silty sands, sand-silt mixtures
- **GW** Well graded gravels, gravel-sand mixtures, little to no fines
- **SP** Poorly graded sand, gravelly sand, little to no fines.
- **SC** Clayey sands, sand-clay mixtures
- **GP** Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML** Inorganic silts, very fine sands, rock flour, silt or clay slits with low plasticity
- **CL** Clayey sands, sand-clay mixtures
- **GM** Silty gravels, gravel-silt mixtures
- **GC** Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell):** Very dark greyish brown 10 YR 5/6

**Matric Color / Grain Size Notes:** Uniform color & texture - some mottling

**Visible Organic Matter:** Yes  
Description: Red Short Grasses, Sparse

**Odors:** Yes  
Description: Slight sulfide odor

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes  
Descriotion: Small, limited wood debris, Decomposed organic matter

**Cultural Resources Notes:** URS Archaeologist - Mike Kelly  
Sarah McDaniel  
Cultural Resources Observed: Yes  
No (Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Sampler Name:** Jeff Leppe

**Sample Signature:**

**Date:** 6/24/2010

**Time:** 10:30

**Photo Directory:** UCR Sed 6_24_10

**Photo File:** No photo

**Sample Labeling (Refer to QAPP and Sample Key):**
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00
Sample Tag: T047

LOCATION NAME
☐ Deadman's Eddy
☐ China Bend
☒ Upper Marcus Flats
☐ Lower Marcus Flats
☐ Alternate

LOCATION CODE
☐ DME
☐ CB
☒ UMF

STATION NO.
☐ 01
☒ 02
☐ 03

GRAB SAMPLE NO. (001 THROUGH 010)*
007 SAMPLE IDENTIFIER
LMF.02.007

*Grab Sample = One Bucket

WATER DEPTH (M / FT)
10.3

UTM Northing (NAD83)
5390645

UTM Easting (NAD83)
4205588

PHYSICAL CHARACTERISTICS

☐ SW Well graded sand, gravelly sand, little to no fines.
☐ SM Silty sands, sand-silt mixtures

☐ GW Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP Poorly graded sand, gravelly sand, little to no fines.
☐ SC Clayey sands, sand-day mixtures

☐ GP Poorly graded gravels, gravel-sand mixtures, little to no fines

☒ ML Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
☐ CL Clayey sands, sand-day mixtures

☐ GM Silty gravels, gravel-sand-silt mixtures

☐ GC Clayey gravels, gravel-sand-clay mixtures

Color (Munsell)
Very dark yellowish brown 10YR 3/2

Color (Munsell) mottles: yellowish red 5YR 5/6

Visible Organic Matter
Yes ☐ No ☒ Description: Short grass, sparse

Odors
Yes ☐ No ☒ Description: Slight, sulfur odor

Obvious Abnormalities (wood, shells, organisms, etc.): Yes ☐ No ☒
Limited wood debris - small leaves

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☒ Cultural Resources Observed: Yes ☐ No ☒
(Please refer to URS archaeologist field monitoring notes)

Other Notes:

Boat: Palouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Sampler Name: Jeff Lepo

Sample Signature: OZ

Date: 6/24/2010

Time: 10:35

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample nos. per location)
Sample Tag No. Example - T021 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No. : SD00
Sample Tag : T048

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GRAB SAMPLE NO. (001 THROUGH 010)* 008
SAMPLE IDENTIFIER UMF 02 008
LOCATION - STATION NO. - GRAB NO.

WATER DEPTH 10.5 (M / FT) UTM Northing (NAD83) 5390648 UTM Easting (NAD83) 420589

PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th>Well graded sand, gravelly sand, little to no fines.</th>
<th>Silty sands, sand-silt mixtures</th>
<th>Well graded gravels, gravel-sand mixtures, little to no fines</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>SP</td>
<td>Poorly graded sand, gravelly sand, little to no fines.</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>ML</td>
<td>Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>SM</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>SC</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>CL</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>GW</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>GP</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>GM</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>GC</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
</tbody>
</table>

Color (Munsell) Very dark orange brown 10 YR 3/2

Color (Munsell) YR 1

Visible Organic Matter Yes [ ] No [ ] Description:

Odors Yes [ ] No [ ] Description: Slight sulfur odor

Sampler Penetration: 20 cm

Obvious Abnormalities (wood, shells, organisms, etc): Yes [ ] No [ ]

Red leech/worm

Cultural Resources Notes: URS Archaeologist - Mike Kelly [ ] Sarah McDaniel [ ] Cultural Resources Observed: Yes [ ] No [ ]
(Please refer to URS archaelogist field monitoring notes)

Other Notes:

Boat: Palouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Sampler Name: Jeff Lepos
Sample Signature: [Signature]

Date: 6/24/2010
Time: 10:50

Photo Directory: UCR Sed 6-24-10
Photo File: 152-153

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012. (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
### FIELD SAMPLE LOG - SEDIMENTS
#### Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample No.:** SD00 0 5  
**Sample Tag:** T 0 4 9

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☑ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LOCATION CODE</th>
<th>DME</th>
<th>CB</th>
<th>UMF</th>
<th>LMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATION NO.</td>
<td>☐01</td>
<td>☑02</td>
<td>☐03</td>
<td></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)*:** 009  
*Grab Sample = One Bucket

**SAMPLE IDENTIFIER:** UMF 02 009  
**LOCATION - STATION NO. - GRAB NO.:**

**WATER DEPTH** (M/FT)  
10.3

**UTM Northing (NAD83):** 5390652

**UTM Easting (NAD83):** 420590

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sands, gravelly sand, little to no fines.  
- **SM**: Silty sands, sand-silt matrices.  
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines.  
- **SP**: Poorly graded sand, gravelly sand, little to no fines.  
- **SC**: Clayey sands, sand-clay mixtures.  
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.  
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.  
- **CL**: Clayey sands, sand-clay mixtures.  
- **GM**: Silty gravels, gravel-sand-silt mixtures.  
- **GC**: Clayey gravels, gravel-sand-clay mixtures.

**Color (Munsell):**  
- Very dark grayish brown: 10 YR 3 2-
- Yellowish red: 5 YR 5 6

**Visible Organic Matter:** Yes ☐ No ☑  
**Description:** Not visible

**Odors:** Yes ☐ No ☑  
**Description:** Slight surface odor

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes ☐ No ☑  
**Description:** Limited organic/matter is visible

**Cultural Resources Notes:**  
URS Archaeologist - Mike Kelly ☐ Sarah McDaniel ☑  
(Please refer to URS archaeologist field monitoring notes)

**Cultural Resources Observed:** Yes ☐ No ☑

**Other Notes:**

**Boat:** Patoune (Gravity Environmental)

**Photo Directory:** UCR Sed 6-24-10

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo File:** 154 - 158

**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DMC - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120, Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)

**Sample Name:** Jeff Leggo

**Sample Signature:**

**Date:** 6/24/2010

**Time:** 00
Sample No.: SD00 05

Sample Tag: T 050

LOCATION NAME
☐ Deadman’s Eddy
☐ China Bend
☒ Upper Marcus Flats
☐ Lower Marcus Flats
☐ Alternate

LOCATION CODE
DME
CB
UMF
LMF

STATION NO.
01
02
03

GRAB SAMPLE NO. (001 THROUGH 010)*
010

SAMPLE IDENTIFIER
UMF . 02 . 010

LOCATION - STATION NO. - GRAB NO.

WATER DEPTH
10.5
(M / FT)

UTM Northing (NAD83)
5390654

UTM Easting (NAD83)
420587

PHYSICAL CHARACTERISTICS

☐ SW
Well graded sand, gravelly sand, little to no fines.

☐ SM
Silty sands, sand-silt mixtures

☐ GW
Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP
Poorly graded sand, gravelly sand, little to no fines.

☐ SC
Clayey sands, sand-clay mixtures

☐ GP
Poorly graded gravels, gravel-sand mixtures, little to no fines

☐ ML
Inorganic silt, very fine sands, rock flour, silt or clay silts with low plasticity

☐ CL
Clayey sands, sand-clay mixtures

☐ GM
Silty gravels, gravel-sand-silt mixtures

☐ GC
Clayey gravels, gravel-sand-clay mixtures

Color (Munsell)

Very dark greyish brown 10 YR 3/12

Matrix Color / Grain Size Notes:

Uniform color & texture

No limited read matter

Visible Organic Matter
Yes ☐ No ☐
Description: small short grass

Odors
Yes ☐ No ☐
Description: slight sulfur

Obvious Abnormalities (wood, shells, organisms, etc.): Yes ☐ No ☐

Some limited organic detritus/decomposed organic matter

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☐

Cultural Resources Observed: Yes ☐ No ☐

(please refer to URS archaeologist field monitoring notes)

Other Notes:

Boat: Palouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6_24_10

Sampler Name: Jeff Leppe

Sample Signature: Jeff Leppe

Date: 6/24/2010

Time: 11:10

Sample Labeling (Refer to QAPP and Sample Key)
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0008, CB - SD0008 through SD0009, DME - SD0010 through SD0012 (three sample number per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No. : SD00 0 6          Sample Tag : T051

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>STATION NO.</td>
<td>□ 01</td>
<td>□ 02</td>
<td>□ 03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRAB SAMPLE NO. (001 THROUGH 010)*</th>
<th>001</th>
<th>SAMPLE IDENTIFIER</th>
<th>UMF . 03 . 001</th>
<th>LOCATION - STATION NO. - GRAB NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER DEPTH (M / FT)</td>
<td>16.4</td>
<td>UTM Northing (NAD83)</td>
<td>5392081</td>
<td>UTM Easting (NAD83)</td>
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</table>

<table>
<thead>
<tr>
<th>PHYSICAL CHARACTERISTICS</th>
<th>SW</th>
<th>SM</th>
<th>GW</th>
<th>SP</th>
<th>SC</th>
<th>GP</th>
<th>ML</th>
<th>CL</th>
<th>GM</th>
<th>GC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well graded sand, gravelly sand, little to no fines</td>
<td>Silty sands, sand-silt mixtures</td>
<td>Well graded gravels, gravel-sand mixtures, little to no fines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorly graded sand, gravelly sand, little to no fines</td>
<td>Clayey sands, sand-clay mixtures</td>
<td>Poorly graded gravels, gravel-sand mixtures, little to no fines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity</td>
<td>Clayey sands, sand-clay mixtures</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color (Munsell)</td>
<td>Very dark gray</td>
<td>10-YR 3.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible Organic Matter</td>
<td>Yes</td>
<td>No</td>
<td>Description:</td>
<td>See below</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odors</td>
<td>Yes</td>
<td>No</td>
<td>Description:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obvious Abnormalities (wood, shells, organisms, etc):</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decomposing organic matter, hard to distinguish, black streaking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Resources Notes: URS Archaeologist - Mike Kelly</td>
<td>Sarah McDaniel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Other Notes: | River mud, organic matter decomposition → black streaking or stringers within gray silt/matrix |

<table>
<thead>
<tr>
<th>Boat: Palouse (Gravity Environmental)</th>
<th>Photo Directory:</th>
<th>UCR Sed 6-24-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampler Type: Power Grab (Gravity Environmental)</td>
<td>Photo File:</td>
<td>195-198</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sampler Name: Jeff Cappo</th>
<th>Sample Signature:</th>
<th>Date: 6/24/2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time: 15:45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0009, CB - SD0010 through SD0011, DME - SD0012 through SD0017 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
# FIELD SAMPLE LOG - SEDIMENTS

Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  

## Sample No.: SD00  
Sample Tag: T052

### LOCATION NAME
- [□] Deadman's Eddy  
- [□] China Bend  
- [□] Upper Marcus Flats  
- [□] Lower Marcus Flats  
- [□] Alternate

### LOCATION CODE
- [□] DME  
- [□] CB  
- [□] UMF  
- [□] LMF  

### STATION NO.
- [□] 01  
- [□] 02  
- [□] 03  

### GRAB SAMPLE NO. (001 THROUGH 010)*  
*Grab Sample = One Bucket  

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.6 (M / FT)</td>
<td>5392083</td>
<td>420021</td>
</tr>
</tbody>
</table>

## PHYSICAL CHARACTERISTICS

| □ SW | Well graded sand, gravelly sand, little to no fines  
- | □ SM | Silty sands, sand-silt mixtures  
- | □ GW | Well graded gravels, gravel-sand mixtures, little to no fines  
- | □ GP | Poorly graded gravels, gravel-sand mixtures, little to no fines  
- | □ GM | Silty gravels, gravel-sand-silt mixtures  
- | □ GC | Clayey gravels, gravel-sand-clay mixtures  
- | □ SP | Poorly graded sand, gravelly sand, little to no fines  
- | □ SC | Clayey sands, sand-clay mixtures  
- | □ CL | Clayey sands, sand-clay mixtures  

**Color (Munsell)**  
Very dark gray 10 YR 3.1

**Color (Munsell)**

**Visible Organic Matter**  
Yes [☑] No [□]  
Description: Decomposed

**Odors**  
Yes [□] No [☑]  
Description: Musky

**Obvious Abnormalities (wood, shells, organisms, etc.):**  
Yes [□] No [☑]

- Decomposing litter - streaking decayed organic matter layered/sticky insilt

**Cultural Resources Notes: URS Archaeologist - Mike Kelly [□] Sarah McDaniel [☑] Cultural Resources Observed: Yes [□] No [☑]**  
*(Please refer to URS archaeologist field monitoring notes)*

**Other Notes:**  
River mud, organic matter decaying. No odor at note, musky or mud odor (?)

### Boat: Pacouse (Gravity Environmental)  
### Sampler Type: Power Grab (Gravity Environmental)

### Photo Directory: UCR Sed 6.24.2010  
### Photo File: 199-200

**Sample Labeling (Refer to QAPP and Sample Key)**  
Sample No. = LMF - SD00001 through SD00003, UMF - SD00004 through SD00006, CB - SD00007 through SD00009, DME - SD0010 through SD0012 (Three sample no. per location)  
Sample Tag No. Example - T001 through T120. Sequential based on collection order and line. Assigned to specific sample number.  
Grab Sample No. Example - 001 through 010 (10 per station)

**Sample Name:** Jeff Lipp  
**Sample Signature:**  
**Date:** 6/24/2010  
**Time:** 16:00
<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
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<tbody>
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<td>LOCATION CODE</td>
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<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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<td>02</td>
<td>03</td>
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<td></td>
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</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)** 003  **SAMPLE IDENTIFIER** UMF 03 003  **LOCATION - STATION NO. - GRAB NO.**

**WATER DEPTH** 18.7 (M / FT)  **UTM Northing (NAD83)** 5392084  **UTM Easting (NAD83)** 420019

**PHYSICAL CHARACTERISTICS**

- **SW** Well graded sand, gravelly sand, little to no fines.
- **SM** Silty sands, sand-silt mixtures
- **GW** Well graded gravels, gravel-sand mixtures, little to no fines
- **SP** Poorly graded sand, gravelly sand, little to no fines.
- **SC** Clayey sands, sand-clay mixtures
- **GP** Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML** Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL** Clayey sands, clay-sand mixtures
- **GM** Silty gravels, gravel-sand-silt mixtures
- **GC** Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)** Very dark gray 10YR 3/1

**Color (Munsell)**

**Visible Organic Matter** Yes [ ] No [ ] Description: Decomposed organic material

**Odors** Yes [ ] No [ ] Description:

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes [ ] No [ ]

Some litter - very fine stems/roots

**Cultural Resources Notes:** URS Archaeologist - Mike Kelly [ ] Sarah McDaniel [ ] Cultural Resources Observed: Yes [ ] No [ ]

(Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

River mud

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo Directory:** UCR Sed 6-24-2010

**Photo File:** 201-203

**Sampler Name:** Jeff [ ]

**Sample Signature:**

**Date:** 6 / 24 / 2010

**Time:** 16:05

**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T01 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00 06
Sample Tag: T 0.54

LOCATION NAME
☐ Deadman’s Eddy
☐ China Bend
☐ Upper Marcus Flats
☐ Lower Marcus Flats
☐ Alternate

LOCATION CODE
☐ DME
☐ CB
☐ UMF
☐ LMF

STATION NO.
☐ 01
☐ 02
☐ 03

GRAB SAMPLE NO. (001 THROUGH 010)*
004

SAMPLE IDENTIFIER
UMF. 03. 004

WATER DEPTH
17.91
(M / FT)

UTM Northing (NAD83)
5392084

UTM Easting (NAD83)
420018

PHYSICAL CHARACTERISTICS

☐ SW
Well graded sand, gravelly sand, little to no fines.

☐ SM
Silty sands, sand-silt mixtures

☐ GW
Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP
Poorly graded sand, gravelly sand, little to no fines.

☐ SC
Clayey sands, sand-clay mixtures

☐ GP
Poorly graded gravels, gravel-sand mixtures, little to no fines

☐ ML
Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity

☐ CL
Clayey sands, sand-clay mixtures

☐ GM
Silty gravels, gravel-sand-silt mixtures

☐ GC
Clayey gravels, gravel-sand-clay mixtures

Color (Munsell)
Very dark gray 10 YR 3.1

Visible Organic Matter
Yes ☐ No ☐
Description:
Uniform color / texture

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☐
Description:
Some decomposing organic matter, dark/black streaks in silt

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel □
(please refer to URS archaeologist field monitoring notes)

Cultural Resources Observed: Yes ☐ No ☐

Other Notes:
Silt - laminated structure in some grabs.

Boat: Palouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6-24-2010
Photo File: 104 - 205

Sampler Name: Jeff L. 0000
Sample Signature: [Signature]
Date: 6/24/2010
Time: 16:15

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0033, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

Sediment Field Form US ver 2.0
**FIELD SAMPLE LOG - SEDMENTS**

Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample No.**: SD00 06
**Sample Tag**: T 05 5

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<th>Alternate</th>
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<tbody>
<tr>
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<td>DME</td>
<td>CB</td>
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<td>01</td>
<td>02</td>
<td>03</td>
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</tr>
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</table>

**GRAB SAMPLE NO. (001 THROUGH 010)**

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<tr>
<th>WATER DEPTH (M / FT)</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
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</thead>
<tbody>
<tr>
<td>17.7</td>
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<td>420019</td>
</tr>
</tbody>
</table>

**SAMPLE IDENTIFIER**: UMF. 03. 004

**LOCATION - STATION NO. - GRAB NO.**

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**: Very dark gray 10YR 3/1

**Visible Organic Matter**: Yes ☑ No ☐

**Description**: Dead organic strecky / lamellae.

**Odors**: Yes ☑ No ☐

**Description**: Musk, river mud

**Sampler Penetration**: 20 cm

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly ☑ Sarah McDaniell ☑ Cultural Resources Observed: Yes ☐ No ☑

(Not sure if it's related to the rest of the table)

**Other Notes**: Silts, laminated (horizontal) structure evident in some grabs.

**Boat**: Palouse (Gravity Environmental)

**Sampler Type**: Power Grab (Gravity Environmental)

**Photo Directory**: UCR Sed 6-24-2010

**Photo File**: 205-207

**Sample Labeling (Refer to QAPP and Sample Key)**

- **Sample No.**: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- **Sample Tag No. Example**: T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- **Grab Sample No. Example**: 001 through 010 (10 per station)

**Sample Name**: [Redacted]

**Sample Signature**: [Redacted]

**Date**: 6/24/2010

**Time**: 16:25

---

*Note: This form is a standard format for documenting field samples, and it is used to collect detailed information about the sediment samples collected during the study.*
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00 06  Sample Tag: TO 56

LOCATION NAME: [ ] Deadman’s Eddy  [ ] China Bend  [ ] Upper Marcus Flats  [ ] Lower Marcus Flats  [ ] Alternate
LOCATION CODE: DME  CB  UMF  LMF
STATION NO.: [ ] 01  [ ] 02  [ ] 03
GRAB SAMPLE NO. (001 THROUGH 010)* 006  SAMPLE IDENTIFIER: UMF. 03.006
LOCATION - STATION NO. - GRAB NO.
*Misprint on UMF.03.006.

WATER DEPTH: 18.3 M / FT  UTM Northing (NAD83)  5392082
UTM Easting (NAD83)  420017

PHYSICAL CHARACTERISTICS

[ ] SW  Well graded sand, gravelly sand, little to no fines.
[ ] SM  Silty sands, sand-silt mixtures
[ ] GW  Well graded gravels, gravel-sand mixtures, little to no fines
[ ] SP  Poorly graded sand, gravelly sand, little to no fines.
[ ] SC  Clayey sands, sand-clay mixtures
[ ] GP  Poorly graded gravels, gravel-sand mixtures, little to no fines
[ ] ML  Inorganic silts, very fine sands, silt or clay silts with low plasticity.
[ ] CL  Clayey sands, sand-clay mixtures
[ ] GM  Silty gravels, gravel-sand-silt mixtures
[ ] GC  Clayey gravels, gravel-sand-clay mixtures

Color (Munsell): Very dark gray 10 YR 3 1

Visible Organic Matter: Yes [ ] No [ ]
Description: Decomposing litter

Odors: Yes [ ] No [ ]
Description: River mud/musty

Sampler Penetration: 20 cm

Obvious Abnormalities (wood, shells, organisms, etc.): Yes [ ] No [ ]
Limited, some organic matter

Cultural Resources Notes: URS Archaeologist - Mike Kelly [ ] Sarah McDaniel [ ]
Cultural Resources Observed: Yes [ ] No [ ]

Other Notes:
River mud/silt, dark decomposed organic streaking

Boat: Palouse (Gravity Environmental)  Photo Directory: UCR Sed 6_24_2010
Sampler Type: Power Grab (Gravity Environmental)  Photo File: 208 - 209

Sampler Name: [ ]
Sample Signature: [ ]
Date: 06/24/2010  Time: 16:35

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T061 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
Sample No.: SD006
Sample Tag: T057

LOCATION NAME
☐ Deadman's Eddy  ☐ China Bend  ☐ Upper Marcus Flats  ☐ Lower Marcus Flats  ☐ Alternate

LOCATION CODE
☐ DME  ☐ CB  ☐ UMF  ☐ LMF

STATION NO.
☐ 01  ☐ 02  ☐ 03

GRAB SAMPLE NO. (001 THROUGH 010)*

SAMPLE IDENTIFIER
UMF-03007

LOCATION - STATION NO. - GRAB NO.

WATER DEPTH (M / FT)
18.7

UTM Northing (NAD83)
5392080

UTM Easting (NAD83)
420016

PHYSICAL CHARACTERISTICS

☐ SW Well graded sand, gravelly sand, little to no fines.
☐ SP Poorly graded sand, gravelly sand, little to no fines.
☐ ML Inorganic silt, very fine sand, rock flour, silt or clay silts with low plasticity.

