

Great Blue Heron Rookery Monitoring project¹



INTRODUCTION

Great Blue Herons are an iconic bird species in the Northwest and the official bird of Portland. This species is widely recognized by the public for their large size and majestic demeanor. West coast populations of great blue herons are non-migratory and many nesting colonies (“rookeries”) are found in the Portland metropolitan area. While they can coexist with humans in an urban environment they are known to be quite sensitive to disturbance at nesting rookeries. They are also an important indicator of environmental contamination. For these reasons, great blue herons are an ideal species to monitor to gauge overall ecosystem health.

Great blue heron populations appear to be increasing in most of the US, however in the Pacific Northwest, populations appear to be experiencing a declining trend². Since 2009 the Audubon Society of Portland has organized a citizen science effort to monitor occupancy at multiple heron rookeries in the Portland area in order to track long-term trends in colony use and document local population changes. Through these efforts, we hope to learn more to help conserve heron populations in our region and to better understand stressors to heron and other bird populations.

OBJECTIVES

1. Determine long-term occupancy trends of rookeries in the Portland metro area. Variables of interest include: # of active rookeries & rookery size (# of active nests and # of adults present) at a minimum of 10 rookeries monitored annually.
2. Monitor nest productivity and chronology at a subset of nests in each rookery

¹ Portions of this protocol were developed from: Vennesland, R.G. and D.M. Norman. 2006. Survey Protocol – For measurement of nesting productivity at Pacific Great Blue Heron nesting colonies. Heron Working Group. 41 pp. & Hussey, K.F. and J.L. Stephens. 2012. Oregon Coordinated Aquatic Bird Monitoring Program colonial waterbird survey protocol: An adaptation of the U.S. Fish & Wildlife “West Colonial Waterbird Survey Protocols”. Rep. No. KBO-2012-0013. Klamath Bird Observatory, Ashland, Oregon.

² Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2010. Version 12.07.2011 [USGS Patuxent Wildlife Research Center](#), Laurel, MD

SITES

Since 2009, 27 sites have been monitored in the Portland Metro area. During this time a number of sites have been abandoned and some new ones have been discovered. We will continue to monitor a minimum of 10 of these sites.

Rookeries monitored by Portland Audubon in 2013

Rookery Name	Peak # of active nests detected in 2013	Notes
Goat Island	11	
Government Island	30	Multiple sites
Heron Lakes Golf Course	30	
Jackson Bottoms	32	
Koll Center Wetlands	0	Likely abandoned
Multnomah Channel	8	5 sites
Port of Vancouver	0	3 sites
Reed Island (Steigerwald)	48	
Ridgefield NWR	37	Multiple sites
Ross Island	19	
Sauvie Island	33	Multiple sites
Scappose Bay	25	
Shillapoo	7	
Smith and Bybee	59	Multiple sites
Total	339 active nests	

EQUIPMENT

- Appropriate clothing & footwear
- Scope of at least 15x magnification (binoculars for some observations)
- Data forms / map + clipboard + pen/pencil

FIELD METHODS

1. Monitoring schedule guidelines

- Number of visits: In order to obtain reliable data each rookery should be visited a minimum of **3 times** throughout the season for rookery occupancy estimates and **6 times** for intensive nest survivorship. The following is a sample schedule:

Visit #	Visit Date	Nesting stage ³	Sampling activity
1	Mid-Feb	Pair formation & nest building	<ul style="list-style-type: none"> • Colony active? If yes, count nests (total, active, inactive) and adults • draw map of nests

³ Average timing for nest stages in Oregon populations. Source: Marshall, D.B., M.G. Hunter, and A.L. Contreras, Eds. 2003, 2006. Birds of Oregon: A general reference. Oregon State University Press, Corvallis, OR 768 Pp.

