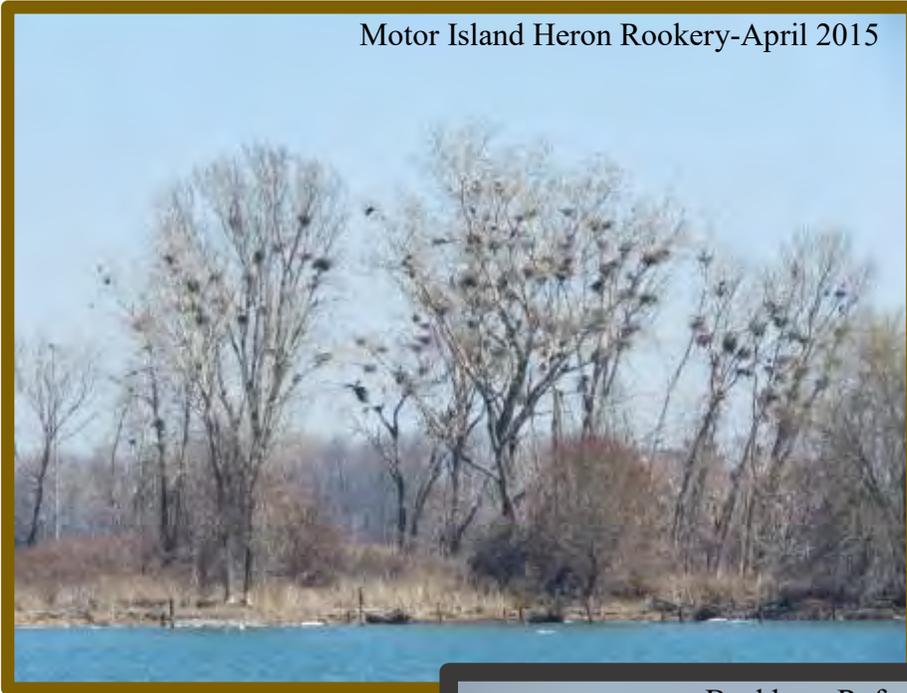


Beneficial Use Impairment Removal Project

Niagara River Area of Concern Heron and Osprey Nesting Success and Productivity Monitoring Year 2 (2015) Survey Report

