



**STANDARD OPERATING PROCEDURE FOR:  
COLLECTION AND PROCESSING OF  
HERON, OSPREY, AND CANADA GOOSE EGGS**

TVA-KIF-SOP-15, Revision 2

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<b>Revision Log</b> <b>SOP for Collection and Processing of Heron, Osprey, and Canada Goose Eggs</b> <b>(TVA-KIF-SOP-15)</b>			
Revision and Date	Section Reference	Revision Description	
1, April 2010	Throughout	Added Canada goose egg sampling. Changed Tupperware to generic “resealable plastic container.”	
	Section 3.3	Added safety glasses and life jacket for collection safety.	
	Section 3.3.c	Clarified procedure for collection of 2 <sup>nd</sup> egg for duplicate analysis.	
	Section 3.3.h	Added paragraph on safe collection procedures and clarified procedures for osprey egg collection.	
	Section 3.5	Added new section for collection of Canada goose eggs.	
	Table 1	Updated sampling equipment checklist.	
	Table 2	Added new table for the form “Heron/Osprey/Canada Goose Egg Field Specimen Collection/Processing.”	
	2, January 2011	Section 3.0	Changed time that census is conducted from April to early spring.
		Sections 3.3.c, 3.4.d, and 3.5.c	Removed requirement to collect two eggs from one nest each season since duplicate analysis is done in the laboratory using two samples from one egg.
		Sections 3.3.d, 3.4.e, and 3.5.d	On bag labels, added location and removed collector’s initials since these are placed on the outer plastic container.
	Sections 3.3.g, 3.4.g, and 3.5.f	On plastic container labels, replaced unique specimen ID number with EQUIS™ ID number and removed date.	
	Sections 3.3.i, 3.4.i, and 3.5.h	Inserted step to complete <i>Heron/Osprey/Canada Goose Egg Field Specimen Collection/Processing Form</i> .	
	Section 3.6.h	Removed step to complete <i>Heron/Osprey/Canada Goose Egg Field Specimen Collection/Processing Form</i> since step added early in procedure.	
	Section 3.6.i and j	Reversed order of steps.	

## **1.0 PURPOSE**

This standard operating procedure (SOP) describes methods for the collection and processing of great blue heron, osprey, and Canada goose eggs in order to determine exposure to metals from the ash spill at Kingston Fossil Plant (KIF). These procedures have been developed to help ensure that samples are collected and processed in a systematic manner and that appropriate documentation is maintained.

## **2.0 GENERAL CONSIDERATIONS**

Potential hazards associated with the planned tasks are thoroughly evaluated prior to conducting field activities. A pre-Job Safety Analysis (JSA) to identify potential hazards is discussed at each sampling event. Personnel use caution when collecting avian egg samples. Personnel use appropriate safety equipment to access nests and when working from boats. Nests in trees or on posts are only accessed by trained personnel. Sampling events are scheduled with the Sampling Coordinator and TVA Police. Table 1 presents an example checklist of equipment and materials needed for avian egg collection and processing.

## **3.0 PROCEDURES**

The following sections describe the procedures for collecting and processing great blue heron, osprey, and Canada goose eggs prior to shipping samples to appropriate laboratories. Any variation in these procedures is approved by the Project Manager and Quality Assurance (QA) Officer and is fully documented. Field work cannot progress until deviations are approved or resolved.

TVA collects eggs from great blue herons, osprey, and Canada geese during the spring breeding season at various localities near the KIF ash spill. TVA also collects samples from nearby reference sites that have not been affected by the ash spill.

An annual census of heron, osprey, and Canada goose populations is conducted in early spring to determine the locality of these avian resources. Locations of heron colonies and individual osprey nests are noted, as well as areas where Canada geese are present. Target nests are identified and selected based upon accessibility of the nests and the safety of sampling personnel. Locations are examined by boat and on land, along the Emory and Clinch Rivers and on the Tennessee River, upstream and downstream of the mouth of the Clinch River.

