

Standard Operating Procedure #1: Nestling Bald Eagle Handling, Measuring, and Sample Collection

Version 1.5

In Protocol for Monitoring Environmental Contaminants in Bald Eagles (Version 2.0): Great Lakes Inventory and Monitoring Network

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Revision History Log

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
1.0	5/9/2007	Bill Route	Added section 2.1 regarding procedure in event of injury to study birds	Addresses an oversight	1.1
1.1	7/25/2008	Rebecca Key and Bill Route	Added / modified explanations of items on the field data sheet. Added new version of data sheet.	Facilitates better data collection and entry into the database.	1.2
1.2	12/9/2010	Bill Route	Up-dated the FWS permit # and clarified some current handling procedures.	Preparation for sending out for review under Animal Welfare Act.	1.3
1.3	5/5/2014	Bill Route	Added information on collecting and securing added eggs and minor additions to eaglet assessment for injury.	Addressed an oversight and add an additional assessment method.	1.4
1.4	12/6/2018	Bill Route	Minor edits, mostly in the Equipment and Supplies section.	Incorporating reviewer suggestions as part of publishing version 2.0 of the protocol	1.5

Objective

This SOP describes specific procedures used to handle, measure, and collect biological samples from nestling bald eagles for bioaccumulative toxics monitoring in Great Lakes Network parks. Methods are adapted from Bortolotti (1984a, 1984b, and 1984c), Henny and Meeker (1981), Henny et al. (1981), and Morizot et al. (1985). The goal is to use methods that preclude injury and undue stress to the birds while banding, determining age and sex, and collecting biological samples to determine exposure to environmental contaminants. Differences in the genetics of nestlings between nest locations and geographical regions of North America can also be determined.

Health and Safety

See SOP #10 – Safety, for more complete safety guidelines for all personnel.

Handlers

All personnel and contractors handling bald eagle nestlings must wear protective gloves. This protects both the handler and the nestling from cross-contamination. Climbers may use leather or synthetic work gloves since latex surgical gloves are not practical or safe while handling nestlings in the nest. Handlers on the ground must wear disposable latex or nitrile surgical gloves, which are disposed of after each use. Climbers and crew members assisting climbers under the tree canopy must wear a helmet when climbers are in the tree.

Nestling Eagles

Bald eagle nestlings have sharp talons and strong beaks that can cause cuts, bruises, and deep puncture wounds. Individuals must be extremely careful when handling these birds to avoid injury to themselves and the birds. Ensure complete control of the nestling's talons at all times. When transferring a nestling to another individual, ensure that the talons are under the 2nd individual's control before the 1st individual lets go of the talons. Vet-wrap or Ace bandages may be used to secure the talons of nestlings and at the discretion of the handler a hood or hat may be used to calm some nestling eagles; however, we have found that most nestlings appear to be more relaxed without their heads covered.

Adult Eagles

We do not handle or sample adult bald eagles under this protocol. However, field crews may encounter sick or injured adult eagles and/or subadults or older nestlings. These large birds are much more dangerous than nestlings and only experienced handlers should attempt to handle them. In the event an adult bald eagle must be captured use the steps outlined in Appendix C.

Checking Nestlings for Injury

It is rare for a nestling bald eagle to be injured during studies of this type. However, anytime wild animals are being handled there is potential for injury. Nestlings could fall from the nest if they

become excited and step back from the approaching climber, or older aged nestlings may be close to fledging and take their maiden flight prematurely.

All nestlings will be inspected for general health and physical abnormalities, but if the handler suspects injury then the bird will be inspected more carefully as follows:

- Wet the wing or leg suspected of injury with water or alcohol to observe the long bones and joints where fractures typically occur. Look carefully for miss-alignment of bones or swelling.
- Feel gently along the wing and leg bones for hot spots, bruising, open wounds, obvious discomfort from the bird or other indications of fractures.
- Assess the head, neck, and body for injuries.
- Monitor the bird for abnormally rapid or raspy breathing.

If breathing is abnormally rapid or raspy, or the bird becomes lethargic, set the bird in a cool spot away from all stimuli and monitor. Continue with the sampling procedure if breathing normalizes. Place the bird back in the nest as soon as possible.