Motor Island Heron Rookery-April 2015



Buckhorn Refuge Osprey Platform-June 2015



February 18, 2016

Beneficial Use Impairment Removal Project

Niagara River Area of Concern

Heron and Osprey Nesting Success and Productivity

Monitoring

Year 2 (2015) Survey Report

February 18, 2016

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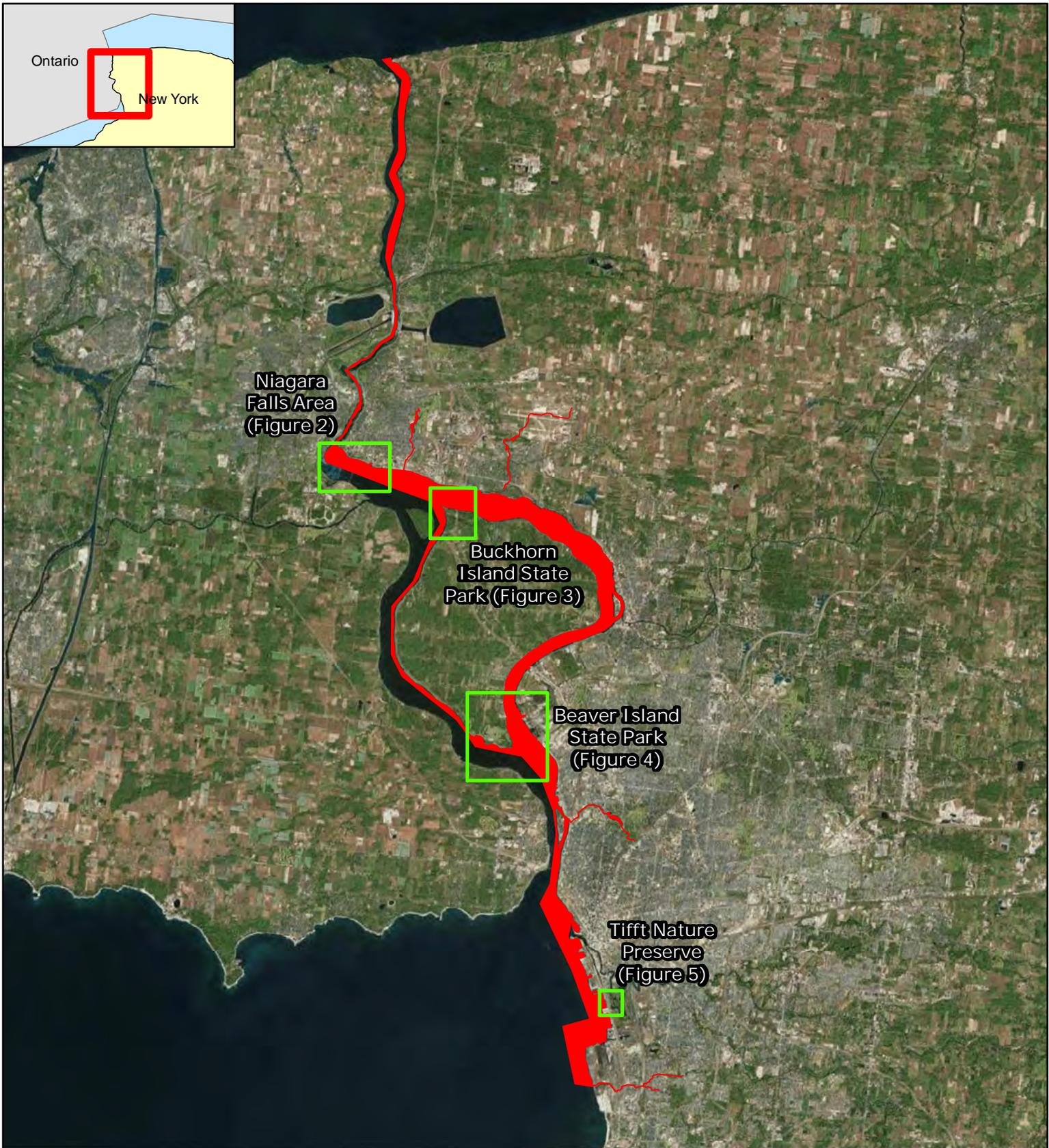
1.0 INTRODUCTION

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 flows from Lake Erie to Lake Ontario and 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 which are managed separately; 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. 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) and 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 (*Pandion haliaetus*) 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). In April 2014 a plan was developed following the criteria outlined in the Scope of Work. The plan identified 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 NR AOC and is hereafter referred to as the "Work Plan" (NewEarth 2015). The Work Plan specifically identifies methods used for monitoring nesting success and productivity of Osprey and several 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*)].



Legend

- Study Area
- Potential Heron and Osprey Nesting Areas

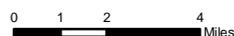


Figure 1. Site Location -
Heron/Osprey Nest
Monitoring Surveys
Niagara River Area Of Concern
Heron and Osprey Monitoring
Niagara and Erie Counties, NY

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

Prepared By:



This report provides a summary of the Year-2 (2015) 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), completed 2015 survey data forms and raw data from heron nest monitoring (Appendix B), and survey data forms and raw data from 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 Tiff Nature Preserve near Buffalo Harbor north to the mouth of the Niagara River at Lake Ontario (Figure 1).

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 Dunn 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) heron survey efforts specifically targeted three heron species; Great Egret, Great Blue Heron and Black-crowned Night-heron. Through a review of Google Earth™ imagery, coordination with NYSDEC and USFWS, and following a broad reconnaissance level survey of the NR AOC initially conducted on March 25-26, 2014 (Figure 1), three potential nest site (e.g., rookery) locations were identified for these species. Locations included: Buckhorn Weir, which is a manmade diversion weir located to the northwest of Buckhorn Island State Park (north end of Grand Island, NY); Motor Island, also known as (aka) Pirate's Island located 1,300 feet to the east of Beaver Island State Park (south end of Grand Island,

NY; and, Strawberry Island located 3,500 feet to the southeast of Motor Island. (Table 1, and Figures 3 and 4). A fourth location along the Canadian border is a potential rookery site but was determined to be outside of the survey area and was excluded from all survey efforts (Figure 2). These sites were monitored throughout the 2014 and 2015 survey for evidence of breeding activity. However as was the case in 2014, nest monitoring data was only collected at the Motor Island site due to lack of heron activity at the other sites.