### 3.1 Pre-Sampling Preparation

The Project Manager is responsible for overall implementation of this SOP and ensuring that the SOP complies with current regulations and standards as these are subject to change. The Project Manager is also responsible for the following activities:

- a. Coordinate with appropriate regulatory agencies to ensure that appropriate documentation and/or permits are obtained.
- b. Provide the Field Team Leader with sample locations and times.
- c. Coordinate with Field Team Leader to ensure that appropriate field equipment and safety gear are available.
- d. Review the site-specific *Quality Assurance Project Plan* (TVA-KIF-QAPP), *Site-Wide Safety and Health Plan* (SWSHP), and appropriate SOPs to determine appropriate field protocols.
- e. Develop contracts and interact with subject matter experts to review sampling protocols and results, to ensure scientific rigor, and to establish contaminant thresholds as necessary.
- f. Verify methods to be used to transport materials and identify appropriate laboratories to perform analyses.
- g. Identify appropriate laboratory space to store samples.
- h. Obtain legal right-of-entry to private properties prior to sampling.

### 3.2 Field Preparation

The Field Team Leader is responsible for implementation of the field collection process. The Field Team Leader ensures that samples are safely collected using sterile procedures to prevent cross-contamination and that associated data are accurate and well documented. The Field Team Leader is responsible for the following activities.

- a. Provide a summary (or JSA) of potential hazards and appropriate safety equipment to the field collection team.
- b. Identify sampling and documentation roles for all personnel and thoroughly describe the sampling process.
- c. Distribute appropriate sampling and documentation equipment to the field collection team.
- d. Log collection activities in bound field logbooks using an indelible ink pen for all entries. Permanent markers are used for hand-written labels on specimen bags and resealable egg collection container labels.

- e. Work with appropriate personnel to produce computerized shipping labels.
- f. Ensure that all QA and quality control (QC) protocols are followed.
- g. Maintain Chain-of-Custody (COC) documentation in accordance with the *Field Documentation SOP* (TVA-KIF-SOP-06).

### 3.3 Sampling Methods for Heron Eggs

Heron colonies in the vicinity of KIF are located in trees on islands and along the shore and on electrical transmission towers. Specialized equipment such as vertical rope gear, tree spikes, and/or ladders is used to access the nests. This type of work is only attempted by trained arborists or transmission maintenance staff. If land routes are available, bucket trucks are used for an added measure of safety. A hard hat and safety glasses are worn at all times. A life jacket is worn when on or within six feet of the water.

Upon arrival to the heron colony, the Field Team Leader coordinates with appropriate personnel to access the nests. Once safety issues are discussed, sampling is initiated by the sampling personnel by following the procedures listed below.

- a. Once safety issues are discussed, climb the trees or towers to access individual nests.
- b. At the nest, note the absence/presence and number of eggs or young in each nest.
- c. Randomly collect one egg from each nest while wearing nitrile gloves.  
**Note:** If only one egg is observed in the nest, that egg is not sampled.
- d. Place each egg in a pre-labeled resealable plastic bag. Label each bag with the specimen ID number, location, date, and time for that sample. Place the bag in a resealable plastic container (such as Tupperware<sup>®</sup> or equivalent) lined with bubble wrap and seal the lid on the container.
- e. Place each resealable plastic container in a cloth bag and lower by rope to personnel on the ground or on a boat.
- f. If necessary, remove the egg from the resealable plastic container while wearing nitrile gloves being careful not to remove the egg from the resealable plastic bag (to avoid cross-contamination) and repackage in the container to help ensure that the egg will not break during transport.
- g. Label the resealable plastic containers on the outside with the following information: an EQuIS<sup>™</sup> ID number, time, and collector.
- h. Seal the resealable plastic containers with custody seals.
- i. Store containers in a cooler with wet ice.

- j. Complete the *Heron/Osprey/Canada Goose Egg Field Specimen Collection/Processing Form* (Table 2) to accompany the samples from the time of collection through temporary storage awaiting shipment to the laboratory.
- k. Take a GPS reading at each sampling location during or following the sampling event.
- l. Upon completion of the sampling event, transport specimens to the appropriate processing laboratory at Kingston or TVA's Walnut Orchard Facility (Norris, Tennessee). See Section 3.6 for sample processing procedures.

### 3.4 Sampling Methods for Osprey Eggs

Most osprey in the vicinity of KIF nest on man-made structures. These structures typically include utility poles, nesting structures, and navigation markers in the river. These nests are accessed by tug boat and barge with an aerial lift. A hard hat, eye protection, and life jacket are worn at all times. Sample personnel in the aerial lift use fall protection.