Note: Some investigators advocate providing 10 cc of water via intubation with syringe and plastic tubing to mitigate injured birds and general stress caused by handling. Providing water may be reasonable for nestlings that appear dehydrated or that are known to have been without food for several days, however, we do not recommend doing so without first consulting a veterinarian. If a bird is injured and needs to be X-rayed, veterinarians do not want water in the stomach. Moreover, the stress and potential harm from incorrect intubation is not warranted in most situations.

Minor scrapes and bruises should be monitored during routine handling and if no complications develop the nestling should be placed back in the nest without further intervention.

In the event of fractures to leg or wing bones make immediate contact with the nearest raptor rehabilitation center or veterinarian and transport the bird immediately. Contact numbers:

- Raptor Center, University of Minnesota, St Paul Campus (612-624-4745)
- Raptor Education Group, Antigo, Wisconsin (715-623-4015)
- Orion's Wildlife Rehabilitation, Duluth, Minnesota (218-348-8745)

Injured birds should be transported in a partially enclosed box with plenty of ventilation or by keeping the bird constrained in hand with the feet held firm between the fingers of one hand. The affected limb should be immobilized with vet wrap or by holding the bird in such a way as to minimize movement of that limb. Keep the bird cool and monitor breathing. Follow the veterinarian's instructions on providing water. Usually water is NOT given to birds that are to be transported to a veterinarian's care.

In the event of serious injury to a bald eagle call the U. S. Fish and Wildlife Service at 612-713-5343 to notify them. Under the terms of the U.S. Fish and Wildlife Service Bald Eagle Scientific Collecting Permit they must be notified and a report of the injury/mortality must be filed in writing within 5 calendar days.

Training and Responsibilities

Bald eagle handling will require a two-person crew to climb nest trees and handle eaglets on the ground. Additional individuals may assist, but only at the discretion of the handler. All persons present at a bald eagle nest must use normal voice (no shouting) and limit noise and unnecessary quick movements, which can make nestlings nervous. Details on training, certification, and permitting can be found in SOP #2; a brief summary of individual responsibilities are listed below.

Climber

Climbers will normally be contracted and each individual uses different techniques and equipment for climbing bald eagle nest trees. Contracted climbers will have experience climbing bald eagle nest trees and handling the nestlings under supervision of an experienced climber and possess personal-injury insurance. Climbers are responsible for assessing whether the nest tree is safe to climb. If safe, he/she will climb the tree and deliver nestlings to the ground crew. Climbers are responsible for the health and well-being of eaglets while they are in the nest and in transit between nest and ground. The climber will place the eaglets in individuals handling bags that have been custom designed for strength and breathability. The climber will either bring the eaglet(s) to the ground or lower the eaglet(s) to the ground in an eagle bag that is secured with a locking carabineer to a climbing rope that is tied to the tree.

Handler

The designated handler will be an NPS-GLKN employee or contractor with experience as a field biologist handling wildlife. The handler, normally the GLKN staff employee, is the responsible person for the overall field operation. The handler, in consultation with the climber, must ensure that the age of target eaglets are >35 but <63 days (5 to 9 weeks) old to minimize the chance of injury from handling yet reduce the likelihood of them jumping from the nest. The handler is also responsible for the health and wellbeing of the eaglets while they are on the ground. Note that all crew members who are authorized to handle bald eagles must possess, or be with another individual who possesses, the necessary state and federal permits. (See SOP #2, Training, Certificates, and Permits). To collect blood samples the handler must undergo training from a trained handler, or receive direct training at one of the following or similar facility: the Raptor Rehabilitation and Research Program at the University of Minnesota; the Small Animal Clinical Sciences Facility, College of Veterinary Medicine at Michigan State University; or the Raptor Education Group, Antigo, WI.

The handler, or at least one person on the ground, must have completed Red Cross certified first-aid training and must be equipped with an NPS-issued VHF radio and a cell phone to contact emergency rescue if needed (see SOP #10, Safety).

Equipment and Supplies

Climber

Contracted climbers must provide a Rope Access Risk Assessment and Rigging Plan (RARA) as part of their contract. This plan must be agreed to by NPS and followed during field operations. Climbers will be required to have basic safety equipment including: climbing harness and rope, climbing ascenders or spurs, helmet, and safety glasses. Individual climbers will provide their own equipment as part of their contract.