☐ SM Silty sands, sand-silt mixtures
☐ SC Clayey sands, sand-clay mixtures
☐ CL Clayey sands, sand-clay mixtures

☐ GW Well graded gravels, gravel-sand mixtures, little to no fines
☐ GP Poorly graded gravels, gravel-sand mixtures, little to no fines
☐ GM Silty gravels, gravel-sand-silt mixtures

Color (Munsell)
Very dark gray 10 YR 3/1

Color (Munsell) YR

Visible Organic Matter
Yes ☐ No ☑ Description: Little to no litter. Uniform color / texture

Odors
Yes ☑ No ☐ Description: Musky, river mud

Obvious Abnormalities (wood, shells, organisms, etc.):
Yes ☐ No ☑

Cultural Resources Notes:
URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☑ Cultural Resources Observed: Yes ☐ No ☑

(If please refer to URS archaeologist field monitoring notes)

Other Notes:

Black streaking, lamellae of decomposing organic matter.

Boat: Patouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6-24-2010

Sampler Name: [Signature]

Sample Signature: [Signature]

Date: 6/24/2010

Time: 16:35
### FIELD SAMPLE LOG - SEDIMENTS
#### Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample Tag:** 058

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<th>LOCATION CODE</th>
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<th>Sample Tag</th>
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<td>DME</td>
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<td>China Bend</td>
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<td>CB</td>
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</tr>
<tr>
<td>Upper Marcus Flats</td>
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</table>

**GRAB SAMPLE NO. (001 THROUGH 010)***

*Grab Sample = One Bucket

**SAMPLE IDENTIFIER**

UMF - 03 .008

**LOCATION - STATION NO. - GRAB NO.**

**WATER DEPTH**

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<th>M / FT</th>
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<th>UTM Easting (NAD83)</th>
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<tbody>
<tr>
<td>18.1</td>
<td>5390280</td>
<td>420018</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **Well graded sand, gravelly sand, little to no lines.**
- **Silty sands, sand-silt mixtures.**
- **Gravelly gravels, gravel-sand mixtures, little to no lines.**
- **Poorly graded gravels, gravel-sand mixtures, little to no lines.**
- **Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.**
- **Clayey sands, sand-clay mixtures.**
- **Clayey gravels, gravel-sand-clay mixtures.**

**Matrix Color / Grain Size Notes:**

- **Very dark gray**
- **Uniform**

**Odors:**

- **Description:** Pine needles

**Sampler Penetration:** 20 cm

**Obvious Abnormalities (wood, shells, organisms, etc.):** No

**Less organic matter on surface**

**Cultural Resources Notes:** URS Archaeologist - Mike Kelly / Sarah McDaniel

(Include names and role)

**Cultural Resources Observed:** Yes

**Other Notes:**

- Black organic matter layered into silts

**Boat:** Palouse (Gravity Environmental)

**Photo Directory:** UCR Sed 6.24.2010

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo File:** X 212 - 213

**Sampler Name:** Jeff (sign)

**Sample Signature:**

**Date:** 6/24/2010

**Time:** 16:45

**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No.: UMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example: T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
Sample No.: SD00  
Sample Tag: T059

LOCATION NAME  
☐ Deadman's Eddy  
☐ China Bend  
☑ Upper Marcus Flats  
☐ Lower Marcus Flats  
☐ Alternate

LOCATION CODE  
DME  
CB  
UMF  
LMF

STATION NO.  
01  
02  
03

GRAB SAMPLE NO. (001 THROUGH 010)*  
009  
SAMPLE IDENTIFIER  
UMF.03.009

WATER DEPTH  
18.6  
(M / FT)  
UTM Northing (NAD83)  
5392080  
426027

UTM Easting (NAD83)  
420016

PHYSICAL CHARACTERISTICS

☐ SW  
Well graded sand, gravelly sand, little to no fines.

☐ SM  
Silty sands, sand-silt mixtures

☐ GW  
Well graded gravels, gravel-sand mixtures, little to no fines.

☐ SP  
Poorly graded sand, gravelly sand, little to no fines.

☐ SC  
Clayey sands, sand-clay mixtures

☐ GP  
Poorly graded gravels, gravel-sand mixtures, little to no fines.

☑ ML  
Inorganic silts, very fine sands, rock flour, silt or clay silt with low plasticity.

☐ CL  
Clayey sands, sand-clay mixtures

☐ GM  
Silty gravels, gravel-sand-silt mixtures

Color (Munsell)  
Very dark gray  
10 YR 3 1/2

Matrix Color / Grain Size Notes:  
Uniform matrix

Odors  
Yes ☐  No ☐  
Description: musky / river mud

Sampling Penetration: 20 cm

Obvious Abnormalities (wood, shells, organisms, etc):  
Yes ☐  No ☐

Cultural Resources Notes: URS Archaeologist - Mike Kelly  
☐ I  Sarah McDaniel  
(Cultural Resources Observed: Yes ☐  No ☐)

(If applicable)

Other Notes:  
Decomposed river mud, organic matter

Boat: Palouse (Gravity Environmental)  
Photo Directory: U1R Sed G 24-2010

Sampler Type: Power Grab (Gravity Environmental)  
Photo File: 214-215

Sampler Name: Jeff Lopez  
Sample Signature: M.S.

Date: 6/24/2010  
Time: 16:50

Sample Labeling (Refer to QAPP and Sample Key)

Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0005, CB - SD0006 through SD0007, UME - SD0008 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample No.: SD00**
Sample Tag: T 0 6 0

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GRAB SAMPLE NO. (001 THROUGH 010)* 010
*Grab Sample = One Bucket

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<td>18.3</td>
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<td>420014</td>
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**PHYSICAL CHARACTERISTICS**

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<th></th>
<th>Well graded sand, gravelly sand, little to no fines.</th>
<th>Silty sands, sand-silt mixtures</th>
<th>Well graded gravels, gravel-sand mixtures, little to no fines</th>
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</thead>
<tbody>
<tr>
<td>SW</td>
<td></td>
<td>SM</td>
<td>GW</td>
</tr>
<tr>
<td>SP</td>
<td>Poorly graded sand, gravelly sand, little to no fines.</td>
<td>SC</td>
<td>GP</td>
</tr>
<tr>
<td>ML</td>
<td>Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.</td>
<td>CL</td>
<td>GM</td>
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<table>
<thead>
<tr>
<th>Color (Munsell)</th>
<th>Very dark grey</th>
<th>10 YR 3.1</th>
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<table>
<thead>
<tr>
<th>Visible Organic Matter</th>
<th>Yes ☑ No ☐</th>
<th>Description: Limited litter</th>
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<table>
<thead>
<tr>
<th>Odors</th>
<th>Yes ☑ No ☐</th>
<th>Description: Masky, river mud</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Obvious Abnormalities (wood, shells, organisms, etc.)</th>
<th>Yes ☑ No ☐</th>
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</thead>
<tbody>
<tr>
<td>Pine needles, bark - limited</td>
<td></td>
</tr>
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| Cultural Resources Notes: URS Archaeologist - Mike Kelly ☑ / Sarah McDaniel ☑ |
| Cultural Resources Observed: Yes ☑ No ☐ |

(Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

Black lamellae/streaks of decayed organic matter

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<thead>
<tr>
<th>Boat: Patouse (Gravity Environmental)</th>
<th>Photo Directory: UCR Sea 6-24-2010</th>
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</thead>
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<thead>
<tr>
<th>Sampler Type: Power Grab (Gravity Environmental)</th>
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<tr>
<th>Sampler Name: [Signature]</th>
<th>Sample Signature: [Signature]</th>
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</table>

Date: 6/24/2010
Time: 16:55

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>SD00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location Name</td>
<td>□ Deadman's Eddy</td>
</tr>
<tr>
<td>Location Code</td>
<td>DME</td>
</tr>
<tr>
<td>Station No.</td>
<td>□ 01</td>
</tr>
</tbody>
</table>

**Grab Sample No. (001 Through 010)**
*Grab Sample = One Bucket

<table>
<thead>
<tr>
<th>Water Depth (M / FT)</th>
<th>UTM Northing (NAD83)</th>
<th>No GPS / Satellite</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Physical Characteristics**

- **SW**: Well graded sand, gravelly sand, little to no fines
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silt, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**
- Dark grayish brown 10 YR 3.2

**Visible Organic Matter**: Yes □ No  
**Odors**: Yes □ No  
**Obvious Abnormalities (wood, shells, organisms, etc.)**: Yes □ No  

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly □ Sarah McDaniel  
(Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

*Only trace recovery of sands in attempts. One boulder recovered. Moderate river current and depth limits ability to meet SOP-4. Difficult to determine bottom composition. GPS / loss of satellite on both units? Use buoy marker & Nobletec system - Reorders drag. Oly contv*

**Boat**: Palouse (Gravity Environmental)  
**Sampler Type**: Power Grab (Gravity Environmental)  
**Photo Directory**: UCR Sed 6-25-2010  
**Photo File**: 247-261

**Sample Labelling (Refer to QAPP and Sample Key)**
- Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0005, DME - SD0004 through SD0002, DME - SD0002 through SD0009, DME - SD0001 through SD00012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

June 2010

Sample No.: SD00 08 Sample Tag: T071

<table>
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<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
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<tbody>
<tr>
<td>LOCATION CODE</td>
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<td>LMF</td>
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<tr>
<td>STATION NO.</td>
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<td>☐ 02</td>
<td>☐ 03</td>
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</table>

GRAB SAMPLE NO. (001 THROUGH 010)* 001 SAMPLE IDENTIFIER CB 02 001
*Grab Sample = One Bucket

WATER DEPTH (M / FT) 16.4 UTM Northing (NAD83) 5408 264

UTM Easting (NAD83) 432128

PHYSICAL CHARACTERISTICS

☐ SW Well graded sand, gravelly sand, little to no fines.
☐ SM Silty sands, sand-silt mixtures
☐ GW Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP Poorly graded sand, gravelly sand, little to no fines.
☐ SC Clayey sands, sand-clay mixtures
☐ GP Poorly graded gravels, gravel-sand mixtures, little to no fines

☐ ML Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
☐ CL Clayey sands, sand-clay mixtures
☐ GM Silty gravels, gravel-sand-silt mixtures

Color (Munsell) Dark greyish brown 10YR 3.2

Matrix Color / Grain Size Notes:

Visible Organic Matter

Yes ☐ No ☐ Description:

Odors

Yes ☐ No ☐ Description:

Sampler Penetration: -0 cm

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☐

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☐
Cultural Resources Observed: Yes ☐ No ☐

(Please refer to URS archaeologist field monitoring notes)

Other Notes:

See Env. Field Handbook for details. Few silts with sand (light to brown) No Sample

Only partial tree recovery of seeds in attempts. Refusal with fullness of sample. River current is moderate conditions limit competent recovery. Cobble and boulder river bottom suspected. Based on nearshore composition.

Boat: Patouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6-25-2010

Photo File: 2.23 - 2.46

Sample Labeling (Refer to QAPP and Sample Key)

Sample No. = UMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)

Sample Name: Jeff Jaffe

Sample Signature: Jaffe

Date: 6/12/2010

Time: 09:30
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00  09
Sample Tag: T 081

LOCATION NAME
☐ Deadman's Eddy
☐ China Bend
☐ Upper Marcus Flats
☐ Lower Marcus Flats
☐ Alternate

LOCATION CODE
☐ DME
☐ CB
☐ UMF
☐ LMF

STATION NO.
☐01
☐02
☐03

GRAB SAMPLE NO. (001 THROUGH 010)*
001

WATER DEPTH
13.1

UTM Northing (NAD83)
5407583

UTM Easting (NAD83)
431105

PHYSICAL CHARACTERISTICS

☐ SW
Well graded sand, gravelly sand, little to no fines.

☐ SM
Silty sands, sand-silt mixtures

☐ GW
Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP
Poorly graded sand, gravelly sand, little to no fines

☐ SC
Clayey sands, sand-clay mixtures

☐ GP
Poorly graded gravels, gravel-sand mixtures, little to no fines

☐ ML
Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity

☐ CL
Clayey sands, sand-clay mixtures

☐ GM
Silty gravels, gravel-sand-silt mixtures

☐ GC
Clayey gravels, gravel-sand-clay mixtures

Color (Munsell)
Dark grayish brown 10 YR 3/2

Visible Organic Matter
Yes ☑ No ☐
Description: Tree limbs, decaying organic tissue

Odors
Yes ☑ No ☐
Description:

Obvious Abnormalities (wood, shells, organisms, etc.): Yes ☑ No ☐
Small green vegetation (milo?) in at least one grab try.

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ Sarah McDaniel ☑ Cultural Resources Observed: Yes ☑ No ☐
(Please refer to URS archaeologist field monitoring notes)

Other Notes:
Several rejections due to cobbles, gravels, tree limbs & organic matter. Sediment matrix is difficult to determine. Increased cobble amounts in some samples. More silts in some grabs. Disturbed samples do not meet SD04.

Boat: Palouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6-25-2010
Photo File: 264 - 278

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME- SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

Sampler Name: Jeff Loggo
Sample Signature: MFS
Date: 6/25/2010
Time: 14:10

June 2010
**FIELD SAMPLE LOG - SEDIMENTS**

Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
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</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>NP = Northport Lower Dalles</td>
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<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td></td>
<td>LD =</td>
</tr>
<tr>
<td>GRAB SAMPLE NO. (001 THROUGH 010)*</td>
<td>001</td>
<td>SAMPLE IDENTIFIER</td>
<td>DME-01.001</td>
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</tbody>
</table>

*Grab Sample = One Bucket

| WATER DEPTH | 3.5 | UTM Northing (NAD83) | 5420949 | UTM Easting (NAD83) | 446396 |

**PHYSICAL CHARACTERISTICS**

- [ ] SW Well graded sand, gravelly sand, little to no fines.
- [ ] SM Silty sands, sand-silt mixtures
- [ ] GW Well graded gravels, gravel-sand mixtures, little to no fines
- [ ] SP Poorly graded sand, gravelly sand, little to no fines.
- [ ] SC Clayey sands, sand-clay mixtures
- [ ] GP Poorly graded gravels, gravel-sand mixtures, little to no fines
- [ ] ML Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- [ ] CL Clayey sands, clay-silt mixtures
- [ ] GM Silty gravels, gravel-sand-silt mixtures
- [ ] GC Clayey gravels, gravel-sand-clay mixtures

- Color (Munsell) Variable color matrix
- [ ] GC Mixed parent materials

- Visible Organic Matter Yes ☐ No ☑
- Odors Yes ☐ No ☑
- Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☑

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☑
Cultural Resources Observed: Yes ☐ No ☑

( Please refer to URS archaeologist field monitoring notes)

**Other Notes:** Poor recovery, 1st grab only half full of sand, mixed colors/matrix.
2nd grab -1 cobble. 3rd grab - few cobbles. Course gravels dominate with sample grab, very poor/no recovery are to cobbles. No sample

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Sample Labeling (Refer to QAPP and Sample Key)**
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME- SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120, Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

**Sample No.: SD001**
Sample Tag: T001

**Sample Name:** Jeff
Sample Signature: 

**Date:** 26/06/2010
**Time:** 11:25

**Photo Directory:** UCR Sed 6-26-2010
**Photo File:** 301 - 310
**FIELD SAMPLE LOG - SEDIMENTS**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations

Sample No.: SD00  
Sample Tag: T

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☑ Deadman’s Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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<tr>
<td>STATION NO.</td>
<td>☑ 01</td>
<td>☑ 02</td>
<td>☐ 03</td>
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GRAB SAMPLE NO. (001 THROUGH 010)*: 001  
SAMPLE IDENTIFIER: DME 02 001  
LOCATION - STATION NO. - GRAB NO.

<table>
<thead>
<tr>
<th>WATER DEPTH (M / FT)</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
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</thead>
<tbody>
<tr>
<td>10.5</td>
<td>5420440</td>
<td>44656803</td>
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</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- ☑ SW Well graded sand, gravelly sand, little to no fines.
- ☑ SM Silty sands, sand-silt mixtures
- ☑ GW Well graded gravels, gravel-sand mixtures, little to no fines
- ☑ SP Poorly graded sand, gravelly sand, little to no fines.
- ☑ SC Clayey sands, sand-clay mixtures
- ☑ GP Poorly graded gravels, gravel-sand mixtures, little to no fines
- ☑ ML Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
- ☑ CL Clayey sands, sand-clay mixtures
- ☑ GM Silty gravels, gravel-sand-silt mixtures
- ☑ GC Clayey gravels, gravel-sand-clay mixtures

Color (Munsell): Variable color matrix  
Matrix Color / Grain Size Notes: Coarse = cobbles

Visible Organic Matter: Yes ☑ No ☐ Description:  
Odors: Yes ☑ No ☐ Description:  
Sampler Penetration: Limited

Obvious Abnormalities (wood, shells, organisms, etc): Yes ☐ No ☑

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☑ Sarah McDaniel ☐  
Cultural Resources Observed: Yes ☐ No ☑

(Please refer to URS archaeologist field monitoring notes)

Other Notes:  
Cobbles of varied/mixed parent materials. Unable to recover competent grab sample. Some mixed sands present. Unable to identify fine-grained materials, refusal of Power Grub sampler.

Boat: Palouse (Gravity Environmental)  
Photo Directory: UCR Sed 6-26-2010  
Sampler Type: Power Grab (Gravity Environmental)  
Photo File: 293-298

Sampler Name: [Signature]
Sample Signature: [Signature]
Date: 6/28/2010  
Time: 10:55

**Sample Labeling (Refer to QAPP and Sample Key)**  
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0008, CB - SD0009 through SD0025, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
## FIELD SAMPLE LOG - SEDIMENTS

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**

**United States Locations/Stations**

### Sample Details
- **Sample No.:** SD00
- **Sample Tag:** T
- **Location Code:** DME, CB, UMF, LMF
- **Station No.:** 01, 02, 03

### Grab Sample Information
- **Grab Sample No.:** 001 through 010
- **Sample Identifier:** DME-03-001
- **Location - Station No. - Grab No.:**
- **Water Depth:** 5.5 ft
- **UTM Northing (NAD83):** 5420745
- **UTM Easting (NAD83):** 446282

### Physical Characteristics
- **Color (Munsell):** Variable Color Matrix
- **Visible Organic Matter:** Yes
- **Odors:** Yes
- **Obvious Abnormalities:** No

### Cultural Resources Notes
**Cultural Resources Notes:**
- URSA Archaeologist: Mike Kelly
- Sarah McDaniel
- Cultural Resources Observed: Yes

### Other Notes
- **No recovery. Power Grab unable to recover any sediments or other materials. Solid bottom, boulders? 4 attempts.**
- **No Sample**

### Sample Labeling
- **Sample Labeling (Refer to QAPP and Sample Key):**
  - **Sample No.:** LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
  - **Sample Tag No.:** Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
  - **Grab Sample No.:** Example - 001 through 010 (10 per station)

### Additional Details
- **Boat:** Palouse (Gravity Environmental)
- **Sampler Type:** Power Grab (Gravity Environmental)
- **Photo Directory:** UCR Sed G-26-2010
- **Photo File:** 311 - 320
- **Sampler Name:** [Redacted]
- **Sample Signature:** [Redacted]
- **Date:** 6/26/2010
- **Time:** 13:25

### Notes
- **June 2010**
SAMPLE NO.: SD00  Sample Tag: T 5

LOCATION NAME: ☐ Deadman’s Eddy  [ ] China Bend  [ ] Upper Marcus Flats  [ ] Lower Marcus Flats  [ ] Alternate

LOCATION CODE:  DME  CB  UMF  LMF

STATION NO.:  [ ] 01  [ ] 02  [ ] 03

GRAB SAMPLE NO. (001 THROUGH 010)*  001

*Grab Sample = One Bucket

WATER DEPTH:  8.5 ft

UTM Northing (NAD83):  541944

UTM Easting (NAD83):  443440

PHYSICAL CHARACTERISTICS:

☐ SW  Well graded sand, gravelly sand, little to no fines.

☐ SM  Silty sands, sand-silt mixtures

☐ GW  Well graded gravels, gravel-sand mixtures, little to no fines

☐ SP  Poorly graded sand, gravelly sand, little to no fines

☐ SC  Clayey sands, sand-clay mixtures

☐ GP  Poorly graded gravels, gravel-sand mixtures, little to no fines

☐ ML  Inorganic silts, very fine sands, rock flour, silt or clay silt with low plasticity

☐ CL  Clayey sands, sand-clay mixtures

☐ GM  Silty gravels, gravel-sand-silt mixtures

☐ GC  Clayey gravels, gravel-sand-clay mixtures

Color (Munsell):  Black  10 YR 2/1

Color (Munsell):  Yellowish Brown  10 YR 5/6

Visible Organic Matter:  Yes  ☐ No  [ ]

Description:  Variable, mix of organic material

Odors:  Yes  ☐ No  [ ]

Description:  Power Grab (Gravity Environmental)

Sampler Penetration:  10 cm

Obvious Abnormalities (wood, shells, organisms, etc.):  Yes  ☐ No  [ ]

Cultural Resources Notes:  URS Archaeologist - Mike Kelly  ☐ Sarah McDaniel  ☑

Cultural Resources Observed:  Yes  ☐ No  [ ]

(please refer to URS archaeologist field monitoring notes)

Other Notes:

Mixed parent materials predominate block sands, few gravels.
Collect 1 sample/grab, shallow but competent.  Subsequent samples 5 failures/ refusal s.  No sample recovery for station.
Cobble to boulder-sized materials predominate.

Boat:  Palouse (Gravity Environmental)

Photo Directory:  YCR-SED 6-24-2010

Sampler Type:  Power Grab (Gravity Environmental)

Photo File:  356 - 367

Sampler Name:  Jeff Lepo

Sample Signature:  [ ]

Date:  6/27/2010

Time:  11:15

Sample Labeling (Refer to QAPP and Sample Key)
Sample No.:  SD001 through SD003, UMF - SD0054 through SD0096, CB - SD007 through SD009, DME - SD0010 through SD0012 (three sample no. per location)
Sample Tag:  T001 through T120.  Sequential based on collection order and time.  Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
### FIELD SAMPLE LOG - SEDIMENTS

Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

**Sample No.: SD00**

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
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<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
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<td>STATION NO.</td>
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<td>03</td>
<td></td>
<td>EDward Dalles</td>
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**GRAB SAMPLE NO. (001 THROUGH 010)**

*Grab Sample = One Bucket

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
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</thead>
<tbody>
<tr>
<td>001</td>
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<td>444101</td>
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</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures
- **ML**: Inorganic salts, very fine sands, rock flour, silt or clay silts with low plasticity.
- **CL**: Clayey sands, sand-clay mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines.
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- **GM**: Silty gravels, gravel-sand-silt mixtures

**Color (Munsell)**

- **Variable color matrix**: 10 YR 3/2
- **Dark yellowish brown**: 10 YR 4/4

**Visible Organic Matter**

- Yes [X] No [ ]

- Description: Few grasses or vegetation blades

**Odors**

- Yes [X] No [ ]

- Description:

- ** sampler penetration: -0- cm**

**Obvious Abnormalities (wood, shells, organisms, etc):** Yes [ ] No [X]

**Cultural Resources Notes:**

URS Archaeologist - Mike Kelly [ ] Sarah McDaniel [X]

(Cultural Resources Observed: Yes [X] No [ ])

(Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

Large boulders and bedrock exposure visible on-shore and in river. Visible depths. Refusal. Limited sand recovery with only skim/thin layer within grab. Fine sands suspended between boulders to water. Refusal, no competent sample.

