

Beneficial Use Impairment Removal Project

Niagara River Area of Concern Heron and Osprey Nesting Success and Productivity Monitoring Year 1 (2014) Survey Report



Final: April 23, 2015

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Niagara River Area of Concern

Heron and Osprey Nesting Success and Productivity

Monitoring

Year 1 (2014) Survey Report

April 23, 2015

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1.0 INTRODUCTION

1.1 BACKGROUND

In 1987 the governments of the United States (U.S.) and Canada identified several areas within the Great Lakes region where environment degradation had occurred due to historic pollution and habitat degradation. The areas were identified and designated for remediation and restoration and referred to as Areas of Concern (AOC). Remedial Action Plans (RAPs) were developed for each AOC and each RAP identified beneficial use impairments (BUI) (i.e., negatively affected chemical, physical, and/or biological properties associated with the AOC) that required restoration or remediation in order to remove the impairment from the list of BUIs associated with AOCs. The 37-mile long Niagara River waterway, which flows from Lake Erie to Lake Ontario, was identified as one of the forty-three AOCs for the Great Lakes region. The Niagara River AOC (NR AOC) is divided into two portions, the New York portion located on the U.S. side of the river; and the Ontario portion located on the Canadian side of the river; each are managed separately. On the U.S. side, the NR AOC extends from Smokes Creek in Buffalo Harbor north to the Niagara River's mouth at Lake Ontario (Figure 1).

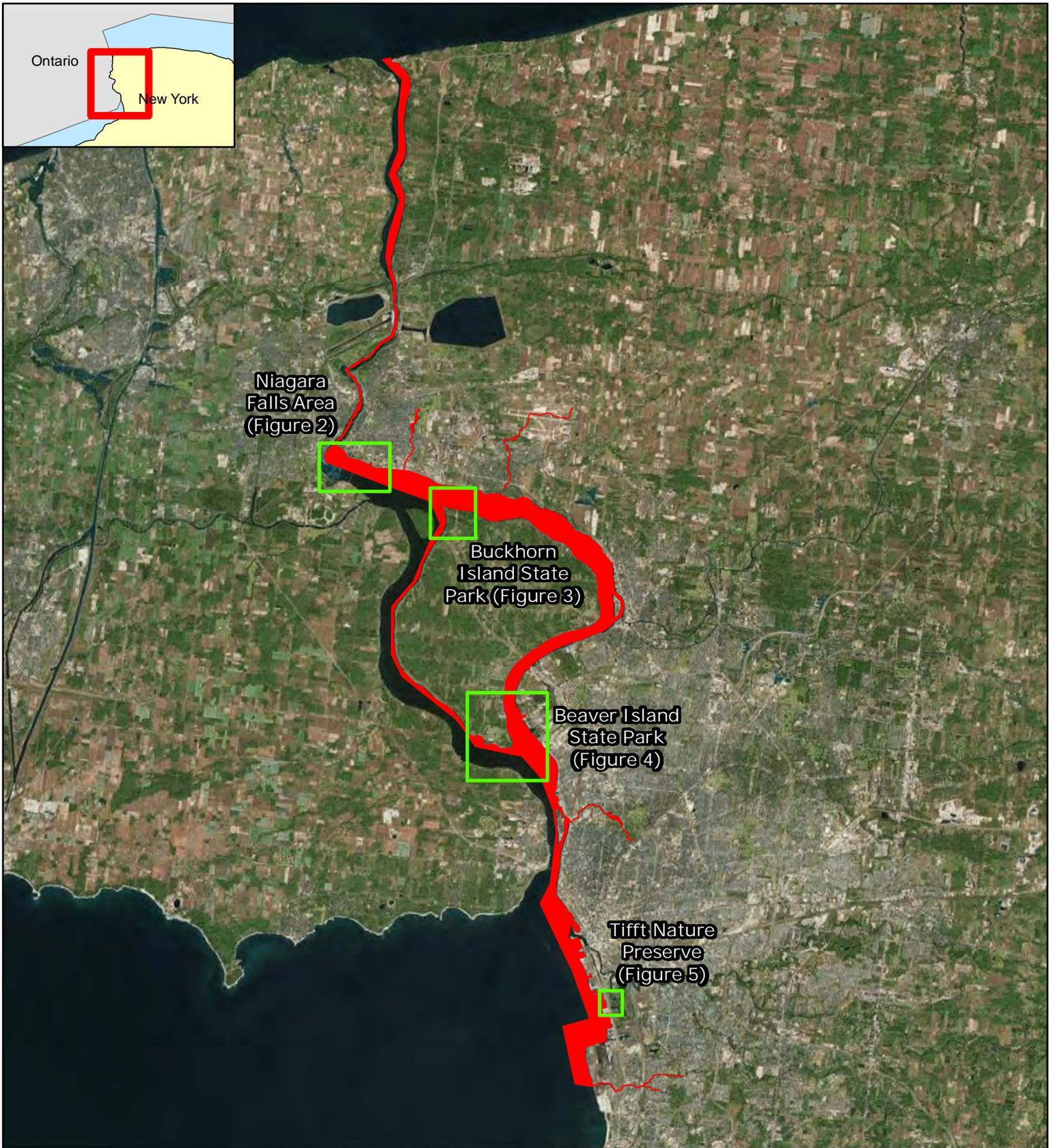
The New York State Department of Environmental Conservation (NYSDEC) is currently funded by the U.S. Environmental Protection Agency (USEPA) to coordinate the Niagara River RAP. Because the Niagara River AOC is a binational AOC, the NYSDEC is coordinating technical assessments and regulatory efforts with the Canadian Niagara River RAP managers. A RAP was developed for the New York portion of the NR AOC (NYSDEC 1994), which identifies and provides the rationale and subsequent remediation plans for several BUIs. A 2012 addendum to the RAP (NR AOC Stage 2 Addendum) describes updated BUI-specific delisting criteria. Included in the delisting criteria for the "Degradation of Fish and Wildlife Populations" BUI, are assessments of 5-year trends in populations of sentinel native species representing the range of trophic levels within aquatic ecosystems (Filipski 2012). In 2012, the U.S. Fish and Wildlife Service (USFWS) New York Field Office (NYFO) was contacted by the USEPA Great Lakes National Program Office (GLNPO) to conduct assessments to evaluate trends of nesting success and productivity of NR AOC herons and Osprey in order to support a determination of the status of the "Degradation of Fish and Wildlife Populations" BUI. These species are identified as sentinel native species and represent the top of the aquatic food chain within the Niagara River aquatic ecosystem.

In February 2014, the NYFO and NYSDEC issued a Scope of Work for performance of NR AOC Heron and Osprey Nesting Success and Productivity Monitoring (USFWS 2014). Per the scope of work, NewEarth Ecological Consulting (NewEarth) developed a Work Plan describing the survey protocols to be used over a 5-year period (2014-2018) for assessing the "Degradation of Fish and Wildlife Populations" BUI within the U.S. side of the NR AOC (NewEarth 2015). The Work Plan specifically identifies methods used for monitoring nesting success and productivity of Osprey (*Pandion haliaetus*) and heron species of particular interest and known to occur in the NR AOC [e.g., Great Egret (*Ardea alba*), Great Blue Heron (*Ardea herodias*) and Black-crowned Night-heron (*Nycticorax nycticorax*)].

This report provides a summary of the initial Year-1 (2014) sampling effort conducted in support of the 2014-2018 NR AOC Heron and Osprey Nesting Success and Productivity Monitoring Project (Project). Section 2.0 of this report provides a brief summary of the methods used, Section 3.0 provides survey results, and a discussion is provided in Section 4.0. Appendices include photographs (Appendix A), as well as completed 2014 survey data forms and raw data for heron nest monitoring and nest site surveys (Appendix B), and Osprey nest monitoring (Appendix C).

1.2 STUDY AREA

This study focused on the New York portion of the NR AOC located on the U.S. side of the Niagara River and extending from Smokes Creek in Buffalo Harbor north to the mouth of the Niagara River at Lake Ontario (Figure 1).



Niagara Falls Area (Figure 2)

Buckhorn Island State Park (Figure 3)

Beaver Island State Park (Figure 4)

Tift Nature Preserve (Figure 5)

Legend

- Study Area
- Potential Heron and Osprey Nesting Areas

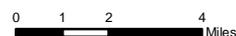


Figure 1. Site Location - Heron/Osprey Nest Monitoring Surveys
Niagara River Area Of Concern
Heron and Osprey Monitoring
Niagara and Erie Counties, NY

Prepared For:
US Fish and Wildlife Service
NY Department of Environmental Conservation

Prepared By:



2.0 METHODS

All heron and Osprey surveys were conducted in accordance with the approved Beneficial Use Impairment Removal Project, Niagara River Area of Concern Heron and Osprey Population Monitoring Work Plan (Work Plan), 2014-2018 (NewEarth 2015). The Work Plan was adapted from a number of sources that are intensively involved in heron and raptor nest monitoring efforts applicable to the Niagara River area, including Moul et al. 2001, Steenhof and Newton 2007, Vennesland 2000, Vennesland and Butler 2004, and Vennesland and Norman 2006.

Survey efforts conducted in support of this Project were performed by biologists skilled in the identification of Osprey, heron, and due to the potential threat from this species to heron rookery nesting success, Double-crested Cormorant (*Phalacrocorax auritus*) which are also referred to as cormorant in this report. Each biologist was well-versed on the life histories of each species as presented in Hatch and Weseloh 1999, Hothem, et al. 2010, McCrinmon et al. 2011, Poole et al. 2002, and Vennesland and Butler 2011, and experienced in the survey of avian species. Survey locations, field methodologies and field efforts were closely coordinated with, and based upon recommendations from, USFWS representative Amy Roe, and NYSDEC representatives Connie Adams, Jennifer Tait, and Mark Filipiski. The Work Plan should be referenced for additional details regarding the survey methodology used in this study.

2.1 HERON

2.1.1 Survey Locations

Per USFWS requirements (USFWS 2014), the 2014-2018 heron survey effort specifically targeted three heron species; Great Egret, Great Blue Heron, and Black-crowned Night-heron. Through a review of Google Earth™ imagery, close coordination with NYSDEC, USFWS and other interested parties, and following a broad reconnaissance level survey of the NR AOC conducted on March 25-26, 2014 (Figure 1), four potential nest site (e.g., rookery) locations were initially identified for these species (Table 1 and Figures 2, 3, and 4). One location was determined to be outside of the survey area and was excluded from survey efforts (Figure 2). The remaining three sites were visited during the 2014 effort and included Buckhorn Weir which is a manmade diversion weir located to the northwest of Buckhorn Island State Park (Figure 3) Motor Island and Strawberry Island (Figure 4). Sites were monitored periodically throughout the 2014 breeding season, however, nest monitoring data was not collected at Strawberry Island and the island near Buckhorn Island State Park due to lack of confirmed heron activity at the sites.

Table 1. Location of Sites Monitored for Heron Nesting Activities

Site Name	Site ID	Nearest Town	Latitude	Longitude
Buckhorn Weir	H-1	Grand Island	43° 4'3.78"N	79° 0'22.08"W
Motor Island (aka Pirate's Island)	H-2	Grand Island	42°57'51.24"N	78°56'3.83"W
Strawberry Island	H-3	Grand Island	42°57'18.54"N	78°55'27.38"W



Legend

-  Potential Osprey Nest Site
-  Potential Heron Nest Site



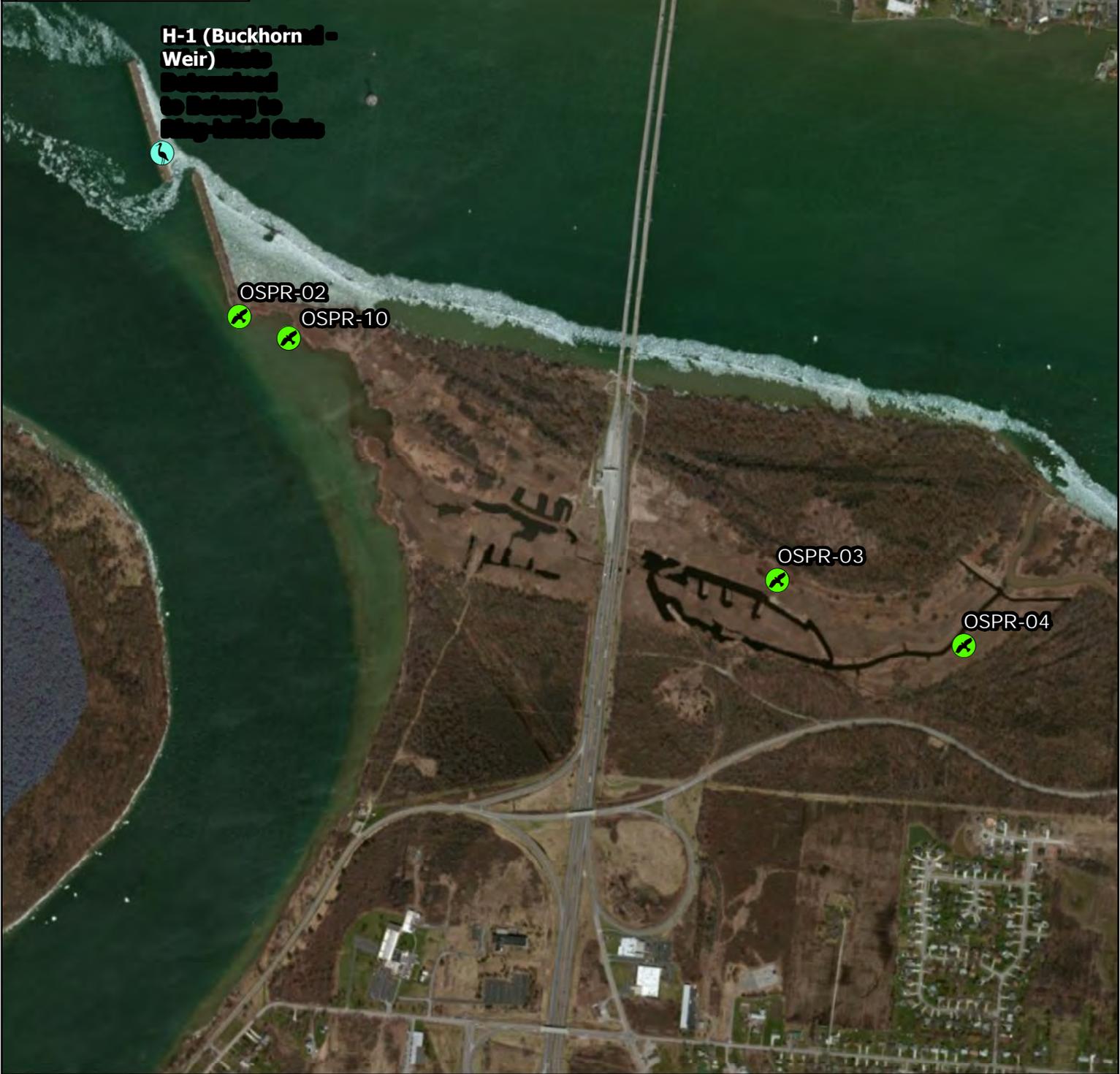
0 0.075 0.15 0.3 Miles

Figure 2. Surveyed Heron/Osprey Locations
Niagara Falls Area

Niagara River Area of Concern Heron and Osprey Survey, Niagara and Erie Counties, NY

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NY Department of Environmental Conservation





H-1 (Buckhorn Weir)
 Potential Heron Nest Site
 Determined to Belong to Ring-billed Gulls

OSPR-02
 OSPR-10

OSPR-03

OSPR-04

Legend

-  Potential Osprey Nest Site
-  Potential Heron Nest Site



0 0.05 0.1 0.2 Miles

Figure 3. Surveyed Heron/Osprey Locations
 Buckhorn Island State Park

Niagara River Area of Concern Heron and
 Osprey Survey, Niagara and Erie Counties, NY

Prepared For:
 US Fish and Wildlife Service
 NY Department of Environmental Conservation

Prepared By:





Ontario
New York

OSPR-12

OSPR-08
(NOT
LOCATED)

OSPR-06

H-2 (Motor
Island)

OSPR-05

X-1

X-2

H-3 (Strawberry
Island)
(No Birds
Documented)

Legend

-  Potential Osprey Nest Site
-  Potential Heron Nest Site
-  Heron Observation Point



0 0.0750.15 0.3
Miles

Figure 4. Surveyed Heron/Osprey Locations
Beaver Island State Park

Niagara River Area of Concern Heron and
Osprey Survey, Niagara and Erie Counties, NY

Prepared For:
US Fish and Wildlife Service
NY Department of Environmental Conservation

Prepared By:



To avoid entering heron nest areas during breeding/nesting activities observers established two remote observation sites that offered optimum views of the rookery while minimizing disturbance to the birds. Observation Point #1 was located on a boat dock along the southeast shoreline of Grand Island and Observation Point #2 was located along the southeastern shoreline of Motor Island (Figure 4).

