ACTIVE CHANNEL AND RESERVOIR BOTTOM SEDIMENT COLLECTION

Purpose

This Water Quality and Hydrology Group procedure describes the procedure for collecting, documenting, and submitting sediment samples collected as part of the Environmental Surveillance Program and other WQH sampling programs.

Scope

This procedure applies to all ENV-WQH group personnel who conduct sediment sampling.

In this procedure

This procedure addresses the following major topics:

Integrated Work Management

The work specified in this procedure for collecting lake sediment samples shall be conducted in accordance with applicable Integrated Work Documents, in accordance with LANL IMP 300-00-00, Integrated Work Management for Work Activities.

The hazards and controls associated with collecting samples with disposable scoops is described in Attachment 1, RRES-ES-Field, General Field Safety for All.

Signatures

First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Prepared and approved by: Signature on file David Rogers, Team Leader, ENV-WQH	Date: 11/22/05
Approved by: Signature on file Mike Alexander, ENV-WQH	Date: 11/22/05
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Approved by: Signature on file Steve.Rae, ENV-WQH Group Leader	Date: 11/22/05

General information about this procedure

Attachments

This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Equipment and Supplies Checklist	1
2	USGS Type E Heavy Duty Crane, E-53 Sounding Reel and Wildco Ponar Sediment Sampling Procedure	3
3	Sediment Sample Collection Log	1

History of revisions

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	4/94	New document.
1	4/96	Revised draft
2	12/01	Annual review
3	8/03	Annual review
4	7/04	Annual review
5	8/04	Level 2 Resumption Walkdown Changes
6	11/05	Title changed as a result of LANL Resumption MSA 3.02-1; changed RRES to ENV where appropriate; changes to comply with IMP 300-00-00 implemenation; changes to reflect 6/28/05 procedure walk-down assessment

Who requires training to this procedure

The following personnel require training before implementing this procedure:

- ENV-WQH personnel assigned to collect sediment sample for the Environmental Surveillance Program and other WQH sampling programs.

Training method

The training requirements self-study to this procedure (read-training). This training will be documented in accordance with the procedure for training (ENV-WQH-QP-024, *Personnel Training*).

Personnel who have not previously collected sediment samples at LANL should be mentored before performing this procedure alone.

General information, continued

Prerequisites

The following training is required prior to performing activities covered under this procedure:

- Training as specified in RRES-ES-Field, *General Field Work for All*

At least one member of the sampling party must have completed the following:

- Boating Safety Training (required for reservoir sampling and raft trip sampling)
- ENV-DO-207, *Handling, Packaging, and Transporting Field Samples*
- RRES-ES-Driving, *Driving, Towing, and Winching for All*
- RRES-WQH-SOP-004, *Radio and Cellular Phone Use*

Definitions

Composite sample: Non-discrete samples composed of more than one specific aliquot collected at more than one location or at different times, to produce an average value for the location or time period covered.

References

The following documents provide additional information:

- RRES-ES-Field, General Field Work for All
- RRES-WQH-SOP-013, Pontoon Boat Use
- LIR 404-00-02, General Waste Management Requirements
- LIR 404-00-04, Managing Solid Waste
- LIR 404-50-01, Water Pollution Control
- LIR 405-10-01, Packaging and Transport

Note

Actions specified within this procedure, unless preceded with “should” or “may,” are to be considered mandatory guidance (i.e., “shall”).

Conducting pre-sampling activities

Preparations for sampling

Prior to the day of sampling, perform the following steps:

Step	Action
1	Meet with the Environmental Surveillance Team Leader or his designee: • review sampling plans and Analytical Request forms • ensure that proper samples will be collected according to the sampling plan • discuss any issues related to sample collection or the sampling site, including altered or unusual site conditions (cutting of a new road, unusual erosion, installation of BMPs, etc.) that might affect the sampling
2	Assemble equipment needed for the sampling activity. Reference Attachment 1, Equipment and Supplies Checklist.
3	Verify the station location. If necessary, obtain maps or a GPS programmed with station coordinates. Bring a GPS unit to the field and be prepared to make a new GPS measurement of the location.