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo Directory:** UCR6-27-2010

**Photo File:** 323-336

**Sampler Name:** Jeff [Signature]

**Sample Signature:** [Signature]

**Date:** 06/27/2010

**Time:** 08:55

**Sample Labelling (Refer to QAPP and Sample Key):**

Sample No. = LMF - SD0001 through SD0023, UMF - SD0064 through SD0068, CB - SD007 through SD009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

June 2010

<table>
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<th>Sample No. : SD00</th>
<th>Sample Tag : T</th>
<th>T</th>
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<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
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<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>NP = Nortport; Lower Dalles</td>
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<tr>
<td>STATION NO.</td>
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**GRAB SAMPLE NO. (001 THROUGH 010)***
Grab Sample = One Bucket

<table>
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<th>SAMPLE IDENTIFIER</th>
<th>LOCATION - STATION NO. - GRAB NO.</th>
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**WATER DEPTH (M/FT)**

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<th>WATER DEPTH</th>
<th>UTM Northing (NAD83)</th>
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**PHYSICAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Color (Munsell)</th>
<th>SW</th>
<th>SM</th>
<th>KGW</th>
<th>SP</th>
<th>SC</th>
<th>CL</th>
<th>GM</th>
<th>GC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark brown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Color (Munsell)</th>
<th>YR</th>
<th>10</th>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible Organic Matter</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Odors</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Obvious Abnormalities (wood, shells, organisms, etc):</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

**Matrix Color / Grain Size Notes:**

Mixed colors and parent materials for gravel.

**Sampler Penetration:** 5-10 cm

**Cultural Resources Observations:**

Cultural Resources Notes: URS Archaeologist - Mike Kelly / Sarah McDaniel

(Please refer to URS archaeologist field monitoring notes)

**Other Notes:**

Dark brown sand is poorly graded. Variable recovery success. Few rejections (2) due to gravels blocking grab sampler. Few clamsHELLS. Fire to mediumsands. Few fire & medium gravels. Difficult to determine sampler penetration due to variable recovery.

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Sample Labeling (Refer to QAPP and Sample Key)**

Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0009, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)

**Sample Labeling Dates and Numbers:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/27/2010</td>
<td>09:20</td>
</tr>
</tbody>
</table>

**Sample Signature:**

Jeff Leppo

**Photo Directory:** UCR Sed 6-27-2010

**Photo File:** 337-343
# Field Sample Log - Sediments

### Upper Columbia River - White Sturgeon Sediment Toxicity Study

**United States Locations/Stations**

**Sample No.: SD00**

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman’s Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
</table>

**LOCATION CODE**

<table>
<thead>
<tr>
<th>DME</th>
<th>CB</th>
<th>UMF</th>
<th>LMF</th>
</tr>
</thead>
</table>

**STATION NO.**

<table>
<thead>
<tr>
<th>☐ 01</th>
<th>☐ 02</th>
<th>☐ 03</th>
</tr>
</thead>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)***

<table>
<thead>
<tr>
<th>002</th>
<th>SAMPLE IDENTIFIER</th>
<th>NP - 03 - 002</th>
</tr>
</thead>
</table>

**LOCATION - STATION NO. - GRAB NO.**

<table>
<thead>
<tr>
<th>UTM Northing (NAD83)</th>
<th>5419368</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTM Easting (NAD83)</td>
<td>44305</td>
</tr>
</tbody>
</table>

**Water Depth**

| Estimate (M / FT) | 3 - 5 | Boat In Reverse? | No Reading |

**Physical Characteristics**

- **SW** Well graded sand, gravelly sand, little to no fines.
- **SM** Silty sands, sand-silt mixtures
- **GW** Well graded gravels, gravel-sand mixtures, little to no fines
- **SP** Poorly graded sand, gravelly sand, little to no fines.
- **SC** Clayey sands, sand-clay mixtures
- **GP** Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML** Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL** Clayey sands, sand-clay mixtures
- **GM** Silty gravels, gravel-sand-silt mixtures

- **Color (Munsell)** Dark Brown
- **Color (Munsell) Notes** 10YR 4/3

- **Visible Organic Matter** Yes ☐ No ☑

- **Odors** Yes ☐ No ☑

- **Obvious Abnormalities** (wood, shells, organisms, etc.): Yes. ☐ No ☑

**Cultural Resources Notes:** URS Archaeologist - Mike Kelly ☐ Sarah McDaniel ☑ Cultural Resources Observed: Yes ☐ No ☑

*(Please refer to URS archaeologist field monitoring notes)*

**Other Notes:**

Good recovery of poorly graded fine to medium sands. Few fine to medium gravels of mixed colors. Parent material present. Some gravels present. Sand texture and colors are relatively uniform dark brown.

**Boat:** Palouse (Gravity Environmental)

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo Directory:** UCR Sed 6-27-2010

**Sample Name:** Jeff Lapo

**Sample Signature:**

**Date:** 6/27/2010

**Time:** 09:50

**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example: T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example: 001 through 010 (10 per station)
Sample No. : SD00

Sample Tag : T

Location Name: Deadman's Eddy

Location Code: DME

Station No.: 01

Grab Sample No. (001 through 010)*: 003

SAMPLE IDENTIFIER

LOCATION - STATION NO. - GRAB NO.

WATER DEPTH: 5 ft

UTM Northing (NAD83): 5419363

UTM Easting (NAD83): 443309

Physical Characteristics:

- SW: Well graded sand, gravelly sand, little to no fines.
- SM: Silty sands, sand-silt mixtures
- SP: Poorly graded sand, gravelly sand, little to no fines.
- SC: Clayey sands, sand-clay mixtures
- ML: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- CL: Clayey sands, sand-clay mixtures
- GW: Well graded gravels, gravel-sand mixtures, little to no fines
- GP: Poorly graded gravels, gravel-sand mixtures, little to no fines
- GM: Silty gravels, gravel-sand-silt mixtures
- GC: Clayey gravels, gravel-sand-cement mixtures

Color (Munsell): Dark brown 10 YR 4/3

Visible Organic Matter: Yes

Odors: Yes

Obvious Abnormalities: Few wood debris, fine to medium bark, litter

Cultural Resources Notes: URS Archaeologist - Mike Kelly / Sarah McDaniel

Cultural Resources Observed: Yes

Other Notes:

1 to 2 refusals per grab, either gravel in clomshell or poor recovery with stomach washing.

Boat: Palouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Sampler Name: Jeff Hepp

Sample Signature: [Signature]

Date: 6-27-2010

Time: 10:10

Sample Labeling (Refer to QAPP and Sample Key):

Sample No. = LMF - SD0001 through SD0010, UMF - SD0004 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example: T001 through T120. Sequential based on collection order and line. Assigned to specific sample number.

Grab Sample No. Example: 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

June 2010

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>SD00</th>
<th>Sample Tag</th>
<th>T174</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>NP</td>
</tr>
<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)*** 004 **SAMPLE IDENTIFIER** NP. 03.004 **LOCATION - STATION NO. - GRAB NO.**

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>FT/MT</th>
<th>UTM Northing (NAD83)</th>
<th>5419362</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UTM Easting (NAD83)</td>
<td>443306</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures.
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines.
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures.
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
- **CL**: Clayey sands, sand-clay mixtures.
- **GM**: Silty gravels, gravel-sand-silt mixtures.
- **GC**: Clayey gravels, gravel-sand-clay mixtures.

**Color (Munsell)**

- **Sands**: Dark brown
- **Clay**: 10 YR 4/3

**Visible Organic Matter**: Yes □ No □

**Odors**: Yes □ No □

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes □ No □

- Fire firewood, medium rust, litter, bark, mixed clay and sand.

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly □ / Sarah McDaniel □

| Cultural Resources Observed: | Yes □ | No □ |

**Other Notes**:

- 5 A retards washed or gravel holding clam shell open.
- A per No to little recovery. Does not meet SOP.
- No Sample

**Boat**: Palouse (Gravity Environmental)

**Sampler Type**: Power Grab (Gravity Environmental)

**Photo Directory**: UCR Sed 6.24.2010

**Sampler Name**: Jeff □

**Sample Signature**: □

**Date**: 6/24/2010

**Time**: 10:30

**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0009, CB - SD0010 through SD0012, DME - SD0013 through SD0015
- Sample Tag No. Example: T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example: 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**

Upper Columbia River - White Sturgeon Sediment Toxity Study
United States Locations/Stations

Sample No.: SD001
Sample Tag: T121

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>LD</td>
</tr>
<tr>
<td>STATION NO.</td>
<td>☑ 01</td>
<td>☐ 02</td>
<td>☐ 03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRADE SAMPLE NO. (001 THROUGH 010)*</td>
<td>001</td>
<td>SAMPLE IDENTIFIER</td>
<td>LD 01 001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Grab Sample = One Bucket

WATER DEPTH: 23.0

<table>
<thead>
<tr>
<th>UTM Northing (NAD83)</th>
<th>5412550</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTM Easting (NAD83)</td>
<td>435422</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

Color (Munsell): Black

Color (Munsell) Description: 10 YR 2.1

Visible Organic Matter: Yes [ ] No ☑
Description: Small organic litter

Odors: Yes ☐ No ☑

Obvious Abnormalities (wood, shells, organisms, etc.): Yes ☐ No ☑

- Few small shells - white 5 to 15 mm. MISC. organic litter / sand

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☐
(Please refer to URS archeologist field monitoring notes)

Michele Steiger ( Cust)

Cultural Resources Observed: Yes ☐ No ☑

Other Notes:

- Good recovery. Predominately fineblack sand, small volume composition of yellowish brown sand grains.

Boat: Palouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sd 6-27-2010

Photo File: 404-408

Sampler Name: Jeff Logan

Sample Signature: [Signature]

Date: 6/27/2010

Time: 14:35

Sample Labeling (Refer to QAPP and Sample Key)

Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0008, CB - SD0009 through SD0016, DME- SD0017 through SD0030. (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

June 2010

Sample No.: SD00 13
Sample Tag: T 122

LOCATION NAME: Deadman's Eddy
LOCATION CODE: DME
STATION NO.: 01

GRAB SAMPLE NO. (001 THROUGH 010)*: C02
SAMPLE IDENTIFIER: LD 01 C02

WATER DEPTH: 21.1 ft
UTM Northing (NAD83): 5412543
UTM Easting (NAD83): 4354424

PHYSICAL CHARACTERISTICS

- SW: Well graded sand, gravelly sand, little to no fines.
- SP: Poorly graded sand, gravelly sand, little to no fines.
- ML: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
- SM: Silty sands, sand-silt mixtures
- SC: Clayey sands, sand-clay mixtures
- CL: Clayey sands, sand-clay mixtures
- GW: Well graded gravels, gravel-sand mixtures, little to no fines
- GP: Poorly graded gravels, gravel-sand mixtures, little to no fines
- GM: Silty gravels, gravel-sand-silt mixtures
- GC: Clayey gravels, gravel-sand-clay mixtures

Color (Munsell): Black
Color (Munsell): 10YR 2.1

Visible Organic Matter: Yes [ ] No [X]
Odors: Yes [ ] No [X]

Obvious Abnormalities (wood, shells, organisms, etc): Yes [ ] No [X]

Few small shells (snails) - white 5 to 10mm. Misc. decomposing organic matter.

Cultural Resources Notes: URS Archaeologist - Mike Kelly [ ] Sarah McDaniel [X]
(please refer to URS archaeologist field notes)
Cultural Resources Observed: Yes [ ] No [X]

Other Notes:

Boat: Palouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)
Sample Name: Jeff Coo
Sample Signature: Jeff Coo
Date: 6/27/2010
Time: 14:45

Sample Labeling (Refer to QAPP and Sample Key)
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0010, DME - SD0010 through SD0012 (three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
**FIELD SAMPLE LOG - SEDIMENTS**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  

**Sample No.**: SD00  
**Sample Tag**: T  

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>LD</td>
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<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td></td>
<td></td>
<td>003</td>
</tr>
</tbody>
</table>

**Grab Sample No.** (001 Through 010)*  
*Grab Sample = One Bucket  
**Sample Identifier**: LD 01 003  
**Location - Station No. - Grab No.**: LD 01 003  

**Water Depth**: 214 (M / FT)  
**UTM Northing (NAD83)**: 5412548  
**UTM Easting (NAD83)**: 435425

**Physical Characteristics**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SW</td>
<td>Poorly graded sand, gravelly sand, little to no fines.</td>
<td>SM</td>
<td>Silty sands, sand-silt mixtures</td>
<td>GW</td>
</tr>
<tr>
<td>SP</td>
<td>Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity</td>
<td>SC</td>
<td>Clayey sands, sand-clay mixtures</td>
<td>GP</td>
</tr>
<tr>
<td>ML</td>
<td></td>
<td>CL</td>
<td>Clayey sands, sand-clay mixtures</td>
<td>GM</td>
</tr>
</tbody>
</table>

**Color (Munsell)**

| Black | 10 yr 2.1 |

**Visible Organic Matter**

| Yes □ | No □ |

**Odors**

| Yes □ | No □ |

**Obvious Abnormalities** (wood, shells, organisms, etc.): Yes □ No □

*Misc. decomposing litter/organic matter.*

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly □ Sarah McDaniel □  
**Cultural Resources Observed**: Yes □ No □

*Please refer to URS archaeologist field monitoring notes*

**Other Notes**: Michele Stagner □

**Boat**: Palouse (Gravity Environmental)  
**Sampler Type**: Power Grab (Gravity Environmental)

**Photo Directory**: UCR Sed 6.27.2010  
**Photo File**: 412-413

**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0008, CB - SD0009 through SD0011, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 001 through 016 (10 per station)

**Sample Name**:  
**Sample Signature**:  
**Date**: 6/27/2010  
**Time**: 14:50
### FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

#### Sample No.: SD003 | Sample Tag: T241

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☑ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☐ Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>☑</td>
</tr>
<tr>
<td>STATION NO.</td>
<td>☑01</td>
<td>☐02</td>
<td>☐03</td>
<td></td>
<td>☑</td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)**
Grab Sample = One Bucket

<table>
<thead>
<tr>
<th>WATER DEPTH (M FT)</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 m</td>
<td>5412545</td>
<td>435434</td>
</tr>
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</table>

#### PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th>Well graded sand, gravelly sand, little to no fines</th>
<th>Silty sands, sand-silt mixtures</th>
<th>Well graded gravels, gravel-sand mixtures, little to no fines</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW</td>
<td>☑</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>SP</td>
<td>☑</td>
<td>☐</td>
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</tr>
<tr>
<td>ML</td>
<td>☑</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Color (Munsell)</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color (Munsell)</td>
<td>YR</td>
</tr>
</tbody>
</table>

Matrix Color / Grain Size Notes:
Uniform texture color

- Visible Organic Matter: Yes ☑ No ☐
- Description: Misc. organic litter

- Odors: Yes ☑ No ☐
- Description: Decomposing bark, wood debris. Small snails/shells, some apparent debris.

#### Cultural Resources Notes:
URS Archaeologist - Mike Kelly ☑ Sarah McDaniell ☐
(Please refer to URS archaeologist field monitoring notes)

- Cultural Resources Observed: Yes ☑ No ☐

- Other Notes:
Continues to include small amounts of yellowish brown/brownish yellow sand grains.

### Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (three sample no. per location)

Sample Tag No. Example = T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)

---

**Boat:** Palouse (Gravity Environmental)

**Photo Directory:** UCR Sea 6-27-2010

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo File:** 414 - 420

---

**Sampler Name:**

**Sample Signature:**

**Date:** 6/27/2010

**Time:** 15:35
FIELD SAMPLE LOG - SEDIMENTS  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations  

Sample No.: SD00  
Sample Tag: T  

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>D</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>[ ] Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| GRAB SAMPLE NO. (001 THROUGH 010)* | 005 | SAMPLE IDENTIFIER | LD . 01 . 005 |  
| LOCATION - STATION NO. - GRAB NO. |  

| WATER DEPTH (M/FT) | 22.0 | UTM Northing (NAD83) | 5412540 | UTM Easting (NAD83) | 435423 |  

### PHYSICAL CHARACTERISTICS

| SW | Well graded sand, gravelly sand, little to no fines. | SM | Silty sands, sand-silt mixtures | GW | Well graded gravels, gravel-sand mixtures, little to no fines |
| SP | Poorly graded sand, gravelly sand, little to no fines. | SC | Clayey sands, sand-clay mixtures | GP | Poorly graded gravels, gravel-sand mixtures, little to no fines |
| Mill | Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity | CL | Clayey sands, sand-clay mixtures | GM | Silty gravels, gravel-sand-silt mixtures |

| Color (Munsell) | Black | 10 YR 2.5/1 | GC | Clayey gravels, gravel-sand-clay mixtures |  

| Visible Organic Matter | Yes ☑ | No ☐ | Description: Misc. organic clitter |  

| Odors | Yes ☑ | No ☐ | Description: |  

| Obvious Abnormalities (wood, shells, organisms, etc.): Yes ☑ No ☐ | Decomposed bark, etc. |  

### Cultural Resources Notes: URS Archaeologist - Mike Kelly ☑  
Sarah McDaniel ☐  
Michele Stayer  
(Please refer to URS archaeologist field monitoring notes)

### Other Notes:

*Some rejected material grabs due to bark or limbs hold open sampler clam shell sides*.

### Boat: Palouse (Gravity Environmental)  
Photo Directory: UCR Sed 6-27-2010  
Sampler Type: Power Grab (Gravity Environmental)  
Photo File: 421-422  

### Sample Labeling (Refer to QAPP and Sample Key):  
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)  
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.  
Grab Sample No. Example - 001 through 010 (10 per station)  

Sampler Name: [Signature]  
Sample Signature: [Signature]  
Date: 6/27/2010  
Time: 15:53
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00  | Sample Tag: T 126

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>Deadman's Eddy</th>
<th>China Bend</th>
<th>Upper Marcus flats</th>
<th>Lower Marcus flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td>NP = Northport</td>
</tr>
<tr>
<td>STATION NO.</td>
<td>01</td>
<td>02</td>
<td>03</td>
<td>LD</td>
<td>Lower Dalles</td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO. (001 THROUGH 010)*** 006  | **SAMPLE IDENTIFIER** LD 01 006

**WATER DEPTH** (M / FT) 22m  | **UTM Northing (NAD83)** 5412550

**UTM Easting (NAD83)**

**PHYSICAL CHARACTERISTICS**

- **SL** Well graded sand, gravelly sand, little to no fines.
- **SM** Silty sands, sand-silt mixtures
- **GW** Well graded gravels, gravel-sand mixtures, little to no fines
- **SP** Poorly graded sand, gravelly sand, little to no fines.
- **SC** Clayey sands, sand-clay mixtures
- **GP** Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML** Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL** Clayey sands, sand-clay mixtures
- **GM** Silty gravels, gravel-sand-silt mixtures
- **GC** Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)** Black 10 YR 2.1

**Matrix Color / Grain Size Notes:**

**Visible Organic Matter** Yes [ ] No [ ]

- **Odora** Yes [ ] No [ ]
  - **Description:** Organic litter, decomposing

**Sampler Penetration:** 20 cm

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes [ ] No [ ]

- **Small snails present**

**Cultural Resources Notes:**
Urs Archaeologist - Mike Kelly 
Sarah McDaniel 
(Please refer to URS archaeologist field monitoring notes)

**Cultural Resources Observed:** Yes [ ] No [ ]

**Other Notes:**

- Old athletic shoe in sample - rejected as one
- Grab - held open sampler

**Boat:** Palouse (Gravity Environmental)

**Photo Directory:** UCR Sd 6.27.2010

**Sampler Type:** Power Grab (Gravity Environmental)

**Photo File:** 423 - 425

**Sample Labeling (Refer to QAPP and Sample Key)**
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)

Sample Tag No. Example - T001 through T120. Sequential based on collection order and time, assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)

**Sampler Name:**

**Sample Signature:**

**Date:** 6.27.2010

**Time:** 15:59
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00   Sample Tag: T   007

LOCATION NAME
☐ Deadman's Eddy    ☐ China Bend    ☐ Upper Marcus Flats    ☐ Lower Marcus Flats    ☐ Alternate

LOCATION CODE
☐ DME    ☐ CB    ☐ UMF    ☐ LMF

STATION NO.
☐ 01    ☐ 02    ☐ 03

GRABD SAMPLE NO. (001 THROUGH 010)*  007
*Grab Sample = One Bucket

WATER DEPTH (M / FT)
21.6

UTM Northing (NAD83)
5412541

UTM Easting (NAD83)
435422

PHYSICAL CHARACTERISTICS

☐ SW  Well graded sand, gravelly sand, little to no fines.
☐ SP  Poorly graded sand, gravelly sand, little to no fines.
☐ ML  Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
☐ SM  Silty sands, sand-silt mixtures
☐ SC  Clayey sands, sand-clay mixtures
☐ CL  Clayey sands, sand-clay mixtures
☐ GW  Well graded gravels, gravel-sand mixtures, little to no fines.
☐ GP  Poorly graded gravels, gravel-sand mixtures, little to no fines.
☐ GM  Silty gravels, gravel-sand-silt mixtures
☐ GC  Clayey gravels, gravel-sand-clay mixtures

Color (Munsell)
Black

Visible Organic Matter
Yes ☐ No ☐
Description: Organic litter, surficial

Odors
Yes ☐ No ☐
Description:

Obvious Abnormalities (wood, shells, organisms, etc.): Yes ☐ No ☐
Few Snail shells, 5 to 10 mm

Cultural Resources Notes: URS Archaeologist - Mike Kelly ☐ / Sarah McDaniel ☐
(Please refer to URS archaeologist field monitoring notes)

Other Notes:

Michele Seigneur

Boat: Pelouse (Gravity Environmental)

Sampler Type: Power Grab (Gravity Environmental)

Photo Directory: UCR Sed 6-27-2010

Sampler Name: Jeff Parker

Sample Signature:

Date: 6/27/2010

Time: 16:12

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)
# FIELD SAMPLE LOG - SEDIMENTS

Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations

**Sample No.: SD001**  
**Sample Tag: T128**

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>☐ Deadman's Eddy</th>
<th>☐ China Bend</th>
<th>☐ Upper Marcus Flats</th>
<th>☐ Lower Marcus Flats</th>
<th>☑ Alternate</th>
</tr>
</thead>
</table>
| LOCATION CODE | DME               | CB          | UMF                 | LMF                 | NP = Northport  
| STATION NO.   | ☑ 01              | ☐ 02        | ☐ 03                |                      | LD = Lower Dalles |

**Grab Sample No. (001 through 010)* 008**  
*Grab Sample = One Bucket  
**Sample Identifier: LD_01_008**  
**Location - Station No. - Grab No.**

**WATER DEPTH (M / FT):** 21.7

**UTM Northing (NAD83):** 5412561  
**UTM Easting (NAD83):** 435421

**Physical Characteristics**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW</td>
<td>Well graded sand, gravelly sand, little to no fines.</td>
</tr>
<tr>
<td>SP</td>
<td>Poorly graded sand, gravelly sand, little to no fines.</td>
</tr>
<tr>
<td>ML</td>
<td>Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.</td>
</tr>
<tr>
<td>SM</td>
<td>Silty sands, sand-silt mixtures</td>
</tr>
<tr>
<td>SC</td>
<td>Clayey sands, sand-clay mixtures</td>
</tr>
<tr>
<td>CL</td>
<td>Clayey sands, sand-clay mixtures</td>
</tr>
<tr>
<td>GW</td>
<td>Well graded gravels, gravel-sand mixtures, little to no fines.</td>
</tr>
<tr>
<td>GP</td>
<td>Poorly graded gravels, gravel-sand mixtures, little to no fines.</td>
</tr>
<tr>
<td>GM</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td>GC</td>
<td>Clayey gravels, gravel-sand-clay mixtures</td>
</tr>
</tbody>
</table>

**Color (Munsell):** Black | Uniform color/texture

**Visible Organic Matter:** Yes ☑ No ☐

**Odors:** Yes ☑ No ☐

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes ☑ No ☐  
Small snails/shells present - appear to be on sediment surface.