Handler (per crew)

The following will be government supplied equipment and supplies:

Banding/Handling

- _____ Latex or nitrile disposable surgical gloves
- _____ USGS # 9 rivet bands
- _____ 1/8" × 1/8" aluminum rivets
- _____ Rivet gun
- _____ Needle nose pliers with wire cutters
- _____ Small file for bands
- _____ Needle nose vice grips
- _____ Leg wrap (Ace bandage or vet wrap, 2" to 3" wide)
- _____ Eagle bags (custom designed)

Measuring

- _____ Clipboard
- _____ Pencils, hand sharpener
- _____ Permanent markers (Sharpies)
- _____ Field data sheets
- _____ 12" aluminum ruler calibrated in mm with inch scale masked
- _____ Digital calipers, extra batteries
- _____ Digital or spring scale: 10 kg in 200 g intervals
- _____ GPS (Geographical Position System) (Garmin or equivalent)

Collecting and storing blood & feather samples

- ___ Small cooler
- ___ Ice packs (blue ice or equivalent)
- ___ Centrifuge capable of holding 10 cc green top vacutainers and obtaining min. 1200 rpm
- ___ Custody forms and seals
- ___ BAEA sample labels
- ___ Clear packing tape to cover labels
- ___ Whirl packs
- ___ Zip lock bags
- ___ Biohazard bags
- ___ Small envelopes for breast feather collection
- ___ Sterile gauze pads, 2" × 2"
- ___ 10 cc sterile, individually packaged, plastic syringes (BD301604)
- ___ 1-inch-long, 22-gauge needles (BD305155)
- ___ **Note:** *individuals taking blood should use the method of blood collection they are most comfortable with. Some may prefer to use winged infusion sets.*
- ___ Alcohol swabs (VWR # 56612-916)
- ___ 10 cc Green-top heparinized vacutainers (VWR # VT6480)
- ___ 2 mL, purple-top glass vial with EDTA for whole blood metals (primarily Pb and Hg) analysis
- ___ Disposable glass Pasteur pipettes (lab provided)
- ___ Mechanical, measured pipette system
- ___ Polypropylene vials for PFC samples (lab provided)
- ___ Glass vials for PBDEs, PCBs, DDT/DDE analysis (lab provided)
- ___ Portable freezer for vehicle
- ___ Aluminum foil for addled eggs
- ___ Access to freezer (−20° C.) and refrigerator (2°–6° C.)

Sample Identification

All samples collected in the field will be individually labeled with an assigned bald eagle (BAEA) number that will be unique to each nestling. This number is linked to the data through the field data sheet (Appendix A). These numbers provide the sample owner (GLKN), sample year (YYYY), the handler's first initial (I) to allow two or more crews to work simultaneously, and a three-digit sequential number assigned by the handler (###). Original field data forms will be retained in a binder for the GLKN office and field data logged into the GLKN's Bald Eagle Database. See SOP #9, Data Management for details.

Field Procedure

Capture

Prior to climbing the nest tree the climber and handler should view the eaglet(s) from the ground to estimate the number in the nest, approximate age, and whether they might be "jumpers" (developed physically and mentally to the point where they are nearly ready to fly, thus may jump out of the nest when the climber approaches). If the eaglet's age and demeanor appears to be within guidelines, the climber should begin slowly climbing the tree. While the climber is scaling the nest tree, the individual(s) on the ground should spread themselves out with the nest in view to watch for eaglets that might jump. If an eaglet jumps/flyes out of the nest, follow its path to track where the eaglet lands. Individuals should search for jumpers/fliers until found or after no less than three hours of diligent searching. Once the eaglet has been located, secure it either by holding both feet and wings or by placing it in an eagle bag. Carry the eaglet back to the site and continue processing.