Osprey nests found in trees are accessed by trained arborists, using specialized equipment such as vertical rope gear, tree spikes, and/or ladders (See Section 3.3). A hard hat, safety glasses, and fall protection are worn at all times. Life jackets are worn when working within six feet of water.

The following procedures are followed for sampling osprey eggs.

- a. Upon approaching a nest, anchor the tug boat/barge and raise an aerial lift with sampling personnel in the lift basket to the nest. The sampling personnel ensure proper fall protection by securing themselves to the lift basket.
- b. If nests are located in trees, climb trees to access individual nests.  
**Note:** Climbers use professional judgment in deciding when collection efforts become too dangerous.
- c. At the nest, note the absence/presence and number of eggs or young in each nest.
- d. Randomly select one egg from the nest and collect while wearing nitrile gloves.  
**Note:** If only one egg is observed in the nest, that egg is not sampled.
- e. Place each egg in a pre-labeled resealable plastic bag. Label each bag with the specimen ID number, location, date, and time for that sample. Place the bag in a resealable plastic container lined with bubble wrap and seal the lid. If the nest is located in a tree, place each resealable plastic container in a cloth bag and lower by rope to personnel on the ground.

- f. When instructed, the lift operator lowers the sampling personnel back down to the barge. If necessary, remove the egg from the resealable plastic container while wearing nitrile gloves being careful not to remove the egg from the resealable plastic bag (to avoid cross-contamination) and repackage to help ensure that the egg will not break during transport.
- g. Label the resealable plastic containers on the outside with the following information: an EQuIS™ ID number, time, and collector.
- h. Seal the resealable plastic containers with custody seals.
- i. Store containers in a cooler with wet ice.
- j. Complete the *Heron/Osprey/Canada Goose Egg Field Specimen Collection/Processing Form* (Table 2) to accompany the samples from the time of collection through temporary storage awaiting shipment to the laboratory.
- k. Take a GPS reading at each sampling location during or following the sampling event.
- l. Upon completion of the sample event, transport specimens to the appropriate processing laboratory at Kingston or TVA's Walnut Orchard Facility (Norris, Tennessee). See Section 3.6 for sample processing procedures.

### 3.5 Sampling Methods for Canada Goose Eggs

Canada geese in the vicinity of KIF are located along shores, banks, and grassy areas on islands and along the Emory, Clinch, and Tennessee River banks. Nests are accessed by land or by boat. Crew members work in teams of two to collect eggs.

Once safety issues are discussed, sampling is initiated by the sampling personnel by following the procedures listed below.

- a. Locate individual nests by walking along shores/banks.  
**Note:** If any nesting birds do not vacate as sampling personnel approach a nest, one crew member opens a large umbrella to encourage birds to move. This crew member keeps the umbrella open while the second crew member works at the nest.
- b. At the nest, note the absence/presence and number of eggs or young in each nest.
- c. Randomly collect one egg from each nest while wearing nitrile gloves.  
**Note:** If only one egg is observed in the nest, that egg is not sampled.
- d. Place each egg in a pre-labeled resealable plastic bag. Label each bag with the specimen ID number, location, date, and time for that sample. Place the bag in a resealable plastic container lined with bubble wrap and seal the lid.

- e. If necessary, remove the egg from the resealable plastic container while wearing nitrile gloves being careful not to remove the egg from the resealable plastic bag (to avoid cross-contamination) and repackage to help ensure that the egg will not break during transport.
- f. Label the resealable plastic containers on the outside with the following information: an EQuIS™ ID number, time, and collector.
- g. Seal the resealable plastic containers with custody seals.
- h. Store containers in a cooler with wet ice.
- i. Complete the *Heron/Osprey/Canada Goose Egg Field Specimen Collection/ Processing Form* (Table 2) to accompany the samples from the time of collection through temporary storage awaiting shipment to the laboratory.
- j. Take a GPS reading at each sampling location during or following the sampling event.
- k. Upon completion of the sample event, transport specimens to the appropriate processing laboratory at Kingston or TVA's Walnut Orchard Facility (Norris, Tennessee). See Section 3.6 for sample processing procedures.

### 3.6 Sample Processing

The procedures listed below are followed for samples regardless of collection times to ensure proper maintenance of sample temperature. Eggs are processed individually.