**Cultural Resources Notes:**  
URS Archaeologist - Mike Kelly ☑  
Sarah McDaniel ☐  
Michele Stegner ☑  
(Cultural Resources Observed: Yes ☑ No ☐)

**Other Notes:**  
Small amounts of brownish/yellow sand grains in matrix - present in all grabs.

**Boat:** Palouse (Gravity Environmental)  
**Photo Directory:** UCR Sed 6-27-2010

**Sampler Type:** Power Grab (Gravity Environmental)  
**Photo File:** 429-432

**Sample Labeling (Refer to QAPP and Sample Key):**
Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)  
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.  
Grab Sample No. Example - 001 through 010 (10 per station)

**Sample Name:** [Signatures]  
**Sample Signature:** [Signatures]  
**Date:** 6-27-2010  
**Time:** 16:47:5
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00 3 Sample Tag: T 129

LOCATION NAME  □ Deadman's Eddy  □ China Bend  □ Upper Marcus Flats  □ Lower Marcus Flats  □ Alternate
LOCATION CODE  DME  CB  UMF  LMF
STATION NO.  □ 01  □ 02  □ 03

GRAB SAMPLE NO. (001 THROUGH 010)*  009  SAMPLE IDENTIFIER  LD 01 009

*Grab Sample = One Bucket

WATER DEPTH  (M / FT) UTM Northing (NAD83)  5412444
UTM Easting (NAD83)  435423

PHYSICAL CHARACTERISTICS

□ SW  Well graded sand, gravelly sand, little to no fines.
□ SM  Silty sands, sand-silt mixtures
□ GW  Well graded gravels, gravel-sand mixtures, little to no fines.

□ SP  Poorly graded sand, gravelly sand, little to no fines.
□ SC  Clayey sands, sand-clay mixtures
□ GP  Poorly graded gravels, gravel-sand mixtures, little to no fines.

□ ML  Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity.
□ CL  Clayey sands, sand-clay mixtures
□ GM  Silty gravels, gravel-sand-silt mixtures

Color (Munsell):  Black  10 YR 2.5 G
□ GC  Clayey gravels, gravel-sand-clay mixtures

Visible Organic Matter: Yes □ No □
Description: Organic matter - back

Odors: Yes □ No □
Description:

Obvious Abnormalities (wood, shells, organisms, etc): Yes □ No □

Small white to yellowish white snails on sediment surface

Cultural Resources Notes: URS Archaeologist - Mike Kelly □ / Sarah McDaniel □
Cultural Resources Observed: Yes □ No □
(please refer to URS archaeologist field monitoring notes)

Other Notes:

Boat: Palouse (Gravity Environmental)
Sampler Type: Power Grab (Gravity Environmental)

Sampler Name: Jeff Lappo
Sample Signature: [Signature]
Date: 6/20/2010
Time: 16:50

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0009, DME - SD0010 through SD0012 (three sample no. per location)
Sample Tag No. Example - T051 through T120. Sequential based on collection order and time. Assigned to specific sample number.
Grab Sample No. Example - 001 through 010 (10 per station)

Photo Directory: ucr Sed 6-27-2010
Photo File: 433-439

Michele Stegner

Sediment Field Form US ver 2.xls
**FIELD SAMPLE LOG - SEDMENTS**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study  
United States Locations/Stations

**Sample No.: SD00** | **Sample Tag:** T

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>China Bend</th>
<th>Upper Marcus Flats</th>
<th>Lower Marcus Flats</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
</tr>
<tr>
<td>STATION NO.</td>
<td><strong>01</strong></td>
<td>02</td>
<td>03</td>
<td><strong>01</strong></td>
</tr>
</tbody>
</table>

**GRAB SAMPLE NO.** (001 THROUGH 010)*  
*Grab Sample = One Bucket  
**010**

**WATER DEPTH** *(M/Ft)*  
20.0

**UTM Northing (NAD83)**  
5412553

**UTM Easting (NAD83)**  
435421

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silts, very fine sands, rock flour, silty or clayey silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**: Black

**Matrix Color / Grain Size Notes:** Uniform texture/color

**Visible Organic Matter**: Yes [ ] No [ ]

**Description**: Organic litter - bole.

**Odors**: Yes [ ] No [ ]

**Description**: Small snails present - number & size away from grab to grab

**Sampler Penetration**: 2.0 cm

**Obvious Abnormalities** (wood, shells, organisms, etc): Yes [ ] No [ ]

**Cultural Resources Notes**: URS Archaeologist - Mike Kelly [ ] Sarah McDaniel [ ] Cultural Resources Observed: Yes [ ] No [ ]

(Please refer to URS archaeological field monitoring notes)

**Other Notes**:

**Boat**: Palouse (Gravity Environmental)

**Photo Directory**: UCR Sed 6_27_2010

**Sampler Type**: Power Grab (Gravity Environmental)

**Photo File**: 440 - 443

**Sampler Name**: Jeff Leppo

**Sample Signature**: [Signature]

**Date**: 6_27_2010

**Time**: 16:57

**Sample Labeling (Refer to QAPP and Sample Key)**

- Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
- Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
- Grab Sample No. Example - 061 through 010 (10 per station)
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - White Sturgeon Sediment Toxicity Study
United States Locations/Stations

Sample No.: SD00
Sample Tag: T 131

<table>
<thead>
<tr>
<th>LOCATION NAME</th>
<th>[ ] Deadman's Eddy</th>
<th>[ ] China Bend</th>
<th>[ ] Upper Marcus Flats</th>
<th>[ ] Lower Marcus Flats</th>
<th>[ ] Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION CODE</td>
<td>DME</td>
<td>CB</td>
<td>UMF</td>
<td>LMF</td>
<td></td>
</tr>
<tr>
<td>STATION NO.</td>
<td>[ ] 01</td>
<td>[✓] 02</td>
<td>[ ] 03</td>
<td>LD</td>
<td></td>
</tr>
</tbody>
</table>

GRAB SAMPLE NO. (001 THROUGH 010)*
*Grab Sample = One Bucket

<table>
<thead>
<tr>
<th>WATER DEPTH</th>
<th>22.5 (M / FT)</th>
<th>UTM Northing (NAD83)</th>
<th>5413586</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UTM Easting (NAD83)</td>
<td>436598</td>
</tr>
</tbody>
</table>

PHYSICAL CHARACTERISTICS

| [ ] SW       | Well graded sand, gravelly sand, little to no fines. |
| [ ] SP       | Poorly graded sand, gravelly sand, little to no fines. |
| [ ] ML       | Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity |
| [ ] SM       | Silty sands, sand-silt mixtures |
| [✓] GW       | Well graded gravels, gravel-sand mixtures, little to no fines |
| [ ] SC       | Clayey sands, sand-clay mixtures |
| [ ] CL       | Clayey sands, sand-clay mixtures |
| [ ] GC       | Clayey gravels, gravel-sand-clay mixtures |

Color (Munsell)

| sands SW Mixed Variable colors YR 1 |

Visible Organic Matter: Yes [✓] No [ ]

Odors: Yes [✓] No [ ]

Obvious Abnormalities (wood, shells, organisms, etc): Yes [ ] No [✓]

Matrix Color / Grain Size Notes:

Mixed Parent Materials

Sampler Penetration: -0- cm

Cultural Resources Notes: URS Archaeologist • Mike Kelly [✓] Sarah McDaniel [ ] Cultural Resources Observed: Yes [ ] No [✓]

(Refer to URS archaeological field monitoring notes)

Other Notes:

Gravel to cobble sized materials of mixed parent materials. Limited volume of well graded sands. Cannot determine composition % each. All 3 attempts have gravels & cobbles. Sand w/ gravel & cobble appears well graded. No sample.

Boat: Palouse (Gravity Environmental)

Photo Directory: UCR Sed 6-27-2010

Sampler Type: Power Grab (Gravity Environmental)

Sampler Name: Jeff Lee

Sample Signature: Jeff Lee

Date: 6-27-2010

Time: 13:50

Sample Labeling (Refer to QAPP and Sample Key)
Sample No. = LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME- SD0010 through SD0012 (Three sample no. per location)
Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.

Grab Sample No. Example - 001 through 010 (10 per station)
## FIELD SAMPLE LOG - SEDIMENTS

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**  
**United States Locations/Stations**  

### Sample Information

- **Sample No.:** SD00  
- **Sample Tag: T141**

### Location Details

- **Location Name:**  
  - [ ] Deadman's Eddy  
  - [ ] China Bend  
  - [ ] Upper Marcus Flats  
  - [ ] Lower Marcus Flats  
  - [ ] Alternate

- **Location Code:** DME  
- **Station No.:**  
  - [ ] 01  
  - [ ] 02  
  - [ ] 03

- **Grab Sample No. (001 through 010):** 001

### Physical Characteristics

- **Water Depth:** 4.9 (M/FT)
- **UTM Northing (NAD83):** 5414446
- **UTM Easting (NAD83):** 438122

### Sample Description

- **Color (Munsell):** YR  
- **Visible Organic Matter:** Yes [ ] No [x]
- **Odors:** Yes [ ] No [x]

### Cultural Resources Notes:

- Cultural Resources Observer: Yes [ ] No [x]

### Other Notes:

- All gravels to cobble sized materials. Some boulders likely can be viewed in water column. Refigel LD-03.
- No Sample. No sediments in sample. Some sediments spread into net. Sample 4trea - cobble and 4 water only.

### Boat

- **Boat:** Palouse (Gravity Environmental)

### Sample Information

- **Sample Labeling (Refer to QAPP and Sample Key):**
  - Sample No.: LMF - SD0001 through SD0003, UMF - SD0004 through SD0006, CB - SD0007 through SD0009, DME - SD0010 through SD0012 (Three sample no. per location)
  - Sample Tag No. Example - T001 through T120. Sequential based on collection order and time. Assigned to specific sample number.
  - Grab Sample No. Example - 001 through 010 (10 per station)

### Sample Signature

- **Sampler Name:** [Signature]
- **Sample Signature:** [Signature]

### Date and Time

- **Date:** 6-27-2010  
- **Time:** 13.00
APPENDIX E

Environmental Field Notebook

Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
This page intentionally Blank.

6/22/10
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00</td>
<td>Orientation on SOPs, including labeling, decom, IDW, sample processing, Core health &amp; safety, cultural resources observations &amp; procedures</td>
<td></td>
</tr>
<tr>
<td>9:00</td>
<td>Finish orientation, HS, move to boats for Prep &amp; mobilization</td>
<td>Start boats for preparation &amp; mobilization.</td>
</tr>
<tr>
<td>10:10</td>
<td>All assemble &amp; boot dock for life preservers, boot H &amp; S talk</td>
<td>Life preservers, boot H &amp; S discussion.</td>
</tr>
<tr>
<td>10:20</td>
<td>Eric &amp; Rene provide boat safety, non-over board, life actions, etc. Motivating crew.</td>
<td>Crew motivation and boat safety briefing.</td>
</tr>
<tr>
<td>10:30</td>
<td>Deco station set up in Palouse</td>
<td>Deco station preparation in Palouse.</td>
</tr>
<tr>
<td>10:35</td>
<td>Pre-for-departure</td>
<td>Preparations for departure.</td>
</tr>
</tbody>
</table>

**Project Client:** UCOR Sediment

**Location:** Kettle Falls, WA

**Date:** 6/22/10

**Notes:**
- Sample identifiers - unique
- Boat crews - Grant & Columbia
- Sand storage 4°C in RINER
- Deco station set up in Palouse
10:42 Poleup stage, possible mechanical
issues. Coolant hose repair.

10:55 Back up course to Lower Marcus
Flats Station 1 LMF-01.

11:45 First power grab (LMF
LMF-01-001 - all black silt
with high organic matter, likely
color), 3-1/2 ton LMF-01
yields only river mud. Three attempts
to collect competent/appropriate
sediment matrix. Need to review QA/QP.

12:20 Decision - move to LMF-02.

Decom powered grab, lexicon tray
Decom procedure: liguidue wash, deionized
water, distilled rinse, dilute nitric acid wash/frise
and distilled final rinse.

Note: Work with Jim Retzer on defining
station coordinates. Will use both fall
boat lot/long (GIS conversion from
URS) National Park Service Trimble
and URS hard-hold Magellan unit.
Magellan & Trimble are correlated pretty
well based on side by side readings.

using UTM NAD83 (Zone 11). We will
agree on location/position to meet
agriculture resource requirements. The
start of LMF-01 was 9 meters
south of center and 4 meters east
of center -> within the 20 meter
diameter from purue station point.

For LMF-01, set anchor to hold
vessel in location. Buoy indicates
boat movement in flat water so
boat actions/sampling, currents
made it difficult to remain in
the 20 meter.

12:50 @ LMF-02. Depth to bottom
is 51 meters range from 40 to
50 meters rest in calm water.
Depth 42 meters as we passed
over coordinate for LMF-02.
Drift around in search area from
cordinate point with resulting
range. Gravity was 33 meters
(100 ft) of airline for sampler.
Location: Lower Marcus Flats  Date: 6/22/10
Project / Client: UCR Sediment Sampling

1730 - Complete sample @ LMF-01 Head back to Kettle Falls Boat Launch
Notes by Jeff Leppa - App
Camera: Canon D-10

Location: Kettle Falls, WA  Date: 6/23/10
Project / Client: Upper Columbia River Sediment Sampling

7:45 Arrive @ Kettle Falls Boat Launch
Gravimetric Columbia boats in transit from Columbia Navigation's dock
Work Boat - Palouse, Gravity Support Boat - Marcus, Columbia, New
Gravimetric has acquired additional air hose to reach sediments @ LMF-02 and LMF-03
Have everyone sign in daily attendance record
Boat setup & mobilization
8:40 Safety Mtg - emergency routes & cell numbers - location in both
TRIP HSAP & URS HSAP
8:50 Gravimetric working on new online
for deeper grab samples.
8:55 Head for LMF-02.
09:20 Setup at LMF-02 - Establish control point coordinates, use anchor line for location to maintain location
40 to 50 m water depth
09:30 - Work begins, will use power grab to get two hexapods to fill two grab buckets. Reduce time run increase safety.
Review depth site with Jim Retzer. His cartography map indicates LMF-02 is situated in old river channel. He indicated we should move east.

Establish location at same UTM northing in eastern direction.

Establish new location with Jim:

<table>
<thead>
<tr>
<th>Northing</th>
<th>New Coordinate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5390157 N</td>
<td>539065 Proposed</td>
</tr>
<tr>
<td>8 meters south of proposed north coordinate</td>
<td></td>
</tr>
</tbody>
</table>

Establish location with Jim:

<table>
<thead>
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Echo location with Jim:

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<td>1400 to 1415</td>
<td>Sample Event: 4 to 5 meters</td>
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<td>1415</td>
<td>Hold-up sampling with two grabs &amp; mixed core/grey nodules with silty organic matter</td>
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1420 Special Mark: Collect Cell Matrix, collect sediment regardless of sediment particle size. Need to come back to LMF-02 to correct air line length.

1440 - Decon materials / equipment. Return to LMF-01

1443 - Talk to David Vardy. Talked of test materials. Whatever sediment we should continue to sample until a plan is made. Let lab determine what process & approvals to charge can be made, if necessary, wrt EPA, etc.

1445 - Back to LMF-01507 & 5001

1455 Setup over LMF-01.

1715 Sample collected from LMF-01.

Collect grass tops 1001 to 1010.

Generally - dark gray + black silty muds w/ organic matter decomposing.

1720 Fire sample given individual times. Each sample 5D001 should be same time according to OWPL. Log each bucket.

Grab will sample & grab time.

Log will have start time for 15:00 LMF-01.
0945 - repair airline by Gravity
Start Sample LMF-02-001
T01
0950 First Grab - Time to use
Fosil & LMF-02
Sticks and fibers of 2 to 15 mm dia
in first two grabs not competent to include
into grab
10:50 - Discuss collection process
and suspension of soil w/sand matrix.
Decant off water from lexan tub
or leave in tub and use for covering
bucket. QAPP says decant off
of the sampler but can lose some
sediments. Decide to not decant
but hold in sampler & lexan tray
to use as cover
11:45 Continue to collect compromised sample
into separate tub those where sticks
or other obstruction prevent uniform
collection. Obstruction continue

Note: For coordinates - continue to use
Gravity's Garmin GPSmap 420s, VES's
Magellan Triton and Garmin iXtre
To merge position, Nobeltec software
12:20 - Continue to have failure w/ recovery due to sticks in soil
Abandon after 3 attempts, agree
12:45 Move LMF-03 > 3 failed attempts @ LMF-03
12:55 Arrive LMF-03, set up anchors
@ coordinate point. Allow boat to stabilize
Nobeltec software w/ GPS coordinates
14:05 Gravel troubles are prevalent
and block/hold open the sampler
Make 6 attempts @ LMF-03
2 additional attempts
SD 003 T021 only sample
@ LMF.
Discuss alternative - failure to
obtain competent samples > 3 per
QAPP.
1445 Devan LMF-03 eg-plant on bank
with liquid-associated weed
nitric acid rinse, deionized H2O wash/rinse

Notes on LMF-02 and LMF-03 - wood
debris (LMF-02) and gravel/cobble (LMF-03)
Required rejection of these grab samples
Sediment surface was disturbed &
winnowing & leaching were present
in both substrates.

LMF-02 - predominantly grayish to
yellowish brown silts (approx 0.5 cm)
over black sand. Significant wood
debris in silt + surface at bottom

LMF-03 - yellowish brown silts
(approx 0.5 cm) over mixed parent
material, matrix of small gravel & cobbles,
red clays.

1505 - Arrive @ UMF-02. Setup
4 anchors to hold position near
coordinate t within 20m diameter

1605 Start Sample @ UMF-02-001
Good recovery. Silts and
very fine sands, ML.
Uniform color & matrix.
Few grasses/vegetation observed
approx 7 to 10cm lengths. Also
red leeches.

16:25 Finish @ UMF-02 for today
17:15 Meet w/ Univ. of Sask. crew
to hand off sample & sig
Cot C. See photos for view
of Cots at Univ. will put
& send copies upon receipt
of laboratory
17:30 Head for motel for mobilization

Notes by: [Signature]
0740 Arrive @ boat launch, prep for Upper Maras Flats (UMF). New URS archaeologist today - Sarah McDaniels. New NPS #BMI Hill observers today.

0810 Orientation meeting with Nicole, Sarah, and Sarah McDaniels. Nicole needs to review word sign HASP.

Note: Craig Christian - observer for both CFT and Ecology.

0830 Heath & Safety Meeting - new personnel, detailed H&S review of individual boat layout and work zone responsibilities.

Trip slip and pinch points. Fire extinguishers, emergency locations.

0840 Leave dock for UMF-02

0855 Arrive @ UMF-02

Setup over coordinate. Note: Close to cultural resource old Maras.

0915 - Work coordinate, moving FS position. Some difficulty with satellite reception on all GPS, plus NPS Trimble. Wait to stabilize. Work anchor sets.

10:00 Sampling @ UMF-02 Begins

11:20 Genevieve sample @ UMF-02

11:45 Arrive @ UMF-01

Setup anchors to control over-coordinate.

12:00 Start @ UMF-01

14:30 Finish @ UMF-01

Predominately dark greyish brown clay, gravel and matrix, slight t excess black fine sands w/ brown/mushy yellowish brown mud & coarse sand. Some variable silt content, layers, streaks, mixed into sands, distinct.
Page 10

5:10 AM

1510 Avenue (UMF-03), Establishment

Decom complete by 9:00 PM. 1% grass wash,

drainage hole, excavate, move, and clean.

1:00 PM

Finish (UMF-03), remove and clean.

Cleanup deck, move, and clean.

17:50

1666 Deck, Meet w/ Univ

5x1K Transfer, 28 buckets

to refrigerator truck, complete Gate

Notes by David

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[Signatures]
0800 Arrive @ China Bend, mobilization load boats.
0840 Daily safety meeting and check-in
Switch w/Marine rescue, first aid kits
Set fire extinguishers
0850 Leave dock for CB-02 station
Sequence CB-02 → CB-04 → CB-03
0910 Arrive @ CB-02, setup anchors for
maintaining control w/in coordinate
range.
* Garry has completed bucket decant @
dock. Collect DW in sealed 5 gallon
bucket.
0950 Bucket positioned, Decant
clarified w/ligand wash, DI water
rinse, nitric acid wash, DI water rinse
1010 Relatively slow to moderate current
and depth to bottom (7m) cause
line w/ pneumatics hose to bow 4
drag back sampler. This does not
allow sample & set fást on bottom.
Eric Westerman reports 196K cfs
currently flowing. Little to no
recovery. 2 tries, no results

10:30 Gravity crew decides to hook up Von Veen
Sampler. Prepare extrallight from
lead balls.
* Retest sample in first several attempts
wil Power Grab indicate possible well
graded sands, mixed parent material + silt+s
10:50 Von Veen Sampler attempted - river current
1 anchor set does not permit sampling.
Sampler tip on side @ river bottom

11:02 Discuss options: shift anchor to
east center or establish coordinate center then
Tech buoy - anchor w/ buoy using length of
anchor rope/chain

11:15 Lay out chain & rope to attach to
anchor (buoy 16.4 meters, 53 feet
7 feet @ anchor Scope \\
eangle = 60ft (53+7)
Chian 12' + Rope 48' = 60 ft. - crew
decide to add additional scope.
Keep buoys close to vertical as possible
160 +adal 6ft = 66ft. (20m)
11:30 Crew works on anchor buoy line.
René works to setup buoy to coordinate
meetup René & Eric to review sample
program. Use Pole to set buoy coordinate
northern limit of coordinate circle.