When the climber has reached the nest and the eaglet(s) are reasonably assured of not jumping, the climber should inform the ground crew as to how many nestlings are the correct age and condition for sampling. The handler should confirm the number to bring down. After securing the eaglet(s) in bags, the climber should check the nest for addled eggs. This requires digging 1–3 inches into the nest material to search for eggs that adults have buried. Addled eggs should be collected by wrapping them in aluminum foil baked at 650° F. If pre-baked foil is not available wrap the egg in aluminum foil with the dull side in. Eggs wrapped in foil are then double bagged in sealed zip-lock bags and placed in the cooler. They are then placed in a freezer and kept frozen until hand-delivered to the laboratory.

Prepare for Handling

The ground crew should lay out all sampling equipment near the nest tree, but far enough away to avoid being struck by falling branches as the climber descends from the nest. The spot should be clear of brush and shaded so that the bird is kept cool during processing. A ground cloth or tarp should be laid down for the tools, samples and nestling. This is important for making sure tools and samples are kept clean and not lost in the surrounding vegetation. A bald eagle data sheet should be started and labels prepared for sample vials and envelopes. Syringe(s) should also be prepared by

affixing a 22-gauge needle beveled side up (on the same side as the fluid scale of the syringe), and an alcohol pad and sterile gauze made ready for the blood draw.

The climber will either bring the eaglet(s) to the ground or lower the eaglet(s) to the ground in an eagle bag that is secured with a locking carabineer to a climbing rope that is tied to the tree. If the tree has too many branches to allow passage of the bird directly to the ground and back, a rope will be affixed from the nest to the base of a nearby tree such that the eaglet can be belayed safely to the ground without being tangled in branches.

FOR THE FOLLOWING STEPS THE DATA RECORDER MUST ENTER DATA ON THE APPROPRIATE FORM IMMEDIATELY AFTER EACH STEP.

Secure and Measure

- 1) The handler should weigh the eaglet before removing it from the bag. Note the combined weight and the tare weight of the empty bag on the form after removing the eaglet. Alternatively, note the color and number of the bag (numbers are written on the bottom of each bag). All bags have been weighed and these weights are available in the database. Make sure prey items or other objects of interest that climbers might have put in the bag are removed before weighing. Also, note if the bag is wet and weigh the bag to ensure this extra weight is accounted for.
- 2) After weighing, open the bag and secure the talons by slowly grasping the lower portion of the legs from behind and holding them firmly. Once the legs are secured, do not let go. Getting “footed” by a nestling is the most common injury to handlers and can be very serious. The talons can get deeply embedded in an arm or finger and getting the nestling to release is extremely difficult.
- 3) Remove the nestling from the bag. It usually works best to have an assistant peel the bag sides down while the handler maintains hold of the nestling’s legs. This should be done slowly while watching to ensure the nestling does not bite. The assistant can pull away from an attempted bite, but the handler should never let go of the legs.
- 4) Assess the nestling for injury, overall health, and appropriate size (age), and demeanor for sampling. Nestlings that are outside of the 5- to 9-week handling window should be considered for being placed back in the nest without sampling. If the eaglet is calm, a head covering may not be necessary. If the nestling is highly agitated, place a breathable covering over its head to calm it down. At this point, some handlers prefer wrapping the talons and legs together with vet wrap or Ace bandages. This can be useful if handling alone or with inexperienced help.
- 5) Place the eaglet belly down on the handling mat with its head away from the handler. Then pull the legs back and tuck the tail feathers under the feet. This belly-down position with the legs pulled back relaxes the tendons that clench the foot and talons. In this position, use a ruler to measure the foot-length. Firmly pull the hallux and middle toe apart while flattening the foot against the ruler. Measure the longest distance from end of the hallux pad to the end

of the longest (middle) toe pad. Then measure the hallux claw with calipers. Measure the longest distance from where the claw inserts to the tip of the claw. Finally, while still in the belly-down position, band the eaglet using # 9 USGS rivet band. Check that the band is round, has no sharp edges, and that the rivet clenches it tight. A small file should be available for smoothing any defects. Failed bands need to be returned to the Master Bander.