- a. Upon arrival at the appropriate processing laboratory, place the samples in a "sample only" refrigerator (with a temperature maintained at less than 6°C but above freezing) for holding until samples can be processed.
- b. Remove each egg from transport materials and label with an ID number on each end of the egg using a permanent marker.
- c. Weigh the egg on a digital analytical scale with an accuracy of  $\pm 0.001$  g.
- d. Measure the length and width of the egg to within 0.01 mm using a digimicrometer.
- e. Record measurements on the *Heron/Osprey/Canada Goose Egg Field Specimen Collection/ Processing Form* (Table 2).
- f. Replace egg in original labeled collection resealable plastic bag, wrap in bubble wrap, place in a glass jar (provided by contract analytical laboratory), and seal.
- g. Label the jar on the side and seal with a labeled custody seal.
- h. Once samples are processed, freeze eggs ( $< -10^{\circ}\text{C}$ ) until shipment to the approved laboratory for analysis.

- i. Complete a COC form to accompany the samples from time of processing through shipment to the laboratory. Refer to *Field Documentation SOP* (TVA-KIF-SOP-06) for proper COC procedures.
- j. Place frozen samples in a cooler with dry ice and ship to the approved laboratories in accordance with the *Sample Labeling, Packing, and Shipping SOP* (TVA-KIF-SOP-07).

### 3.7 Field Logbook Documentation

In addition to the minimum requirements discussed in the *Field Documentation SOP* (TVA-KIF-SOP-06), the field logbooks document the collection and sampling characteristics specific to this SOP. Field data are documented in the field logbook using indelible ink. Data include date, site name, GPS coordinates, collection time, sample team members, species, and number of species collected. Additional comments associated with field access, weather conditions, and anecdotal observations are also noted. Similar information is recorded on the *Heron/Osprey/Canada Goose Egg Field Specimen Collection/Processing Form* (Table 2).

Sampling information is provided to KIF QA Oversight Contractor who creates unique sampling labels for each specimen in accordance with *Sample Labeling, Packaging, and Shipping SOP* (TVA-KIF-SOP-07).

A completed project COC form and sample labels are provided post-processing and accompany the samples to the approved analytical laboratory. Refer to the *Field Documentation SOP* (TVA-KIF-SOP-06) for proper COC procedures.

### 4.0 REFERENCES

- Environmental Standards, Inc. *Memorandum on Proper Field Documentation Procedures*, March 29, 2009.
- Hoyt, D. F. *Practical methods of estimating volume and fresh weight of bird eggs*, *Auk* 96:73-77, 1979.
- Tennessee Valley Authority (TVA). *Field Documentation SOP* (TVA-KIF-SOP-06), 2009.
- TVA. *Quality Assurance Project Plan for the Tennessee Valley Authority Kingston Ash Recovery Project* (TVA-KIF-QAPP), August 16, 2010.
- TVA. *Sample Labeling, Packing, and Shipping SOP* (TVA-KIF-SOP-07), 2010.
- TVA. *Site-Wide Safety and Health Plan for the TVA Kingston Fossil Plant Ash Release Response* (SWSHP), 2010.

<b>Table 1: Heron, Osprey, and Canada Goose Egg Samples Equipment &amp; Material Checklist</b>	
<b>Item Description</b>	<b>Check</b>
<b>Health &amp; Safety</b>	
Job Safety Analysis documentation	
Hard hat	
U.S. Coast Guard-approved flotation devices	
Nitrile gloves	
Leather gloves	
Field first-aid kit	
Safety glasses	
Safety gear for climbing transmission line structures and/or trees	
Personal fall arrest system	
Marine radio	
<b>Paperwork</b>	
Indelible ink pen	
Chain-of-Custody forms	
Field logbook	
<b>Sampling Supplies and Equipment</b>	
GPS unit	
Duct tape	
Rope gear (for accessing nests in trees)	
Large umbrella	
Cloth bags (for lowering eggs from nests in trees to sampling personnel on the ground)	
Tug boat and barge	
Aerial lift	
Extension ladder	
Bubble wrap	
Custody seals/tape	
Coolers with ice	
Laboratory-provided jars and lids	
Permanent markers	
Resealable plastic bags (gallon and pint sizes)	
Packing and shipping supplies	
Shipping labels	
Shipping forms (or courier forms)	
Plastic containers (such as Tupperware® containers)	
Scale	
Digimicrometer	