Boat

Plan view

(10m) 38°C

Station Coordinate

Discuss w/ technical observers Craig,
Christian & Nicole Beaden
- are OK with method, need to review
QAPP details.

12:13 Rene confirms that buoy location is 30 ft N
from coordinate center based on CB-02
coordinate entry 432120, 5008773

12:20 Review procedures w/ crew & technical
observers. Work to set up the drop point
1st Try - water only
Rene marks sampler contact point
w/ Nobiletec
2nd Try - water only

12:40 Exhaust options - no reasonable return
can be determined @ this time to set
sample using available equipment per
QAPP guidelines. Decide & consider
this fully the 3rd attempt - ride
and move to CB-01

Pull buoy

13:05 Pull up on CB-01 to set buoy @
5th tangent, 10 meters (33 ft)
from center coordinate.

13:15 Buoy set on marked on Nobiletec

Get decons samples

13:30 1st sample - not competent sample
Approx 3 to 6 cm of mixed parent
material yellowish brown & black sandstone
Grab Sampler did not appear to level off or settle under an undisturbed scenario. Water depth 17.2m.

2nd Attempt - pull up single boulder, rounded convex discus, 8 to 10 inch diameter.

1355 3rd Attempt - mixed pre-treatment SW sample, 5 to 10 cm, disturbed. Some silt present. Sample appears washed, angled in sampler. Decide to move to CB-03.

1405 - Move to CB-03. Setup buoy with anchor at north tangent to center coordinate. 13.1 meters.
                   Depth position buoy to meet 10m radius.

1410  Gary decants before CB-03

1417  First attempt, tree limb stems and organic matter, no sediment. Milfoil?? Vegetation on limb.

1425  2nd attempt. Mixed sample, well grid, gravel, cobbles (GW), QAPP defined pebbles, cobbles as unsuitable material. Not confident that sample leaves undisturbed.

        Discuss sample with technical observers, review QAPP for guidelines. Reject sample. 50/50 estimate Gravel/Pea Gravel prevents clay, clam-shells.

14:30  Third attempt, same profile.

14:45  Close out, CB-03

15:00  Back to Chine Bend

15:20  Return to Colville
07:55 - Arrive @ DME, Gravity Env. & Columbus Nav boats in water. Creus settle up boats for day's sampling. Water level is up to near-top of dock and ramp.

Discuss today's water conditions w/ Rene & Eric W.

08:30 - Leave for DME. Completed health/safety meeting. Positions in mouth: water, awareness, buddy checks.

08:50 - Setup over DME-02. Located in eddy on south river bank. Good current flow upstream. GPS shows 1/2 mph. Approx. 10 m depth

09:14 - GPS reset. Rene observes Nobiletco position. Continue to set anchors. Satellite acquisition (spotty) - lose 1 & 2 sets then position. Decide to move to DME-01

10:20 - Lose satellite reception as well. DME-02, Nobiletco experience not able to pick up satellite.

10:30 - No satellite reception w/ Boot GPS. Rene needs Nobiletco system to position boat to coordinate reference & hold/set anchor. Handheld jumps (Magellan Triton / Garmin Map 420xs)

10:35 - Try boat move to DME-03

Then back to DME-02. Reception poor to navigate with or satellite drop out.

10:45 - Satellite back. Rene maneuvers over DME-02. Start grab sampler. See Field Log for DME-02-00

11:10 - Finished at DME-02

No suitable recovery due to cobble. Three attempts

11:12 - Move to DME-01 adjacent to gravel bar.

11:45 - DME-01 - no suitable recovery due to cobble.

First attempt - minimal recovery, well-graded mixed sand.

Second attempt - 1 cobble recovered.
11:50 DME-01 Station has swift current with difficult in setting power grab.
Riv. depth approx 3 to 4’ m. Appears to be cobble sized material w/ sand interspersed, but unable to determine the particle size. Note depth & coordinate at depth see bottom.

11:55 Move up for third attempt. Few cobbleites. No success on DME-01

12:15 Break for lunch.

13:05 Head to DME-03

13:25 Attempts to recover samples from DME-03 failed. Grab only brought up vata - could be due to presence of lg. rocks. Three attempts.
Riv. depth 5.5 - 6 m strong current, win eddy.

13:30 Complete discon of equipment & sampler, etc.. after DME-03

No recovery @ DME-03

13:40 Revew CDT & NOS permits w/ technical observers, per their request, to ascertain appropriateness. @ AEP is the doc of record for this project, per ARS’s scope & SOPs w/ AAPP.
0800 Crew, tech, observers and URS meet @ boat launch, Orientation to health & safety meeting. Discuss today's program. Sequence NP-02 → NP-03 → NP-01.

08:30 Head up for NP-02 north of boat launch.

0910 Finish @ NP-02 - no recovery, large boulders and breakers visible on shore. Triangular bottom depths, average approx 5 meters; but dependent on position. Trace scree only.

Move to NP-03 after 3 attempts. Correlations indicate other attempts would not be effective.

0915 Decon sample equipment, Prep for NP-03

0920 Start sample @ NP-03

Variable recovery. Uniform poorly graded dark brown sand & gravel to cobble sized materials. Limit recovery - unable to close Power Grab.

10:30 End day.

Lunch

11:10 Complete decon, leave dock & maneuver over NP-01

11:15 Start NP-01. First grab is well sorted black sand with yellowish brown (10YR 7/1 and 10YR 5/4)

Predominant color is black sand; 5+ attempts do not yield competent sample. Cobble to boulder sized rock in remaining attempts. No sample / refusal.

11:40 End NP-01. Decon & North port dock. Collect T0V in tub then transfer to 3-gal bucket. Await for Jonathon Reinh & Michele Stegner (URS) archaeologists for Little Dalles L.C.

Lunch
12:30 Jonathan (ERS) and Michele (URS) arrive. scenic provides geological field observation & log requerements.

12:45 - 13:00 Travel to LD-03
Set up power station coordinates
13:00 LD-03 T141. All cobbles/boulders, few suspended solids/soil in sampler. 4 efforts for retrieval - refusal
13:15 Decom equipment/scrap
13:20 Move to LD-02
13:35 Arrive @ LD-02. Set up for sample. Coordinate in moderate to swift current w/20 ft. 23 meters of river depth. Float up to target position 10 meters upstream. Then drop sampler & float back w/current to sample bottom. Revisit w/grond to check size & material w/ same rods.

* 4 to 6 ft white sturgeon surface and rolls in current w/50 meters of boat.
18:55 - Finish work & leave Northport

Notes by Jeff Long

Michele Stegner assisted w/ UTM coordinate acquisition for grab samples
APPENDIX F

Chain of Custody Forms

Field Report
Sediment Sampling Program
Assessment of Sediment Toxicity to White Sturgeon
June 22 through 27, 2010
<table>
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<th>Sample Tag No.</th>
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<th>Sampling Date</th>
<th>Sampling Time</th>
<th>Sample Notes and Comments</th>
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**Upper Columbia River RIFFS - Quality Assurance Project Plan for the Assessment of Sediment Toxicity in White Sturgeon (May 2010)**

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<th>No. of Containers</th>
<th>Sample Notes and Comments</th>
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**Custodial Record**

- **Received by:** Jeff E. Lipp (Signature & Print Name)
  - **Date:** 6/27/10
  - **Time:** 18:30

- **Received by:** Jeff Thomson (Signature & Print Name)
  - **Date:** 6/27/10
  - **Time:** 18:30

- **Received by:** Ryan Dove (Signature & Print Name)
  - **Date:** 7/01/10
  - **Time:** 0900

- **Received by:** Ryan Dove (Signature & Print Name)
  - **Date:** 7/01/10
  - **Time:** 0900

- **Received by:** David Vardy (Signature & Print Name)
  - **Date:** 7/12/10
  - **Time:** 1500

**Unique Chain of Custody No.:** UCRSED0013

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Custodial Record

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Reinstituted by:  Jeff D. Thompson  7/6/2010  09:00
Received by:  Ryan Dove  7/6/2010  09:00

Unique Chain of Custody No.  UCRSED001

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**Analytical / Physical Parameters**

Upper Columbia River
ReFTS - Quality Assurance
Project Plan for the
Assessment of Sediment
Toxicity to White
Sturgeon (May 2010)

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**Custodian Record**

- **Received by:** JEFF THOMSEN Date: 7/01/10 Time: 0900
- **Replenished by:** RYAN DOVE Date: 7/12/10 Time: 1500
- **Received by laboratory:** Date: 7/12/10 Time: 1500

**Sample Receiving Notes**

- **Date:** 6/27/10 **Time:** 18:25
- **Date:** 6/27/10 **Time:** 18:25

**Unique Chain of Custody No.:** UCRSED0018

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**Analytical / Physical Parameters**

- **Upper Columbia River RIFFS - Quality Assurance Project Plan for the Assessment of Sediment Toxicity to White Sturgeon (May 2010)**
- **No. of Containers**

**Custodial Record**

- **Received by:** Jeff Thomsen  
  **Date:** 6/12/2010  
  **Time:** 09:00

- **Prepared by:** Ryan Dove  
  **Date:** 7/01/2010  
  **Time:** 09:00

- **Prepared by:** Ryan Dove  
  **Date:** 7/12/2010  
  **Time:** 1500

- **Received by:** Laboratory  
  **Date:** 7/12/2010  
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**Analytical / Physical Parameters**

- Upper Columbia River
- RIF'S - Quality Assurance
- Project Plan for the Assessment of Sediment Toxicity to White Sturgeon (May 2010)

**Lab ID No.:**

**Sample Notes and Comments:**

**Customized Record**

- **Received by:** Jeffrey Elledge
  - **Date:** 6/23/10
  - **Time:** 17:15

- **Received by:** Jeff Thorson
  - **Date:** 6/23/10
  - **Time:** 17:15

- **Received by:** Jeff Thorson
  - **Date:** 7/01/10
  - **Time:** 09:00

- **Received by:** Ryan Dove
  - **Date:** 7/01/10
  - **Time:** 09:00

- **Received by:** Ryan Dove
  - **Date:** 7/12/10
  - **Time:** 15:00

- **Received by:** Roland Kraft
  - **Date:** 7/12/10
  - **Time:** 15:00

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**Custodian Record**

*Received by Sampler (Sign & Print Name)*

*Signatures*

- Jeffy E. Loppo
- Jeff Thomsen
- Ryan Dave

**Sample Receiving Notes**

- Received by: Jeffy E. Loppo
- Date: 6/24/10
- Time: 17:55

- Received by: Jeff Thomsen
- Date: 6/24/10
- Time: 17:55

- Received by: Ryan Dave
- Date: 7/01/10
- Time: 09:00

**Unique Chain of Custody No.**

- UCRSED008

**Laboratory Work Order No.**

- UTMS003
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**Custodial Record**

**Relaying by Sampler (Sign & Print Name):**

**Date:** 6/23/2010  **Time:** 17:15

**Received by:** Jeffrey E. Leppo

**Sample Receiving Notes**

**Unique Chain of Custody No.:** UCRSED005

**Laboratory Work Order No.:**

**Relinquished by:**

**Date:** 7/01/10  **Time:** 08:00

**Received by:** Ryan Sorensen

**Date:** 7/01/10  **Time:** 08:00

**Relinquished by:**

**Received by Laboratory:**
APPENDIX C-2

FIELD REPORT AND RECORDS
METHODS DEVELOPMENT FOR THE
WHITE STURGEON SEDIMENT TOXICITY STUDY
SEDIMENT SAMPLING
JUNE 30, 2010 MEMORANDUM
MEMORANDUM

TO: Marko Adzic, Teck American Incorporated
FROM: Jeffrey E. Leppo, LG
DATE: June 30, 2010
FILE: 36310054.00001
SUBJECT: Field Report and Records – Methods Development for the White Sturgeon Sediment Toxicity Study Sediment Sampling, British Columbia, Canada

Introduction

URS Incorporated (URS) conducted field services for Teck American Incorporated (Teck) on the Columbia River (CR) at Birchbank Eddy (BBE), Genelle (GE), and Lower Arrow Lake (LALL) sediment sampling locations in British Columbia, Canada on May 12 and 13, 2010. The field services scope of work was based on the requirements and standard operating procedures (SOP) outlined within the Quality Assurance Project Plan – Methods Development for the White Sturgeon Sediment Toxicity Study (QAPP) prepared for Teck in April 2010.

Field records attached to this memorandum include:

- Photographs of the locations, general sampling procedures, and grab samples
- Field Data/Sampling Diary sheets for each sample location and station
- Photocopy of the hard-bound Environmental Field Book daily record
- Chain-of-custody for May 12 and 13, 2010 grab samples

Scope of Work

Three below-water sediment sampling locations and coordinates are identified in the QAPP, including BBE, GE, and LALL located above Trail, British Columbia. Each of the three general sample locations was accessed by boat and positioned for sediment grab sampling by Gravity Environmental, Inc. (Gravity) based on the QAPP coordinates. The longitude and latitude coordinates for each grab sample station were marked using the sample boat’s global positioning system (GPS) and recorded on the individual field data/sampling diaries. Table 1 presents coordinates of each grab sample location. Sediment sample locations are shown in Map 1.

All sediment samples were collected using a decontaminated compressed air operated Power Grab sampler. Sediment was collected as ten grab samples at each general location and transferred to five-gallon decontaminated polyethylene buckets; dependent on the river bottom composition and sample recovery. Unique sample numbers and tags were assigned based on QAPP SOP-4 instructions.

Photographs of each location, sample procedures, and grab samples were taken and are sequentially identified using a white board to record pertinent information (e.g., time, date, and location) within Attachment A. Typical sampling activities and sediments collected during this event are presented in Figures 1 through 15.
Individual photo files are labeled with the name of the station and a sequential number within the photographic directory for each of the three locations, as follows:

- Birchbank Eddy – BBE_001 to BBE_021
- Genelle – GE_001 to GE_045
- Lower Arrow Lake – LALL_001 to LALL_035

Field data and sampling diary sheets were prepared for each grab sample (Attachment B). Field sampling diaries include observations on the weather, time, latitude and longitude, water depth, sediment texture and characteristics, photograph record, abnormalities, and other relevant notes. A bound environmental field book (Attachment C) was used to record general information regarding project personnel, activities, and operations.

Field Observations

Ten competent grab samples (five gallons each) were obtained from both the Genelle and Lower Arrow Lake locations; for a total of 20 grab samples. The river bottom composition of the Birchbank Eddy was primarily composed of cobble and boulder-sized material. Three attempts were made to collect sediments at this location; unfortunately, the presence of a coarse substrate precluded the recovery of a suitable fine to coarse sand matrix. Please refer to the Birchbank Eddy photos and field diary for reference.

Grab samples were transported to shore and relinquished under chain-of-custody protocol to Dr. Markus Hecker (Principal Investigator) and representatives of the University of Saskatchewan, Aquatic Exposure Laboratory. Samples were placed in a refrigerated truck maintained to approximately 4°C and transported to the University of Saskatchewan. Please refer to Attachment D for the chain-of-custodies.

Deviations and Corrective Actions

The presence of a cobble and boulder river bottom cover precluded the ability to collect a competent sample from the Birchbank Eddy location.

No other reportable deviations, contingencies, or corrective actions required for this project phase as defined by the QAPP or SOPs.

Attachments:

Table 1: Sample Coordinates
Map 1: Sediment Sample Locations
Figures 1-15: Site Photographs
Attachment A: Photographic Record
Attachment B: Field Data/Sampling Diaries
Attachment C: Environmental Field Book
Attachment D: Chain-of-Custodies
## Table 1
Sample Numbers and Coordinates
Methods Development - White Sturgeon Sediment Toxicity Study
Upper Columbia River - Birchbank Eddy, Genelle, and Lower Arrow Lake (Canada)

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<td>5465790.327</td>
<td>440467.594</td>
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<td>Lower Arrow Lake</td>
<td>TAI-CAN-LALL-1-PG-3</td>
<td>LALL3</td>
<td>5465799.460</td>
<td>440479.801</td>
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<td>TAI-CAN-LALL-1-PG-4</td>
<td>LALL4</td>
<td>5465801.313</td>
<td>440479.821</td>
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<td>TAI-CAN-LALL-1-PG-5</td>
<td>LALL5</td>
<td>5465803.152</td>
<td>440481.052</td>
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<td>TAI-CAN-LALL-1-PG-6</td>
<td>LALL6</td>
<td>5465806.858</td>
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<td>Lower Arrow Lake</td>
<td>TAI-CAN-LALL-1-PG-7</td>
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<td>TAI-CAN-LALL-1-PG-8</td>
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<td>Lower Arrow Lake</td>
<td>TAI-CAN-LALL-1-PG-9</td>
<td>LALL9</td>
<td>5465799.407</td>
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<td>Lower Arrow Lake</td>
<td>TAI-CAN-LALL-1-PG-10</td>
<td>LALL10</td>
<td>5465830.918</td>
<td>440483.775</td>
</tr>
</tbody>
</table>

Notes:
(1) Sample could not be collected because river bottom comprised of cobbles and boulders
(2) Coordinates based on Universal Transverse Mercator (UTM) using North American Datum of 1983 (NAD83), Zone 11
(3) Sample coordinates miss-recorded in field. Presented UTM coordinates have been corrected.
Sediment Sample Locations

Source:
GIS base layer Information provided by Parametrix Inc.

URS Corporation

Map 1
Methods Development for the
White Sturgeon Sediment Toxicity Study
(Birchbank Eddy, Genelle, and Lower Arrow Lake)
Upper Columbia River, Canada
FIGURES 1 through 15
Site Photographs
Figure 1
Photograph of Birchbank Eddy Station, view to north. Note cobbley river bottom.

Figure 2
Deployment of the Power Grab sediment sampling device, Birchbank Eddy Station, view to the north.
Figure 3
Retrieval of Power Grab sediment sample at Birchbank Eddy Station, view to the north.

Figure 4
Poor recovery at Birchbank Eddy Station. Note cobbles and absence of finer sediment material.
Figure 5
Preparing to deposit Power Grab sediment grab sample into sample tray at the Genelle Station.

Figure 6
Sediment grab sample following placement in sample tray at the Genelle Station.
Figure 7
Close-up view of Genelle Station sediment grab sample.

Figure 8
Transferring Genelle Station sediment grab sample from sample tray.
Figure 9
Sediment grab sample number GE4 following placement in sample container, Genelle Station.

Figure 10
Shoreline at Genelle Station, view toward east.
Figure 11
Shoreline at Genelle Station, view to southeast.

Figure 12
Sediment grab sample number LALL2 in sample tray, Lower Arrow Lake Station
Figure 13
Sediment grab sample number LALL4 in sample tray, Lower Arrow Lake Station

Figure 14
Close-up of grab sample number LALL4 in sample tray, Lower Arrow Lake Station
Figure 15
Shoreline at Lower Arrow Lake Station, view to northeast
ATTACHMENT A
Photographic Record
Provided on Compact Disc (CD)
ATTACHMENT B
Field Data/Sampling Diaries
**FIELD DATA / SAMPLING DIARY**
Upper Columbia River - White Sturgeon Sediment Toxicity Study

| STATION: | 1 |
| STATION CODE: | BBE | GENELLE | LOWER ARROW LAKE |
| DATE: | 5/12/2010 |
| WEATHER CONDITIONS: | Sunny, clear, 65 to 70°F |
| SEDIMENT SAMPLER TYPE: | Power Grab |
| URS FIELD PERSONNEL: | Gary Panther, Jeff Leggo |
| Other Notes: | No sample, no fine to coarse grains sands |

| Sample No. | TAI-CAN-BBE.7-PG. 1 |
| Container Tag No. | NA |
| Time | 12:39 |
| UTM Easting | See Above |
| UTM Northing | |
| Field Photo No. | UCR Birchbank Eddy |
| Camera Image No. | BBE_001 to BBE_021, Photo sequence Sample Area |
| Water Depth (cm) | 229 (7.5 ft) |
| Sampler Depth Penetration (cm) | 2 to 5 cm |
| Sediment Texture (ASTM/Unified) | GW, well graded gravels w/ cobbles & boulders, little to no fines or sand |
| Sediment Color (Munsell) | Variable matrix parent material & colors |
| Odors | No odors |
| Leakage Disturbance | Very poor recovery - unable to close sampler |
| Abnormalities | 1) Freshwater clam |
| Other Notes | Cobble to boulder sized material on river bottom, sand limited to matrix interves |

**Station Reference UTM Coordinates**
| Easting | 4610843 |
| Northing | 11742771 |

**Sampler Name:** Jeff Leggo

**Sample Signature:** Jeff Leggo

**Date:** 5/19/2010

**Time:** 16:00
### Sample No. 1

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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<td>BBE</td>
</tr>
<tr>
<td>Station</td>
<td>GENELLE</td>
</tr>
<tr>
<td>Sediment Sampler Type</td>
<td>Power Grab</td>
</tr>
<tr>
<td>Weather Conditions</td>
<td>Clear, sunny, 65 to 70°F</td>
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<tr>
<td>UTM Easting</td>
<td>See above</td>
</tr>
<tr>
<td>UTM Northing</td>
<td>117 42.280</td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR Genelle</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>GE_001 to GE_006, Photo sequence - sampling, sample</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
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<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>15 (5 to 6 in.)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unilled)</td>
<td>SW-well graded sands, little to no fines, few small gravel</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Grayish brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Minimal visible organic material - small wood particles on surface - removed as feasible</td>
</tr>
</tbody>
</table>

**Sample Signature:**

**Date:** 5/19/2010

**Time:** 19:02
<table>
<thead>
<tr>
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<td>Container Tag No.</td>
<td>GE2</td>
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<tr>
<td>Time</td>
<td>1400</td>
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<tr>
<td>UTM Northing</td>
<td>1111</td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>U2 Genelle</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>GE-007 to GE-011</td>
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<tr>
<td>Water Depth (cm)</td>
<td>162 (5.3 ft)</td>
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<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>15 (5 to 6 in.)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well-graded sands, little to no fines, few small gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Grayish brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery - cobbles present</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>Small roots</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Increase invisible organic matter - roots removed, as feasible. Move to center of eddy for next sample based on field observations. Few cobbles.</td>
</tr>
</tbody>
</table>

Sampler Name: Jeff Leppo

Sample Signature: [Signature]

Date: 5/17/2010

Time: 19:06
**FIELD DATA / SAMPLING DIARY**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study

| STATION: | 3 |
| STATION CODE: | BBE |
| WEATHER CONDITIONS: | Clear, sunny, 65 to 70°F |
| SEDIMENT SAMPLER TYPE: | Power Grab |
| URS FIELD PERSONNEL: | Gary Panther, Jeff Leppo |

| Sample No. | TAI-CAN-GE_1-PG_3 |
| Container Tag No. | GE3 |
| Time | 1450 |
| UTM Easting | See above |
| Field Photo No. | VCR Genelle |
| Camera Image No. | GE_012 to GE_016 |
| Water Depth (cm) | 180 (5.9 ft) |
| Sampler Depth Penetration (cm) | 23 (8 to 10 in) |
| Sediment Texture (ASTM/Unified) | SW, well graded sands, little to no fines, few small gravel |
| Sediment Color (Munsell) | Grayish brown |
| Odors | None observed |
| Leakage Disturbance | Good recovery |
| Abnormalities | None observed |
| Other Notes | Good sample located close to middle of edge, little to no visible organic matter. Good place for reman grb samples |

Sampler Name: Jeff Leppo  
Sample Signature: [Signature]  
Date: 5/12/2010  
Time: 19:07
FIELD DATA / SAMPLING DIARY
Upper Columbia River - White Sturgeon Sediment Toxicity Study

STATION: 4  BIRCHBANK EDDY  GENELLE  LOWER ARROW LAKE
STATION CODE: BBE  GE  LALL

DATE: 5/12/2010
WEATHER CONDITIONS: Clear, sunny, 65 to 70°F
SEDIMENT SAMPLER TYPE: Power Grab

URS FIELD PERSONNEL: Gary Panther, Jeff Leppo

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-GE_1-PG.4</th>
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<tr>
<td>Container Tag No.</td>
<td>GE4</td>
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<tr>
<td>Time</td>
<td>1508</td>
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<td>UTM Easting</td>
<td>See above</td>
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<tr>
<td>UTM Northing</td>
<td></td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR Genelle</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>GE-O17 to GE-O21</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>192 (6.3 ft)</td>
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<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>27 (10 to 11 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sands, little to no fines, few small gravel</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Grayish brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>No visible organic matter</td>
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Sampler Name: Jeff Leppo
Sample Signature: [Signature]
Date: 5/19/2010
Time: 1908
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<td>11 11</td>
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<tr>
<td>Field Photo No.</td>
<td>UF GENELLE</td>
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<tr>
<td>Camera Image No.</td>
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<tr>
<td>Water Depth (cm)</td>
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<td>Sampler Depth Penetration (cm)</td>
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</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW-well graded sand, little to no fines, fine smd gravel</td>
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<tr>
<td>Sediment Color (Munsell)</td>
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</tr>
<tr>
<td>Odors</td>
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</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
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<tr>
<td>Abnormalities</td>
<td>None observed</td>
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<tr>
<td>Other Notes</td>
<td>No visible organic matter</td>
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Sampler Name: Jeff Leppo
Sample Signature: [Signature]
Date: 5/19/2010
Time: 19:10
### Sample Information

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<td>GE6</td>
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<tr>
<td>Time</td>
<td>15:22</td>
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<tr>
<td>UTM Easing</td>
<td>See Above</td>
</tr>
<tr>
<td>UTM Northing</td>
<td>11 11</td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR Genelle</td>
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<tr>
<td>Camera Image No.</td>
<td>GE-025 to GE-027</td>
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<td>Water Depth (cm)</td>
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<td>Sampler Depth Penetration (cm)</td>
<td>28 (11 in.)</td>
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### Sediment Characteristics

- **Texture (ASTM/Unified):** SW - well graded sands, little to no fines, few small gravels
- **Color (Munsell):** Grayish brown
- **Odors:** None observed
- **Leakage Disturbance:** Good recovery
- **Abnormalities:** None observed
- **Other Notes:** No visible organic matter.