2.1.2 Survey Periods

The primary goal of the heron nest monitoring effort was to collect information on target heron species in order to facilitate efforts to establish population estimates, and to evaluate trends in the number of breeding adults for each species within the U.S. side of the NR AOC. Per approved survey guidelines as identified in the approved NR AOC heron and Osprey monitoring Work Plan (NewEarth 2015), multiple surveys were completed in 2014 within the recommended survey windows and included a pre-breeding season site reconnaissance, five nest monitoring events, and a post-breeding season nest site survey as shown in Table 2. Optimal seasonal timing varies from year to year depending on weather conditions and breeding chronology of the target birds and was taken into consideration when timing survey events. Survey dates were also selected to capture the variation in breeding phenology among coexisting species, with a goal of increasing the probability of conducting at least one of the surveys during the seasonal peak in vocalization among all target heron species in the NR AOC.

Table 2. Heron Nest Monitoring Survey Dates

Survey Event	Survey Dates
Pre-Breeding General Site Recon	March 25-26, 2014
1	April 17-18, 2014
2	May 21, 2014
3	June 4-5, 2014
4	June 24, 2014
5	July 16, 2014
Post-breeding Nest Site Survey	November 17, 2014

2.1.3 Productivity Monitoring

Per Work Plan monitoring recommendations, nest sites were monitored five times during the breeding season. The first visit was conducted after many adults had arrived on the rookery site and initiated courtship/breeding activities, but before most had had begun incubation. Subsequent survey events were scheduled to maximize the probability of determining nesting success for the highest number of nests, and in general took place approximately every three weeks during the incubation and nestling periods.

Monitoring was performed during the afternoon, when herons were most likely to be attending their nests, and on warm, windless days. All data gathered during heron survey efforts were documented in full on the appropriate Heron Nest Monitoring Data Form (Appendix B) and were completed while biologists were at the site.

Characterizing Nests

For each nest, biologists made note of the species occupying the nest, even if the species was not one of the focal species (e.g. if a nest is being used by Double-crested). If the nest was not occupied the nest was identified as “inactive”. Observers also made note of the nest status, using the following notation scheme modified from Vennesland and Norman (2006):

AD	Adult Present at Nest, Not Incubating
IN	Incubating/Brooding
YN	Young are visible in the nest
YB	Young are present, but have left nest
NV	Not Visible
FL	Failed Nest
IA	Nest Inactive (Status Unknown)

For nests that contained young, the approximate age of the nestlings was recorded as follows (1 = 0-2 Weeks; 2 = 2-5 weeks; 3 = 5-8 weeks). Due to the sensitivity of colonies, observers spent the minimum amount of time necessary to accurately assess the activity at the nest. Nests were only listed as “failed” if there was visible evidence (e.g. the nest was destroyed, dislodged, or only dead birds were seen in the nest) that the nest is no longer in use.

Ageing Young

During the course of survey activities observers noted the age of nestlings so that future visits could be timed to maximize the likelihood of determining success of each nest. As detailed in the Work Plan (NewEarth 2015), at 0-2 weeks old Great Blue Heron nestlings are still covered in down, and after two weeks feathers begin to emerge. By 5 weeks of age nestlings can stand erect, but primary feathers are still in pins. By six weeks of age, primaries should have grown, but birds may still be flightless (Vennesland et al. 2011, Baicich and Harrison 1997). In Great Egrets and Black-crowned Night-Herons, the nestling period is slightly more advanced. Feathers start appearing after one week, and by four weeks of age, primaries have grown in (Hothem et al. 2010, Mccrimmon et al. 2011, Baicich and Harrison 1997).

Determining Nesting Success

Nests were considered to have been active if herons are seen attending the nest at least once during the breeding season. Nests were considered to have reached the incubating/brooding stage if at least one adult was present and sitting on the nest. Because of difficulty in determining nesting success once young leave the nest, young were considered to have fledged once they were seen on branches near the nest site or when they had reached fledging age (six

weeks for Great Blue Heron and 4 weeks for Great Egret and Black-crowned Night-Heron). Nests were considered to have failed if incubating/brooding or nestlings were observed during at least one survey event but later never determined to have fledged; or if failure can be determined after the season has ended (e.g. predated/abandoned eggs in the nest). Nests in which adults are observed attending to a nest, but meet neither the “fledged” nor “fail” will be considered to have uncertain status as it cannot be determined whether adults ever laid in the nest or not.

2.1.4 Nest Site Surveys

On November 17, 2014, after the nesting season had ended and all birds had departed the area, biologists entered the Motor Island rookery site (the only site on the U.S. side of the NR AOC confirmed to have nesting heron) to collect additional data on the nesting area and to gain a better count of nest sites (Figure 4). Biologists traversed the entire island and collected data on all trees and shrub clusters of suitable height and diameter to support nests of any of the target heron species. Each tree or shrub was marked with a handheld GPS and the coordinates were entered into Google Earth and ESRI ArcGIS databases. Additional information relating to the overall tree or shrub size (diameter) and health, threats to nesting birds (predators, beaver activity), and direct evidence of mortality was collected and recorded on the Heron Nest Site Data Form (Appendix B).

There can be a significant amount of overlap in the height and nest size used by heron and Double-crested Cormorant in a rookery, but generally speaking, heron nests are found in two fairly distinct strata of vegetation, above 20 ft and below 20 ft. Within these strata, in general larger sized nests at a height >20 feet tend to be occupied by Great Blue Heron, whereas large nests below 20 ft are typically occupied by Great Egret. Small nests >20 ft are typically occupied by Double-crested cormorant and those at a height <20 ft are typically occupied by Black-crowned Night Heron. In an effort to determine site use by the target heron species, the number of nests in each tree or shrub community was tallied based on an estimate of the overall height class location of the nest (<20 ft or >20 ft) and the size of the nest relative to others in the height class (small versus large), and was recorded on the Heron Nest Site Data Form (Appendix B).

2.1.5 Photographic Documentation

Due to the density of nests typical in heron rookeries, photographs of the rookery on Motor Island were collected from the two fixed locations (observation points #1 and #2) to be used for tracking nests throughout the duration of survey activities (Figure 4). Biologists attempted to collect photographs for use in nest monitoring from both observation points during the March reconnaissance effort when trees were bare and birds were not present on the site, but the river surrounding Motor Island was frozen and Observation Point #2 was inaccessible. Photographs were then collected in April; still during leaf off conditions, but some heron were already present on nests. All individual nests were assigned a reference number on the photograph for tracking during the nesting season (Appendix A).

Additional photographs were taken throughout the nest monitoring events, and during the post-breeding season nest count, to document the overall rookery setting, various stages of nesting activity, and general features found on the island (Appendix A).

2.2 OSPREY SURVEYS

2.2.1 Survey Locations

Prior to the nest monitoring survey, 11 potential nest locations were targeted for observation during the 2014 effort (Table 3) and are shown in Figures 2 through 5. These locations included all known Osprey platforms whether active or not (O1, OSPR-2, OSPR-3, OSPR-4, OSPR-5, OSPR-6, OSPR-7, OSPR-11), natural active or formerly active nest sites away from dedicated platforms (OSPR-10), and sites where information sources had identified Osprey activity, but nests had yet to be located (OSPR-8, OSPR-9). One additional site was identified mid-way through 2014 survey efforts and per the Work Plan was added to the list of target sites (OSPR-12). All sites were monitored throughout the entire survey effort regardless of whether Osprey were confirmed at the location during previous visits or not.

Table 3. Location of Sites Monitored for Osprey Nesting Activities

Site ID	General Location	Latitude	Longitude
OSPR-1	Adams Slip, Niagara Falls	43° 4'42.44"N	79° 2'46.77"W
OSPR-2	Buckhorn State Park West, Grand Island	43° 3'50.99"N	79° 0'11.12"W
OSPR-3	Buckhorn State Park Central, Grand Island	43° 3'34.50"N	78°59'6.78"W
OSPR-4	Buckhorn State Park East, Grand Island	43° 3'30.93"N	78°58'44.83"W
OSPR-5	Beaver Island State Park, Grand Island	42°57'43.34"N	78°57'36.87"W
OSPR-6	East River Marsh, Grand Island	42°58'0.25"N	78°56'26.76"W
OSPR-7	Tifft Nature Preserve, Buffalo	42°50'53.68"N	78°51'27.78"W
OSPR-8	Niagara Power Plant, Kenmore	Vicinity of 42°58'12.80"N	Vicinity of 78°55'54.57"W
OSPR-9	Sewer Plant, Wheatfield	Vicinity of 43° 4'29.68"N	Vicinity of 78°56'19.69"W
OSPR-10	Buckhorn State Park West-Relocation, Grand Island	43° 3'49.73"N	79° 0'5.24"W
OSPR-11	Tifft Nature Preserve, Buffalo	42°51'10.99"N	78°51'30.03"W
OSPR-12	Tonawanda Coke Plant, Kenmore	42°58'39.13"N	78°56'23.62"W



Legend

-  Potential Osprey Nest Site
-  Potential Heron Nest Site



0 0.025 0.05 0.1 Miles

Figure 5. Surveyed Heron/Osprey Locations
Tift Nature Preserve

Niagara River Area of Concern Heron and
Osprey Survey, Niagara and Erie Counties, NY

Prepared For:
US Fish and Wildlife Service
NY Department of Environmental Conservation

Prepared By:



To avoid disturbing Osprey during breeding/nesting activities biologists observed nest sites from remote locations that offered optimum views of the nest site rookery while minimizing disturbance to the birds. The locations were not fixed and biologists were free to select vantage points as needed for optimal views throughout the survey effort. During 2104 survey efforts the latitude and longitude of each nest site was recorded using a handheld GPS receiver and are provided in Table 3.

2.3.1 Survey Periods

The primary goal of the Osprey nest monitoring effort was to collect information on nesting activities in order to facilitate efforts to establish Osprey population estimates, and to evaluate trends in the number of breeding adults within the NR AOC. Per approved survey guidelines as identified in the approved NR AOC heron and Osprey monitoring Work Plan (NewEarth 2015), multiple surveys were completed in 2014 within the recommended survey windows and included a pre-breeding season site reconnaissance and four nest monitoring events as shown in Table 4. No Osprey breeding/nesting activity was noted in the Project area during the site reconnaissance efforts, so monitoring was delayed until mid-May. Optimal seasonal timing varies from year to year depending on weather conditions and breeding chronology of the target birds and was taken into consideration when timing survey events.

Table 4. Osprey Nest Monitoring Survey Dates

Survey Event	Survey Dates
Pre-Breeding General Site Recon	March 25-26 and April 17-18, 2014
1	May 20, 2014
2	June 4-5, 2014
3	June 24, 2014
4	July 16, 2014

2.3.2 Productivity Monitoring

Per Work Plan monitoring recommendations, Osprey nest sites were monitored four times during the breeding season. The first monitoring event was conducted after most adults had arrived at nest sites and initiated courtship/breeding activities, but before incubation had begun. Subsequent survey events were scheduled to maximize the probability of determination of nesting success for the highest number of nests, and in general took place approximately every three weeks during the incubation and nestling periods. All data gathered during Osprey survey efforts were documented in full on the appropriate data forms (Appendix C) and were completed while at the site. At no time were nest sites approached during the active breeding/nesting period.

Characterizing Nests

At each nest, biologists made note of the nest status using the following notation scheme modified from Vennesland and Norman (2006):

AD	Adult Present at Nest, Not Incubating
IN	Incubating/Brooding
YN	Young are visible in the nest, or adult is seen carrying food
NV	Not Visible
FL	Failed Nest
IA	Nest Inactive (Status Unknown)

Biologists were able to determine the status of most nests shortly after arriving at the observation site. However when no adults or young were visible, the observer waited up to one hour for adults to return to the nest. If no adults were seen the nest was listed as “inactive”. Nests were only listed as “failed” if there was visible evidence that the nest is no longer in use (e.g. the nest was destroyed, dead birds were observed at the nest site).

Ageing Young

Attempts were made to age nestlings in order to better determine timing of site visits and for evaluation of nesting success. For nests that contained young, the approximate age of the nestlings was recorded as follows (1 = 0-2 Weeks; 2 = 2-5 weeks; 3 = 5-8 weeks). Generally, nestlings 0-2 weeks old are covered in down, and at two weeks will begin to appear feathered. By five weeks old, young are nearly full grown (Poole et al. 2002).

Determining Nesting Success

Nests were considered to have been active if Ospreys were seen attending the site at least once during the breeding season. Nests were considered to have reached the incubating/brooding stage if at least one adult was observed sitting on the nest. Because of difficulty in determining nesting success once young leave the nest, young were considered to have fledged once they had reached five weeks of age, which is typically when juveniles are able to leave the nest site. Nests were considered to have failed if incubating/brooding or nestlings were observed at some point in the survey period, but were never determined to have fledged. Nests in which adults were observed attending to a nest, but did not meet neither the “fledged” nor “fail” determination were considered to have uncertain status as it cannot be determined whether adults ever laid eggs in the nest or not.

2.3.3 Photographic Documentation

Biologists collected photographs of each nest site throughout the nest monitoring events to document the overall nest setting and various stages of nesting activity (Appendix A).

3.0 RESULTS

3.1 HERON

A site reconnaissance survey was performed on March 25th and 26th, 2014, heron nest monitoring surveys were conducted on April 18th, May 21st, June 4th, June 24th and July 16th, 2104, and a post-breeding season nest site survey of Motor Island was performed on November 17, 2014 (Table 2). Tables 5 through 7 summarize the heron survey results, and Figures 2, 3, and 4, show the locations of potential heron survey sites; although only site H-1 on Motor Island (Figure 4) had nesting heron present during the survey. Appendix A provides photographs from the survey event, and Appendix B provides the raw survey data and completed data forms from heron nest monitoring and nest site surveys. Note that the heron nest monitoring data form was revised following the April 2014 survey event to improve data collection efficiency.

3.1.1 Rookery Locations

The site reconnaissance survey performed during leaf-off conditions in March targeted the NR AOC in an effort to identify any new potential rookery locations (based on presence of stick nests), and to confirm presence of potential heron nests at the sites that had been identified in the Work Plan (Table 1). No new sites were found on the U.S. side of the AOC, but potential sites were observed from Three Sisters Island but were located on the Canadian side (i.e., Weseloh Rocks area); outside of the Scope of Work for this effort (Figure 2). Stick nests of appropriate size for heron nesting were confirmed during the reconnaissance effort at two sites identified in the Work Plan: Motor Island (aka Pirate's Island) and at an island site to the northwest of Buckhorn Island State Park (Figures 3 and 4). No heron nests were found on Strawberry Island, but an active bald eagle nest was confirmed.

During all subsequent survey events observers assessed Motor Island, Strawberry Island, and Buckhorn Weir (Figures 3 and 4) for nesting activity, but heron breeding/nesting was only confirmed at the Motor Island rookery site (identified as H-1 on Figure 4). Black-crowned night heron were observed flying near the Strawberry Island site on numerous occasions, but no nests could be located during search efforts even when conducted during leaf off conditions. Buckhorn Weir, was once home to nesting terns, but is now dominated by over 10,000 pairs of ring-billed gulls and nearly 100 pairs of double-crested cormorants (Adams 2015). Observers continued to visit all three sites during the nesting season to monitor the areas, but only collected nest monitoring and nest site data on Motor Island where active heron nesting had been confirmed.

3.1.2 Productivity Monitoring

Biologists attempted to track individual heron nests throughout the duration of the nesting season using observations from points #1 and #2 (Figure 4), and using photographs which included nest identification numbers (see photographs in Appendix A). Based on an evaluation of photographs taken in April during leaf off conditions, potential nest sites that could be easily distinguished from the observation points included; 158 potential Great Blue Heron, 18 Black-crowned Night

Heron, and 29 Great Egret (Table 5). Of these, 53 of the potential Great Blue Heron nests, two Black-Crowned Night Heron nests, and one Great Egret and nest were dropped from monitoring due to occupancy by Double-crested Cormorant (a species which aggressively competes with heron and egrets on the island for nesting space), or because the nest could not be relocated.

Table 5. Summary of Heron and Egret Observations on Motor Island

	Black-crowned Night Heron	Great Blue Heron	Great Egret
Number of Nests Originally Identified Before Leaf Out	18	158	29
April 18			
Total Number of Active Nests	16	105	28
Nests with Adults Tending	13	28	17
Nests with Adult Incubating	3	77	11
Nests with Young	0	0	0
May 21			
Total Number of Active Nests	40	69	24
Nests with Adults Tending	3	34	5
Nests with Adult Incubating	37	6	18
Nests with Young	0	29	1
June 4			
Total Number of Active Nests	15	18	12
Nests with Adults Tending	2	1	3
Nests with Adult Incubating	4	0	5
Nests with Young	9	17	4
June 24			
Total Number of Active Nests	3	10	5
Nests with Adults Tending	0	0	0
Nests with Adult Incubating	0	0	0
Nests with Young	3	10	5
Total Number of Young Produced	20	107	24

Throughout the season the condition of trees and shrubs changed rapidly from full leaf off prior to the end of April, to extremely dense vegetative cover by early-June. Many nests that were originally identified early in the nesting season had to be dropped from the monitoring effort as the season progressed. By mid-May only 69 (66%) of the original 105 active Great Blue Heron nests were visible enough that biologists could confidently identify the species and nesting activity. By June 4th only 18 nests were visible enough to monitor (Table 5). Nest numbers for Black-crowned Night Heron (16 nests) and Great Egret (28 nests) actually increased after the first count in April to 64 during the second count in May, primarily because of a closer view of

the colony from Observation Point #2, and although still located off island, biologists had the ability to move around the end of the island somewhat as needed for a better vantage point from their watercraft. In addition, the later arrival of these species on site made it easier to distinguish nests within the dense tangle of shrubs (see photographs in Appendix A). However, by June 4th the number of active nests that were visible also had dropped significantly to 15 for Black-crowned Night Heron and 12 for Great Egret (Table 5).