2	Mid-March	Egg laying, incubation	<ul style="list-style-type: none"> • Colony active? If yes, count all nests (total, active, inactive) and adults • Record # new nests, draw map of nests
3	Mid-April	Incubation, Nestling	<ul style="list-style-type: none"> • Nest count (total, active, inactive) • Preliminary count of nestlings / fledglings at subset of nests
4	Mid-May	Nestling	<ul style="list-style-type: none"> • Nest count (total, active, inactive) • Preliminary count of nestlings / fledglings at subset of nests
5	Mid-June	Nestling, Fledging	<ul style="list-style-type: none"> • Nest count (total, active, inactive) • Preliminary count of nestlings / fledglings at subset of nests
6	Mid-July	Fledging	<ul style="list-style-type: none"> • Final nest count (total, active, inactive) • Final count of nestlings / fledglings at subset of nests

* If a colony is not active the first visit, check at least one more time 1 month later to confirm

** A Follow-up visit in the fall to confirm total nests (after leaves fall of trees)

b. Visit length

- i. Initial colony visit (prior to incubation onset) does not need to be long. Enough time should be spent to count all nests and determine activity levels (30min. to one hour).
 - ii. During incubation and when chicks first hatch, adults generally will only be off the nest for 10-30 minutes so stay at site long enough to see returning adults.
 - iii. When monitoring for nest productivity, visits will be longer as the nesting stage at each nest will need to be assessed.
- c. Time of day: visits should be rotated throughout daylight hours to account for daily differences in heron behavior (rotate morning, afternoon, evening visits if possible)

2. Site Map

During the initial visit a map should be drawn depicting view of the rookery, location of nests, and landmarks such as distinctive trees and objects. In subsequent visits the map can be amended (new nests added). The subset of nests monitored for nest productivity should be labeled on the map. A blown-up photograph of the colony could be used as a map if desired.

3. Rookery occupancy estimate (see attached data form)

The first objective of this project is to estimate long-term occupancy trends of rookeries in the Portland metro area. To accomplish this, count the number of active and inactive nests in the entire rookery. Focus most of your visits prior to leaf-out (before ~ late April). It is important to do this more than once as nest numbers will likely change as 1) new nests may be built after the initial visit; 2) nests may be abandoned; and 3) new nests built later in the season (re-nesting attempts). Also, count the total number of herons (adults and juveniles) seen in each colony. This provides a rough colony population estimate and helps confirm number of active nests.

We define an **active nest (nest with eggs or chicks)** as one that fits into any of these 3 categories:

- A. Has an adult standing on or very close to the nest. Be careful as single birds standing at a nest may be unpaired or stealing sticks from a nest. Also, some 1st year birds may visit old nest sites without nesting themselves.
- B. An incubating heron (in a continuously crouched position) is present in the nest
- C. Young birds can be seen in the nest

Important notes:

- A minimum of **3 visits** to the site should be made (at least 2 prior to leaf-out) to provide this estimate. At least 2 of these visits should be spaced at least **1 month apart**.
- Heron nests often will stay in the tree for multiple years. Nests built in one season may or may not be used the next year. To help confirm a nest is active, look for fresh sticks/vegetation used for nesting material.
- If possible, in late season look for eggshells/feces under nest to confirm nest was active.

4. Nest productivity estimate (see attached data form)

The second objective of this project is to estimate the nest productivity of a subset of nests in each colony (or all nests in small rookeries). Choose a subset of **up to 25 nests** during the initial visits to the rookery for intensive nest monitoring. Pick active nests that look like they will remain in view after leaf-out.

a. Estimating hatching date

If possible, estimate the approximate **hatch date** period by 1) observing nestlings, 2) hearing nestlings calling at nests (light chatter), searching for hatched egg shells⁴ from under nests (only at accessible colonies after chicks have hatched – DO NOT enter colony if adult herons become agitated). If you can determine the approximate hatch date, then the expected fledge date will be 8 weeks later. Adjust your remaining visit schedule appropriately.

b. Data Recording (see data form below)

Nest productivity data will be recorded on the Nest productivity data form.