### Sampling Details

- **Sampler Name:** Jeff Leppo
- **Sample Signature:** [Signature]
- **Date:** 5/12/2010
- **Time:** 19:12
**URS**

**FIELD DATA / SAMPLING DIARY**
Upper Columbia River - White Sturgeon Sediment Toxicity Study

<table>
<thead>
<tr>
<th>STATION: 7</th>
<th>BIRCHBANK EDDY</th>
<th>GENELLE</th>
<th>LOWER ARROW LAKE</th>
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**STATION CODE:** BBE

**DATE:** 5/12/2010

**WEATHER CONDITIONS:** Clear, sunny, 65 to 70°F

**SEDIMENT SAMPLER TYPE:** Power Grab

**URS FIELD PERSONNEL:** Gary Panther, Jeff Leggo

**Other Notes:**

<table>
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<tr>
<th>Sample No.</th>
<th>TAI-CAN-GE-1-PG-7</th>
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<tr>
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<table>
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<th>UTM Northing</th>
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<table>
<thead>
<tr>
<th>Field Photo No.</th>
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<table>
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<th>Camera Image No.</th>
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<table>
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<th>Water Depth (cm)</th>
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<table>
<thead>
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<th>Sampler Depth Penetration (cm)</th>
<th>25 (10 in.)</th>
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<table>
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<tr>
<th>Sediment Texture (ASTM/Unified)</th>
<th>SW-well graded sands, little to no fines, few small gravels</th>
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</table>

<table>
<thead>
<tr>
<th>Sediment Color (Munsell)</th>
<th>Grayish brown</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Odors</th>
<th>None observed</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Leakage Disturbance</th>
<th>Good recovery</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Abnormalities</th>
<th>None observed</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Other Notes</th>
<th>Dark gray stringers with grayish brown color matrix. Possible evidence of different depositions or disturbance (natural)</th>
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**Sampler Name:** Jeff Leggo

**Sample Signature:**

**Date:** 5/19/2010

**Time:** 19:44
<table>
<thead>
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<tr>
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</tr>
<tr>
<td>UTM Northing</td>
<td>11 11</td>
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<td>Field Photo No.</td>
<td>UCR Genelle</td>
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<td>Camera Image No.</td>
<td>GE-032</td>
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<tr>
<td>Water Depth (cm)</td>
<td>204 (6.7 ft.)</td>
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<td>25 (10 in.)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sands, little to no fines, few small gravel</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Grayish brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>No visible organic matter</td>
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Sampler Name: Jeff Leppo
Sample Signature: [Signature]
Date: 5/19/2010
Time: 19:17
### Field Data / Sampling Diary
#### Upper Columbia River - White Sturgeon Sediment Toxicity Study

<table>
<thead>
<tr>
<th>Station:</th>
<th>9</th>
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<tbody>
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<td>Station Code:</td>
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<tr>
<td>Genelle</td>
<td>GE</td>
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<tr>
<td>Lower Arrow Lake</td>
<td>LALL</td>
</tr>
<tr>
<td>Date:</td>
<td>5/12/2010</td>
</tr>
<tr>
<td>Weather Conditions:</td>
<td>Clear, sunny, 70-70°F</td>
</tr>
<tr>
<td>Sediment Sampler Type:</td>
<td>Power Grab</td>
</tr>
<tr>
<td>URS Field Personnel:</td>
<td>Gary Panther, Jeff Leppo</td>
</tr>
</tbody>
</table>

| Sample No.       | TAI-CAN-GE-0-PG-9            |
| Container Tag No. | GE9                         |
| Time             | 1548                        |
| UTM Easting      | See above                   |
| UTM Northing     |                             |
| Field Photo No.  | UCR - Genelle               |
| Camera Image No. | GE-033                      |
| Water Depth (cm) | 179 (5.9 ft)                |
| Sampler Depth Penetration (cm) | 20 (8 in.)                   |
| Sediment Texture (ASTM/Unified) | SW - well graded sands, little to no fines, few small gravels |
| Sediment Color (Munsell) | Grayish brown               |
| Odors            | None observed               |
| Leakage Disturbance | Good recovery              |
| Abnormalities    | None observed               |
| Other Notes      | No visible organic matter   |

Sampler Name: **Jeff Leppo**
Sample Signature: **[Signature]**
Date: **5/19/2010**
Time: **19:19**
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-GE-1-PG-10</th>
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<tbody>
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<td>UTM Northing</td>
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<td>UCR Genelle</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>GE-028 to GE-030, also GE-034 to GE-035, Area</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>192 (6.3 ft)</td>
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<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>25 (10 in.)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW-well graded sands, little tonobines, few small gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Grayish brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>No visible organic matter</td>
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Sampler Name: Jeff Leppo
Sample Signature: [Signature]
Date: 5/19/2010
Time: 19:13
<table>
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<tr>
<th>Sample No.</th>
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<td>Time</td>
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</tr>
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<td>UTM Easting</td>
<td>See above</td>
</tr>
<tr>
<td>UTM Northing</td>
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</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR-Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-01 to LALL-012, PhotoSegment</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>207 (6.8 ft)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>23 (8 to 10 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW- well graded sands, little to no fines, few small gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light brown</td>
</tr>
<tr>
<td>Odors</td>
<td>No odors</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Some organic matter, litter on surface, overlying sand, sediment</td>
</tr>
</tbody>
</table>

Sampler Name: Jeff Leppo
Sample Signature: [Signature]
Date: 5/19/2010
Time: 17:20
### Field Data / Sampling Diary

**Upper Columbia River - White Sturgeon Sediment Toxicity Study**

<table>
<thead>
<tr>
<th>Station</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station Code</td>
<td>BBGE LALL V</td>
</tr>
<tr>
<td>Date</td>
<td>5/13/2010</td>
</tr>
<tr>
<td>Weather Conditions</td>
<td>Clear, sunny, 60 to 65°F</td>
</tr>
<tr>
<td>Sediment Sampler Type</td>
<td>Power Grab</td>
</tr>
<tr>
<td>URS Field Personnel</td>
<td>Gary Panther, Jeff Leppo</td>
</tr>
</tbody>
</table>

### Sample Details

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL-1.PG-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL2</td>
</tr>
<tr>
<td>Time</td>
<td>0950</td>
</tr>
<tr>
<td>UTM Easting</td>
<td>See above.</td>
</tr>
<tr>
<td>UTM Northing</td>
<td></td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR - Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-013 &amp; LALL-014</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>210 (6.9 ft)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>23 (8 to 10 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sands, little to no fines, few small gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Limited organic matter litter on sediment surface. Good sand samples.</td>
</tr>
</tbody>
</table>

**Sampler Name:** Jeff Leppo  
**Sample Signature:**  
**Date:** 5/19/2010  
**Time:** 19:21
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL-1-PG-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL3</td>
</tr>
<tr>
<td>Time</td>
<td>1005</td>
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<tr>
<td>UTM Easting</td>
<td>See above</td>
</tr>
<tr>
<td>UTM Northing</td>
<td></td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR - Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL_015</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>213 (7.0 ft)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>28 (11 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sands, little to no fines, few small gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leaksage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter</td>
</tr>
</tbody>
</table>

Sampler Name: Jeff Legoe
Sample Signature: [Signature]
Date: 5/19/2010
Time: 19:22
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL-1-PG-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL4</td>
</tr>
<tr>
<td>Time</td>
<td>1013</td>
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<tr>
<td>UTM Easting</td>
<td>See above</td>
</tr>
<tr>
<td>UTM Northing</td>
<td>See above</td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-016 to LALL-018</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>201 (6.6 ft)</td>
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<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>23 (8 to 10 in.)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW-well graded sands, little to no fines, few small gravel</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Lightbrown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter</td>
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</table>

Sampler Name: Jeff Leppo
Sample Signature: [Signature]
Date: 5/13/2010
Time: 19:23
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL-1-PG - 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL-5</td>
</tr>
<tr>
<td>Time</td>
<td>10:20</td>
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<tr>
<td>UTM Easting</td>
<td>See above.</td>
</tr>
<tr>
<td>UTM Northing</td>
<td>&quot; &quot;</td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR - Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-019</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>219 (7.2 ft)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>25 (10 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sands, little to no fine, few small gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter.</td>
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</tbody>
</table>

Sampler Name: Jeff Leppo

Sample Signature: [Signature]

Date: 5/13/10

Time: 19:23
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL.1-PG.6</th>
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</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL6</td>
</tr>
<tr>
<td>Time</td>
<td>10:30</td>
</tr>
<tr>
<td>UTM Easting</td>
<td>See above</td>
</tr>
<tr>
<td>UTM Northing</td>
<td></td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-020 LALL-021</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>23 (8 to 10 in) 222 (7.3 ft)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>23 (8 to 10 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW-well graded sands, little to no fines, few small granules</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light Brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter</td>
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</tbody>
</table>

Sampler Name: Jeff Lappo
Sample Signature: [Signature]
Date: 5/13/2010
Time: 19:24
**FIELD DATA / SAMPLING DIARY**  
Upper Columbia River - White Sturgeon Sediment Toxicity Study

<table>
<thead>
<tr>
<th>STATION:</th>
<th>7</th>
<th>BIRCHBANK EDDY</th>
<th>GENELLE</th>
<th>LOWER ARROW LAKE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATION CODE:</td>
<td></td>
<td>BBE</td>
<td>GE</td>
<td>LALL ✓</td>
</tr>
<tr>
<td>DATE:</td>
<td>5/13/2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WEATHER CONDITIONS:</td>
<td>Partly cloudy, 65°F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEDIMENT SAMPLER TYPE:</td>
<td>Power Grab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URS FIELD PERSONNEL:</td>
<td>Gary Panther, Jeff Leppo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL-1-PG-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL7</td>
</tr>
<tr>
<td>Time</td>
<td>1043</td>
</tr>
<tr>
<td>UTM Easting</td>
<td>See above.</td>
</tr>
<tr>
<td>UTM Northing</td>
<td>117</td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-022</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>229 (7.5 ft.)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>23 (8 to 10 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW-well graded sands, little to no fines, few small gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter.</td>
</tr>
</tbody>
</table>

Sampler Name: ____________________________  
Sample Signature: ________________________  
Date: _______ / _______ /2010  
Time: ________________
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL1-PG - 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL8</td>
</tr>
<tr>
<td>Time</td>
<td>10:55</td>
</tr>
<tr>
<td>UTM Easling</td>
<td>See above.</td>
</tr>
<tr>
<td>UTM Northing</td>
<td></td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-023 to LALL-029 Photos of sample area</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>232 (7.6 ft)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>23 (9 in)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sands, little to no fines, few to med. gravels</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Lightbrown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Two grab efforts, poor recovery on first grab</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter, matrix more variable with increase in gravel size. Need to move to concentrate on more uniform sand matrix.</td>
</tr>
</tbody>
</table>

Sampler Name: Jeff Leppo  
Sample Signature: [Signature]  
Date: 5/13/2010  
Time: 19:27
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL-1-PG-9</th>
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</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL 9</td>
</tr>
<tr>
<td>Time</td>
<td>11:05</td>
</tr>
<tr>
<td>UTM Easting</td>
<td>See above</td>
</tr>
<tr>
<td>UTM Northing</td>
<td></td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UCR_Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-030</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>22.2 (7.3 ft)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>23 (9 in.)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sands, little to no fines, few small gravel</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter</td>
</tr>
</tbody>
</table>

Sample Name: ____________________________

Sample Signature: _______________________

Date: __________/________/2010

Time: ____________________________
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>TAI-CAN-LALL1-PG-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Tag No.</td>
<td>LALL 10</td>
</tr>
<tr>
<td>Time</td>
<td>11:10</td>
</tr>
<tr>
<td>UTM Easting</td>
<td>See above</td>
</tr>
<tr>
<td>UTM Northing</td>
<td>11 11</td>
</tr>
<tr>
<td>Field Photo No.</td>
<td>UC R Lower Arrow Lake</td>
</tr>
<tr>
<td>Camera Image No.</td>
<td>LALL-031 to LALL-035. Photos sequence at sample area.</td>
</tr>
<tr>
<td>Water Depth (cm)</td>
<td>216 (7.1 ft.)</td>
</tr>
<tr>
<td>Sampler Depth Penetration (cm)</td>
<td>25 (10 in.)</td>
</tr>
<tr>
<td>Sediment Texture (ASTM/Unified)</td>
<td>SW - well graded sand, little to no fines, few small gravel</td>
</tr>
<tr>
<td>Sediment Color (Munsell)</td>
<td>Light brown</td>
</tr>
<tr>
<td>Odors</td>
<td>None observed</td>
</tr>
<tr>
<td>Leakage Disturbance</td>
<td>Good recovery</td>
</tr>
<tr>
<td>Abnormalities</td>
<td>None observed</td>
</tr>
<tr>
<td>Other Notes</td>
<td>Little to no visible organic matter</td>
</tr>
</tbody>
</table>

Sampler Name: Jeff Leppo
Sample Signature: [Signature]
Date: 5/13/2010
Time: 19:28
ATTACHMENT C
Environmental Field Book
Name: Jeff Leppe
      URS Corp.
      Gary Panther
      Spokane, WA
Address: 920 N. Argonne Rd
         Suite 300
         Spokane 99212
Phone: (509) 928 4413
Project: UCR
         White Sturgeon Sediment
         Toxicity Study

This book is printed on "Rite in the Rain" All-Weather Writing Paper. A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

Reference Page Index
67 Error codes, Hazardous classifications, Container types
68 Sampling guidelines (Liquids)
69 Sampling guidelines (Solids)
70 Approximate Volume of Water in Casing or Hole, Ground Water Monitoring Well
71 PVC Pipe casing tables
72 Soil Classification
73 Soil Classification
74 Conversions (Length, Weight, Volume, Temp, etc.)
75 Conversions (Concentrations, Volume/Flow or Time, Velocity, Acceleration)
76 Maximum Concentration of Contaminants for the Toxicity Characteristic
<table>
<thead>
<tr>
<th>PAGE</th>
<th>REFERENCE</th>
<th>DATE</th>
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<tbody>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Location: [Handwritten]
Project / Client: [Handwritten]

Tech Contact: David Espejorn
250. 231. 0104

Start: Page 4
Other Persons & Dock

* Markus Hecker - ENTRIX and Unv. of Saskatchewan
* JoAnnathan Deering - UotS
* Jeff Prohsam - UotSask
  Thomson
* Renee Trudeau - Gravity Environments
* Allen Burkhardt - Columbia

Weather: Clear skies, 55°F
Dry conditions
Gravity

10:10 Work continues w/ hydraulics for power grab sampler
* Prep Dean setup for brackets. Markus/Mark Adzie
  Bucket decom procedure agreed on under QAPP SOP
10:30 Shean & Eric go to pickup parts for pump / pump on powerhouse.

11:24 H & S Tailgate Mfg
Fire Exit, Trips of Falls, Feed Systems, beltsiffs around
A frame, man-over-board

11:35 Leave Gyro Park Boat Launch, head up river

11:50 Arrive @ Birchbank Eddy
1st Location
Rocky bottom - cobble and boulder sized materials on river bottom. Extends over area into deeper water and up the bank

Lat N 49 10.619
Long W 117 42.915

12:00 Discuss cobble/boulder sand filled intercies, between rocks
difficult to gather significant sample

2nd Location @ Birchbank - review
N 49 10.637
W 117 42.877

Same bottom, cobble/boulder w/ limited sand intercies
Notable sample w/ power grab (Collect 1 Tube Photos)

River Sounding - out to 14 ft depth appears cobble/boulder

12:10 or limit to usability

3rd Location
N 46 10.843
W 117 42.771

Setup to collect sample
Location: Birchbank Eddy  Date: 5/12/10
Project / Client: to Genelle  UCR Sediment

- Birchbank Eddy = 3rd location
- Setup for power-grab sampler
- See grab sample no. TAICAN-BBE-PL-1 - cobbles gravel with sand
- 12:50 Markus & crew agree to move
  oral forego BBE sample
  due to bottom matrix
- 12:55 Move to Genelle

Location: Genelle  Date: 5/12/10
Project / Client: to Trail Boot Launch  UCR Sediment

- 16:05 Complete Sediments sampling
- @ Genelle, good recovery in well graded sands
- Collect all 10 grab samples from
  TAICAN-GE-1-PL-10
  TAICAN-GE-1-PS-10
  Containers GE1 to GE10

Agreed Upon - Markus & Markus
+ Liguinox. Then river water rinse was field approved following discussion of the
use of liners / no liners

- 16:55 Finish w / supply
  & decon. Prep to
  move back down to
  Trail Boot Launch

Start Sampling - See Field Diary
Trail Boat Launch
17:20 - Arrive back @ Trail Boat Launch

Worked Materials on QA/AC of sample collection, date/time numbers, etc.
Prep. COC's

17:40 - Sign & relinquish Chain of Custody with Jonathan Doering, Univ. of Saskatchewan.
- Take photo for copy

Gravity Env. Crew bring boat clean & maintenance

18:00 Leave site, head to motel
18:15 - Arrive @ motel

Lower Arrow Lake

08:45 - Arrive @ Arrow Lake

Personal - see notes from 5/12/10

Boats - see notes from 5/12/10

Mobilization & Safety Meeting

09:10 - Start up boats, prepare departure

Head out to sediment sample point

09:30 - Dean power grab, lean to fill bucket - interiors w/ water/rince, liguino scrub & water/rince

10:10 - Collect last grab sample

LA LL10

11:20 - Finish up w/ sample

Platform work - clean up/Dean head to dock

11:35 - Return to dock

11:50 - Complete Cat C

Religious to Jon Doering
Location: Lower Arrow Lake  Date: 5/13/10
Project / Client: UCR Sediment

Camera/Photo copies to:

Jonathan Doering
jad929@email.usask.ca
306-270-3378 (cell)
306-966-4223 (office)
4557

1220 - Call Markow to update/status
1230 - Crews finish up
demob, head home.

See field diaries for
reference sediment sample
site observations, sample
into/descriptions, and
locations
ATTACHMENT D
Chain-of-Custody
<table>
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<th>Sample I.D.</th>
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<th>No. of Containers</th>
<th>Matrix</th>
<th>Sampling Date</th>
<th>Sampling Time</th>
<th>Notes and Comments</th>
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<tbody>
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<td>GE1</td>
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<td>5/12/10</td>
<td>1330</td>
<td>Samples: Jeff, Gary, Panther - URS Corp (Spokane)</td>
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<td></td>
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</tbody>
</table>

Sample Received Intact: Yes

Sample Recording Notes: (Jonathan Dearing)

Date: 5/12/10  Time: 1735  Sample 1735 received by JD

Reference Location: GENELLE

REFERENCE UTM COORDINATES:

Easting: 448723.51
Northing: 5450261.18

Notes and Comments:

Coordinates for QAPP Reference only. Please refer to Field Diaries for lot/long data for each grab sample.
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<th>Sample ID</th>
<th>Container Tag No</th>
<th>No. of Containers</th>
<th>Matrix</th>
<th>Sampling Date</th>
<th>Sampling Time</th>
<th>Notes and Comments</th>
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<tr>
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<td>5/13/10</td>
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<tr>
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<td>LALL6</td>
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<td>Sed</td>
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<td></td>
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<td>TAI-CAN-LALL-1-PG-7</td>
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<td>TAI-CAN-LALL-1-PG-8</td>
<td>LALL8</td>
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<tr>
<td>TAI-CAN-LALL-1-PG-9</td>
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<tr>
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<td>Sed</td>
<td>5/13/10</td>
<td>1110</td>
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</tbody>
</table>

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**Notes and Comments:**
- Fieldsamplers - Jeff Leppo
- Gary Panther

**Reference Location:**
- LOWER ARROW LAKE

**Reference UTM Coordinates:**
- Easting: 435940
- Northing: 5466319

---

**Sample Receiving Notes:**
- Received by: Jonathon Darrow
- Date: 5/13/10
- Time: 1205
APPENDIX C-3

FIELD REPORT AND RECORDS
ON-SHORE SEDIMENT SAMPLING
DEADMAN’S EDDY, UCR, STEVENS COUNTY, WA
METHODS DEVELOPMENT FOR THE
WHITE STURGEON SEDIMENT TOXICITY STUDY
JUNE 24, 2010 MEMORANDUM
MEMORANDUM

TO: Marko Adzic, Teck American Incorporated
FROM: Jeffrey E. Leppo, LG
DATE: June 24, 2010
FILE: 36310054.00002
SUBJECT: Field Report and Records – On-Shore Sediment Sampling

Deadman’s Eddy, Upper Columbia River, Stevens County, Washington
Methods Development for the White Sturgeon Sediment Toxicity Study

Introduction

URS Corporation (URS) conducted field services for Teck American Incorporated (Teck) along the Upper Columbia River (UCR) at Deadman’s Eddy (DME). Specifically, on-shore sediment samples were collected from the gravel bar at Deadman’s Eddy located in Stevens County, Washington, on May 27, 2010. The field services scope of work was based on the requirements and standard operating procedures (SOP) outlined within the Quality Assurance Project Plan – Methods Development for the White Sturgeon Sediment Toxicity Study (QAPP) prepared for Teck in April 2010.