- 6) Measure the eaglet's bill depth and length with calipers. This can be done efficiently by a second handler while the banding is being done and the bird is still in the belly-down position. Bill length, also known as culmen length, is from tip of the upper mandible to where it meets the cere (fleshy part of the head). Bill depth is measured at the widest point, top to bottom, with bill closed.
- 7) Re-position the nestling by flipping it to a back-down position. With practice this can be done in one smooth motion by crossing your arms (in belly-down position) and quickly flipping the eaglet so that it ends up on its back and your arms are not crossed. In this position, open one wing and measure the 8th primary feather. There are 10 primaries. Count back from the outermost primary and measure between primaries 7 and 8. Place the ruler into the space between these two feathers with the "0" end of the rule in the center and measure out to the tip of the 8th primary, making sure the feather is straight.

Sample

- 1) With the one wing open, swab the brachial vein with an alcohol pad or swab where the vein crosses the ulna. Then have a second handler gently but firmly apply pressure to the brachial vein near the base of the wing (arm pit) where it runs along the humerus. Check by having the handler press and release pressure, which should make the brachial vein bulge and relax. With gentle but firm pressure being applied by the second handler, insert the needle, bevel side up, in to the vein. Take care not to go too far, and make sure the needle is aligned so that it runs into and along the inside of the vein without going through the other side. Draw 10–11 cc of blood with a smooth, consistent pull back on the plunger. As soon as the draw is completed, and BEFORE the needle is removed, the second handler must release pressure on the vein. Failure to release pressure will cause unnecessary bleeding. Immediately after the needle is removed, apply direct pressure on the puncture site with the sterile gauze for 1–2 minutes or until bleeding stops.
 - a. Occasionally the vein will be nicked or the needle will go through it and blood will run under the skin creating a bulge called a hematoma. When this occurs, withdraw the needle and place firm pressure on the wound with the sterile gauze until the blood clots. If you did not get enough blood you may need to try the other wing. A full sample is 10 cc, but often 8 cc is enough.
 - b. Occasionally the vein will collapse. This usually occurs in young eaglets, or when insufficient pressure is applied to the vein, or if the handler draws back on the plunger too rapidly. Try to NOT pull the needle out. Rather, make sure vein pressure is being

applied and draw more slowly. If the collapse is complete, and you cannot draw blood, then pull out and try the other wing.

- 2) Place the sterile gauze from the previous step into a small, labeled paper envelope, and put in the cooler. If there are not at least a few drops of blood on the gauze, place a few drops of blood from the syringe on it before putting it in the envelope.
- 3) Transfer the blood to a pre-labeled both the 10 ml green-top Vacutainer and the 2 mL purple-top Vacutainer. Invert the Vacutainers a few times to mix then place in a Zip-lock bag. Place the bag with a blue ice pack in the cooler.
- 4) Collect 3–4 breast feathers from the eaglet by plucking them to include the entire quill. Select feathers from different areas of the breast. Place the feathers in a small envelope, seal envelope, and put a numbered BAEA label on the envelope. Place feather envelope in a dry section of the cooler.

Final Check and Cleanup

- 1) Examine the eaglet more closely and note any deformities, including clubfoot, deformed bill, micro ophthalmia (one eye smaller than the other; often the left eye), and any other wounds or unusual markings. Determine if ear maggots are present and estimate if the eaglet's crop is full, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, or empty.
- 2) Check over data sheet to ensure all data was collected and that the data sheet is legible. Log any added eggs that were collected. The egg should be labeled by writing on the tinfoil with a permanent marker.
- 3) Place the eaglet back in the eagle bag for the climber. All nestlings should be placed back in the nest as soon as possible. After hundreds of nestlings being handled, on one occasion we had a nestling that was considered at risk for jumping. In this case, we left the nestling on a perch tree nearby where the adult eagles could feed it.
- 4) Place the needle cover back on the needle and place it, the syringe, and all sampling waste in the biohazards/sharps container.
- 5) Pick up all equipment; double-check; check again; leave no trace.

Record Site Characteristics

- 1) Check the location information. If the nest has been visited on the ground before it should have nest name, territory name, and a GPS reading from the ground. If not, then the nest site needs to be individually named. This name may be changed later when the territory can be determined. Most critical is to get the GPS location as precise as possible. If a "ground" GPS coordinate was not previously taken, then get coordinates as close to the base of the tree as possible.
- 2) Measure the DBH of the nest tree, using the centimeter scale on a diameter-tape. Use a range-finder to measure the height of the tree.

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Appendix A. Explanations for bald eagle datasheet fields.