Due the extreme difficulty in observing and tracking specific nests, as survey efforts progressed biologists began recording the number of target species they could locate at each stage of nesting activity during each survey event, regardless of their nest location. Birds were assigned a nest number, but due to the complexity of tracking individual nests within leaf out conditions that number may or may not coincide with the original nest ID assigned in the observation point photographs. Based solely on the highest number of active nests observed during any one survey 105 pair of Great Blue Heron (77 incubating), 40 pair of Black-crowned Night Heron (37 incubating), and 28 pair of Great Egret documented (18 incubating) were confirmed on Motor Island (Table 5). As noted, this number is an underestimate of nesting pairs due to poor visibility.

Although five events were conducted, nearly all heron nesting activities had been completed by late-June and few young remained at any of the nests that were still visible in full leaf out conditions. Biologists visited the site again on July 16th to perform a follow up count. No Great Blue Heron were seen at nest sites from Observation Point #1, and any remaining target birds in the vicinity of Observation Point #2 quickly dispersed when biologists neared the area, making it impossible to get an accurate count. Dozens of juvenile heron, representing all three of the target species, were observed flying and foraging along the Niagara River, but could no longer be tied to a specific heron rookery site.

Double-crested Cormorants were not the focus of the survey effort, but biologists reported three confirmed instances of Great Blue Heron being displaced by Double-crested Cormorants. Individual Double-crested Cormorants were not counted, but based on general observations and notes made during survey efforts, it was estimated that at least 300 pair likely occupy the island.

3.1.3 Nest Site Survey

One hundred forty nine (149) trees or shrub communities of suitable height and diameter to support a heron nest were documented during the 2014 survey of the rookery site on Motor Island (Figure 3), of these, 81 (54%) had at least one nest present. Tree species documented included 71 eastern cottonwood (*Populus deltoides*), 27 black willow (*Salix nigra*), eight green ash (*Fraxinus pensylvanica*), six American elm (*Ulmus americana*), four American hornbeam (*Carpinus caroliniana*), three silver maple (*Acer saccharinum*), three species of apple or cherry (*Prunus* or *Malus spp.*), one hawthorn (*Crataegus spp.*), one non-native Lombardy poplar (*Populus nigra Italica*), and four dead trees (Table 6). Shrub species included seven individual communities of staghorn sumac (*Rhus typhina*) collectively with an estimated 281 stems, two communities of non-native common lilac (*Syringa vulgaris*) with approximately 81 stems, one

community of the non-native Japanese honeysuckle (*Lonicera japonica*) with 12 stems, one stem of red osier dogwood (*Cornus sericea*), and three large communities of the aggressive invasive non-native species, tree of heaven (*Ailanthus altissima*) with an estimated 263 stems (Table 6). Seven species could not be definitively identified due to winter leaf off conditions and/or condition of the vegetation. All of the types of tree or shrub species documented on the island were used for nesting to some extent by heron or Double-crested Cormorant except the non-native species Lombardy poplar.

Table 6. Heron and Cormorant Use of Available Trees and Shrubs on Motor Island

	# Trees or Stems Available	Trees or Shrubs Used	% Use	Total Nests	Avg. # Nests per Tree Used
TREES					
American Elm	6	1	17	1	1.0
American Hornbeam	4	4	100	30	7.5
Black Willow	27	15	56	131	8.7
Cherry/Apple	3	1	33	2	2.0
Dead	4	2	50	6	3.0
Eastern Cottonwood	71	41	58	372	9.1
Green Ash	8	5	63	19	3.8
Lombardy Poplar	1	0	0	0	0
Silver Maple	3	2	67	10	5.0
Undetermined	7	1	14	11	11.0
SHRUBS					
Common Lilac ¹	81	na	na	18	0.2
Japanese Honeysuckle ¹	12	1	100	1	0.1
Red Osier Dogwood	1	1	100	3	3.0
Staghorn Sumac	281	na	na	24	0.1
Tree of Heaven ¹	263	na	na	151	0.6

¹ Non-native and/or NYSDEC recognized invasive species

Based on the number of individual trees or shrubs available for use in nesting, American hornbeam, Japanese honeysuckle, and red-osier dogwood had highest use (100%); although the number of individuals of each of these species was very low (i.e., < 4) (Table 6). American elm was used least based on their availability (17%) (Table 6). The average density of nests per tree was highest in eastern cottonwood (9.1 nests), followed by black willow (8.7 nests), and American hornbeam (7.5 nests). The remaining tree species averaged five or fewer nests per active tree. Based on an estimate of the number of stems of shrub species available within each of the shrub clusters documented, the density of nests per shrub species was highest in the non-native invasive species tree of heaven (263 stems, 0.6 nests per stem), followed by lilac (81 stems, 0.2 nests per stem), then honeysuckle and sumac (each with 0.1 nests per stem).

A total of 779 nests were documented in the rookery (Table 7). In the lower nesting level layers (below 20 ft) 168 small nests (potentially Black-crowned Night Heron) and 180 large nests (potentially Great Egret) were documented (Table 7). Above 20 ft there were 299 small nests (potentially Double-crested Cormorant) and 132 large nests (potentially Great Blue Heron).

Table 7. Height and Size Classes of Nests per Tree/Shrub Type

Tree or Shrub Type	Diameter Ranges for Trees with Nests	# Nests <20 ft Large Size	# Nests <20 ft Small Size	# Nests >20 ft Large Size	# Nests >20 ft Small Size	Total Nests
American Elm	10	0	0	0	1	1
American Hornbeam	8-12	30	0	0	0	30
Black Willow	18-73	3	15	37	76	131
Cherry/Apple	3	0	2	0	0	2
Common Lilac	4	10	8	0	0	18
Dead	9-12	1	1	1	3	6
Eastern Cottonwood	5-53	16	70	87	199	372
Green Ash	9-21	0	2	3	14	19
Japanese Honeysuckle	2	0	1	0	0	1
Lombardy Poplar	0	0	0	0	0	0
Red Osier Dogwood	3	0	3	0	0	3
Silver Maple	14-25	0	0	4	6	10
Staghorn Sumac	3	7	17	0	0	24
Tree of Heaven	2-6	107	44	0	0	151
Undetermined	5-13	6	5	0	0	11
TOTAL		180	168	132	299	779

The highest numbers of nests in any single tree (63 nests) were found in a 53 in diameter cottonwood located near the center of the island and included 18 large nests and 45 smaller nests. The highest concentrations of nests found in the low-growing tree/shrub layer (135 nests) were found in an approximately 35 ft radius cluster of tree of heaven near the southeastern end of the island and included 103 large nests and 32 small.

Evidence of damage from ice, high winds, beaver, and/or rot was noted for sixteen trees or shrubs across the island; although only those with damage significant enough to result in death of the tree or shrub were noted. Many trees showed some evidence of beaver damage (i.e., active chews around the base of the trunk), but despite intensive beaver removal efforts by NYSDEC, at least five appeared to have been targeted by beaver within a month of the survey based on fresh wood chips and/or tracks found at the tree base. Some trees on the island are protected by wire beaver exclusion cages around their trunks, but over half were not protected or the cages that were put in place were dislodged and ineffective. Another potential threat to the rookery includes an aggressively growing grape (*Vitis* spp.) vine which is common throughout the site and has covered much of the lower tree and shrub layer, particularly in the northwest end of the island. Shoreline erosion also threatens some of the trees and shrubs along the perimeter of the island.

A carcass count was not the focus of the effort, however carcasses of 28 Double-crested Cormorant, four Great Blue Heron, three gulls, two unknown avian species, and one Great Egret were observed during the survey. The gull carcasses were relatively fresh and likely killed by a natural predator within a month prior to the survey. The double-crested cormorant carcasses were likely the result of lethal cormorant control activities which since 2005 have been performed annually in May by NYSDEC and/or contractors.

3.1.4 Incidental Observations

Bald eagles were observed nesting on Strawberry Island and were seen flying in the vicinity of Motor Island on at least one occasion during every survey event; including the November rookery survey. Eagles were also observed flying over, or perched along the shoreline of, areas of the Niagara River to the north of Motor Island on several survey events, but observers could not confirm if the observations were of the same eagles as those nesting on Strawberry Island. One Great Blue Heron carcass was found along the shoreline of Strawberry Island. Numerous Common Tern (*Sterna hirundo*), Caspian Tern (*Hydroprogne caspia*, formerly *Sterna caspia*), and five Black Tern (*Chlidonias niger*) were observed flying over, and foraging in, the Niagara River while in route to Motor Island Observation Point #2.

3.1.5 Disturbances Noted During Survey Efforts

Disturbances to nesting heron that were directly observed by biologists included one person seen walking on the island during the May 21 survey, and several people on the island installing beaver exclusion fence in June; both activities took place while the heron were actively nesting and both caused notable disturbances to the nesting birds. Numerous disruptions to nesting herons were also noted throughout the survey effort as a result of recreational boaters that

encroached close to the edge of the island. NYSDEC predator control efforts (i.e., shooting of cormorants), took place on Motor Island on May 25 and 29, 2014. Control efforts were not directly observed, but biologists reported several dead cormorant as well as one dead Great Blue Heron in nests or hanging from tree limbs following those efforts (Appendix A). Four hundred and sixty-six (466) cormorants were reportedly eliminated during the culling effort (Adams and Walters 2014).

3.2 OSPREY

A site reconnaissance survey was performed on March 25th and 26th, 2014, and Osprey nest monitoring surveys were conducted on April 18th, May 20st, June 4th, June 24th and July 16th, 2104 per Work Plan recommendations (Table 4). Table 9 summarizes Osprey survey results and Figures 2 through 5 identify the locations of each survey site. Appendix A provides photographs from the survey event, and Appendix C provides the raw survey data and completed data forms from Osprey nest monitoring surveys.

3.2.1 Nest Site Locations and Type

The site reconnaissance survey performed during leaf off conditions in March, targeted the entire U.S. side of the NR AOC in an effort to identify any new potential Osprey nest locations (based on presence of large stick nests), and to confirm presence of potential Osprey nests or platforms at the sites that had been identified in the Work Plan (Table 3). During the reconnaissance biologists determined that areas of the AOC downstream (north) of Niagara Falls were unsuitable for Osprey nesting due to the steep cliffs and rapid flowing water, and those areas were eliminated from subsequent surveys.

All 12 of the existing and potential sites were visited during each of the four survey events to document nesting activities or to attempt to locate potential nests. Although 12 locations were visited, potential nest sites were only identified at 10 of the locations (Table 8). It is believed that sites #8 and #12, located in the vicinity of the Niagara Power Plant and Tonawanda Coke Factory, may be the same location, and despite reports of a nest at OSPR-9, no nest sites or Osprey activity were observed (Figure 4). Throughout the survey biologists also continued to conduct reconnaissance of areas of slower moving water upstream (south) of Niagara Falls in an attempt to identify new nests; no new sites were found.

Of the 10 confirmed Osprey locations, eight sites had man-made nesting platforms and the remaining two were on some type of man-made structure. Five platforms (OSPR-1, OSPR-2, OSPR-5, OSPR-6, and OSPR-7) were installed between 2007 and 2010 as part of New York Power Authority (NYPA) Habitat Improvement Project (HIP) efforts, and two platforms (OSPR-3 and OSPR-4) were installed in the mid 1990's by NYSDEC and New York State Office of Parks, Recreation and Historic Preservation (OPRHP) (NYPA 2013). The remaining nest sites included a utility line pole (OSPR-10) and an abandoned crane (OSPR-12). Table 8 shows the structure that the potential nest sites are located on and the types of nest platforms found at each. Due to interferences with power line activities, the natural nest at Site OSPR-10 was removed in the late 1990's and was relocated to a man-made nesting platform (OSPR-2) (Adams 2015).

However, Osprey have since rebuilt the nest on the power lines at OSPR-10. NYPA conducted nest monitoring at seven locations (OSPR-1 through OSPR-7) in 2012, and the corresponding nest ID for those locations is also provided in Table 8 for reference.

Table 8. Osprey Nest Site Types and Locations Surveyed

Site ID	Location	Structure/Nest Site Type	Corresponding NYPA ID ¹
OSPR-1	Adams Slip, Niagara Falls	Untreated wood pole/ metal nest platform	OP-6
OSPR-2	Buckhorn State Park West-Relocation, Grand Island	Untreated wood pole/ metal nest platform	OP-1, originally relocated nest from OSPR-10
OSPR-3	Buckhorn State Park Central, Grand Island	Utility pole/wood nest platform	OP-3
OSPR-4	Buckhorn State Park East, Grand Island	Utility pole/wood nest platform	OP-2
OSPR-5	Beaver Island State Park, Grand Island	H-pile, steel, & untreated wood pole/metal nest platform	OP-7
OSPR-6	East River Marsh, Grand Island	H-pile, steel, & untreated wood pole/metal nest platform	OP-4
OSPR-7	Tiff Nature Preserve, Buffalo	Untreated wood pole/metal nest platform	OP-5
OSPR-8	Niagara Power Plant, Kenmore	No structure or nest site located	NA
OSPR-9	Sewer Plant, Wheatfield	No structure or nest site located	NA
OSPR-10	Buckhorn State Park West, Grand Island	Steel transmission line tower/natural nest-no platform	Nest relocated to OSPR-2 but Osprey rebuilt it
OSPR-11	Tiff Nature Preserve, Buffalo	Utility pole/wood nest platform	NA
OSPR-12	Tonawanda Coke Plant, Kenmore	Steel abandoned crane/natural nest-no platform	NA

¹ Source: New York Power Authority 2013.

3.2.2 Productivity Monitoring

Osprey incubation/brooding was confirmed at three of the ten nest sites located during the 2014 effort (30%). Two of the active nests were on man-made Osprey nest platforms (OSPR -2, and OSPR -7), and one was on a man-made feature (abandoned crane in the Tonawanda Coke facility) (Table 9). One location (OSPR -2) successfully fledged two young for a mean number of fledglings produced per pair of 0.67.

Table 9. Summary of 2014 Osprey Nest Status

Site ID	General Location	Nest Status ¹				Final Determination
		May 20	June 4-5	June 24	July 16	
OSPR-1	Adams Slip	IA	IA	IA	IA	No signs of activity noted.
OSPR-2	Buckhorn SP	IN	IN	IN	FY	Successfully fledged two young. On 7/16 one juvenile observed sitting at nest edge, and a second was observed flying nearby.
OSPR-3	Buckhorn SP	IA	IA	IA	IA	No signs of activity noted.
OSPR-4	Buckhorn SP	IA	IA	IA	IA	No signs of activity noted.
OSPR-5	Beaver Island	IA	IA	IA	IA	No signs of activity noted.
OSPR-6	East River	IA	IA	IA	IA	A pair was first seen in the area on 7/16, but could not be tied to the nest site.
OSPR-7	Tifft	IA	IN	IN	FL	Nest active, but ultimately failed. The pair was seen in the area on 7/16, but no evidence of young noted.
OSPR-8	Power Plant	NA	NA	NA	NA	No structure or nest site found, possibly the same location/pair as #12.
OSPR-9	Sewer Plant	NA	NA	NA	NA	No structure or nest site found.
OSPR-10	Buckhorn	IA	IA	IA	IA	Nest present. Male from site OSPR-2 observed near nest site on 7/16 then returned to OSPR-2 site.
OSPR-11	Tifft	NA	IA	IA	IA	Nest site first located in May.
OSPR-12	Tonawanda Coke	NA	IN	AD	FL	Nest active, but ultimately failed. Nest first located in May. On 7/16 female seen carrying fish, but not feeding young. Male observed moving sticks around within nest.

¹ Nest Status Codes: AD = adult present at nest, not incubating; FL = failed nest; FY = young fledged; IA = inactive (status unknown); IN = incubating/brooding; NA = no nest site located

Many of the man-made nesting platforms monitored had several scattered twigs on them, but only OSPR-2 and OSPR-11 had an actual nest. A full nest was also present on another man-made structure (the transmission line pole at site OSPR-10). Ospreys were seen in the vicinity of this nest, as well as near the nest platform structures at OSPR-6, but there was no evidence that the nests were actively being used.

3.2.3 Incidental Observations

On several survey events, bald eagles were observed flying over, or perched along the shoreline of, areas of the Niagara River to the north of Motor Island. Biologists could not confirm if the observations were of the same eagles as those nesting on Strawberry Island.