General sampling procedures

Gloves

Nitrile gloves, or other glove type as specified for the specific sampling activity or contaminant, should be worn during all sampling activities. The purpose of the gloves is to prevent sample contamination and contamination of the sampler. After donning the gloves, the person handling the sampler should avoid touching other surfaces to keep the gloves contaminant free.

Sampling Order

To minimize the possibility of inadvertently contaminating a sample, the samples should be collected from the least contaminated areas first. The sampling team should then progressively move to areas of greater contamination.

Check that station is marked

Locations for all stations shall be marked in the field with stakes. The locations for stations along the Rio Grande (such as Rio Grande at Pajarito) may not be marked as the location is too close to the stream bank to retain a stake.

Stakes shall be removed from sampling locations when stations are moved or sampling at a location is discontinued.

Disposing of wastes

There are only municipal refuse associated with this operation, which must be disposed of in accordance with LIR404-00-04, *Managing Solid Waste*, LIR404-00-02, *General Waste Management Requirements*, and LIR405-10-01, *Packaging and Transport.*

Collecting lake sediment samples

Background Lake sediments are collected using a Ponar Grab sampler and crane assembly mounted on a pontoon boat.

Selection of sampling location Locations for reservoir sampling can be found by referring to maps and by using a GPS unit pre-programmed with current station coordinates. Make a GPS reading of the collection point coordinates to document where the sample was collected to compare with prior sampling trips.

How to sample with the Ponar Grab sampler To collect a sample with the Ponar Grab, follow the *USGS Type E Heavy Duty Crane, E-53 Sounding Reel and Wildco Ponar Sediment Sampling Procedure,* Attachment 2.

Transport samples to ECR SMO When sampling complete, apply chain of custody tape to sample containers and transport sample containers and completed Analtyical Request Forms to the ECR SMO. Reference ENV-DO-207, *Handling, Packaging, and Transporting Field Samples.*

Collecting samples with disposable scoops

Background

Disposable scoops and trowels provide simple, quick, and easy means to collect sludge and sediment samples from shallow or dry streams, ground surface, river bank, or similar sites.

Selection of sampling location

All sediment sampling sites (with exceptions along the Rio Grande as previously noted) shall be identified by posts with labels identifying the station name. Be prepared to replace the location marker if necessary.

Station locations can be found by referring to maps and by using a GPS unit pre-programmed with current station coordinates. Make a GPS reading of the collection point coordinates to document where the sample was collected to compare with prior sampling trips.

Samples collected near the mouth of a tributary stream shall be collected far enough upstream so that the sample is not influenced by water or sediments from the larger stream.

Samples collected in a major stream just downstream from the mouth of a tributary shall be collected far enough downstream (usually a few meters) so that sediments from the tributary may have settled out on the bottom of the larger stream.

Document in field notes the flow conditions of each stream and the distance upstream from the larger stream at which the sample was collected.

Description of sample and sampling location

For each sediment sample take at least two photos of the site: one a closeup of the sample, the second a site photo showing the setting of the sampling location relative to the channel and its banks. The second photo should include a view large enough so that a person not familiar with the site can use the photo to locate it for subsequent sampling.

Complete a Sediment Sample Collection Log (Attachment 3) giving a description of the sample and sample setting. Return a copy of the completed Sediment Sample Collection Log to the Environmental Surveillance Team Leader or designee.