BAEA FIELD DATA SHEET – 20____

GLKN# or B.A. # (&alt nest) _____ Nest Name _____ Date _____

Park _____ County _____ State _____ Within Park Boundaries? _____

GPS _____ Type: A / G / E Year _____

Landowner _____ Field Crew _____

Visit Notes, Eaglet Notes, Climber Assessment & Tree / Nest Notes on Back

Productivity

Yg / Ad	1	2	3
FWS Bd.	L / R	L / R	L / R
Color Bd. (note color)	L / R	L / R	L / R
Weight (kg / lb) (note bag color)			
Footpad (mm)			
Bill Depth (mm)			
Culmen Length (mm)			
Hallux Claw (mm)			
Sex (M / F / U)			
8 th Primary (mm)			
Age (days)			
Crop (0, 1/4, 1/2, 3/4, full)			
Sample ID BAEA-GLKN-	20 ____ - ____ - ____	20 ____ - ____ - ____	20 ____ - ____ - ____
Total Blood (Y / N - ml)			
Serum (Y / N - ml)			
Remaining RBCs (Y / N - ml)			
Breast Feathers (Y / N - #)			
DNA (Y / N)			

Adults Present: None / One / Two Bands Seen: _____

Dead Young: Y / N # of Dead Young: _____ Dead Young Comments: _____

Adult Feathers Present: Y / N Adult Feathers Collected: # _____ SampleID(s): _____

Addled Eggs: # Present: _____ Addled Eggs Collected: 0 / 1 / 2 / 3 SampleID(s): _____

Prey Remains Present: Y / N Description: _____

Prey Remains Collected: Y / N SampleID(s): _____

Nest Tree: Old / New this year Tree Species: _____ Nest Height: _____ (ft / m)

Nest Tree Dead? Y / N Tree Above Nest: _____ (ft / m) DBH / CBH _____ (in / cm)

QA/QC Check (Initials / date):

Database Entry (Initials / date):

The following list and explanations are to be used when filling out the bald eagle data sheet.

GLKN# = This number is assigned by the Great Lakes Network Office for a specific nest location (not territory).

B.A.# = This number is assigned by the State Department of Natural Resources and it corresponds to a known or estimated territory.

Alt. Nest = The B.A.# is assigned an a, b, c, etc to indicate successive or alternate nests that might be used within the same territory (e.g. 32a, 32b...).

Nest Name = Descriptive name, normally assigned by the State DNR, park, or GLKN

Date = DD/MM/YYYY when the eaglets were sampled.

Park = The Park that the nest is associated with. Use the park's four letter alpha code.

County and State = County and State where the nest is located.

Field crew = List the names of the individuals handling the nestling(s).

GPS = Write down the GPS coordinates, usually as decimal degrees in NAD83 format (see GPS SOP).

Type = **A** = air, **G** = ground, **E** = estimated. Circle the means of collecting the coordinates. Ground coordinates are collected at the nest and are the most accurate.

Year = The year in which the GPS location listed on the form was collected. You may be using the ground location from last year, and if it is the same tree then no new location was entered. Thus, the GPS location is from the previous year.

Land owner = Name the agency or individual who owns the property where the nest is located.

Productivity = This is the total number of nestlings or fledglings that you could determine were produced from the nest this year. You might handle and take samples from only 2 nestlings, but a third eaglet is in the nest, hence sample size = 2 but productivity = 3.

The following are for each nestling (1, 2, 3) sampled:

USGS Bd L/R = List the full number of the U.S. Geological Survey leg band that was placed on the eaglet and then circle whether it was placed on the left (L) or right (R) leg.

Color Bd. L/R – (color) = Color bands were not used. If in the future they are, list the full number and circle which leg for any state DNR or project-specific leg bands that might be used. Describe the color of any color bands.

Weight = Enter the weight. Normally this should be in kilograms. Note the bag color so that the bag weight can be subtracted to give true weight of the eaglet.

Footpad = Length of the footpad from tip of hallux talon to the opposite and longest toe talon. The footpad must be fully stretched. This measurement is used for sexing the bird and accurate, consistent measurements are required.