3.2.4 Disturbances Noted During Survey Efforts

No significant disturbances were noted during Osprey survey efforts.

4.0 DISCUSSION

4.1 HERON

4.1.1 Nest Locations and Habitat

This survey represented a full census of all known heron breeding sites within the U.S. side of the NR AOC. Strawberry Island may once again support heron nesting in the future and should continue to be monitored, but at this time there are no obvious opportunities to increase the sample size of rookeries for the target heron species in the current study area. Future work may include a field survey and/or desktop evaluation of data from known nesting locations on the Canadian side of the NR AOC for comparison. If approved and logistically feasible, future surveys are recommended in the upper Niagara River (Fort Erie to Grand Island and circle Motor Island) and in the lower Niagara River from its mouth to approximately Devil's Hole). Habitat for nesting heron is extremely limited throughout the general vicinity of this study, and because of this, populations of these target species in the NR AOC are extremely vulnerable.

4.1.2 Productivity Monitoring

Based on the highest number of active nests observed during any one 2104 NR AOC survey event (excluding cormorants), 105 pairs of Great Blue Heron (77 incubating), 40 pairs of Black-crowned Night Heron (37 incubating), and 28 pairs of Great Egret (18 incubating) were documented. In comparison, based on survey events conducted on Motor Island on May 8th and 15th, 2014 by NYSDEC staff, 54 pair of Great Blue Heron, 63 pair of Great Egrets, and 60 Black-crowned Night Heron were using the island (Adams and Walters 2014). Each approach reflects a similar total number of pairs of the target species, 173 pairs (NR AOC survey) versus 177 pairs (NYSDEC survey), although the estimates differ by species. The NR AOC survey

estimates nearly twice the number of Great Blue Heron pairs than the NYSDEC approach, and the NYSDEC approach estimates nearly twice the number of Great Egret and Black-crowned Night Heron than the NR AOC study. The differences are most likely a reflection of the survey method used, which allowed NYSDEC biologists to enter the colony site to more closely assess nests which are often tightly packed within dense vegetation.

The ability to track nesting success from a pair tending to an active nest through fledging of young was extremely difficult to assess over the course of this study; primarily due to the deterioration in nest visibility/coverage of the Motor Island rookery throughout the survey. Biologists were faced with the trade-off of establishing suitable vantage points for tracking nests while avoiding disturbance to nesting birds. Ultimately, using two off-island observation points, over half of all nests that were visible at the beginning of the survey in April were no longer visible by early June when many of the heron young had hatched and would have been visible in the nests. Adding to this, the visual coverage of the north and east areas of the island were even more limited and difficult to track throughout the study than were other areas of the island due to the location of the two observation points to the west and south sides of the island. Based on the 2014 nest count conducted following the breeding season on the island, there are over 150 nests in these areas, and dozens more are located in the center of the island which also has limited visibility from off island locations.

Despite the difficulty in tracking nests over the duration of the study, the results provide a fairly good indication of the total number of active pairs of the target heron species utilizing Motor Island. However, future approaches to address the goals of heron productivity monitoring and nesting success will include a more focused effort on counting numbers of each species at each life stage without a focus on individual nests (too difficult with leaf out), as well as monitoring of a target sub-set of nests that will be visible for duration and focus exclusively on tracking their progress/success. The latter approach unfortunately biases the effort which will target productivity based on visibility of a nest. Future survey efforts will utilize additional observation locations along the north/east sides of the island which will help to refine estimates of heron use of the full island.

4.1.3 Nest Site Survey

When comparing the total number of heron and cormorant nests found on Motor Island to the number of pairs reportedly using the island based on nest monitoring efforts, the collective number of nests identified during the 2014 post-breeding season nest count (779) is higher than the estimated 173 heron pairs observed during the 2014 NR AOC survey effort (which excludes Double-crested Cormorant pairs). However, the number of nests available on the island is similar to the May 2014 NYSDEC survey estimate of 762 nesting pairs, which includes 390 pair of cormorant (Adams and Walters 2014). When the NYSDEC estimate of cormorant pairs are added to the NR AOC survey results, the estimate of heron and cormorant pairs using Motor Island still falls short of the number of nests available by 216 nests. Again, this is most likely a reflection of the differences in the nesting season survey methods (remote stations versus on-site).

Using the established height-size criteria (i.e., nests above, versus below, 20 feet) as an indicator of the species likely using each available nest on Motor Island, there are an estimated 348 nests in the < 20 foot category, which includes Great Egret (180 nests) and Black-crowned Night Heron (168) and, 431 nests in the > 20 foot category, which includes Great Blue Heron (132 nests) and Double-crested Cormorant (299 nests). In comparison, collectively the highest number of pairs of Great Egret and Black-crowned Night Heron reported on either study (NR AOC and NYSDEC) is 123 pairs; which represents 35% of the 348 nest sites identified for these species based on the nest height/size class estimates. The highest number of pairs of Great Blue Heron and cormorant reported on either study is 495 pairs; greater than 100% use of the 431 nest sites identified for these species based on the nest height/size class estimates. However, the total number of nest sites available based on the count of nests on the island (779) closely matches the total number of pairs reported by NYSDEC (762). This suggests that nearly every available nest on the island is being used. But, the overlap in the height and size classes of nests used by each species is significant enough that the currently defined categories are not a useful post-breeding season indicator of the species using each nest.

Based on NYSDEC 2014 estimates of cormorant pairs on Motor Island, and assuming that all available nest on the island were used, cormorants occupied 50 percent of the available nests on Motor Island in mid-May 2014. Culling efforts in late-May removed 466 of these individuals, and is expected to improve opportunities for returning heron in the 2015 breeding season. However, cormorant numbers have generally continued to increase on Motor Island and in the region despite ongoing culling efforts since 2010 (Adams and Walters 2010, 2011, 2012, 2014), and the species continues to be a threat to the sustainability of heron species throughout the area.

The nest site survey revealed that a wide diversity of tree species and size classes are being used by the target species and nearly every species of tree and shrub available on the island had evidence of nesting activity. This further supports the need for protecting every potential nest site on the island and suggests that tree plantings may be a useful measure to increase nest site availability over the long-term. Most of the vegetation available to support nesting efforts appeared to be in good health. However, if left unchecked beaver activity and the spread of grape vines could significantly compromise nesting opportunities for the target species. Control/prevention measures are recommended, but should be done after all nesting has been completed. Vine removal should be evaluated and focused on specific areas/vegetation since some species are using the vine habitat. Shoreline erosion poses a less significant threat, but since nearly every tree is of value, stabilization efforts may be warranted to reduce vegetation loss. Given the significance of the Motor Island rookery site for heron nesting, tree/shrub health should be assessed regularly to identify threats, and to confirm that new growth is forming to replace vegetation that ages and dies off.

4.1.4 Incidental Observations

Bald eagles, a state Threatened species, were observed on numerous occasions and are known to nest on Strawberry Island. Eagles are a desirable species in the NR AOC. However, their

presence may be detrimental to target species. Heron and cormorant reportedly nested on Strawberry Island prior to the arrival of nesting eagles on the island in 2005-2006 and their presence on the island is believed to be the reason colonial waterbirds no longer use the island (Adams and Walters 2012). Eagle nesting on Motor Island (the only known colony of Great Blue Heron, Black-crowned Night Heron, and Great Egret in the NR AOC), could be catastrophic to the NR AOC heron population. Caspian Tern, state Threatened Common Tern, and state Endangered Black Tern, were reported in the general project area during 2104 surveys. Reports by NYSDEC indicate increased sightings of terns throughout the NR AOC, and recent use of a newly restored island (Frog Island) by Caspian Tern (Adams and Walters 2014). This suggests that these protected species are benefitting from restoration efforts in the NR AOC.

4.1.5 Disturbances at Nesting Areas

NYSDEC cormorant control operations on Motor Island in May 2014 eliminated 466 cormorants from the island (Adams 2015). The measures used likely cause some disturbance to the heron and egret nesting on the island, but the lack of control of DCCO and other potential threats to nesting heron and egret quite possibly would result in an overabundance of DCCO and abandonment of the colony. Many abandoned Canada Goose eggs were also noted on the island during the nest site survey. It is unknown if geese were targeted during the NYSDEC culling effort.

Other disturbances at Motor Island included boat traffic, people on the island installing beaver exclusion devices, and others on the island that may not have been authorized to be there. Timing efforts requiring access onto the island to avoid key breeding/nesting periods and posting signs along the island shoreline would likely help to minimize these potential threats.

4.2 OSPREY

4.2.1 Nest Locations and Habitat

Of the 10 Osprey nest sites monitored (recall two additional sites could not be located), all were either platforms installed specifically for Osprey nesting or other man-made structures (i.e., utility poles, cranes, abandoned structures). An assessment of potential natural nest sites was not conducted as part of this survey. However, there appears to be a lack of suitable natural structures available (i.e., stable, large diameter trees in close proximity to suitable foraging habitat) in the NR AOC.

Pairs actively tending to nests were documented at three of the 10 sites. Two of the nests were on man-made Osprey nest structures, including the sole nest that produced fledglings, suggesting the usefulness of those restoration efforts for this species in the NR AOC. However, there does not appear to be additional opportunity to expand nest sites to increase nesting activity in the NR AOC. Numerous potential nest structures exist in the NR AOC that are not being utilized; including the 10 monitored sites, as well as many additional man-made features in the area that could be used (i.e., utility poles, abandoned equipment and structures). This suggests that the density of suitable structures may be maximized for the number of Osprey currently using this

area. It is also possible that additional nest sites exist, but have yet to be located. For example, there are countless towers around the power station (OSPR-6) that have the potential to host Osprey nests, but access is restricted and views are limited.

4.2.2 Productivity Monitoring

The mean number of young (0.67) produced from the three pairs actively nesting in the area is average when compared to the only known consistent nest monitoring effort in the NR AOC which found that only six chicks have been fledged from the area since 2009, including one in 2009, two in 2010, three in 2011, and none in 2012 (NYPA 2013). But numbers of active nest sites and chicks fledged are lower than what has been reported outside of the study area (Poole et al., 2002). The number of nesting pairs is generally limited by the number of Ospreys using the area, and although numerous Osprey have been seen in the general NR AOC, only two to three pairs have been consistently confirmed in the area since 2009 (NYPA 2013). Overall, the aquatic resources available for foraging habitat for Osprey are generally of low quality due to shallow water depths and/or fast flowing water. The high level of disturbance in the general area may also be a contributing factor. Higher quality habitat, which for this species includes less development, and deep relatively slow moving water, exists outside of the study area and nesting Osprey likely would utilize these areas first.

Nest Site OSPR-2, in Buckhorn State Park, hosts the oldest known successfully nesting pair of Osprey in the NR AOC and was the only site in 2014 to fledge young. Previous monitoring efforts report one chick fledged in 2009, two in 2010, two in 2011, and none in 2012 (NYPA 2013). Nest OSPR-2 was originally located on the power line utility pole nearby, but the actual nest was relocated to the man-made nest platform in 1994 when maintenance work was done on the power lines. Since then, Osprey again built a nest on the power lines (nest OSPR-10). That nest was visited by Osprey in 2014, but was not actively used. The nest site on the abandoned Tonawanda Coke Plant crane (OSPR-12) is the oldest known nest site, but consistent with the 2014 results and NYPA nest monitoring efforts, activity at the nest is inconsistent and the nest is known to fail often (NYPA 2013, Personal Communication NYSDEC 2014, 2015).

4.2.3 Incidental Observations

Several bald eagles are known to use the NR AOC, but do not appear to be affecting Osprey nesting.

4.2.4 Disturbances at Nest Sites

No significant disturbances were noted and all nest locations appeared to be structurally sound.

5.0 CONCLUSIONS

This study is the first of five annual survey events that will be conducted at an intensive level within the NR AOC and represents a full census of every known location that supports nesting Great Blue Heron, Black-crowned Night Heron, Great Egret, and Osprey species within the

AOC. The study provides the baseline on which future survey events will be evaluated and offers a foundation for future comparisons with other studies locally and in the region.

It is well-known that nearly all of the former open space, forest, and marshes in the region no longer exist, have been significantly reduced in size, and/or have had at least some of their primary functions degraded. Despite this, all of the targeted heron species and Osprey were confirmed in the NR AOC during this study area. Future survey efforts will help to assess their population sizes and use of the NR AOC, and may identify potential future restoration needs for the region. Newly restored island sites (i.e., Frog Island) and other potential nest platforms and suitable sites should be added to future surveys as they are identified.

Measures to control threats to nesting egret and heron (i.e., DCCO lethal removal, beaver removal, and beaver exclusion devices, etc.) may be somewhat disruptive to nesting birds. However in absence of active management, the motor island colony (the largest known heron rookery in the Niagara AOC region) would be highly susceptible to failure. Management efforts are warranted, but should take place in a manner and time period to cause the least amount of disturbance to nesting birds. Extensive use and continued maintenance of exclusion fence may eliminate the need for use of lethal beaver control methods.

6.0 LITERATURE CITED

- Adams, C. and J. Walters. 2010. 2010 Niagara Frontier Colonial Waterbirds, New York State Department of Environmental Conservation (NYSDEC), Region 9, Buffalo, New York.
- Adams, C. and J. Walters. 2011. 2011 Niagara Frontier Colonial Waterbirds, New York State Department of Environmental Conservation (NYSDEC), Region 9, Buffalo, New York.
- Adams, C. and J. Walters. 2012. 2012 Niagara Frontier Colonial Waterbirds, New York State Department of Environmental Conservation (NYSDEC), Region 9, Buffalo, New York. October 2012.
- Adams, C. and J. Walters. 2014. 2013-2014 Niagara Frontier Colonial Waterbirds, New York State Department of Environmental Conservation (NYSDEC), Region 9, Buffalo, New York. December 2014.
- Adams C. 2015. Personal communications between Stacie Grove, Principal Biologist at NewEarth Ecological Consulting and Connie Adams, Senior Biologist at NYSDEC Region 9, Buffalo, New York on April 1, 2015.
- Baichich, P. and C.J.O. Harrison. 1997. A Guide to the Nests, Eggs, and Nestlings of North American Birds. Second Edition. Natural World Academic Press.
- Filipski, M. 2012. Remedial Action Plan Stage 2 Addendum, Niagara River Area of Concern. New York State Department of Environmental Conservation. January 2012.

- Hatch, Jeremy J. and D. V. Weseloh. 1999. Double-crested Cormorant (*Phalacrocorax auritus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/441>doi:10.2173/bna.441
- Hothem, Roger L., Brianne E. Brussee and William E. Davis, Jr. 2010. Black-crowned Night-Heron (*Nycticorax nycticorax*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/074>
- McGowan K. and K. Corwin (Eds.). 2008. The Second Atlas of Breeding Birds in New York State, Cornell University Press, December 2008.
- Mccrimmon, Jr., Donald A., John C. Ogden and G. Thomas Bancroft. 2011. Great Egret (*Ardea alba*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/570>
- Moul, I.E., R.G. Vennesland, M.L. Harris and R.W. Butler. 2001. Standardizing and interpreting nesting records for Great Blue Herons in British Columbia. Canadian Wildlife Service, No.217.
- NewEarth Ecological Consulting (NewEarth). 2015. Beneficial Use Impairment Removal Project, Niagara River Area of Concern, Heron and Osprey Nesting Success and Productivity Work Plan 2014-2018.
- New York Power Authority (NYPA). 2013. Osprey Nesting Platform Monitoring Report, Niagara Power Project (FERC No. 2216): 2012. Prepared by Gomez and Sullivan/Kleinschmidt Associates. 1/7/2013.
- New York State Department of Environmental Conservation (NYSDEC). 1994. Niagara River Remedial Action Plan. September, 1994. NYSDEC Division of Water, Albany, New York.
- Poole, Alan F., Rob O. Bierregaard and Mark S. Martell. 2002. Osprey (*Pandion haliaetus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/683>doi:10.2173/bna.683
- Steenhof, K. and I. Newton. 2007. Assessing Nesting Success and Productivity, Chapter 11. in Raptor Research and Management Techniques, Bird, D.M, KL. Bildstein, D.R. Barber~

and A. Zimmerman (eds). Hancock House Publishers, Blaine, Washington.
<http://raptors.hancockwildlife.org/staticpages/index.php?page=RRi\IT-Book>

US Fish and Wildlife Service (USFWS). 2014. Statement of Work: Niagara River Area of Concern (NR AOC) Heron and Osprey Nesting Success and Productivity Surveys.

Vennesland, R.G. 2000. The effects of disturbance from humans and predators on the breeding decisions and productivity of the Great Blue Heron in south-coastal British Columbia. M.Sc. Thesis. Simon Fraser University, BC.

Vennesland, R.G. and R.W. Butler. 2004. Factors influencing Great Blue Heron nesting productivity on the Pacific coast of Canada from 1998 to 1999. *Waterbirds* 27: 289-296.