Table 1. Location of Sites Monitored for Heron Nesting Activities-2015.

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

Biologists also established remote observation sites that offered views of potential rookery sites while minimizing disturbance to the birds: 1) Observation Point #1, located on a boat dock along the southeast shoreline of Grand Island; 2) Observation Point #2, located along the southeastern shoreline of Motor Island (Figure 4); and, Observation Point #3, located on a spit of land extending toward Buckhorn Weir (Figure 3).

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 identified in the Work Plan (NewEarth 2015) multiple surveys were completed in 2015 within the recommended survey windows and included a pre-breeding season site reconnaissance and five nest monitoring events 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. 2015 Heron Nest Monitoring Survey Dates.

Survey Event	Survey Dates
General Site Recon	April 17, 2015
1	April 18, 2015
2	May 16, 2014
3	June 14, 2014
4	June 28, 2014
5	July 12, 2014



Legend

-  Potential Osprey Nest Site
-  Potential Heron Nest Site



0 0.075 0.15 0.3 Miles

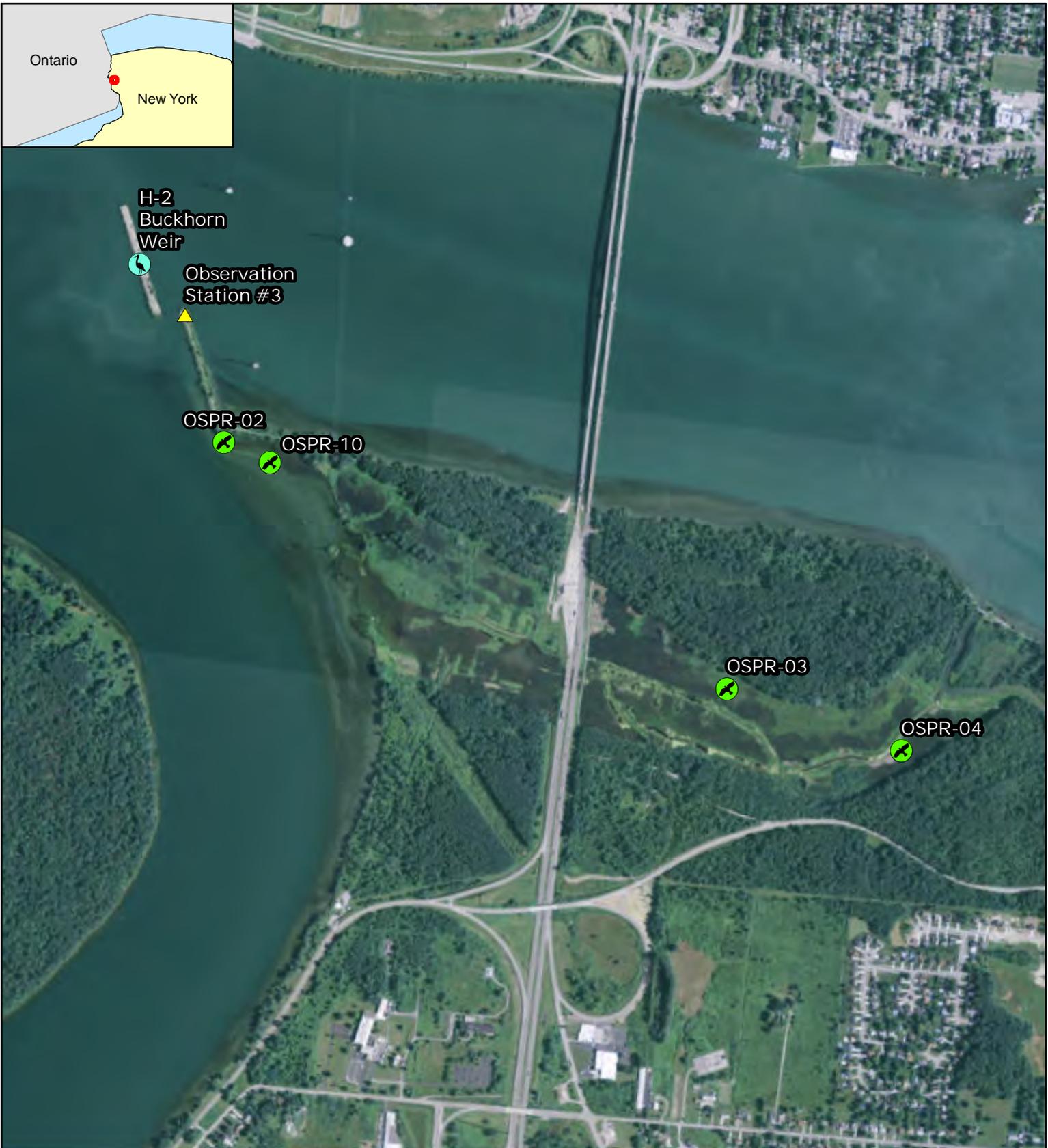
Figure 2. Surveyed Heron/Osprey Locations
Niagara Falls Area