Bill Depth = Calipers measurement from top of culmen (bill) to bottom. Place calipers at point where cere meets the culmen and then at right angle to the bill.

Culmen Length = Calipers measurement of length of bill, cere to tip.

Hallux Claw = Calipers measurement of hallux claw, outer measurement from where it inserts in to the skin to the tip.

Sex (M/F/U) = Enter the estimated sex of the eaglet. This is determined by the length of the footpad with birds > 135 mm being female and all others listed as male. If hallux claw is broken or not measured then circle U for unknown.

8th Primary = Ruler measurement of the length of the 8th primary from tissue between the 7th and 8th and the tip of the 8th. There are 10 primaries and they are numbered from proximal to distal. For the purpose of locating the 8th in the field, count in three flight feathers from the outer primary (10th) then measure between the 8th and 7th.

Age (days) = After determining the sex from footpad, use the Bortolotti chart to estimate age from the length of the 8th primary.

Crop = Estimate whether the crop is empty, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or full.

Eaglet Sample ID = BAEA = Bald Eagle Number; GLKN = Great Lakes Network.

For 20____-__-____ enter the remaining digits of the year (e.g. 06), an initial for the handler (B for Bill), and the pre-determined 3- digit sequential number. For example, in 2006 the first and last sample collected by Bill Route was: GLKN-2006-B-001 and GLKN-2006-B-054.

Total Blood (Y/N) = Enter the total ml of blood collected from the nestling; enter N if no blood was collected.

Plasma = After being spun down, enter the total estimated ml of plasma and the amounts in each vial for the various analytes. If plasma was split for various lab samples, indicate the amounts and lab (or test). Use the plasma section of the datasheet to indicate the amounts, or utilize the back of the datasheet.

Remaining RBCs = Enter the amount of Red Blood Cells remaining from the total blood sample after being spun.

Breast Feathers (Y/N #) = Enter the number of feathers collected; enter N if none were taken.

DNA (Y/N) = Enter Y or N for yes and no respectively if a cotton swab was retained for DNA.

Adults present: Circle as appropriate. **Bands seen:** Yes or No and number on the band if seen.

Dead Young: Enter Y or N for yes and no respectively if dead young were found. Indicate the number found and then comment on circumstances. For example were they in the nest or on the ground, decomposed, partially eaten, etc. and were there any deformities.

Adult Feathers = Enter Y or N for yes and no respectively if an adult feather was found. Indicate the number collected for DNA and record the associated Sample ID's. For non-eaglet feather samples, utilize a similar format as eaglet samples, but use the letter F as the beginning of the last three spaces within the sampleID (e.g. GLKN-2008-B-F01).

Addled Eggs = Enter the number of Addled Eggs Present, the number of Addled Eggs collected, and record the associated SampleIDs. For addled egg samples, utilize a similar format as eaglet samples, but use the letter E as the beginning of the last three spaces within the sampleID (e.g. GLKN-2008-B-E01).

Prey Remains Present = Enter Y or N for yes and no respectively if prey remains are present in nest or surrounding the nest tree. Provide a description of the remains (list the species and number as best you can determine).

Prey Remains Collected = Enter Y or N for yes and no respectively if prey remains are collected. Record the associated SampleIDs. For prey remains samples, utilize a similar format as eaglet samples, but use the letter P as the beginning of the last three spaces within the sampleID (e.g. GLKN-2008-B-P01).

Nest Tree: Old / New this year = Circle as appropriate. Then enter the species name, if the tree is dead, height above ground to rim of nest, height of tree remaining above the nest rim, and DBH (diameter at breast height) or CBH circumference at breast height) of the tree trunk.

Comments = Use the back of the datasheet to write down any notes on getting to the nest, problems with the sampling methods, qualifiers on the data, etc.

Database Entry (Initials /date) = The date and initials of the person who entered the datasheet information into the database.

QA/QC Check (Initials / date) = The date and the initials of the person (or persons) who provided the Quality Assurance and Quality Control checking of the data.

Appendix B. Daily equipment and supplies checklist.

Cut this checklist out and place it on a clipboard for review each morning.

This checklist is to ensure equipment and supplies are available each day for handling at least 12 bald eagle nestlings. Check this list each morning before going to the field.