Record the following information:

- a. Nest ID#. Each nest monitored for productivity should be plotted on the colony map and be given a unique "Nest ID#" (e.g. "N1" = nest 1).
- b. Nest activity: "Y" for active and "N" for inactive nest
- c. Nest Status (if nest is active)

STD Adult STandDing

INC or BR INCubating or Brooding – a heron is in a continuous crouched position,

⁴ Hatched egg shells are always opened on the latitudinal axis near the top of the egg (include picture) as opposed to predated eggs that are usually smashed or have a hole cut in them along the longitudinal axis.

either incubating eggs or brooding recently hatched nestlings. An additional clue that a nest has eggs is egg turning behavior.

YNG YouNG are in the nest. Record number and age of chicks.
NV Not Visible. Activity is unknown, usually because cannot see into nest

- d. Record the number of adults present and the number of young present. If young are present and can be observed, record the age of the nestlings based on two-week periods (“1” for 1-2 weeks old, “2” for 2-4 weeks old, “3” for 4-6 weeks old, and “4” for 6-8 weeks old). See attached illustrations of nestling stages.
- e. Record nest activity codes: all behaviors observed from adults or nestlings including:
- | | |
|-------------------|--|
| 1AS or 2AS | 1 or 2 Adult(s) Standing on the nest |
| ASN | Adult Standing Near the nest |
| EX | An exchange of adults, either to relieve incubation or deliver food to nestlings |
| COP/MATE | Behavior indicating pair bonding |
| STICK | A stick being brought to the nest |
| FIGHT | Young fighting in the nest |
| WING | Young are exercising their wings (begins about 2 weeks prior to fledging) |

c. Definitions of productivity

1. **Successful nest:** Target hatching success but try for fledging success as well
 - a. **Hatching success:** a nest that produces at least 1 Hatchling.
 - b. **Fledging success:** a nest that produces at least 1 fledgling. We define a “fledgling” as a young heron that can leave the nest (typically at 8 weeks of age).
2. **Failed nest (FN):** An active nest observed to be incubating that produces no fledglings. A nest can be abandoned, predated, knocked down, or have problems in incubation, hatching or raising of the chicks. It is often impossible to determine the cause of failure in a few visits, but if known it should be recorded. If a new nest is initiated after a nest is lost, it should be noted that the new nest could be a re-nesting attempt. The presence of fresh and/or unhatched eggshells (i.e., from the current year) under a nest is an indication that it was incubating, but failed.

5. Other guidelines

- a. Minimize disturbance to colonies. As a general rule, stay at least a) 200 m away from colony before eggs have been laid; b) 100 m after eggs have been laid; and c) 10 m after chicks are present. If any vocal response is heard to the approach, the observer should go no closer to the colony.
- b. If possible, take pictures of each colony, adults, chicks and send to Candace (candacelarson.audubon@gmail.com) and Joe (jliebezeit@audubonportland.org). We may use photos in reports, presentations, etc. We will credit photos appropriately.

1-2 WEEKS OF AGE
(Illustration by Donald Gunn)



2-4 WEEKS OF AGE
(Illustration by Donald Gunn)



4-6 WEEKS OF AGE
(Illustration by Donald Gunn)



6-8 WEEKS OF AGE
(Illustration by Donald Gunn)



Great Blue Heron – Rookery Occupancy data form

Audubon Society of Portland

Colony Name:		GPS loc'n: _____ N
Date (MM/DD/YY):	Visit #:	_____ W (If new or not already documented) Map Datum (e.g. WGS84): _____
Distance from Rookery:		Monitoring locations (provide coordinates or mark on a map):

VOLUNTEER INFO:

Your Name:
Email:
Phone:

OBSERVATION PERIOD

Start Time:
End Time:

WEATHER

Temperature (°F): _____
Precipitation: _____
Wind (0-7): _____
Cloud Cover (%): _____

SURVEY RESULT

Rookery abandoned:		(must visit site at least twice to confirm abandonment)
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Total # nests visible:		# active nests:	
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(see protocol for definition of "active nest")

Total # GBHE present:		# adults:		# juveniles:	
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Possible nests out of view (Y / N): _____

Behaviors observed and other notes (use reverse side if needed):

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.