Records attached to this memorandum include:

- Sediment Sample Locations, Methods Development for the White Sturgeon Sediment Toxicity Study – Deadman’s Eddy (Map 1).
- Sample Location and Coordinates table (Attachment A)
- Field Data/Sampling Diary sheets for each sample location and station (Attachment B)
- Photocopy of the hard-bound Environmental Field Book daily record (Attachment C)
- Photographs of the locations, general sampling procedures, and grab samples (Attachment D)
- Archaeological monitoring results (Attachment E)
- Chain-of-custody and shipment records for May 27, 2010 surface grab samples (Attachment F)

Scope of Work

The DME location is identified within the QAPP (April 2010) as approved by the U.S. Environmental Protection Agency (EPA) and delineated within four coordinates under the Universal Transverse Mercator (UTM) system using North American Datum for 1983 (NAD83, Zone 11). The four UTM corner coordinates are identified as:

- Northeast Corner – Easting (447158), Northing (5421097)
- Southeast Corner – Easting (447077), Northing (5421068)
- Southwest Corner – Easting (447023), Northing (5421127)
- Northwest Corner – Easting (447026), Northing (5421144)
The four UTM corner coordinates were located using a consumer-grade, hand-held Global Positioning System (GPS) unit (Magellan Triton) and marked using wooden stakes. See Figures 1 through 4. The following methods were used to locate and provide documentation for each on-shore surface grab sample.

- Based on field observations of the sediment composition a transect line was laid between the northeast and northwest corners using a string marker.

- The distance between the two corners was measured by tape as 458 feet (139.5 meters). Based on this measured distance, the transect was divided into 50 foot (15.2 meter) increments or ten references points, with a total transect distance of 450 feet (137.2 meters). The 10 reference points were labeled A (northeast corner) to J (northwest corner).

- The 10 grab sample points were located at various distances in the sand sediments south of the 50 foot transect reference points and marked with flags. Two grab samples were collected south of transect reference point E, as the reference point A (northeast corner) sediment material was comprised of cobbles and boulders. UTM coordinates and elevations were recorded using the hand-held GPS unit for each flagged grab sample point. Attachment A provides the individual grab sample location data.

- Each of the 10 grab samples were collected using a decontaminated shovel and placed into decontaminated polyethylene (PE) 5-gallon bucket. The upper 4 inches (10 centimeters) of sediment was removed to access the underlying sample area. Grab samples were generally collected between 4 and 12 inches (30 centimeters) below the ground surface; 12 inches being the maximum depth prescribed by the QAPP. Unique sample numbers and container numbers were assigned based on QAPP SOP-4. See Figures 5 and 6

- Sample data and observations were recorded on field sample logs (Attachment B). The field sample logs include information on the sample time, UTM coordinates, sample texture and colors, general characteristics, photographic record, and other relevant notes. A bound environmental field book (Attachment C) was used to record general information regarding project personnel, activities, and operations.

- Photographic documentation was collected (Attachment D). Photographs of the locations, samples, and procedures are sequentially identified using a white board marker to record pertinent information (e.g., time, date, and location). The photograph directory is labeled TAI-DME 5_27_2010. The photographs are labeled IMG_0001 to IMG_0091. The individual grab sample photographs (numbers) are recorded on the field sample logs for reference.

- Archaeological monitoring of ground-disturbing activities was conducted by a qualified archaeologist who meets the U.S. Secretary of Interior’s Professional Qualification Standards (as outlined in 36 CFR Part 61). The DME sediment sampling program was monitored by a URS Registered Professional Archeologist (RPA) Sarah McDaniel, RPA in
accordance with protocols outlined in Appendix C of the QAPP (April 2010). Ms. McDaniel’s archaeological monitoring results are provided in Attachment E.

Field Observations

The field sampling event was attended by the following persons:

Sampling and Support
- Eric Weatherman, Captain, Columbia Navigation, Inc.
- Alan Burkhart, Columbia Navigations, Inc.
- Sarah McDaniel, RPA, URS Corporation
- Jeffrey E. Leppo LG, URS Corporation

Observers
- Joseph Wichmann, PhD, Technical Advisor, representing Citizens for a Clean Columbia
- Steve Demus, CH2M Hill, providing EPA technical oversight

Figure 5 shows sampling, support, and observer personnel present on May 27, 2010 (Jeffery Leppo is not present in the photograph). The DME location is situated on the west side of the Columbia River and is a depositional sediment bar comprised primarily of sands, gravels, cobbles and boulders. Figures 6 and 7 present surface conditions at DME. Ten sediment grab samples (five gallons each) were obtained from within the DME sampling area delineated by the four corner markers. The primary sample matrix consisted of dark gray and yellowish brown well-graded sands. The presence of buried cobbles and boulders was encountered at several locations at depths ranging from 5 to 8 inches (13 to 20 cm) below ground surface; in these instances the sand sediments were collected above these materials. Figures 8 and 9 present typical grab sample collection activities.

The ten sediment grab samples were labeled TAI-US-DME-HS-1 through TAI-US-DME-HS-10 and are illustrated within Map 1. The corresponding container tag numbers were DME-1 through DME-10. Grab samples were transported by vehicle to Spokane, Washington under chain-of-custody protocol and delivered to representatives of Teck on May 28, 2010. The grab samples were then transported by Teck to the Teck Metals, Ltd facility in Trail, British Columbia, Canada, with subsequent shipping to the University of Saskatchewan, Aquatic Exposure Laboratory. Please refer to Appendix F for the chain-of-custody and shipping documents.

The archaeological monitoring reported no cultural resources were identified or disturbed as a result of this on-shore sediment sampling program.

A benchmark at the Northport (WA) boat launch was established as a reference point for both UTM coordinates and elevation data. The data is entered into the Environmental Field Book, page 1. Photographs IMG_001 and IMG_002 provide a view of the location.
Deviations and Corrective Actions

No reportable deviations, contingencies, or corrective actions were required for this project phase as defined by the QAPP or SOPs.

Attachments:

- Figures 1-9: May 27, 2010 Site Photographs
- Map 1: Sediment Sample Locations
- Attachment A: Sample Locations and Coordinates Table
- Attachment B: Field Data/Sampling Diaries
- Attachment C: Environmental Field Book
- Attachment D: Photographic Record
- Attachment E: Archaeological Monitoring Results
- Attachment F: Chain-of-Custody
Figure 1
Photograph of the northeast corner coordinate, view to west

Figure 2
Southeast corner coordinate, view to southeast.
Figure 3
Southwest corner coordinate, view to northeast.

Figure 4
Northwest corner coordinate, view to northwest.
Figure 5
Sampling and support, and observer personnel, view to east.

Figure 6
Deadman’s Eddy surface conditions, view to northwest.
Figure 7
Deadman’s Eddy surface conditions, view to south

Figure 8
Grab sample collection, sample number TAI-US-DME-HS-1, view to northeast.
Figure 9
Grab sample test pit, sample number TAI-US-DME-HS-1.
Sediment Sample Locations

Source: GIS base layer information provided by Parametrix Inc.

Legend
- Sample Locations
- Corner Locations
- Proposed Target Sampling Area
- Water Depth Contour (12m interval)
- River Reach Delineations (USGS)

Sediment Sample Locations

Legend
- Sample Locations
- Corner Locations
- Proposed Target Sampling Area
- Water Depth Contour (12m interval)
- River Reach Delineations (USGS)

URS Corporation

Methods Development for the White Sturgeon Sediment Toxicity Study
(Deadman’s Eddy)
Upper Columbia River, WA
ATTACHMENT A
Sample Locations and Coordinates Table
### Sample Locations and Coordinates

Methods Development - White Sturgeon Sediment Toxicity Study  
Upper Columbia River - Deadman's Eddy (U.S.)

<table>
<thead>
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<th>Sample Container Tag No.</th>
<th>Reference Point</th>
<th>Reference Point Distance from NE to NW Corner (m)</th>
<th>Northing (UTM) (3)</th>
<th>Easting (UTM)</th>
<th>Elevation (m)</th>
<th>Distance from Transect Line (m)</th>
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<td>447128</td>
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<td>DME-3</td>
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**Notes:**
1. Total transect line distance from northeast corner to northwest corner was hand measured at approximately 139.5 meters
3. Coordinates based on Universal Transverse Mercator (UTM) using North American Datum of 1983 (NAD83), Zone 11

Grab sample points (container tag no.) located approximately perpendicular to and south of transect line
ATTACHMENT B
Field Data/Sampling Diaries
**FIELD SAMPLE LOG - SEDIMENTS**

Upper Columbia River - Methods Development White Sturgeon Sediment Toxicity Study
U.S. Location - Deadman's Eddy

**Sample No.**: TAI-US-DME-HS-

<table>
<thead>
<tr>
<th>ELEVATION (M)</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
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**PHYSICAL CHARACTERISTICS**

- **WS**: Well sorted sand, gravelly sand, little to no fines.
- **SP**: Poorly sorted sand, gravelly sand, little to no fines.
- **ML**: Inorganic silts, very fine sands, rock flour, silt, or clay silts with low plasticity.
- **SM**: Silty sands, sand-silt mixtures.
- **SC**: Clayey sands, sand-clay mixtures.
- **CL**: Clayey sands, sand-clay mixtures.
- **GW**: Well sorted gravels, gravel-sand mixtures, little to no fines.
- **GP**: Poorly sorted gravels, gravel-sand mixtures, little to no fines.
- **GM**: Silty gravels, gravel-sand-silt mixtures.
- **GC**: Clayey gravels, gravel-sand-silt mixtures.

**Color (Munsell)**: Very dark gray 10 YR 3 1

**Visible Organic Matter**: Yes [ ] No [X]  
Description:

**Odors**: Yes [ ] No [X]  
Description:

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes [ ] No [X]

**Sample Depth**: 4 to 8 inches

**Other Matrix Descriptions**:  
Clayey gravels, gravel-sand-silt mixtures.

**Cultural Resources**: Archaeologist: Sarah McDonald  
Resources Found or Identified? Yes [ ] No [X]  
(Please refer to archaeologist's observation record)

**Other Notes**: Cobble and boulders @ 6 to 8 inches below surface

**Boat Contractor**: Columbia Navigation, Inc, Capt. Eric Weatherman

**Photo Directory**: TAI-DME-5-27-2010

**Sampler Type**: HS (hand sample)  
**Photo File No(s)**: IMG_033 to 038

**Sampler Name**:  
**Sample Signature**:  
**Date**: 5/27/2010  
**Time**: 12:30
**FIELD SAMPLE LOG - SEDIMENTS**
Upper Columbia River - Methods Development White Sturgeon Sediment Toxicity Study
U.S. Location - Deadman's Eddy

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<th>UTM Easting (NAD83)</th>
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**PHYSICAL CHARACTERISTICS**

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<thead>
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<th>SW</th>
<th>Well graded sand, gravelly sand, little to no fines</th>
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<tbody>
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<tr>
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<td>Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity</td>
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<tr>
<td>SM</td>
<td>Silty sands, sand-silt mixtures</td>
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<td>SC</td>
<td>Clayey sands, sand-clay mixtures</td>
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<tr>
<td>CL</td>
<td>Clayey sands, sand-clay mixtures</td>
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<tr>
<td>GW</td>
<td>Well graded gravels, gravel-sand mixtures</td>
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<tr>
<td>GP</td>
<td>Poorly graded gravels, gravel-sand mixtures, little to no fines</td>
</tr>
<tr>
<td>GM</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td>GC</td>
<td>Clayey gravels, gravel-sand-clay mixtures</td>
</tr>
</tbody>
</table>

**Color (Munsell):**
- Brown
- Yellow

**Visible Organic Matter:**
- Yes [ ]
- No [X]

**Odors:**
- Yes [ ]
- No [X]

**Obvious Abnormalities (wood, shells, organisms, etc.):**
- Yes [ ]
- No [X]

**Other Matrix Descriptions:**
- Mixed matrix colors

**Sample Depth:**
- 4 to 6 inches
- 10 to 15 cm

**Cultural Resources:**
- Archaeologist: Sarah M. Daniel

**Other Notes:**
- Primarily fine sands, increasing uniformity w/ depth. Cobbles and boulders @ 5 to 6 inches below surface. Mixed color matrix for sands.

**Boat Contractor:**
- Columbia Navigation, Inc, Capt, Eric Weatherman

**Photo Directory:**
- TAI-DME 5.27.10

**Sampler Type:**
- HS (hard sample)

**Sampler Name:**
- Jeff Lappe

**Sample Signature:**
- [Signature]

**Date:**
- 5/27/2010

**Time:**
- 12:35

**Time:**
- 12:35
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - Methods Development White Sturgeon Sediment Toxicity Study
U.S. Location - Deadman's Eddy

Sample No.: TAI-US-DME-HS-
Container Tag: DME

ELEVATION (M) | UTM Northing (NAD83) | UTM Easting (NAD83)
--- | --- | ---
397 | 5421093 | 447108

PHYSICAL CHARACTERISTICS

- □ SW: Well-graded sand, gravelly sand, little to no fines.
- □ SM: Silty sands, sand-silt mixtures
- □ GW: Well-graded gravels, gravel-sand mixtures, little to no fines
- □ SP: Poorly graded sand, gravelly sand, little to no fines.
- □ SC: Clayey sands, silt-clay mixtures
- □ GP: Poorly graded gravels, gravel-sand mixtures, little to no fines
- □ ML: Inorganic silt, very fine sands, rock flour, silt or clay silt with low plasticity
- □ CL: Clayey sands, clay-clay mixtures
- □ GM: Silty gravels, gravel-sand-silt mixtures
- □ GC: Clayey gravels, gravel-sand-clay mixtures

Color (Munsell)
- Moist | Dark gray | 10 YR 4/1
- Dry | Yellowish brown | 10 YR 5/6

Visible Organic Matter
- Yes ☐ No ☑
Description: Mixed matrix colors

Odors
- Yes ☐ No ☑
Description: Sample Depth: 1 to 12 inches
Sample Depth: 10 to 30 cm

Obvious Abnormalities (wood, shells, organisms, etc.): Yes ☐ No ☑

Cultural Resources: Archaeologist Sarah McDonald
Resources Found or Identified? Yes ☐ No ☑ (Please refer to archaeologist's observation record)

Other Notes:
Layered sand horizons - dark gray & yellow brown

Boat Contractor: Columbia Navigation, Inc., Capt. Eric Weatherman

Photo Directory: TAI-DME 5_27_10

Sampler Type: HS (hand sample)
Photo File No(s): IMG_0043 to 0048

Sampler Name: Jeff Leppo
Sample Signature: [Signature]

Date: 5/27/2010
Time: 13:08
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - Methods Development White Sturgeon Sediment Toxicity Study
U.S. Location - Deadman's Eddy

Sample No.: TAI-US-DME-HS-4
Container Tag: DME 4

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<tbody>
<tr>
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</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravel, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silt, very fine sands, rock flour, silt or clay silt with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell):**
- Dark Gray
  - 10 YR 3/1
  - 10 YR 4/1

**Moist/Dry:**
- Dark Yellowish Brown
  - 10 YR 4/6

**Visible Organic Matter:**
- Yes ☐ No ☒

**Odors:**
- Yes ☐ No ☒

**Obvious Abnormalities (wood, shells, organisms, etc.):**
- Yes ☐ No ☒

**Cultural Resources:**
- Archaeologist: Sarah McDaniell
- Resources Found or Identified? Yes ☐ No ☒ (Please refer to archaeologist's observation record)

**Other Notes:**
- Layered sand horizons, streaks of dark gray and dark yellowish brown sands, vertical deposition

**Boat Contractor:** Columbia Navigation, Inc, Capt. Eric Weatherman

**Photo Directory:** TAI-DME 5-27-2010

**Sampler Type:** HS (hand sample)

**Sample Name:** Jeff Leppo

**Sample Signature:**

Date: 5/27/2010
Time: 13:15
FIELD SAMPLE LOG - SEDIMENTS  
Upper Columbia River - Methods Development White Sturgeon Sediment Toxicity Study  
U.S. Location - Deadman's Eddy

Sample No.: TAI-US-DME-HS-  
Container Tag: DME  

<table>
<thead>
<tr>
<th>ELEVATION (M)</th>
<th>UTM Northing (NAD83)</th>
<th>UTM Easting (NAD83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>398</td>
<td>5421099</td>
<td>447091</td>
</tr>
</tbody>
</table>

**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines
- **SM**: Silty sands, sand-silt mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
- **SP**: Poorly graded sand, gravelly sand, little to no fines
- **SC**: Clayey sands, sand-clay mixtures
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines
- **ML**: Inorganic silts, very fine sands, rock flour, silt or clay silts with low plasticity
- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

**Color (Munsell)**

- Moist: Dark gray brown 10 YR 3/1  
- Other Matrix Descriptions: Mixed color matrix

**Visible Organic Matter**

- Yes [ ]  No [X]  
- Description:  

**Odors**

- Yes [ ]  No [X]  
- Description:  

**Obvious Abnormalities** (wood, shells, organisms, etc.)

- Yes [ ]  No [X]

**Cultural Resources:** Archaeologist: Sarah McDaniell  
Resources Found or Identified? Yes [ ]  No [X]  
(Please refer to archaeologist's observation record)

**Other Notes:**  
Layered sand horizons, dark gray and dark yellowish brown

**Boat Contractor:** Columbia Navigation, Inc., Capt. Eric Weatherman

**Photo Directory:** TAI-DME 5-27-10

**Sampler Type:** HS (hand sample)

**Photo File No[s]:** IMG_0054 to 0059

**Sampler Name:** Jeff Leppo

**Sample Signature:** [Signature]

**Date:** 5/27/2010  
**Time:** 13:30
Sample No.: TAI-US-DME-HS- 6  Container Tag: DME 6

Elevation (M): 399  UTM Northing (NAD83): 5421109  UTM Easting (NAD83): 447082

Physical Characteristics:
- SW: Well graded sand, gravelly sand, little to no fines
- SM: Silty sands, sand-silt mixtures
- GW: Well graded gravel, gravelly sand mixtures, little to no fines
- SP: Poorly graded sand, gravelly sand, little to no fines
- SC: Clayey sands, sand-clay mixtures
- GP: Poorly graded gravel, gravelly sand mixtures, little to no fines
- ML: Inorganic soils, very fine sands, mud, silt, or clay silt with low plasticity
- CL: Clayey sands, sand-clay mixtures
- GM: Silty gravel, gravel-sand-silt mixtures

Color (Munsell): Dark gray 10 YR 3/1  Dark yellowish brown 10 YR 4/6

Other Matrix Descriptions: Mixed color matrix

Visible Organic Matter: Yes [ ] No [x] Description: Mixed color matrix

Odors: Yes [ ] No [x] Description: Sample Depth: ______ to ______ inches

Obvious Abnormalities (wood, shells, organisms, etc.): Yes [ ] No [x]

Cultural Resources: Archaeologist: Sarah McDaniel Resources Found or Identified? Yes [ ] No [x] (Please refer to archaeologist's observation record)

Other Notes:
Mixed sand layers/horizons of dark gray and dark yellowish brown, vertical deposition, evidence of beach washing

Boat Contractor: Columbia Navigation, Inc., Capt. Eric Weatherman

Sampler Type: HS (hand sample) Photo Directory: TAI-DME 5-27-2010

Sampler Name: Jeff Leppo

Sample Signature: [Signature]

Date: 5/27/2010 Time: 13:40
Sample No.: TAI-US-DME-HS-7  Container Tag: DME 7

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**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-silt mixtures.
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines.
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **SC**: Clayey sands, clay-silt mixtures.
- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- **ML**: Inorganic silts, very fine sands, silt, organics, little to no fines.
- **CL**: Clayey sands, clay-silt mixtures.
- **GM**: Silty gravels, gravel-sand-silt mixtures.
- **GC**: Clayey gravels, gravel-sand-silt mixtures.

**Color (Munsell)**

- Dark Gray
- Brownish Yellow

**Visible Organic Matter**

- Yes ☐
- No ☑

**Odors**

- Yes ☐
- No ☑

**Other Matrix Descriptions:**

- Mixed color matrix

**Sample Depth:**

- 4 to 12 inches
- 10 to 30 cm

**Obvious Abnormalities (wood, shells, organisms, etc.):**

- Yes ☐
- No ☑

**Cultural Resources:**

- Archaeologist: Sarah McDaniel
- Resources Found or Identified? Yes ☐
- No ☑

**Other Notes:**

- Mixed color matrix, relatively even distribution, no layering or striations

**Boat Contractor:** Columbia Navigation, Inc., Capt. Eric Weatherman

**Photo Directory:** TAI-DME.5.27.2010

**Sampler Type:** HS (hand sample)

**Photo File No(s):** IMG0066 to 0071

**Sampler Name:** Jeff Leppo

**Sample Signature:**

Date: 5/27/2010

Time: 13:52
FIELD SAMPLE LOG - SEDIMENTS
Upper Columbia River - Methods Development White Sturgeon Sediment Toxicity Study
U.S. Location - Deadman's Eddy

Sample No.: TAI-US-DME-HS-8
Container Tag: DME-8

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PHYSICAL CHARACTERISTICS

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SM**: Silty sands, sand-clay mixtures
- **GW**: Well graded gravels, gravel-sand mixtures, little to no fines
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- **CL**: Clayey sands, sand-clay mixtures
- **GM**: Silty gravels, gravel-sand-silt mixtures
- **GC**: Clayey gravels, gravel-sand-clay mixtures

Color (Munsell): Dark gray 10 YR 3 1

Visible Organic Matter: Yes [ ] No [x]

Odors: Yes [ ] No [x]

Obvious Abnormalities (wood, shells, organisms, etc.): Yes [ ] No [x]

See notes below

Other Matrix Descriptions: Mixed color matrix

Sample Depth: 4 to 6 inches

Cultural Resources: Archaeologist: Sarah M. Daniel

Resources Found or Identified? Yes [ ] No [x]

Other Notes:
Mixed layered sand horizons of dark gray and dark yellowish brown over gravels and cobbles - coarse material's w/ yellowish brown (10 YR 5/8) fine sand (SP). Roots present (near shrubs), somelimit/ed organic litter/wood particles.