Vennesland, R. and D. Norman. 2006. Survey Protocol for Measurement of Nesting Productivity at Pacific Great Blue Heron Nesting Colonies. Prepared by The Heron Working Group. Available at:
<http://www.heronworkinggroup.org/Heron%20Working%20Group%20Great%20Blue%20Heron%20Colony%20Survey%20Protocol%20-%20FINAL%20-%20November%202006.pdf>

Vennesland, Ross G. and Robert W. Butler. 2011. Great Blue Heron (*Ardea herodias*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/025>

APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

Photographic Documentation
NRAOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 1 (2014) Survey Report



Observation Point # 2 in Leaf Off Conditions



Observation Point # 2 in Leaf Out Conditions



Great Blue Heron and Double-crested Cormorant



Great Blue Heron and Great Egret

Photographic Documentation
NRAOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 1 (2014) Survey Report



Black-crowned Night Heron



Dead Double-crested Cormorant Following May Culling Effort



Great Egret and Great Blue Heron with Young



Cluster of Great Blue Heron Nests with Young

Photographic Documentation
NRAOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 1 (2014) Survey Report



Cluster of Double-crested Cormorant and Nests



Shrub with Heron Nests Cut Down by Beaver



Excessive Vibe Growth Overtaking Trees that Host Heron Nests



Evidence of Recent Beaver Chews on Tree that Hosts Heron Nests

Photographic Documentation
NRAOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 1 (2014) Survey Report



Osprey Nest Platform OSPR-1



Osprey Nest Platform OSPR-2 (Active Pair)



Osprey Nest Platform OSPR-3



Osprey Nest Platform OSPR-4

Photographic Documentation
NRAOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 1 (2014) Survey Report



Osprey Nest Platform OSPR-5



Osprey Nest Platform OSPR-6



Osprey Nest Platform OSPR-7 (Active Pair)



Vicinity of Osprey Natural Nest Site OSPR-10 on Utility Line

Photographic Documentation
NRAOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 1 (2014) Survey Report



Osprey Nest Platform OSPR-11



Osprey Natural Nest Site OSPR-12 (Active Pair)



Adult Osprey in Flight Near Nest OSPR-07



Adult Osprey Perched Along the Niagara River

APPENDIX B

2104 HERON NEST MONITORING AND NEST SITE SURVEY DATA AND FORMS

NIAGARA RIVER HERON NEST SURVEY DATA FORM INSTRUCTIONS

The following instructions provide specific details for filling out the data form to provide consistency in recording survey data.

Header Information

Date: day/month/year (e.g., 15 May 2014). To be completed prior to beginning of survey.

Start Time: Record the start time at the beginning of each survey. Record in military time (e.g., 0600 = 6 am, 1300 = 1 pm).

End Time: Record the end time at the beginning of each survey. Record in military time (e.g., 0600 = 6 am, 1300 = 1 pm).

Observer(s) (List All): List all observer and recorder names.

Colony: Enter the colony number

Observation Point: Enter the observation point identifier

Wind: Use the Beaufort Wind Scale below and record the average Force rating number.

Temp: Record as Fahrenheit

Cloud Cover: Record as approximate (nearest 10%) cloud cover

Events that may have affected nesting: Describe any known events that may have changed nest chronology or success since the last visit

Comments: Make any other notes about the survey that were not previously addressed

Observation Information

Nest Number: Record the nest number as listed in the photo.

Species: Check the species that is occupying the nest. (BCNH = Black-crowned Night Heron, GBHE = Great Blue Heron, GREG = Great Egret, NONE = No Species Present, OTHER = species not listed, describe in comments)

Status: Check the current status of the nest

Number of Adults: Record the number of adults present at the nest

Number of Young: Record the number of young present at the nest

Age of Young: Record as follows: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Comments: Record any additional comments about the nest that haven't been addressed.

Force	Beaufort Wind Scale			Name	Conditions on Land
	knots	km/h	mi/h		
0	< 1	< 2	< 1	Calm	Smoke rises vertically.
1	1-3	1-5	1-4	Light air	Smoke drifts and leaves rustle.
2	4-6	6-11	5-7	Light breeze	Wind felt on face.
3	7-10	12-19	8-11	Gentle breeze	Flags extended, leaves move.
4	11-16	20-29	12-18	Moderate breeze	Dust and small branches move.
5	17-21	30-39	19-24	Fresh breeze	Small trees begin to sway.
6	22-27	40-50	25-31	Strong breeze	Large branches move, wires whistle, umbrellas are difficult to control.
7	28-33	51-61	32-38	Near gale	Whole trees in motion, inconvenience in walking.
8	34-40	62-74	39-46	Gale	Difficult to walk against wind. Twigs and small branches blown off trees.
9	41-47	76-87	47-54	Strong gale	Minor structural damage may occur (shingles blown off roofs).
10	48-55	88-102	55-63	Storm	Trees uprooted, structural damage likely.
11	56-63	103-118	64-73	Violent storm	Widespread damage to structures.
12	64+	119+	74+	Hurricane	Severe structural damage to buildings, wide spread devastation.

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 Start Time 1045 End Time 1200 Colony Motor Island Observer(s) Ben Galbraith, Justin Sweitzer
 Wind 2 Temp (F) 66 Clouds (%) 80-90 Events That May Have Affected Nesting None
 Comments/General Assessment of Site 2 boats observed on water

NEST NUMBER	SPECIES	NEST STATUS	# OF ADULTS	# OF YOUNG	AGE OF YOUNG	COMMENTS
1	GBHE	I	2	—	—	
2	—	IA	—	—	—	
3	—	IA	—	—	—	
4	DCCO	AD	—	—	—	
5	GBHE	I	2	—	—	
6	GBHE	AD	1	—	—	
7	GBHE	AD	2	—	—	
8	GBHE	I	1	—	—	
9	GBHE	I	1	—	—	
10	GBHE	I	2	—	—	
11	—	IA	—	—	—	
12	GBHE	I	2	—	—	
13	DCCO	I	2	—	—	
14	GBHE	I	2	—	—	
15	DCCO	I	2	—	—	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 Start Time 1045 End Time 1200 Colony Mator Island Observer(s) Ben Griffith, Justin SweitzerWind 2 Temp (F) 66 Clouds (%) 80-90 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES	NEST STATUS	# OF ADULTS	# OF YOUNG	AGE OF YOUNG	COMMENTS
16	DCCO	I	2	-	-	
17	DCCO	AD	2	-	-	
18	DCCO	I	2	-	-	
19	DCCO	AD	1	-	-	extremely hard to see
20	BCNH	AD	2	-	-	20 moved down & right of 19
21	BCNH	AD	2	-	-	moved below 20
22	DCCO	I	2	-	-	GBHE on nest during Recon on 03/25/14
23	GBHE	I	2	-	-	
24	GBHE	I	1	-	-	
25	GBHE	I	1	-	-	2 nd nest behind and not observable
26	GBHE	I	1	-	-	
27	-	IA	-	-	-	
28	DCCO	I	2	-	-	
29	-	IA	-	-	-	
29A	GBHE	I	2	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret

Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;

YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)

Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/19/2014 Start Time 1045 End Time 1200 Colony Motor Island Observer(s) Ben Goffitt, Justin Switzer
 Wind 2 Temp (F) 66 Clouds (%) 80-90 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES	NEST STATUS	# OF ADULTS	# OF YOUNG	AGE OF YOUNG	COMMENTS
30	GBHE	I	1	-	-	
30a	GBHE	I	1	-	-	
31	GBHE	I	1	-	-	
32	GBHE	I	1	-	-	
33	DCCO	AD	1	-	-	
33a	DCCO	I	1	-	-	
34	GBHE	I	1	-	-	
35	GBHE	I	1	-	-	
36	DCCO	I	1	-	-	
37	DCCO	I	2	-	-	relocated (see photo)
38	DCCO	I	2	-	-	
39	GBHE	I	1	-	-	
40	GBHE	I	1	-	-	
41	GBHE	I	2	-	-	
42	GBHE	I	1	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 Start Time 1045 End Time 1200 Colony Motor Island Observer(s) B. Griffith, J. Sweitzer
 Wind 2 Temp (F) 66 Clouds (%) 80-90 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES	NEST STATUS	# OF ADULTS	# OF YOUNG	AGE OF YOUNG	COMMENTS
48	GBHE	I	1	-	-	
49	GBHE	AD	2	-	-	
43	GBHE	AD	2	-	-	may exclude - difficult to see nest
44	DCCO	I	1	-	-	
45	GBHE	I	2	-	-	
45a	DCCO	I	1	-	-	New nest
46	DCCO	AD	2	-	-	
47	GBHE	AD	2	-	-	
85	DCCO	AD	2	-	-	
86	GBHE	AD	1	-	-	
87	GBHE	I	1	-	-	
50	GBHE	I	1	-	-	
51	GBHE	I	1	-	-	
54	GBHE	AD	1	-	-	
53	-	NV	-	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/08/2014 Start Time 1045 End Time 1200 Colony Motor Island Observer(s) B. Griffith, J. Switzer

Wind 2 Temp (F) 66 Clouds (%) 80-90 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES	NEST STATUS	# OF ADULTS	# OF YOUNG	AGE OF YOUNG	COMMENTS
52	-	-	-	-	-	No nest
55	GBHE	I	2	-	-	
56	-	NV	-	-	-	
57	GBHE	I	1	-	-	
58	-	IA	-	-	-	
59	GBHE	I	1	-	-	
60	GBHE	AD	1	-	-	
61	-	IA	-	-	-	
62	DCCO	AD	2	-	-	
63	-	IA	-	-	-	
64	DCCO	AD	2	-	-	
65	GBHE	AD	1	-	-	
66	GBHE	AD	1	-	-	
67	GBHE	I	1	-	-	
68	-	IA	-	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 Start Time 1045 End Time 1200 Colony Motac Island Observer(s) B. Griffith, J. Switzer
 Wind 2 Temp (F) 66 Clouds (%) _____ Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES	NEST STATUS	# OF ADULTS	# OF YOUNG	AGE OF YOUNG	COMMENTS
69	GBHE	AD	2	-	-	
70	GBHE	AD	1	-	-	
71	GBHE	I	2	-	-	
72	GBHE	I	1	-	-	
73	GBHE	I	1	-	-	
74	DCCO	I	2	-	-	
75	DCCO	AD	2	-	-	Nest moved (see photo)
142	GBHE	I	1	-	-	
143						Excluded - no observable
144						Excluded - not observable (possible DCCO)
144a	GBHE	AD	2	-	-	
* 145						No Nest
146	GBHE	AD	1	-	-	Difficult to observe it incubating
76	GBHE	I	2	-	-	
77	GBHE	I	2	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 Start Time 1045 End Time 1200 Colony Motor Island Observer(s) B. Griffith, J. Switzer
 Wind 2 Temp (F) 66 Clouds (%) 70-80 Events That May Have Affected Nesting None
 Comments/General Assessment of Site _____

nest number	Species	nest status	# of adults	# of young	age of young	Comments
107	GBHE	I	1	-	-	
108	GBHE	I	1	-	-	
108a	DCCO	I	1	-	-	New nest
109	GBHE	I	1	-	-	
109c	GBHE	I	1	-	-	
110	GBHE	I	1	-	-	
111	GBHE	I	1	-	-	
112	DCCO	AD	1	-	-	
113	GBHE	I	1	-	-	
114	GBHE	I	1	-	-	
115	GBHE	AD	2	-	-	
116	GBHE	I	1	-	-	
117	GBHE	I	1	-	-	
118	GBHE	I	1	-	-	
119	DCCO	I	2	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 Start Time 1045 End Time 1200 Colony Motor Island Observer(s) B. Griffith
 Wind 2 Temp (F) 66 Clouds (%) 70-80 Events That May Have Affected Nesting None
 Comments/General Assessment of Site _____

nest number	Species	nest status	# of adults	# of young	age of young	Comments
120	GBHE	I	1	-	-	
121	GBHE	I	1	-	-	
122	-	IA	-	-	-	
123	GBHE	I	2	-	-	
124	GBHE	I	1	-	-	
125	-	IA	-	-	-	
126	GBHE	I	1	-	-	
127	GBHE	I	2	-	-	
128	GBHE	I	1	-	-	
129	GBHE	I	1	-	-	
130	DCCO	I	1	-	-	
131	-	NV	-	-	-	
132	GBHE	AD	1	-	-	
133	GBHE	I	1	-	-	
134	DCCO	I	1	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 Start Time 1045 End Time 1200 Colony Motor Island Observer(s) B. Griffith, J. Sweitzer

Wind 2 Temp (F) 66 Clouds (%) 70-80 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

nest number	Species	nest status	# of adults	# of young	age of young	Comments
135	GBHE	AD	2	-	-	
136	GBHE	I	1	-	-	
137	GBHE	AD	1	-	-	
138	GBHE	AD	2	-	-	
139	GBHE	AD	2	-	-	
139a	GBHE	I	2	-	-	
147	GBHE	AD	1	-	-	
148	GBHE	I	1	-	-	
149	GBHE	I	1	-	-	
END						

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Heron Colony Observation Datasheet

04/18/2014 SEE NOTES

Date (04/23/2014) Start Time 0840 End Time 0840 Colony Moture Island Observer(s) B GREFFER
 Wind 2-3 Temp (F) 35 Clouds (%) 30 Events That May Have Affected Nesting Nil

Comments/General Assessment of Site VANTAGE POINT #2. THIS SURVEY WAS CONDUCTED BY COORDINATOR PHOTOGRAPHS TAKEN ON 04/17/2014 @ 0840. DUE TO THE RIVER BEING FROZEN PREVIOUS SURVEY

nest number	Species	nest status	# of adults	# of young	age of young	Comments
1	GREG	AD	1	-	-	
2	GREG	AD	1	-	-	
3	GREG	AD	2	-	-	
4	GREG	IN	1	-	-	
5	GREG	AD	1	-	-	
6	GREG	IN	1	-	-	
7	GREG	IN	1	-	-	
8	-	NV	-	-	-	
9	GREG	IN	1	-	-	
10	GREG	AD	1	-	-	
11	GREG	AD	1	-	-	
12	GREG	AD	1	-	-	
13	GREG	AD	1	-	-	
14	GREG	IN	1	-	-	
15	GREG	AD	2	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

THIS VANTAGE POINT WAS NOT ESTABLISHED WILL BE SURVEYED DURING MAY 2014 SURVEY EVENT.

Niagara River Area of Concern Heron Colony Observation Datasheet

04/18/2014 sets notes

Date 04/23/2014 Start Time 0840 End Time 0840 Colony Moran Island Observer(s) B GRIFFIN
 Wind 2-3 Temp (F) 35 Clouds (%) 30 Events That May Have Affected Nesting NONE
 Comments/General Assessment of Site SEE PAGE #1 VANTAGE #2

nest number	Species	nest status	# of adults	# of young	age of young	Comments
16	GBHE	AD	2	-	-	
17	GREG	AD	2	-	-	
18	GREG	IN	1	-	-	
19	BLNH	IN	1	-	-	
20	BLNH	IN	1	-	-	
21	BLNH	IN	1	-	-	
22	GREG	IN	1	-	-	
23	GREG	IN	1	-	-	
24	GREG	IN	1	-	-	
25	GREG	AD	2	-	-	
26	GREG	AD	1	-	-	
27	GREG	IN	2	-	-	
28	-	NV	-	-	-	
29	GREG	AD	1	-	-	
30	GREG	AD	2	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret

Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;

YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)

Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

ASSESSED FROM 4/18 PHOTOS

Niagara River Area of Concern Heron Colony Observation Datasheet

Date 04/18/2014 see notes Start Time 0840 End Time 0840 Colony Motor Island Observer(s) B GREGG
 Date 04/23/2014 Start Time _____ End Time _____ Colony _____ Observer(s) _____
 Wind 2-3 Temp (F) 35 Clouds (%) 30 Events That May Have Affected Nesting NONE
 Comments/General Assessment of Site SEE PAGE #1 VANTAGE #2

nest number	Species	nest status	# of adults	# of young	age of young	Comments
31	GBHE	AD	2	-	-	
32	GBHE	AD	2	-	-	
33	GBHE	AD	1	-	-	
34	BCNH	AD	2	-	-	
35	BCNH	AD	2	-	-	
36	BLNH	AD	2	-	-	
37	BCNH	AD	1	-	-	
38	-	NV	-	-	-	
39	-	NV	-	-	-	
40	GREG	AD	1	-	-	
41	-	NV	-	-	-	
42	-	NV	-	-	-	
43	-	NV	-	-	-	
44	-	NV	-	-	-	
45	-	NV	-	-	-	

Species: BCNH = Black-crowned Night-Heron; GBHE = Great Blue Heron; GREG = Great Egret
 Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 YB = Young are present, but have left nest; NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)

Nesting Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

* ADDITIONAL NESTS WILL BE IDENTIFIED DURING THE MAY SURVEY.
 ASSESSED FROM VIB PHOTOS

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Motor Island Obs Point H1-1 Observer(s) Ben Griffith, Justin SweitzerWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
1	✓												1	1	1	
2	✓												1	1	1	
3																
4										✓						
5	✓												1	1	2	
6	✓															
7										✓			2	1	2	
8	✓															
9										✓						
10										✓						
11										✓						
12	✓												1	1	UNK.	Poor visibility
13				✓			✓						1			
14				✓			✓						1			
15				✓			✓						1			Dead Adult Near Nest