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

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US Fish and Wildlife Service
NY Department of Environmental Conservation

Prepared By:





Legend

-  Potential Osprey Nest Site
-  Potential Heron Nest Site
-  Observation Station



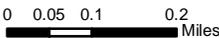


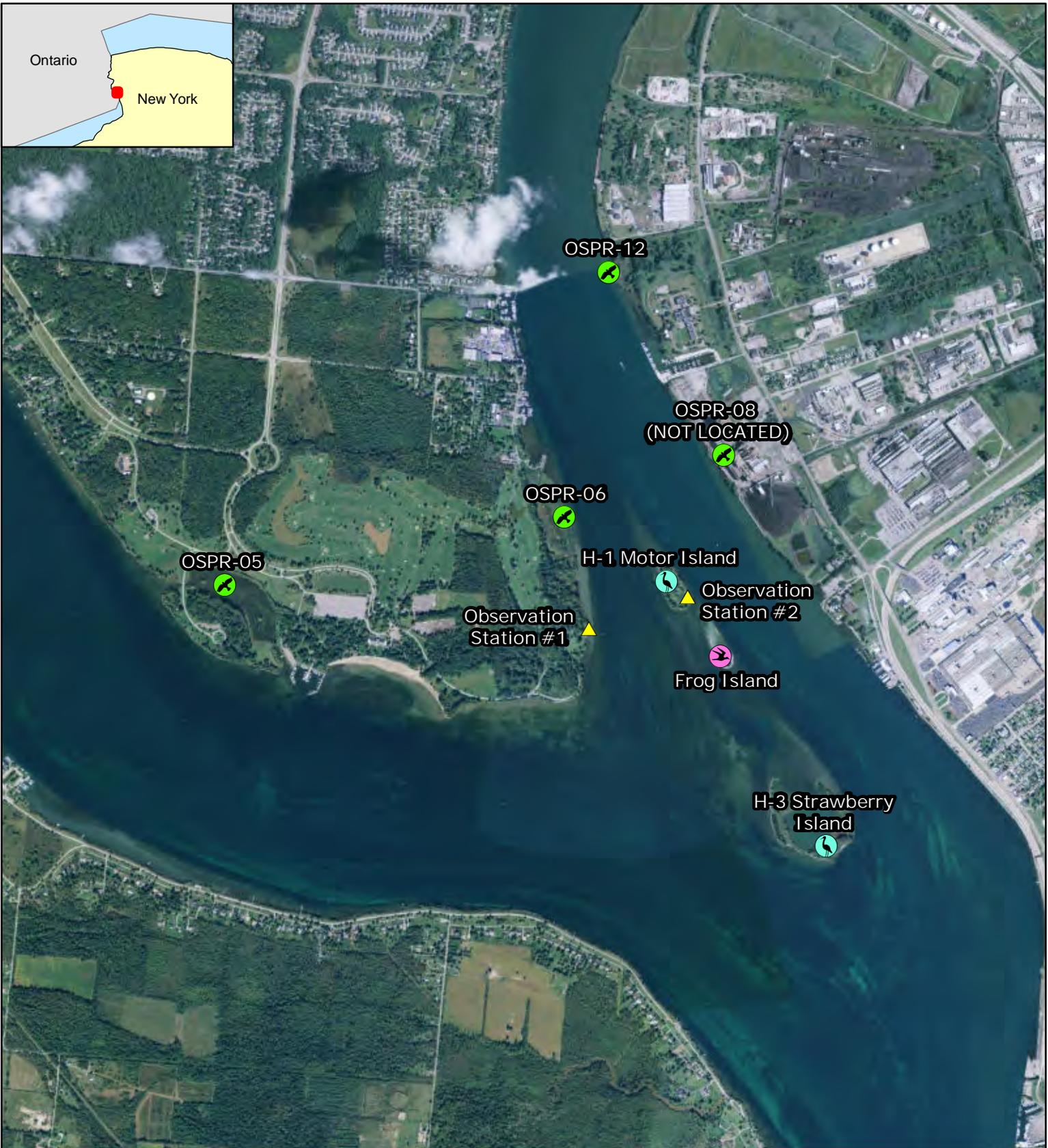
Figure 3. Potential Heron/Osprey Nest Locations Buckhorn Island State Park