Collecting samples with disposable scoops, continued

How to use the scoop

To collect a sample with a scoop, perform the following steps:

Step	Action
1	• When sampling stream sediments, collect the sample from a transect across the stream channel and obtain samples of equally weighted aliquots across the active channel. • Unless otherwise requested, choose a location for the sample that represents the majority of the sediment in the channel. • Concentrate on the upper 1/2-3/4" of sediment, assuring that the entire stream channel (transect) is represented in the sample. • Avoid collecting pebbles, sticks, leaves. Collect the finer grained materials. • If sampling sediment from a large river bank, collect at a location where slower moving water has created deposits of fine material. Avoid rocky areas.
2	Use the scoop to carefully collect the sediment, avoiding collection of cobbles, pebbles, and organic matter (that is, avoid large sticks, pine cones, or pine needles; but not ash or small particles of decayed organic matter).
3	• Pour the sediment into the appropriate sample container. • Repeat step two to collect sufficient sample material.
4	Apply chain of custody tape to sample containers.
5	Dispose of scoop or trowel. These shall be used at only one location.
6	Deliver sample containers and completed Analytical Request Forms to ECR SMO. Reference ENV-DO-207, *Handling, Packaging, and Transporting Field Samples.*

Records resulting from this procedure

Records

The following records are generated as a result of this procedure:

- Entries in field notebooks
- Anaytical Request Form
- Sediment Sample Collection Log
- Photographs

Click here to record self-study training to this document.

WATER QUALITY AND HYDROLOGY GROUP

EQUIPMENT AND SUPPLIES CHECKLIST

This form is from ENV-WQH-SOP-012.6

The following equipment is necessary for sediment sampling:

_____	GPS unit
_____	Ponar Grab sampler (for lakes only)
_____	Precleaned, disposable scoops
_____	Alconox (for lakes only)
_____	sample containers (see below)
_____	bowl (for lakes only)
_____	protective gloves
_____	de-ionized water (for lakes only)
_____	paper towels
_____	Analytical Request/Chain of Custody Forms
_____	bar-code labels
_____	pens
_____	cellular phone or radio
_____	first aid kit
_____	sun screen (optional)
_____	insect repellent (optional)
_____	field shoes
_____	camera
_____	stakes to mark station location

Initials:_____

Date: _____

USGS TYPE E HEAVY DUTY CRANE, E-53 SOUNDING REEL and Wildco Ponar Sediment Sampling Procedure

DESCRIPTION

The Type E crane is used when heavy sediment samplers are required. The Type E crane is collapsible, and is made from aluminum stock with stainless steel bolts and stainless steel shafts. The reel mount is drilled to install a Type A-55, B-56 or E-53 sounding reel which clamps to the crane assembly. This crane is usually used for samplers from 100 pounds (45 kg) and up. The approximate weight of the crane is 60 pounds (27 kg.)

The E-53 Sounding Reel is used to position sample collection equipment and is mounted on the crane. The reel has an effective drum circumference of 2 feet (61 cm) and has 165 feet (50.3 m) of 0.125 inch (0.32 cm) cable or 200 feet (61 m) of 0.10 inch (0.254 cm) cable. It is equipped with a USGS-type computing depth indicator. It comes with a friction brake which is controlled by a permanently attached crank on the right side of the reel, which is located on the end of the jack shaft next to the double "V" drive pulley. A hand crank which is fitted to the pulley end of the jack shaft is used for retrieving the sampler.

The Wildco® Ponar Type Grab sampler is used for collecting for bottom materials such as sand, gravel and clay. It can be used in streams, lakes reservoirs and the ocean. This modified Van Veen type self-tripping sampler has center hinged jaws and a spring loaded pin that releases when the sampler makes impact with the bottom. The top is covered with a stainless steel screen with neoprene rubber flaps which allows water to flow through for a controlled descent. The ponar is constructed of stainless steel with zinc plated steel arms and weights. A pin prevents premature closing. The ponar is 150mm x 150mm (6" x 6") and weighs 11 kg (24 lbs.) Sample volume is 2400ml.