Date 5/21/2014 Start Time 1315 End Time 1830 Colony Motor Island Obs Point A1-1 Observer(s) B. Griffith, J. SwitzerWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
16				✓		✓							1			
17				✓		✓							1			
18				✓		✓							1			
19				✓		✓							1			Dead on Nest
20		✓					✓						1			
21										✓						
22				✓			✓						1			3 New Nest observed (DCCO)
23	✓					✓							1			Likely young on nest
24	✓							✓					1	2	2	
25	✓							✓					1	1	2	
26										✓						
27	✓					✓							2			building nest, 3 New DCCO Nests observed
28				✓			✓						2			1 Dead on Nest
29	✓							✓					1	1	1	
29A	✓						✓						1			

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Madar Island Obs Point H1-1 Observer(s) B. Griffith, J. SwartzWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
30	✓							✓					1	2	3	
30a	✓							✓						1	3	
31	✓					✓							1			
32	✓							✓					1	4	3	
33									✓							
33a				✓			✓						1			
34	✓							✓					1	2	2	
35	✓							✓					1	1	1	
36				✓			✓						2			NEW DCCO NEST BETWEEN 36 & 37
37				✓			✓						2			
38				✓			✓						1			
39	✓					✓							1			
40									✓							
41	✓					✓							1			
42	✓						✓						1	3	1	

} 3 NEW
DCCO NESTS

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Motiv Island Obs Point H1-1 Observer(s) B. Griffith, J. SweeterWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

Nest Number	Species					Status					Number of adults	number of young	Age of young	Comments		
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible					Failed nest	Nest inactive
43										✓						Leaves disrupting view
44				✓			✓						2			
45	✓					✓							1			
45a				✓		✓							1			4 New Owl Nests
46				✓			✓						2			
47											✓					
48	✓					✓							1			2 New Owl Nests
49	✓						✓						1			
85				✓			✓						1			
86	✓					✓							1			
87	✓						✓						1			Likely Brooding
50	✓					✓							1			Nest barely visible
51	✓					✓							2			
54	✓					✓							1			
53	✓									✓						

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Motor Island Obs Point H1-1 Observer(s) B. Griffith S. Sweitzer
 Wind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting People on Island @ 1405
 Comments/General Assessment of Site Stopped survey @ 1405 due to people on island. Started survey again @ 1745

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
52	<hr/>															No Nest
55										✓						
56										✓						
57										✓						
58				✓			✓			✓			1			
59										✓						
60										✓						
61	✓					✓				✓			1			
62										✓						
63										✓						
64				✓			✓			✓						PERSON ON ISLAND @ 1405 - STOPPED SURVEY
65										✓						
66	✓							✓					0	1	3	
67	✓							✓					1	1	1	
68										✓						

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Moto Island Obs Point H-1 Observer(s) B. Griffith, J. SwitzerWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
69										✓						
70										✓						
71										✓						
72	✓							✓					1	UNK.	Poor Visibility	
73										✓						
74				✓			✓						1			
75				✓			✓						1			
76	✓					✓							1			
77										✓						
142										✓						
143										✓						
144										✓						
144a	✓							✓					1	1		
145	_____															No Net
146										✓						

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Motor Island Obs Point H1-1 Observer(s) B. Griffith, J. SwitzerWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
78										✓						
79										✓						
80										✓						
140	✓												1	Unk.		
140a										✓						
141	✓												1			
141a	✓												1			
81																No Nest
82										✓						
83										✓						
84	✓												1			Poor Viability
88	✓												2			
89										✓						
90																No Nest
91										✓						

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Motor Island Obs Point H1-1 Observer(s) B. Griffith, J. SwitzerWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
92										✓						
93	✓					✓							1			
94										✓						
95										✓						
96	✓							✓					1	2	1	
97										✓						
98										✓						
99	✓					✓							1			
100										✓						
101	<hr/>															
102				✓		✓							2			No Nest Copulating
103				✓			✓						1			
104	✓					✓							1			
105	✓							✓					2	2	1	
106										✓						

Date 05/21/2014 Start Time 1315 End Time 1830 Colony Motw Island Obs Point H1-1 Observer(s) B. Griffith, J. SwitzerWind 2 Temp (F) 70 Clouds (%) 50-70 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
120	✓							✓					1	2	1	
121	✓					✓							1			
122	✓					✓							1			
123	✓							✓					1	1	2	
124	✓							✓					1	1	1	
125	✓					✓							1			
126	✓					✓							1			
127										✓						
128	✓							✓					1	2	3	
129	✓					✓							1			
130										✓						
131										✓						
132	✓					✓							1			poor visibility
133										✓						
134	✓							✓					1	2	2	

Date 5/21/14 Start Time 1149 End Time 1157 Colony H7 Obs Point 2 Observer(s) B. GRIFFITH
J. SWEITZERWind 1 Temp (F) 60 Clouds (%) 30 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES					STATUS						NUMBER OF ADULTS	NUMBER OF YOUNG	AGE OF YOUNG	COMMENTS	
	GBHE	BCNH	GREG	DCCO	OTHER	ADULT PRESENT	INCUBATING/BROODING	YOUNG VISIBLE IN NEST	YOUNG PRESENT/BUT HAVE LEFT NEST	NOT VISIBLE	FAILED NEST					NEST INACTIVE
1			✓				✓						1			
2			✓				✓						1			
3			✓				✓						1			
4		✓					✓						1			
5		✓					✓						1			
6			✓			✓	✓						1			
7			✓			✓	✓						1			
8			✓				✓						1			
9		✓					✓						1			
10		✓					✓						1			
11			✓				✓						1			
12			✓				✓						1			
13			✓				✓						1			
14			✓				✓						1			
15		✓					✓						1			

Date 5/21/14 Start Time 1149 End Time 1157 Colony H1 Obs Point 2 Observer(s) B. BRIFFITH
S. SWITZER
 Wind 1 Temp (F) 60 Clouds (%) 30 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES					STATUS						NUMBER OF ADULTS	NUMBER OF YOUNG	AGE OF YOUNG	COMMENTS	
	GBHE	BCNH	GREG	DCCO	OTHER	ADULT PRESENT	INCUBATING/BROODING	YOUNG VISIBLE IN NEST	YOUNG PRESENT/BUT HAVE LEFT NEST	NOT VISIBLE	FAILED NEST					NEST INACTIVE
16			✓				✓						1			
17	✓						✓						1			
18		✓				✓							1			
19		✓				✓							1			
20		✓					✓						1			
21			✓				✓						1			
22			✓				✓						1			
23		✓					✓						1			
24		✓					✓						1			
25		✓					✓						1			
26		✓					✓						1			
27		✓					✓						1			
28		✓					✓						1			
29		✓					✓						1			
30		✓					✓						1			

Date 5/21/14 Start Time 1149 End Time 1157 Colony H2 Obs Point 2 Observer(s) B. GRIFFITH
J. SWEITZERWind 1 Temp (F) 60 Clouds (%) 30 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES					STATUS						NUMBER OF ADULTS	NUMBER OF YOUNG	AGE OF YOUNG	COMMENTS	
	GBHE	BCNH	GREG	DCCO	OTHER	ADULT PRESENT	INCUBATING/BROODING	YOUNG VISIBLE IN NEST	YOUNG PRESENT/BUT HAVE LEFT NEST	NOT VISIBLE	FAILED NEST					NEST INACTIVE
31		✓					✓						1			
32			✓				✓						1			
33			✓			✓							1			
34			✓			✓							1			
35		✓				✓							1			
36	✓						✓						1			
37		✓					✓						1			
38		✓					✓						1			
39		✓					✓						1			
40		✓					✓						1			
41		✓					✓						1			
42		✓					✓						1			
43		✓					✓						1			
44		✓					✓						1			
45		✓					✓						1			

Date 5/21 Start Time 1149 End Time 1157 Colony H1 ~~H12~~ Obs Point 2 Observer(s) B. GRAFFITY
J. SWITZER
 Wind 1 Temp (F) 60 Clouds (%) 30 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

NEST NUMBER	SPECIES					STATUS						NUMBER OF ADULTS	NUMBER OF YOUNG	AGE OF YOUNG	COMMENTS
	GBHE	BCNH	GREG	DCCO	OTHER	ADULT PRESENT	INCUBATING/BROODING	YOUNG VISIBLE IN NEST	YOUNG PRESENT/BUT HAVE LEFT NEST	NOT VISIBLE	FAILED NEST				
46		✓					✓					1			
47		✓					✓					1			
48		✓					✓					1			
49		✓					✓					1			
50		✓					✓					1			
51			✓					✓				1	1	4	
52			✓			✓						1			
53		✓					✓				✓	1			
54		✓					✓					1			
55		✓					✓					1			
56		✓					✓					2			
57		✓					✓					1			
58		✓					✓					1			
59		✓					✓					1			
60		✓					✓					1			

Date 6/4/14 Start Time 1720 End Time 1740 Colony H1 Obs Point 1 Observer(s) B. GRIFFITH / GROVE

Wind 3 Temp (F) 65 Clouds (%) 100 Events That May Have Affected Nesting _____

Comments/General Assessment of Site CANOPY OF TREES SIGNIFICANTLY OBSCURING VIEW OF NESTS

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/ but have left nest	Not visible	Failed nest					Nest inactive
1										X						
2																
3																
4																
5																
6																
7																
8																
9																
10																
11										✓						
12				X			X					0	1			
13											X					
14										X						
15										X						

Date 6/4/14 Start Time 1720 End Time 1740 Colony H-1 Obs Point 1 Observer(s) B. GRIFFITH/GROVE
 Wind 3 Temp (F) 65 Clouds (%) 100 Events That May Have Affected Nesting _____
 Comments/General Assessment of Site _____

Nest Number	Species				Status				Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest		Young present/but have left nest
29A	X									
29	X							X		
28	X							X		
27								X		
26								X		
25								X		
24								X		
23	X								X	
22								X		2
21								X		2
20								X		2
19								X		
18								X		
17								X		
16								X		

Date 6/14/14 Start Time 1720 End Time 1740 Colony H-1 Obs Point 1 Observer(s) B. GRIFFITH/GROVE
 Wind 3 Temp (F) 65 Clouds (%) 100 Events That May Have Affected Nesting _____
 Comments/General Assessment of Site _____

Nest Number	Species							Status								
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest	Nest inactive	Number of adults	number of young	Age of young	Comments
30	X							X					0	2	W	
30A												X				
36				X												
48	X															
87	X												0	2		
86	X												0	4		
45	X												0	2		
64	X												0	2		
69	X												0	2		
100	X												0	2		
109	X												0	2		
113	X												0	2		
114	X												0	2		
120	X												0	2		
135	X												0	2		POSSIBLY A 3RD CHICK

Date 6/4/2014 Start Time 1530 End Time 1615 Colony H1 Obs Point 2 Observer(s) B. GRIFITH, S. GROVE

Wind 3 Temp (F) 65 Clouds (%) 100 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
16										✓						
17										✓						
18										✓						
19										✓						
20										✓						
21			✓			✓				✓						
22										✓						
23										✓						
24										✓						
25										✓						
26										✓						
27										✓						
28		✓						✓				1	2	2		
29		✓						✓				1	2	2		
30		✓						✓				1	2	1		

Date 6/4/2014 Start Time 1530 End Time 1615 Colony H1 Obs Point 2 Observer(s) B. GRIFFIN, S. GAUVE
 Wind 3 Temp (F) 65 Clouds (%) 100 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments		
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive	
31			✓							✓							
32			✓					✓					2	2	2		
33			✓				✓						1	0	0		
34		✓						✓					1	1	1		
35										✓							
36	✓					✓							1	0	0		
37										✓							
38										✓							
39		✓					✓						1	0	0		
40		✓						✓					1	2	3		
41										✓							
42			✓			✓							1	0	0	not clear	
43			✓					✓					1	1	1		
44			✓			✓							1	0	0	not clear	
45										✓							

Date 6/4/2014 Start Time 1530 End Time 1615 Colony H1 Obs Point 2 Observer(s) B. GRUBBITH, S. GRAVE
 Wind 3 Temp (F) 65 Clouds (%) 100 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Nest Number	Species					Status						Number of adults	number of young	Age of young	Comments	
	GBHE	BCNH	GREG	DCCO	Other	Adult present	Incubating/brooding	Young visible in nest	Young present/but have left nest	Not visible	Failed nest					Nest inactive
46										✓						
47		✓					✓						1	0	0	
48										✓						
49		✓				✓							1	0	0	
50										✓						
51			✓					✓					1	2	2	
52			✓			✓							1	0	6	
53										✓						
54		✓					✓						1	0	0	
55		✓				✓							1	0	0	
56		✓						✓					0	2	2	
57										✓						
58										✓						
59										✓						
60										✓						

2014 Motor Island Nest Site Survey Data

ID	Tree_Shrub Common Name	Tree_Shrub Scientific Name	Shrub Height (ft) ²	Tree_Shrub Diameter (in)	# Nests < 20 ft Large Size	# Nests < 20 ft Small Size	# Nests > 20 ft Large Size	# Nests > 20 ft Small Size	Total Number of Nests	DCCO Carcass	GREG Carcass	GBHE Carcass	CANG Eggs	Fresh Gull Carcass	Carcass of Unknown Species	Downed Heron Nest	Additional Comments
1	Eastern Cottonwood	<i>Populus deltoides</i>		16					0				3				
2	Eastern Cottonwood	<i>Populus deltoides</i>		13					0								
3	American Elm	<i>Ulmus americana</i>		5					0								
4	Staghorn Sumac	<i>Rhus typhina</i>	10	3					0								2 stems
5	Eastern Cottonwood	<i>Populus deltoides</i>		14					0								
6	Eastern Cottonwood	<i>Populus deltoides</i>		11					0								
7	Black Willow	<i>Salix nigra</i>	18	4					0				7				25 stems
8	Eastern Cottonwood	<i>Populus deltoides</i>		21					0								
9	Silver Maple	<i>Acer saccharinum</i>		25			4	5	9								4 stems
10	Silver Maple	<i>Acer saccharinum</i>		15					0								
11	Eastern Cottonwood	<i>Populus deltoides</i>		15					0								on bank, roots 90% undercut
12	Black Willow	<i>Salix nigra</i>		36	1		1	1	3								4 stems joined at base, dead top on 3 of 4 stems
13	Eastern Cottonwood	<i>Populus deltoides</i>		12				3	3				3				dying, covered in vitas vine, 1 partial nest
14	Eastern Cottonwood	<i>Populus deltoides</i>	13	6					0								
15	Eastern Cottonwood	<i>Populus deltoides</i>		10					0								
16	Black Willow	<i>Salix nigra</i>	10	7					0								6 stems
17	Eastern Cottonwood	<i>Populus deltoides</i>		14					0	2							
18	Eastern Cottonwood	<i>Populus deltoides</i>		13				1	1								
19	Black Willow	<i>Salix nigra</i>		53			5	7	12	2							fresh beaver chews on downed limb from tree
20	Silver Maple	<i>Acer saccharinum</i>		14				1	1								7 stems
21	Black Willow	<i>Salix nigra</i>		49			2	5	7								
22	Eastern Cottonwood	<i>Populus deltoides</i>		18			2	5	7								
23	Eastern Cottonwood	<i>Populus deltoides</i>	10	6					0								top sheared off
24	Eastern Cottonwood	<i>Populus deltoides</i>		5					0								
25	Eastern Cottonwood	<i>Populus deltoides</i>		8					0								
26	Eastern Cottonwood	<i>Populus deltoides</i>		9					0					1			vitas killing tree
27	Black Willow	<i>Salix nigra</i>	11	45	1				1								dead, rotten bole, top sheared off
28	Eastern Cottonwood	<i>Populus deltoides</i>		13				3	9	12							vitas killing tree
29	Black Willow	<i>Salix nigra</i>		48	1	3		1	5			1	2		1		2 stems, 1 bent over parallels ground, vitas killing tree
30	Green Ash	<i>Fraxinus pensylvanica</i>		12					0								on bank, roots 70% undercut
31	Black Willow	<i>Salix nigra</i>		73		6	7	2	15	1					1		1 partial nest
32	Eastern Cottonwood	<i>Populus deltoides</i>		14		6			6								
33	Eastern Cottonwood	<i>Populus deltoides</i>		24				4	7	11						1	
34	Black Willow	<i>Salix nigra</i>		45				5	13	18							tree dying, 3 partial nests
35	Black Willow	<i>Salix nigra</i>		40				7	8	15	3			1			tree dying, BAOR nest
36	Black Willow	<i>Salix nigra</i>	20	72					0								rotten, top sheared off
37	Black Willow	<i>Salix nigra</i>	18	42					0								top sheared off
38	Black Willow	<i>Salix nigra</i>		63			5	15	20	1		1	4			1	
39	Black Willow	<i>Salix nigra</i>		46			3	7	10								2 stems
40	Black Willow	<i>Salix nigra</i>		25				2	1	3							
41	Undetermined			17					0								2 stems, new beaver chews
42	Undetermined			42					0								2 stems, new beaver chews
43	Black Willow	<i>Salix nigra</i>	20	23					0				4				resprout from trunk of large downed tree
44	Staghorn Sumac	<i>Rhus typhina</i>	15	3					0								47 stems within 25 ft area