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

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Legend

	Potential Osprey Nest Site		Frog Island Restoration Site
	Potential Heron Nest Site		Observation Station

Figure 4. Potential Heron/Osprey Nest Locations Beaver Island State Park

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

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 US Fish and Wildlife Service
 NY Department of Environmental Conservation

Prepared By:



2.1.3 Productivity Monitoring

Nest monitoring efforts in 2015 were modified slightly from the 2014 survey in an effort to better capture and track nesting activity. In 2014 efforts to track specific nest sites across the island were relatively unsuccessful since biologists lost sight of most of the individual nests soon after the May survey event due to dense vegetation and poor visibility from the two assigned observation stations. The 2015 survey approach attempted to improve on nest detections and tracking throughout the monitoring effort and included: 1) tracking productivity at a small subset of highly visible nests located along the eastern shoreline of the island; and 2) a count of overall nesting activity by species during each survey event, regardless of the nest location. In addition, unlike the 2014 effort during which observations were made only from remote vantage points, in 2015 per USFWS and NYSDEC approval biologists accessed the island on foot in an effort to get better visibility of nests.

Active rookery sites were monitored five times during the breeding season. The first visit in April was conducted after many adults had arrived on the rookery site and initiated courtship/breeding activities but before many had begun incubation. April surveys were conducted only from Observation Stations # 1 and 3 due to large ice flows on the Niagara River which prevented safe access to Motor and Strawberry Islands. Subsequent events utilized all remote observation stations as well as strategic locations on Motor Island and along its perimeter.

Surveys 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), which 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 was being used by Cormorants). 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 but 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 was 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 a two-week period feathers begin to emerge. By five 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 were 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 could be determined after the season had ended (e.g. predated/abandoned eggs in the nest). Nests in which adults were observed attending to a nest, but met neither the “fledged” nor “fail” conditions were considered to have uncertain status as it could not be determined whether adults ever laid in the nest or not.

2.1.4 Photographic Documentation

Photographs were taken throughout the nest monitoring events 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

Based on data from the 2014 survey effort and a site reconnaissance performed on April 17, 2015, 12 potential Osprey nest locations were targeted for observation during the 2015 effort (Table 3) and are shown in Figures 2 through 5. These locations included all known man-made platforms whether active or not (OSPR-1, 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, OSPR-

12), and sites where sources had identified Osprey activity but nests had yet to be located (OSPR-8, OSPR-9). All sites were monitored for activity during the 2015 survey effort regardless of whether Osprey were previously confirmed at the location.

Table 3. Location of Sites Monitored for Osprey Nesting Activities-2015.

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	Tiffit 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	Tiffit 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

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. The latitude and longitude of each potential nest site was recorded using a handheld GPS receiver and are provided in Table 3.



Legend

 Potential Osprey Nest Site



0 0.025 0.05 0.1 Miles

Figure 5. Potential Heron/Osprey Nest 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:
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ECOLOGICAL CONSULTING, LLC

2.2.3 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 the Work Plan (NewEarth 2015) multiple surveys were completed in 2015 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. 2015 Osprey Nest Monitoring Survey Dates.