STORAGE AND TRANSPORT

- Remove winch unit from the boat and crane and store indoors when not in use. The sampling crane shall remain mounted on the boat at all times.
- Detach ponar and store clean. Lock sampling jaws in open position by carefully adjusting the hinged arms to align the pin holes. Insert the standard pin in the aligned pin holes.
- During transport/trailering to the site, the sampling crane must remain in the collapsed position and secured with bungee tie-down cords or other appropriate restraints. While navigating on the lake the crane may be collapsed or left in sampling position dependant on water and wind conditions.

GENERAL OPERATION

This procedure requires two people, a crane and reel operator and a ponar handler. The crane and reel operator may use leather gloves for positioning and handling the crane. The ponar handler shall use nitrile sampling gloves. At all times use caution avoiding injury from pinch points or dropping the sampler.

CRANE SET UP

Raise the sampling crane arm by grasping the handle cross bar and lifting. A levering foot bar is provided for ease in lifting. Brace the sampling crane arm by connecting the two upper brackets into position.

CABLE and PONAR PREPARATION AND USE

- Using the handle on the right side of the reel to control the clutch, slowly un-spool approx. three feet of cable guiding cable clip forward over the brass cable wheel and the two black rubber cable wheels.
- Position the ponar on the floor of the boat and attach the cable clip to the ponar connector tab. Adjust cable length to reach ponar. Do not attempt to attach the ponar to the cable by lifting it. Replace the standard pin with the spring loaded pin and hold in place. Suspend the ponar so that it is weighted. The ponar is tripped when it comes to rest on a solid surface or lake bottom.
- Retract the sampling crane, by grasping the hand bar with both hands and gently pulling back. Slowly lock assembly in place by depressing the foot bar. Keep hands, fingers, and feet away from pinch points.
- After the ponar sampler is attached, the crane operator will extend the sampling crane arm by grasping the hand bar and pushing the assembly forward. Pull the foot bar, locking the assembly into place.
- To lower the Ponar sampler, stand on the right hand side of the sampling crane, and slowly shift the clutch handle (right side of reel) forward engaging the clutch and allowing the sampler to contact the surface of the water in a controlled manner. Zero the depth indicator. Release the sampler and cable into the lake by fully engaging the clutch. The winch and sampler assembly work by gravity so the sampler must be allowed to “free fall”. During the deployment of the sampler keep all objects clear of the left reel hand crank.
- Once the sampler has reached the bottom of the lake, read and record the depth from the depth indicator.
- Fully disengage the clutch and retrieve the sampler from the bottom of the lake using the left reel hand crank to reel it in. Once the sampler reaches the surface, engage the clutch and

fully retract the sampling crane. Next engage the clutch to allow for the Ponar sampler to be placed over the sample preparation receptacle.

- Once over the sample preparation receptacle, the ponar handler will position the sampler, open the sampling jaws and extract the sample.
- If required, the ponar sampler will be deployed multiple times using the above procedure until an adequate volume of sample is retrieved. For specific sediment sampling instructions refer to RRES-WQH-HCP-012, Sediment Sampling.
- When sample collection is completed, prepare the assembly for transport.

Water Quality and Hydrology Group

SEDIMENT SAMPLE COLLECTION LOG

THIS FORM IS FROM ENV-WQH-SOP-012.6

General:

Location: Sample ID:	Date collected: COC No.:
Time collected:	Weather conditions:

Sample description:

Color:	Grain size*:
Grain shape (angular, rounded, platy):	Sorting (uniform? range of sizes):
Composition (percentage of mineral, organic matter):	Is sediment loose; hard; frozen?
Other:	

Location description:

Channel width and depth:	Range of overall channel sediment sizes:
Flowing water?	Water depth?
Debris in channel?	Evidence of recent flow?

Remarks:

Photos: Close-up of sample, panorama of location.

Form completed by:

Sample collected by:

*Grain size (diameter, mm): >250 mm (10 in) boulders; >75 mm (3 in) cobbles; >2 mm gravel; >1 very coarse sand; >0.5 coarse sand; >0.25 medium sand; >0.1 fine sand; >0.05 very fine sand.