Boat Contractor: Columbia Navigation, Inc., Capt. Eric Weatherman

Photo Directory: TAI-DME-5-27-2010

Sampler Type: HS (hand sample)

Sampler Name: Jeff Leppo

Sample Signature: [Signature]

Date: 5/27/2010
Time: 14:05
### FIELD SAMPLE LOG - SEDIMENTS

**Upper Columbia River - Methods Development White Sturgeon Sediment Toxicity Study**

**U.S. Location - Deadman's Eddy**

**Sample No.: TAI-US-DME-HS-9**

**Container Tag: DME**

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<tr>
<td><strong>GW</strong></td>
</tr>
<tr>
<td><strong>GP</strong></td>
</tr>
<tr>
<td><strong>GM</strong></td>
</tr>
</tbody>
</table>

**Color (Munsell):**

- Dark grey
- Brownish yellow

**Visible Organic Matter:**

Yes [x] No [ ]

**Odor:**

Yes [x] No [ ]

**Obvious Abnormalities (wood, shells, organisms, etc.):**

Yes [ ] No [x]

**Cultural Resources:**

Archaeologist: **Sarah McDaniel**

Resources Found or Identified? Yes [x] No [ ]

(Please refer to archaeologist's observation record)

**Other Notes:**

Evenly mixed sands, no visible layers/stratations. Few gravels w/depth. Coarser sands appear to be brownish yellow.

**Boat Contractor:** Columbia Navigation, Inc, Capt. Eric Weatherman

**Photo Directory:** TAI-DME 5.27.2010

**Sampler Type:** HS (hand sample)

**Photo File No(s):** IMG_0080 to 0084

**Sampler Name:**

[Signature]

**Sample Signature:**

[Signature]

**Date:** 5/27/2010

**Time:** 14:17
**Sample No.: TAI-US-DME-HS-10**  
**Container Tag: DME 10**

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<tr>
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<td>447027</td>
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**PHYSICAL CHARACTERISTICS**

- **SW**: Well graded sand, gravelly sand, little to no fines.
- **SP**: Poorly graded sand, gravelly sand, little to no fines.
- **ML**: Inorganic silt, very fine sands, rock flour, silt or clay silt with low plasticity.
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- **GP**: Poorly graded gravels, gravel-sand mixtures, little to no fines.
- **GM**: Silty gravels, gravel-sand-silt mixtures.
- **GC**: Clayey gravels, gravel-sand-clay mixtures.

**Color (Munsell)**
- Dark gray: 10 YR 3/1
- Yellowish brown: 10 YR 5/6

**Visible Organic Matter**: Yes [ ] No [x]  
**Description**:  

**Odors**: Yes [ ] No [x]  
**Description**:  

**Sample Depth**: 4 to 12 inches  
**Sample Depth**: 10 to 30 cm  

**Obvious Abnormalities (wood, shells, organisms, etc.):** Yes [ ] No [x]  

**Cultural Resources: Archaeologist**: Sarah McDaniels  
**Resources Found or Identified?**: Yes [ ] No [x]  

**Other Notes:**  
*Mixed matrix, evenly distributed colors & grain size*

**Boat Contractor**: Columbia Navigation, Inc, Capt. Eric Weatherman  
**Photo Directory**: TAI-DME S-27-2010  
**Sampler Type**: HS (hand sample)  
**Photo File No(s)**: IMG-0085 to 0089

**Sampler Name**: Jeff Lepper  
**Sample Signature**: [Signature]  
**Date**: 5/27/2010  
**Time**: 14:25
ATTACHMENT C
Environmental Field Book
Field Prep & Mobilization - Surface Sediments

* General QAPP References

* Sample Coordinates:
  Deadman's Eddy Gravel Bar

<table>
<thead>
<tr>
<th>North</th>
<th>Easting</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE Corner: 5421097</td>
<td>4477158</td>
</tr>
<tr>
<td>NW Corner: 5421144</td>
<td>447026</td>
</tr>
<tr>
<td>SW Corner: 5421127</td>
<td>447023</td>
</tr>
<tr>
<td>SE Corner: 5421068</td>
<td>447077</td>
</tr>
</tbody>
</table>

Polygon - 20 meters (66')

Radius:
- Establish grid from 4 Corners
- Collect Benchmark UTM + Elev
- Northport Boat Launch
- Gravel Size Sands (0.5 to 2mm)
- Steel Shovel, see QAPP Decon
- Remove Top 4 in (10.16 cm)
- Collect 4 to 12 in (10-31 cm)
- No samples below (12 in) or (31 cm)
TAI
Teck American Inc.
Date 5/27/10

Location UCR Deadman's Eddy
Project / Client UCR Deadman's Eddy
Whit Sturgeon - Methods - Sediment

084 Arrive on site

Attendees
Sarah McDaniel, URS
Steve Demus, CHMM
Joe Wickman
Alan Burkhart, Columbia Nav.
Eric Wyllermers, Columbia Nav.

Establish BM for UTm (Elev.
Zone II, NAD 83
Elev. 462 meters 411 M
5419055 N, 443452 E

0910 - Leave dock for DME
0940 - Arrive @ DME Sandbar. Loody on cutline near that sampling area. Beachcroft on sand Quarters edge.

Appr. Water Elev. GPS 40 Tm
0955 Stale out NE Corner
0 542 1097, 447 1085

1010 Stale out SE Corner
0 542 1068, 447 077 E
395 M elev.

1020 Stale out SW Corner
N 5421127, 447023, 395 M

1030 Stale out NW Corner
m 5421144, 447026, 398 E

Photos DME 5-27-2010 IMG_0001 to 0002

Safety Meeting
Boat Set up
Ship's Trip & Falls
PIE Devices
GPS Unit - Magellan Triton (Hand held)
<table>
<thead>
<tr>
<th>General Photos/Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>From approx. middle area</td>
</tr>
<tr>
<td>Sarah Med @ center of sampling area (where photos shot from)</td>
</tr>
<tr>
<td>1 Picture to NE (A) from center</td>
</tr>
<tr>
<td>2 Photo to E (A) from center</td>
</tr>
<tr>
<td>3 Photo to SW &amp; NW</td>
</tr>
</tbody>
</table>

GPS Unit - Magellan, handheld |
Variable elevation readings observed, not consistent with topography
String line set up between NE Δ and NW Δ as reference line - lozenge place between sand bar & rock bar to set line, then systematic intervals of 50 ft intervals measured out.

Total length of line: 453 ft.

Site TAE-DMSE 5-27-2010 IMG_0028-0032
Samples TAE-DMSE 5-27-2010 IMG_0038-0041
- See field logs for specific photos
Weather conditions change throughout session from 55°F and cloudy to increasing rain. Steady rain continues thru to end of sampling.

1435 - Leave site, head for Northport Boat Launch. Unload buckets and gear into truck.

1515 - Leave for Spokane.

Note: Field sheets/logs prepared for each 10 grab sampler, inclusive descriptions, sample numbers, UTM coordinates, etc.
ATTACHMENT D
Photographic Record
Provided on Compact Disc (CD)
ATTACHMENT E
Archaeological Monitoring Results
MEMORANDUM

TO:        Marko Adzic, Teck American Incorporated
FROM:      Sarah McDaniel, RPA
DATE:      June 23, 2010
FILE:      36310054.00002
SUBJECT:   Archaeological Monitoring Results,
           On-Shore Sediment Sampling - Deadman’s Eddy, Upper Columbia River, Stevens County, Washington
           Methods Development for the White Sturgeon Sediment Toxicity Study

Introduction

URS Corporation (URS) conducted field services for Teck American Incorporated (Teck) along the Upper Columbia River (UCR) at Deadman’s Eddy (DME). Specifically, on-shore sediment samples were collected from the gravel bar at Deadman’s Eddy located in Stevens County, Washington, on May 27, 2010. The field services scope of work was based on the requirements and standard operating procedures (SOPs) outlined within the Quality Assurance Project Plan – Methods Development for the White Sturgeon Sediment Toxicity Study (QAPP) prepared for Teck in April 2010 and as approved by the U.S. Environmental Protection Agency (EPA). This cultural resource monitoring report has been prepared in support of the above-mentioned work and is consistent with the protocols outlined in Appendix C Cultural Resources Coordination Plan of the aforementioned approved QAPP.

As per the QAPP, archaeological monitoring of ground-disturbing activities was conducted by a qualified archaeologist meeting the Secretary of Interior’s Professional Qualification Standards (as outlined in 36 CFR Part 61). This memorandum documents results of the monitoring that occurred on May 27, 2010, by URS archaeologist Sarah McDaniel, Registered Professional Archeologist (RPA) in conjunction with the on-shore sediment sampling. No cultural resources were identified or disturbed as a result of this investigation.

Location

The DME project site is located along the Columbia River (River Mile 738.5), about two miles northeast of the town of Northport, Washington, in Stevens County. The sampling area is found in Section 26, Township 39 ½ North, Range 40 East, on the USGS 7.5’ Series Boundary, Washington quadrangle (Figure 1). The DME location is identified within the QAPP (April 2010) and delineated within four coordinates under the Universal Transverse Mercator (UTM) system using North American Datum for 1983 (NAD83, Zone 11). The four UTM corner coordinates are identified as:

- Northeast Corner –Eastings (447158), Northing (5421097)
- Southeast Corner –Eastings (447077), Northing (5421068)
- Southwest Corner –Eastings (447023), Northing (5421127)
- Northwest Corner –Eastings (447026), Northing (5421144)
Methods Development for the White Sturgeon Toxicity Study
Northport Vicinity, Stevens County, Washington
May 27, 2010

Upper Columbia River Deadman's Eddy

Figure 1
On-Shore Sediment Sampling Location Map
Background Research

Prior to the fieldwork, a records search was conducted by URS to identify any previously recorded archaeological sites, historic resources, or cultural surveys within one mile radius of the project Area. The May 2010 search was conducted via the online Washington State Department of Archaeology and Historic Preservation (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD) database. This restricted-access, searchable GIS database depicts locations of the following: 1) previously-recorded archaeological sites, 2) cultural resource surveys conducted after 1995, 3) historic register properties, and 4) cemeteries. Regional ethnographic, historic, and archaeological references were also consulted as part of this pre-field review.

General sensitivity of the sampling area is high based on the quantity of archaeological sites that can be found along this stretch of the UCR. Results of the records search indicate that there are two archaeological sites (45ST89 and 45ST90) located over 0.25 mile to the east and to the west, respectively, of the DME sampling area; but none are known to be present within the sampling area. Previously-recorded site types include pre-contact period resources, such as shell, bone, caches, sweatlodges, hearths, and stone tool materials, as well as historic period resources related to mining and homesteading. These sites appear to be found at slightly higher elevations than the project site, which is seasonally inundated by the Columbia River, but are often found eroding into the Columbia River.

Ethnographic literature (e.g., Bouchard and Kennedy 1979, 1984; Kennedy and Bouchard 1998; Pearkes 2002) does not indicate specific place-names for the project site, but describes a number of ethnogeographic locales in this general area. For example, a small Lakes village was reportedly located about three miles upriver from Northport, which would put it in the vicinity of the project site. The project site may also be at or near the locale of an “aboriginal campsite,” described as being located “northeast from the gravel bar immediately upriver from Nigger Creek and across the river from Deadmans Eddy”, which was occupied until around 1910 (Bouchard and Kennedy 1979:320; Chance 1967:77). Clair Hunt’s Homesteaders Map of the North Half of the Colville Indian Reservation (http://content.wsulibs.wsu.edu/u?/maps,720), dated 1900, depicts the locations of several Indian allotments along the west side of the Columbia River in the area of Nigger Creek and the project site. In sum, ethnographic and historic references indicate the project site, which falls within ceded North Half of the Colville Indian Reservation, has been used by ancestral to contemporary Lakes and Colville peoples and could contain evidence of this prior use, especially as related to fishing or habitation activities. Historic use of the area could also be found as related to mining and homesteading activities.

Field Methods

One the day of the site visit, project observers, including boat operators and environmental representatives, were advised of the potential for archaeological resources and to avoid contact with any such resources should they be encountered. As some of the individuals are local residents and familiar with the history of this area, URS asked if any were aware of the presence of potential cultural resources or the origin of the name “Deadman’s Eddy.” Eric Weatherman, of Columbia Navigation Inc., believed the name has something to do with an historic train derailment, but was uncertain as to the accuracy of this information (personal communication, May 27, 2010). Technical Advisor for Citizens for a Clean Columbia Joe Wichmann, Ph.D., stated that the gravel bar on which the project sampling occurred had
been altered by historic mining activities (personal communication, May 27, 2010). None of the individuals questioned knew of any specific cultural resource concerns within the project site.

The DME location is on the west side of the Columbia River and is a depositional sediment bar composed primarily of sands, gravels, cobbles and boulders. Within this area, 10 grab sample points were collected at 50-foot intervals. At each sample point, a 5-gallon bucket was filled by a URS geologist using a shovel, within an area previously-approved for sampling in the QAPP. Coordinates of the samples were plotted under the UTM system using North American Datum for 1983 (NAD83) (Table 1), as shown in Map 1, Sediment Sample Locations.

Individual grab sample points were visually inspected for any evidence of cultural resources prior to any sampling. Sediment removed for sampling was also visually inspected by the archaeologist during ground disturbance. As outlined within the approved QAPP, the hand excavation removed the upper 4 inches (10 centimeters) of sediment to access the underlying sample area, and grab samples were generally collected between 4 and 12 inches (30 centimeters) below the ground surface. The presence of buried cobbles and boulders was observed at several locations, with the sand sediments collected above these materials. Depth of the shovel sampling did not exceed 12 inches.

Table 1. Grab Sample Locations Coordinates.

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<thead>
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<th>Easting (UTM-NAD83)</th>
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</table>

Field Observations

The project site is used as a local “party spot” by adolescents, with campfire rings, rubber tires and other modern debris observed across the gravel bar. Two metal artifacts, including a tin cup and unidentifiable metal fragment, were observed near the project site but were not impacted by the sediment removal. The gravel bar that comprises the project site is largely characterized by rounded cobbles that appear to have been re-deposited as a result of natural riverine forces, and possibly the reported historic mining activities.
The project site is subject to frequent inundation, as evidenced by the overall absence of vegetation and soil development (Photo 1). Sediment consists of black and tan sand deposits (Photo 2) along with river cobbles. No significant cultural resources were observed during the pre-investigation surface examination, and none were encountered during the limited subsurface sediment sampling activities. Additional sediment sampling at this same QAPP locale, using the same techniques of shovel excavation and extending to the same limited depths of about 12 inches, is unlikely to affect any significant, buried resources given the frequent inundation of this landform and the absence of surficial artifacts.

Photo 1. Overview of the Deadman’s Eddy sample area, facing south. Lathe at bottom left of photo demarks the northeast corner of the DME sediment sampling area.
Photo 2. Deadman’s Eddy sediment sampling methods, facing east.
References

Bouchard, Randy and Dorothy I.D. Kennedy


Chance, David H.

Kennedy, Dorothy I.D., and Randall T. Bouchard

Pearkes, Eileen Delehanty
Methods Development for the White Sturgeon Sediment Toxicity Study (Deadman’s Eddy)
Upper Columbia River, WA

Legend
- Sample Locations
- Corner Locations
- Proposed Target Sampling Area
- Water Depth Contour (12m interval)
- River Reach Delimitations (USGS)

Source: GIS base layer information provided by Parametrix Inc.
ATTACHMENT F
Chain-of-Custody
**CANADA CUSTOMS INVOICE**

1. **Vendor (Name and Address)**
   
   TECK AMERICAN INC.
   501 N RIVERPOINT BLVD
   SUITE 300
   SPOKANE, WA 99202

2. **Date of Direct Shipment to Canada**
   MAY 27, 2010

3. **Other References (Include Purchaser’s Order No.)**
   SAMPLES FOR TESTING PURPOSES

4. **Consignee (Name and Address)**
   
   TECK METALS LTD.
   25 ALDRIDGE AVE.
   TRAIL, B.C. V1R 4L8

5. **Purchaser’s Name and Address (if other than Consignee)**

6. **Country of Transhipment**

7. **Country of Origin of Goods**
   USA

8. **Transportation: Give Mode and Place of Direct Shipment**
   Canada

   PRIVATE VEHICLE EX SPOKANE, WA
   TECK REPRESENTATIVE: MARKO ADZIC

9. **Conditions of Sale and Terms of Payment**
   (i.e. Sale, Consignment Shipment, Leased Goods, etc.)

   NOT SOLD. SAMPLES FOR TESTING PURPOSES

10. **Currency of Settlement**
    US DOLLARS

11. **No. of Pkgs**

12. **Specification of Commodities (Kind of Packages, Marks and Numbers, General Description and Characters)**
    (i.e. Grade, Quality)

    5 GALLON BUCKETS CONTAINING GRANULATED SLAG/SILICA SEDIMENT SAMPLES

    H.S. 2621.90.00.00

13. **Quantity (State Unit)**
    120 KGS.

14. **Unit Price**
    $10.00

15. **Total**
    $10.00

16. **Net Weight**
    120 KGS.

17. **Invoice Total**
    $10.00

18. **If any of fields 1 to 17 are included on the attached commercial invoice, check this box**
    [ ]

19. **Exporter’s Name and Address (if other than Vendor)**
    
    TECK METALS LTD.
    TRAIL, B.C. V1R 4L8

20. **Originator (Name and Address)**
    
    TECK METALS LTD.
    TRAIL, B.C. V1R 4L8

21. **Departmental Ruling (if applicable)**

22. **If fields 23 to 25 are not applicable, check this box**
    [ x ]

23. **If included in field 17 indicate amount:**
   (i) Transportation charges, expenses and insurance from the place of direct shipment to Canada

   (ii) Costs for construction, erection and assembly incurred after importation into Canada

   (iii) Export packing

24. **If not included in field 17 indicate amount:**
   (i) Transportation charges, expenses and insurance to the place of direct shipment to Canada

   (ii) Amounts for commissions other than buying commissions

   (iii) Export packing

25. **Check (if applicable):**
   (i) Royalty payments or subsequent proceeds are paid or payable by the purchaser [ ]

   (ii) The purchaser has supplied goods or services for use in the production of these goods [ ]
WAREHOUSE SHIPPING INSTRUCTIONS FOR OUTBOUND SHIPMENTS

THIS FORM MUST ACCOMPANY ALL OUTGOING SHIPMENTS WHEN THE SHIPMENT IS SENT TO THE WAREHOUSE

SHIP TO:
Company Name: Dof. Saskatoon Toxicology Centre
Street: 49 Campus Drive
City: SASKatoon
Province: SASK
Postal Code: 57N 583
Phone No: (306) 966-5783

CONTACT TRAFFIC DEPT. FOR DOCUMENTATION FOR EXPORT SHIPMENTS.

Description of Goods Being Shipped: (Show total weight or volume or dangerous goods in each package)
10 Barrels of sediments on pallet

CHAIN of CUSTODY Required

Reason Material Being Shipped:
(Note: Purchasing must be advised of any goods being sent to a supplier. Contact Purchasing if you have any questions.)
Credit Return □ Exchange □ Repair & Return □ Sample □ Testing ☑ Warranty □
Reason: River Sediment For Testing

P.O. Number __________________________ Supplier Return Authorization No. (or Invoice No.) ____________
Buyer Contacted _________________________ Supplier Contact (Who Authorized Return): ______________________

Shipping Instructions:
Air □ Courier □ Mail □ Truck □ Prepaid ☑ Collect □
Approximate Value of Shipment [ ] Charge Code for Prepaid Shipments [ ]

IMPORTANT: DANGEROUS GOOD DECLARATION

Is this material classified under the T.D.G.R. YES □ NO ☑

Proper Shipping Name:

Certain materials are classified as Dangerous goods under the Transportation of Dangerous goods Regulations (T.D.G.R.) and require special packaging, labeling and documentation. Complete the information requested here if the regulations apply to this material.

Major Component - If * N. O. S. **
Identification No. (UN, NA of PIN)
Primary Class __________ Sub. Class __________ Packing Group __________

If in doubt, contact Warehouse Shipper, Phone 4975

PLANT ORIGINATOR (PRINT) ________________________ ACTIVITY (PRINT) ________________________
SIGNATURE OF PLANT ORIGINATOR ________________________ PHONE NO. (506) 4236

ALL OF ABOVE PORTION OF FORM MUST BE COMPLETED BY ORIGINATOR

Warehouse Remarks (To be completed by Warehouse Personnel)
Date Shipped: __________________ Carrier: __________________ Way Bill No. __________________
No. of Cartons: __________________ Total Weight: ________ Warehouse Shipper: __________________

WHITE - TRAFFIC COPY GREEN - SUPPLIER COPY (INCLUDE WITH OUTBOUND SHIPMENT)
PINK - THIS COPY TO BE RETURNED TO INITIATOR BY WAREHOUSE ONCE SHIPMENT SENT
Canary - WAREHOUSE COPY
GOLD - ACCOUNTS PAYABLE (IF REQUIRED)

Wp342lw Revised April 22, 2002

211-2345-HP
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### Custodial Record

**Received by Sampler (Sign & Print Name):**

- Jeffrey Elting  
  Date: 5/28/10  
  Time: 0900

**Received by:**

- Aleta Vermeulen  
  Date: 5/28/10  
  Time: 0900

**Reinstructed by:**

- Aleta Vermeulen  
  Date: 6/01/10  
  Time: 10:45

**Received by:**

- K.S. Pace  
  Date: 6/01/10  
  Time: 10:45

**Received by Laboratory:**

Date:  
Time:  

**Unique Chain of Custody No.:**

DME-COC-001  

**Laboratory Work Order No.:**


APPENDIX D

PHOTOGRAPHS OF SEDIMENT EXPOSURE STUDY USING WHITE STURGEON
Photo D-1. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Each green tub represents an exposure chamber.

Photo D-2. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Each green tub represents an exposure chamber.
Photo D-3. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Each green tub represents an exposure chamber.

Photo D-4. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Each green tub represents an exposure chamber.
Photo D-5. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Close-up of flow bars and sediment exposure chamber employed for the duration of the study.

Photo D-6. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Close-up of dedicated recirculating systems employed for each sediment exposure chamber duration of the study.
Photo D-7. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Close-up of dedicated porewater extraction portals for ceramic airstones employed for the duration of the study.
Photo D-8. White sturgeon sediment toxicity test exposure chambers as set-up at the University of Saskatchewan, Aquatic Toxicity Research Facility. Close-up of sediment exposure chamber containing white sturgeon as employed for the duration of the study.