2014 Motor Island Nest Site Survey Data

ID	Tree_Shrub Common Name	Tree_Shrub Scientific Name	Shrub Height (ft) ²	Tree_Shrub Diameter (in)	# Nests < 20 ft Large Size	# Nests < 20 ft Small Size	# Nests > 20 ft Large Size	# Nests > 20 ft Small Size	Total Number of Nests	DCCO Carcass	GREG Carcass	GBHE Carcass	CANG Eggs	Fresh Gull Carcass	Carcass of Unknown Species	Downed Heron Nest	Additional Comments
45	Eastern Cottonwood	<i>Populus deltoides</i>		36		4	3	12	19				4	1		1	one large limb broken off and on ground
46	Staghorn Sumac	<i>Rhus typhina</i>	15	4					0								53 stems in 25 ft area, cages on some stems
47	Black Willow	<i>Salix nigra</i>		27		3			3								1 partial nest
48	American Elm	<i>Ulmus americana</i>		10				1	1								
49	Black Willow	<i>Salix nigra</i>		23		3		1	4							1	
50	American Elm	<i>Ulmus americana</i>		12					0								
51	Staghorn Sumac	<i>Rhus typhina</i>	15	3		15			15								15 stems within 25 ft area
52	Black Willow	<i>Salix nigra</i>	18	17					0								2 stems, top sheared off, fresh beaver chews
53	Staghorn Sumac	<i>Rhus typhina</i>	15	3					0								19 stems within 20 ft area
54	American Elm	<i>Ulmus americana</i>		4					0								
55	Eastern Cottonwood	<i>Populus deltoides</i>		6					0								
56	Eastern Cottonwood	<i>Populus deltoides</i>		13					0				3				2 stems
57	Common Lilac ¹	<i>Syringa vulgaris</i>	11	1					0								9 stem clusters within 15 ft area
58	Eastern Cottonwood	<i>Populus deltoides</i>		13					0								
59	Eastern Cottonwood	<i>Populus deltoides</i>		10					0								
60	Eastern Cottonwood	<i>Populus deltoides</i>		16					0								
61	Staghorn Sumac	<i>Rhus typhina</i>	16	3					0								90 stems within 25 ft radius
62	Eastern Cottonwood	<i>Populus deltoides</i>		18					0								2 stems, on shoreline - ice damage
63	Eastern Cottonwood	<i>Populus deltoides</i>		18					0								2 stems, on shoreline - ice damage
64	Common Lilac ¹	<i>Syringa vulgaris</i>	10	4	10	8			18								72 stems within 15 ft radius, some stems with cages
65	Lombardy Poplar ¹	<i>Populus nigra Italica</i>		23					0								6 nests < 8 ft off ground
66	Eastern Cottonwood	<i>Populus deltoides</i>		10	6	20			26							1	
67	Japanese Honeysuckle ¹	<i>Lonicera japonica</i>	8	2		1			1								12 stems beneath canopy of #66
68	Eastern Cottonwood	<i>Populus deltoides</i>		29		3	7	8	18	2							low nests < 10 ft
69	Eastern Cottonwood	<i>Populus deltoides</i>		48		7	14	22	43	3						2	3 stems
70	Eastern Cottonwood	<i>Populus deltoides</i>		53			18	45	63	7		1				1	
71	Cherry/Apple	<i>Prunus or Malus spp</i>	8	4		2			2								5 stems within 5 ft area, nests at 3 and 5 ft height
72	Eastern Cottonwood	<i>Populus deltoides</i>	20	5		4			4								4 stems
73	Eastern Cottonwood	<i>Populus deltoides</i>		24			5	13	18								2 trunks
74	Eastern Cottonwood	<i>Populus deltoides</i>		47		3	1	13	17	3						2	
75	Eastern Cottonwood	<i>Populus deltoides</i>	25	5	2				2								shrubby growth, bent branches
76	Tree of Heaven ¹	<i>Ailanthus altissima</i>	20	2	103	32			135				4	1			169 stems within 30 ft radius. Located in front of cottonwood, and behind sumacs
77	American Hornbeam	<i>Carpinus caroliniana</i>		12	13				13								
78	American Hornbeam	<i>Carpinus caroliniana</i>		10	6				6								
79	American Hornbeam	<i>Carpinus caroliniana</i>		11	4				4								
80	American Hornbeam	<i>Carpinus caroliniana</i>		8	7				7								
81	Eastern Cottonwood	<i>Populus deltoides</i>		20		7		2	9								nests small, but high
82	Tree of Heaven ¹	<i>Ailanthus altissima</i>		4					0								15 stems 10 ft radius, cages on some stems
83	Eastern Cottonwood	<i>Populus deltoides</i>		31		5	8	9	22	2		1	1				3 stems, dead gbhe in nest

2014 Motor Island Nest Site Survey Data

ID	Tree_Shrub Common Name	Tree_Shrub Scientific Name	Shrub Height (ft) ²	Tree_Shrub Diameter (in)	# Nests < 20 ft Large Size	# Nests < 20 ft Small Size	# Nests > 20 ft Large Size	# Nests > 20 ft Small Size	Total Number of Nests	DCCO Carcass	GREG Carcass	GBHE Carcass	CANG Eggs	Fresh Gull Carcass	Carcass of Unknown Species	Downed Heron Nest	Additional Comments
84	Dead			11		1	1	3	5	1							
85	Red Osier Dogwood	<i>Cornus sericea</i>		3		3			3	2							tree recently downed by beaver
86	Dead			9	1				1							2	
87	Eastern Cottonwood	<i>Populus deltoides</i>		10		1		3	4								active beaver chews
88	Eastern Cottonwood	<i>Populus deltoides</i>		11	2				2								
89	Eastern Cottonwood	<i>Populus deltoides</i>		13				3	3								
90	Eastern Cottonwood	<i>Populus deltoides</i>		9	2				2								
91	Eastern Cottonwood	<i>Populus deltoides</i>		9		1		1	2								
92	Eastern Cottonwood	<i>Populus deltoides</i>		9				4	4								one additional partial nest
93	Dead			8					0								
94	Eastern Cottonwood	<i>Populus deltoides</i>		11	2				2								
95	Eastern Cottonwood	<i>Populus deltoides</i>		15	2	7			9								
96	Eastern Cottonwood	<i>Populus deltoides</i>		8		2			2								
97	Eastern Cottonwood	<i>Populus deltoides</i>		13				2	2								
98	Eastern Cottonwood	<i>Populus deltoides</i>		22				4	10	14							
99	Eastern Cottonwood	<i>Populus deltoides</i>		13				2	2								
100	Undetermined			13	4	2			6							1	
101	Undetermined			13	2				2								
102	Eastern Cottonwood	<i>Populus deltoides</i>		19				7	2	9							
103	Eastern Cottonwood	<i>Populus deltoides</i>		12				2	2								
104	Tree of Heaven ¹	<i>Ailanthus altissima</i>	25	6	4	12			16								79 stems within 30 ft area
105	Staghorn Sumac	<i>Rhus typhina</i>	15	3	7	2			9								55 stems within 100 x 50 ft area in front of tree of heaven
106	Cherry/Apple	<i>Prunus or Malus spp</i>	15	10					0								8 stems
107	Green Ash	<i>Fraxinus pensylvanica</i>		18				2	2				1				2 live DCCO in tree
108	American Elm	<i>Ulmus americana</i>		13					0								6 stems
109	Eastern Cottonwood	<i>Populus deltoides</i>		16					0								4 stems, active beaver chews
110	Eastern Cottonwood	<i>Populus deltoides</i>		18					0								active beaver chews
111	Eastern Cottonwood	<i>Populus deltoides</i>		14					0	1			1				active beaver chews
112	Cherry/Apple	<i>Prunus or Malus spp</i>	15	4					0								3 clumps, 5-8 stems each, overgrown with vines
113	Green Ash	<i>Fraxinus pensylvanica</i>		16					0	1			5				
114	Green Ash	<i>Fraxinus pensylvanica</i>		15					2	1	1						small nests
115	Black Willow	<i>Salix nigra</i>		18				14	14								10 stems
116	Undetermined		25	5		3			3				1				5 stems
117	Black Willow	<i>Salix nigra</i>		8					0								
118	Eastern Cottonwood	<i>Populus deltoides</i>		18				3	3								
119	Undetermined		10	5					0								shrub overgrown with vitas vine
120	Undetermined			9					0								
121	Eastern Cottonwood	<i>Populus deltoides</i>		20					0								
122	Black Willow	<i>Salix nigra</i>							0								
123	Green Ash	<i>Fraxinus pensylvanica</i>		10					0								
124	Green Ash	<i>Fraxinus pensylvanica</i>		9		1			1								small nests
125	Green Ash	<i>Fraxinus pensylvanica</i>		13		1		3	4							1	3 stems, 1 branch from tree with nest downed
126	Black Willow	<i>Salix nigra</i>		18					0								
127	Black Willow	<i>Salix nigra</i>		11					0								
128	Eastern Cottonwood	<i>Populus deltoides</i>		17				1	1								3 stems
129	Eastern Cottonwood	<i>Populus deltoides</i>		16					0								
130	Black Willow	<i>Salix nigra</i>		51				1	1								active beaver chews

2014 Motor Island Nest Site Survey Data

ID	Tree_Shrub Common Name	Tree_Shrub Scientific Name	Shrub Height (ft) ²	Tree_Shrub Diameter (in)	# Nests < 20 ft Large Size	# Nests < 20 ft Small Size	# Nests > 20 ft Large Size	# Nests > 20 ft Small Size	Total Number of Nests	DCCO Carcass	GREG Carcass	GBHE Carcass	CANG Eggs	Fresh Gull Carcass	Carcass of Unknown Species	Downed Heron Nest	Additional Comments
131	Hawthorn	<i>Crataegus spp</i>	18	3					0					1			2 stems
132	Eastern Cottonwood	<i>Populus deltoides</i>		28				4	4				2				3 stems, 1 partial nest
133	American Elm	<i>Ulmus americana</i>		12					0								
134	Black Willow	<i>Salix nigra</i>		13					0								uprooted, active beaver chews
135	Green Ash	<i>Fraxinus pensylvanica</i>		21			1	9	10							1	
136	Dead			10					0								
137	Black Willow	<i>Salix nigra</i>	15	6					0								shrubby, 13 stems
138	Eastern Cottonwood	<i>Populus deltoides</i>		20					0								2 stems
139	Eastern Cottonwood	<i>Populus deltoides</i>		12					0								
140	Eastern Cottonwood	<i>Populus deltoides</i>		13					0								2 stems, small nests
141	Eastern Cottonwood	<i>Populus deltoides</i>		19				2	2								
142	Eastern Cottonwood	<i>Populus deltoides</i>		20				3	3								
143	Eastern Cottonwood	<i>Populus deltoides</i>		15				1	1								active beaver chews
144	Eastern Cottonwood	<i>Populus deltoides</i>		13				2	2								cage ripped off, active beaver chews
145	Eastern Cottonwood	<i>Populus deltoides</i>		14					0								
146	Eastern Cottonwood	<i>Populus deltoides</i>		18				2	2								2 stems
147	Eastern Cottonwood	<i>Populus deltoides</i>		14				3	3								overgrown with vitas vines
148	Eastern Cottonwood	<i>Populus deltoides</i>		24			2	9	11								active beaver chews, 5 large stems
149	Eastern Cottonwood	<i>Populus deltoides</i>		16					0								
		TOTALS			180	168	132	299	779	32	1	4	45	5	2	15	

¹ Non-native and/or NYSDEC recognized invasive species

² Includes trees with tops sheared off at ≤ 26 ft

Niagara River Area of Concern - Heron Rookery Nest Site Data Form

Site ID: H-1

Location: MOTOR ISLAND

(S. GROVE)

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Date: 11/17/2014

ID	Tree or Shrub Species	Tree Diameter in. (largest bole if multiple stems)	# of Nests				Comments (dead birds, abandoned eggs, tree/shrub health, disturbance)
			< 20 ft (large)	< 20 ft (small)	> 20 ft (large)	> 20 ft (small)	
1	PODE	16					3 CANG EGGS
2	PODE	13					
3	ULMA	5					
4	RHTY	3					SHRUB 10', 2 STEMS
5	PODE	14					
6	PODE	11					
7	SANI	4					SHRUB FORM, 18', 25 STEMS, 7 CANG EGGS
8	PODE	21					
9	ACSA	25			4	5	4 STEMS
10	ACSA	15					
11	PODE	15					ON BANK, ROOTS UNDERCUT 90%
12	SANI	36	1		1	1	4 STEMS JOINED @ BASE, DEAD TOP ON 3 STEMS
13	PODE	12				3	DYING - COVERED IN VITIS VINE, 1 PARTIAL NEST
14		6					13' TALL BROKEN TOP
15		10					
16	SANI	7					10', SHRUBBY FORM, 6 STEMS
17	PODE	14					
18	PODE	13				1	2 DEAD DECO
19	SANI	53					FRESH BEAVER CHEWS
20	ACSA	14					7 STEMS

3 CANG EGGS

General Comments/Observations:

PODE - POPULUS DELTOIDES, ULAM - ULMUS AMERICANA
 RHTY - RHUS TYPHINA, SANI - SALIX NIGRA, ACSA - ACER SACCHARINUM

Niagara River Area of Concern - Heron Rookery Nest Site Data Form

Site ID: H-1

Location: MOTOR ISLAND

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Date: 11/17/2014

ID	Tree or Shrub Species	Tree Diameter in. (largest bole if multiple stems)	# of Nests				Comments (dead birds, abandoned eggs, tree/shrub health, disturbance)
			< 20 ft (large)	< 20 ft (small)	> 20 ft (large)	> 20 ft (small)	
21	SANI	49			2	5	
22	PODE	18			2	5	
23		6					10' TOP SHEARED OFF
24		5					
25		8					
26		9					
27	SANI	45	1				VITAS VINE KILLING TREE FRESH GULL KILL 14' DEAD TOP, ROTING BOLE, TOP OFF
28	PODE	13		3	3	9	VITAS VINE KILLING TREES
29	SANI	48	1	3		1	2 STEMS, 1 BENT OVER, VITAS KILLING TREES
30	FRPE	120					ON BANK, 70% OF ROOT SYSTEM UNDERCUT
31	SANI	73		6	7	2	PARTIAL NEST, 1 DEAD DECID, 1 UNKN SPP
32	PODE	14		6			
33	PODE	24			4	7	
34	SANI	45			5	13	TREE DYING, 1 PARTIAL NEST
35		40			7	8	TREE DYING, 1 BAD NEST
36		72					20' ROTTEN, TOP SHEARED OFF
37		42					18' TOP SHEARED OFF
38		63			5	15	
39		46			3	7	2 STEMS
40		25			2	1	

General Comments/Observations:

FRPE - FRAXINUS PENNSYLVANICA

UNKN
GRHE
ACHMS

Niagara River Area of Concern - Heron Rookery Nest Site Data Form

Site ID: H-1 Location: MOTOR ISLAND

ID	Tree or Shrub Species	Tree Diameter in. (largest bole if multiple stems)	# of Nests				Comments (dead birds, abandoned eggs, tree/shrub health, disturbance)
			< 20 ft (large)	< 20 ft (small)	> 20 ft (large)	> 20 ft (small)	
41	UNKN	17					2 STEMS, FRESH BEAVER CHEWS
42	UNKN	42					2 STEMS, FRESH CHEWS
43	SANI	23					20' RESPRUTING FROM TRUNK OF DOWNED TREE, 4' CANG
44	RHTY	3					15', 47 STEMS IN APPROX 25' AREA (RADIUS), 4' CANG
45	PODE	36		4	3	12	4 CANG, 1 GULL, 1 GBHE NEST DOWN, 1 LIMB ON GROUND
46	RHTY	4					15', 53 STEMS - 25' AREA, SOME CAGES ON STEMS
47	SANI	27		3			1 PARTIAL NEST
48	ULAM	10				1	
49	SANI	23		3		1	
50	ULAM	12					
51	RHTY	3		15			15', 15 STEMS - 25' AREA (RADIUS)
52	SANI	17					18', 2 STEMS, TOP SHEARED OFF, FRESH CHEWS
53	RHTY	3					15', 19 STEMS - 20' AREA
54	ULAM	4					
55	PODE	6					2 STEMS
56	PODE	13					
57	SYVU	1					11', 9 STEM CLUSTERS IN 15' DIA AREA
58	PODE	13					
59		10					
60		16					

General Comments/Observations: ULAM - ULMUS AMERICANA, SYVU - SYRINGA VULGARIS
 UNKN - UNDETERMINED