- ☐ Eagle bags (2) and small tarp
- ☐ Bands, rivets (12 ea), and rivet tool
- ☐ Scales, calipers, ruler, tape measure
- ☐ At least 12 sets of syringes and 22-gauge needles
- ☐ Minimum 12 blood tubes (green tops)
- ☐ Minimum 12 blood tubes with EDTA (purple tops)
- ☐ Foil for addled eggs
- ☐ Alcohol wipes and gauze for 12 nestlings
- ☐ Small sample bags and tags (12 ea)
- ☐ Small cooler with ice packs
- ☐ GPS and extra batteries
- ☐ Forms, pencils, Sharpies
- ☐ Maps, directions, coordinates
- ☐ Cell phone and/or VHF radio
- ☐ Contact numbers

Appendix C. Handling sick or injured adult bald eagles.

Field crews may encounter a sick or injured adult eagle, sub adult, or older (>10 week-old) nestling. These large birds are dangerous and only experienced handlers should attempt to handle them. In the event an adult bald eagle is found sick or injured, take these steps:

Assess the Situation

- 1) Approach slowly to see if it will fly. Adults in healthy condition will fly immediately. If it does not fly then it is sick or injured. An eagle suffering from lead poisoning—one of the most common reasons for flightless adults—will have its head hung low and there may be greenish colored droppings around it. Sick and injured adults may hop quickly away, but if they do not fly then they probably need medical attention.
- 2) If possible, call a raptor rehabilitator and let them know the bird's condition. They will want to know how agile it is (not moving, head down versus agitated and hopping away), whether it appears to favor a wing or a wing looks injured (out of place or at strange angles), whether it is near a road (possible vehicle strike), or powerline (possible electrocution), or other characteristics that might suggest the reason for it not flying away.
- 3) Decide whether capture and transport to a raptor rehabilitator is the best option. This will require one or two persons to handle the bird and transport it—often a long distance.

Capture if Necessary

AT NO TIME SHOULD A HOOD BE PLACED ON AN ADULT EAGLE, AND THEIR LEGS AND/OR TALONS SHOULD NEVER BE WRAPPED WITH VET WRAP, ACE BANDAGES, OR ANYTHING THAT WILL NOT IMMEDIATELY FALL OFF. THIS IS DUE TO THE POTENTIAL DANGER IF THEY ESCAPE DURING HANDLING.

- 1) Use personal protective equipment, including leather gloves, long-sleeved coat, and safety glasses.
- 2) Approach the bird from behind if possible. Having another person approach from the front at the same time can distract the bird, allowing you to get closer from behind. Try to cover the bird with a coat, sheet, or blanket. This will usually calm the bird. Do not tie anything to the bird. If it does suddenly fly, you do not want it hindered by any covering.
- 3) Try to keep the head and wings tucked in place under the covering and keep the bird in an up-right position at all times. If the bird is docile, you may be able to hold the bird without securing the legs and talons. Place both hands on either side of the covered bird, making sure to secure the wings. You should be able to pick it up, then wrap one arm around the bird to secure its wings, and carry it. Watch for thrashing feet and talons. Even a very sick adult may attempt to regain control and lash out with its feet.
- 4) If the bird is aggressive, you may need to slowly move your hands under the covered bird from behind and take control of the legs. This is most easily done by placing one hand on the

birds back with slight pressure, then moving your other hand slowly behind the bird and under the cover to pin one foot to the ground. With one foot pinned to the ground, move the other hand down to grasp the second foot near its ankle. Maneuver your strongest hand so that both legs are locked between your thumb and fingers. That leaves your second hand for securing the rest of the bird.

Transport

- 1) A well-secured adult should be covered. One hand should have firm control of the legs, one arm should be wrapped around the bird, and the bird should be held tight to your stomach or at your side and facing forward. Care should be taken to not damage wing and tail feathers.
- 2) An eagle can be held this way for short hikes or vehicle transport to a veterinarian or rehabilitation center.
- 3) For longer transports, place the bird in a well-ventilated cardboard box or dog kennel large enough to allow the bird to stand upright. Make sure the top or door is closed tight so it cannot escape. Do not provide the bird with water or food unless told to do so by a veterinarian or rehabilitator.