Niagara River Area of Concern - Heron Rookery Nest Site Data Form

Site ID: H-1

Location: MOTOR ISLAND

Date: 11/17/2014

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ID	Tree or Shrub Species	Tree Diameter in. (largest hole if multiple stems)	# of Nests				Comments (dead birds, abandoned eggs, tree/shrub health, disturbance)
			< 20 ft (large)	< 20 ft (small)	> 20 ft (large)	> 20 ft (small)	
61	RHTY	3					16' 90 STEMS IN 25' RAD. AREA
62	PODE	18					2 STEMS ON SHOULDER w/ ICE DAMAGE
63	PODE	18					2 STEMS ON SHORE, ICE DAMAGE
64	SYVU	4	10	8			10' 72 STEMS 15' RADII, SOME w/ CAGES
65	PONI	23					6 NESTS & 8' OFF GROUND
66	PODE	10	6	20			1 DOWNED GBHE NEST
67	LOJA	2		1			8' 12 STEMS BENEATH CANOPY OF #66
68	PODE	29		3	7	8	2 DEAD OCCO, LOW NESTS & 10'
69		48		7	14	22	3 DEAD OCCO, 1 DOWNED GBHE NEST, 3 STEMS
70		53			18	45	7 DEAD, OCCO, 1 DEAD GBHE, 1 HERON NEST ON GRND.
71	PR/MA	4		2			8' 5 STEMS 5' AREA RADII, NESTS @ 3', 5'
72	PODE	5		4			20' 4 STEMS
73		21			5	13	2 TRUNKS
74		47		3	1	13	3 DEAD OCCO, 1 DOWNED GBHE NEST
75		5	2				25' SHRUBBY GROWTH, BENT BRANCHES
76	AIAL	2	103	32			20', 169 STEMS 30' RAD. 4 CHANG EGGS, 1 GULL
77	CACA	12	13				IN FRONT OF BSHND RHTY
78		10	6				
79		11	4				
80		8	7				

General Comments/Observations:

PONI - POPULUS NIGRA ITAL LOJA - LONICERA JAPONICA
 PR/MA - PRUNUS OR MALUS SPP. AIAL - AILANTHUS ALTISSIMA
 CACA - CARPINUS CAROLINIANA

Niagara River Area of Concern - Heron Rookery Nest Site Data Form

Site ID: H-1

Location: MOTOR ISLAND

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Date: 11/17/2014

ID	Tree or Shrub Species	Tree Diameter in. (largest bole if multiple stems)	# of Nests				Comments (dead birds, abandoned eggs, tree/shrub health, disturbance)
			< 20 ft (large)	< 20 ft (small)	> 20 ft (large)	> 20 ft (small)	
81	PODE	20		7		2	NESTS SMALL HIGH (SMALLER THAN TYPICAL OCCO)
82	AIAL	4					15 STEMS 10' RADIVS - SOME W CAGES
83	PODE	31		5	8	9	3 DEAD DCCO, 1 GBHE, 1 CANG EGG, 3 STEMS GBHE IN NEST
84	DEAD	11		1	1	3	1 OCCO
85	COSE	3		3			2 DCCO, TREE DOWNED BY BEAVER
86	DEAD	9	1				2 GBHE NESTS ON GRND
87	PODE	10		1		3	ACTIVE CHEWS
88		11	2				
89		13			3		
90		9	2				
91		9		1		1	
92	✓	9				4	1 PARTIAL NEST
93	DEAD	8					
94	PODE	11	2				
95		15	2	7			
96		8		2			
97		13			2		
98		22			4		
99	↖	13			2	10	
100	UNKN	13	4	2			1 GBHE NEST ON GRND

General Comments/Observations: DEAD - NON-LIVING COSE - CORNUS SERICIA

DEAD

Niagara River Area of Concern - Heron Rookery Nest Site Data Form

Site ID: H-1 Location: MOTOR ISLAND

Page 6 of 8 Date: 11/17/2014

ID	Tree or Shrub Species	Tree Diameter in. (largest bole if multiple stems)	# of Nests				Comments (dead birds, abandoned eggs, tree/shrub health, disturbance)
			< 20 ft (large)	< 20 ft (small)	> 20 ft (large)	> 20 ft (small)	
101	UNKN	13	2				
102	PODE	19			7	2	
103	PODE	12			2		
104	AIAL	6	4	12			25' 79 STEMS 30' RADIUS
105	RHTY	3	7	2			15' 55 STEMS 100' x 50' IN FRONT OF AIAL
106	PR/MA	10					15' 8 STEMS
107	FRPE	18			2		1 CANG EGG 2 LIVE DCCO ROOSTING IN TREE
108	ALPM	13					6 STEMS
109	PODE	16					4 STEMS, ACTIVE CHEWS
110	↓	12 18 10 11					ACTIVE CHEWS
111	↓	14					1 DCCO, 1 CANG EGG, ACTIVE CHEWS
112	PR/MA	4					15' 3 CLUMPS OF 5-8 STEMS ea, overgrown w/ VITAS
113	FRPE	16					1 DCCO, 5 CANG EGGS
114	↓	15			2		1 DCCO, 1 GREG
115	SANI	18				14	10 STEMS
116	UNKN	5		3			25' 1 CANG EGG, 5 STEMS
117	SANI	8					
118	PODE	18				3	
119	UNKN	5					
120	UNKN	9					10' SHRUB OVERGROWN w/ VITAS VINE

General Comments/Observations:

Niagara River Area of Concern - Heron Rookery Nest Site Data Form

Site ID: H-1 Location: MOTOR ISLAND

Date: 11/17/2014 Page 7 of 8

ID	Tree or Shrub Species	Tree Diameter in. (largest bole if multiple stems)	# of Nests				Comments (dead birds, abandoned eggs, tree/shrub health, disturbance)
			< 20 ft (large)	< 20 ft (small)	> 20 ft (large)	> 20 ft (small)	
121	PODE	20					
122	SANI						
123	FRPE	10					
124	↓	9		1			
125	↓	13		1		3	1 DOWNED GBE NEST, 3 STEMS, 1 BRANCH w/ NEST DOWNED
126	SANI	18					
127	SANI	11					
128	PODE	17			1		3 STEMS
129	↓	16					
130	SANI	51				1	ACTIVE CHEWS
131	CRAT	3					18', 1 DEAD GULL, 2 STEMS
132	PODE	28				4	2 CANG EGGS, 3 STEMS, 1 PARTIAL NEST
133	QLHM	12					
134	SANI	13					UPROOTED, ACTIVE CHEWS
135	FRPE	21			1	9	DOWNED GBE NEST
136	DEAD	10					
137	SANI	6					15', SHRUBBY GROWTH, 13 STEMS
138	PODE	20					2 STEMS
139	↓	12					
140	↓	13					MEDIUM

General Comments/Observations: CRAT = CRETAEGUS SOP

APPENDIX C

2104 OSPREY NEST MONITORING SURVEY DATA AND FORMS

2014 Osprey Nest Monitoring

Date	Nest ID	Start Time	End Time	Nest Status	Number of Adults	Number of Young	Age of Young	Comments
20-May-14	OSPR01	7:20:00 AM	7:30:00 AM	IA	0	0	0	No Activity
20-May-14	OSPR02	8:10:00 AM	8:30:00 AM	IN	0	0	0	No Activity
20-May-14	OSPR03	5:45:00 PM	6:05:00 PM	IA	0	0	0	No Activity
20-May-14	OSPR04	6:20:00 PM	6:30:00 PM	IA	0	0	0	
20-May-14	OSPR05	6:50:00 PM	7:00:00 PM	IA	0	0	0	Light Rain
20-May-14	OSPR06	7:10:00 PM	7:20:00 PM	IA	0	0	0	Light Rain
20-May-14	OSPR07	7:45:00 PM	8:00:00 PM	IA	0	0	0	No Activity
20-May-14	OSPR10	6:20:00 PM	6:30:00 PM	IA	0	0	0	No Activity
04-Jun-14	OSPR01	7:00:00 PM	7:05:00 PM	IA	0	0	0	Sticks Present on Platform, Likely placed by humans
04-Jun-14	OSPR05	6:05:00 PM	6:10:00 PM	IA	0	0	0	Sticks Present on Platform, Likely placed by humans
04-Jun-14	OSPR06	6:16:00 PM	6:21:00 PM	IA	0	0	0	Sticks Present on Platform, Likely placed by humans
04-Jun-14	OSPR07	8:45:00 AM	8:47:00 AM	IN	1	0	0	Adult Sitting on Nest
04-Jun-14	OSPR11	8:15:00 AM	8:20:00 AM	IA	0	0	0	Second Platform at Tiff Preserve. No Sticks present or activity observed
04-Jun-14	OSPR12	5:50:00 PM	5:52:00 PM	IN	2	0	0	1 Osprey Incubating, second bird attending nest
05-Jun-14	OSPR02	7:15:00 AM	7:21:00 AM	IN	1	0	0	1 Adult Incubating, 1 Adult Near Nest
05-Jun-14	OSPR03	8:35:00 AM	8:40:00 AM	IA	0	0	0	No Sticks on Platform
05-Jun-14	OSPR04	6:20:00 AM	6:25:00 AM	IA	0	0	0	
05-Jun-14	OSPR10	7:17:00 AM	7:21:00 AM	IA	0	0	0	Nest on Power Line, No OSPR Observed
24-Jun-14	OSPR01	6:00:00 PM	6:05:00 PM	IA	0	0	0	
24-Jun-14	OSPR02	6:15:00 PM	6:20:00 PM	IN	2	0	0	
24-Jun-14	OSPR03	6:28:00 PM	6:35:00 PM	IA	0	0	0	
24-Jun-14	OSPR04	6:28:00 PM	6:35:00 PM	IA	0	0	0	

2014 Osprey Nest Monitoring

Date	Nest ID	Start Time	End Time	Nest Status	Number of Adults	Number of Young	Age of Young	Comments
24-Jun-14	OSPR05	4:55:00 PM	5:00:00 PM	IA	0	0	0	
24-Jun-14	OSPR06	5:05:00 PM	5:15:00 PM	IA	0	0	0	
24-Jun-14	OSPR07	7:40:00 PM	7:45:00 PM	IN	1	0	0	
24-Jun-14	OSPR10	6:15:00 PM	6:20:00 PM	IA	0	0	0	
24-Jun-14	OSPR11	7:50:00 PM	7:55:00 PM	IA	0	0	0	
24-Jun-14	OSPR12	5:16:00 PM	5:23:00 PM	AD	2	0	0	
16-Jul-14	OSPR01	4:50:00 PM	4:55:00 PM	IA	0	0	0	No sign of activity
16-Jul-14	OSPR12	9:42:00 AM	9:57:00 AM	FL	2	0	0	Male present at start of observation. After approximately 2 minutes, female came incarrying fish. Male left then returned with stick. Female left with fish while male moved sticks around in nest.
16-Jul-14	OSPR03	10:30:00 AM	10:35:00 AM	IA	0	0	0	No signs of activity
16-Jul-14	OSPR-04	10:40:00 AM	10:45:00 AM	IA	0	0	0	No signs of activity
16-Jul-14	OSPR02	10:55:00 AM	11:10:00 AM	FY	1	1	4	Female present; one juvenile at nest edge, a second flying near male nearby
16-Jul-14	OSPR10	11:20:00 AM	11:25:00 AM	IA	1	0	0	Male from OSPR-02 present near nest
16-Jul-14	OSPR05	12:45:00 PM	12:50:00 PM	IA	0	0	0	No signs of activity
16-Jul-14	OSPR06	3:00:00 PM	3:05:00 PM	IA	1	0	0	Bird in area. Likely from OSPR-12
16-Jul-14	OSPR07	5:50:00 PM	6:00:00 PM	FL	2	0	0	Both birds present at nest site, but showing no signs of eggs or young.
16-Jul-14	OSPR11	6:10:00 PM	6:15:00 PM	IA	0	0	0	No sign of activity

* Header information (weather, surveyors, comments) omitted to facilitate presentation of data (see associated project database for data)

Niagara River Area of Concern Osprey Nest Observation Datasheet

Date 5/20/2014 Start Time 0700 End Time 2000 Observer(s) BEN GRIFFITH, ^{JUSTIN} SWEITZER Wind 2
 Temp (F) 58 Clouds (%) 100 Events That May Have Affected Nesting NONE
 Comments/General Assessment of Site SOME NESTS OBSERVED DURING MARSH BIRD SURVEY EFFORT.

Start Time	End time	nest ID	nest status	# of adults	# of young	age of young	Comments
0720	0730	OSPR01	IA				NO ACTIVITY
0810	0830	OSPR02	IA				NO ACTIVITY
1745	1805	OSPR03	IA				NO ACTIVITY
1820	1830	OSPR04	IN	2	0	—	1 ADULT INCUBATING, 1 ADULT NEAR NEST
1850	1900	OSPR05	IA				LIGHT RAIN
1910	1920	OSPR06	IA				LIGHT RAIN
1945	2000	OSPR07	IA				NO ACTIVITY
1820	1830	OSPR10	IA				NO ACTIVITY

Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)

Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Osprey Nest Observation Datasheet

Date 6/4/13 Observer(s) S. Grove, B. Griffith Wind 2

Temp (F) 70 Clouds (%) 60 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Start Time	End time	nest ID	nest status	# of adults	# of young	age of young	Comments
0815	0820	OSPR-11	IA	0	0	0	Second platform at Tiffit Preserve. No sticks present or activity observed.
0845	0847	OSPR-07	IN	1	0	0	
1750	1752	OSPR-12	IN	2	0	0	1 osprey incubating, second bird attending nest
1805	1810	OSPR-05	IA	0	0	0	Sticks present on platform, likely placed by humans
1816	1821	OSPR-06	IA	0	0	0	Sticks present on platform, likely placed by humans
1900	1905	OSPR-01	IA	0	0	0	Sticks present on platform, likely placed by humans

Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)

Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Osprey Nest Observation Datasheet

Date 6/5/13 Observer(s) S. Grove, B. Griffith Wind 2

Temp (F) 60 Clouds (%) 80 Events That May Have Affected Nesting _____

Comments/General Assessment of Site _____

Start Time	End time	nest ID	nest status	# of adults	# of young	age of young	Comments
0620	0625	OSPR-04	IA	0	0	0	No sticks on platform
0715	0717	OSPR-02	IN	1	0	0	
0717	0721	OSPR-10	IA	0	0	0	Nest on power line, no OSPR observed
0835	0840	OSPR-03	IA	0	0	0	Nest on power line, no OSPR observed

Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)
 Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Osprey Nest Observation Datasheet

Date 06/24/2014 Start Time 1655 End Time 1955 Observer(s) J. SWEITZER, B. GRIFFITH Wind 3
 Temp (F) 84-7 Clouds (%) 10 Events That May Have Affected Nesting None
 Comments/General Assessment of Site None

Start Time	End time	nest ID	nest status	# of adults	# of young	age of young	Comments
1655	1700	OSPR-05	IA	0	0	-	
1705	1715	OSPR-06	IA	0	0	-	
1716	1723	OSPR-12	AD	2	0	-	
1800	1805	OSPR-01	IA	0	0	-	
1815	1820	OSPR-02	IN	2	0	-	
1815	1820	OSPR-10	IA	0	0	-	
1828	1835	OSPR-03	IA	0	0	-	
1828	1835	OSPR-04	IA	0	0	-	
1940	1945	OSPR-07	IN	1	0	-	
1950	1955	OSPR-11	IA	0	0	-	

Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;
 NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)

Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks

Niagara River Area of Concern Osprey Nest Observation Datasheet

Date 7/16/14 Observer(s) B. GRIFFIN Wind 1

Temp (F) 65 Clouds (%) 50 Events That May Have Affected Nesting None

Comments/General Assessment of Site _____

Start Time	End time	nest ID	nest status	# of adults	# of young	age of young	Comments
0942	0957	12	FL	2	0	0	MALE @ START, 12 MIN ♀ ARRIVED w/ FISH MALE LEFT RETURNED w/ STICK, ♀ LEFT WITH FISH
1030	1035	03	0	0	0	0	NO ACTIVITY
1040	1045	04	0	0	0	0	NO ACTIVITY
1055	1110	02	FY	2	2	4	♀ PRESENT, 1500 @ NEST, 1 FLYING w/ MALE
1120	1125	10	EA	1	0	0	MALE FROM 02 NEAR NEST, THEN LEFT
1245	1250	05	IA	0	0	0	NO ACTIVITY
1500	1505	06	IA	1	0	0	BIRD IN GENERAL AREA, LITELY FROM #12
1650	1655	01	IA	0	0	0	NO ACTIVITY
1750	1800	07	FL	2	0	0	BIRDS @ NEST, NO SIGNS OF EGGS/YOUNG
1810	1815	11	EA	0	0	0	NO ACTIVITY

Nest Status: AD = Adult Present at Nest, Not Incubating; IN = Incubating/Brooding; YN = Young are visible in the nest;

NV = Not Visible; FL = Failed Nest; IA = Nest Inactive (Status Unknown)

Nestling Age: 1 = 0-2 Weeks; 2 = 2-5 Weeks; 3 = 5-8 weeks 4 = 7 & WKS