Survey Event	Survey Dates
Pre-Breeding General Site Recon	April 18, 2015
1	May 15-16, 2014
2	June 14-15, 2014
3	June 27-28, 2014
4	July 17, 2014

2.2.4 Productivity Monitoring

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) which 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 but not incubating
- IN Incubating/Brooding
- YN Young are visible in the nest, or adult is seen carrying food to the nest site
- 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 and/or 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 between 0-2 week of age 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 could not be determined whether adults ever laid eggs in the nest or not.

2.2.5 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).

2.3 OTHER SPECIES/LOCATIONS

2.3.1 Frog Island Restoration Site

Although not specifically a component of the osprey and heron monitoring effort, biologists monitored avian use of Frog Island; a newly constructed (fall of 2014) fish habitat restoration site within the Niagara AOC (Figure 1). Frog Island is an approximately 2.6-acre roughly oval-shaped site within the Niagara River and located approximately 800 feet to the southeast of Motor Island. The site is comprised of rock berms and vegetative plantings. Surveys of Frog Island were conducted concurrent to heron monitoring efforts on Motor Island on June 14th, June 28th and July 12th. The number of each species using the site was recorded during each visit. Bird habitat restoration efforts by NYSDEC are also proposed near Strawberry Island but had not been completed at the time of this survey.

3.0 RESULTS AND DISCUSSION

3.1 HERON

A site reconnaissance survey was performed on April 17th, 2014 followed by heron nest monitoring surveys on April 18th, May 16th, June 14th, June 28th and July 12th, 2105 (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 2014 and 2015 surveys. 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.

3.1.1 Rookery Locations

The site reconnaissance in April 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 during the 2014 effort and through follow up discussions with NYDEC staff knowledgeable of the Project area (Table 1 and Figure 2). Monitoring efforts also included an evaluation of the gorge of the Niagara River downstream (north) of Niagara Falls, in June (by NewEarth biologists) and in July by NYSDEC, to follow up on reported sightings of heron and Cormorants (Adams Personal Communication 2015). Many foraging heron and Cormorant were observed throughout the AOC, particularly within the gorge north of Niagara Falls; however, no new rookery sites were found.

During 2015 monitoring activities observers assessed Motor Island, Strawberry Island and Buckhorn Weir (Figures 3 and 4) for nesting activity, although since the onset of this monitoring effort in 2014 heron breeding/nesting has only been confirmed at the Motor Island rookery site (identified as H-1 on Figure 4). Despite the lack of heron activity biologists continued to visit all three sites during the nesting season to monitor the areas. Motor Island has been used as a rookery site for target heron species since at least 2002 (Adams Personal Communication 2015, Weseloh Personal Communication 2016). Populations of herons and Cormorant on Motor Island started to increase in 2011 when bald eagles (*Haliaeetus leucocephalus*) began visiting nearby Strawberry Island, which is located 3,500 feet from Motor Island. Both heron and Cormorants were known to nest on Strawberry Island but have not been observed nesting on the island since 2013 when the bald eagles began nesting there (Adams and Walters 2014). Buckhorn Weir is not known to have previously supported nesting heron species but was once home to thousands of nesting terns and is thought to provide suitable habitat for nesting heron (Adams and Walters 2015). The weir site is currently dominated by over 10,000 pairs of ring-billed gulls and nearly 100 pairs of Cormorants (Adams and Walters 2015).

Based on current knowledge of rookery locations 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. If approved and logistically feasible future more intensive reconnaissance

surveys are recommended in the upper Niagara River (Fort Erie to Grand Island) and in the lower Niagara River from its mouth to approximately Devil's Hole) in an effort to identify additional sites. 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. Identifying and protecting those nest sites that exist are key in conservation efforts for these species.

3.1.2 Productivity Monitoring

Island-wide Monitoring on Motor Island

April surveys of the Motor Island rookery were conducted from Observation Station # 1. The island itself was not accessed in April due to large chunks of ice on the river which posed a safety threat. Despite the limited visibility of the entire island from this vantage point, nests of Great Blue Heron and Cormorant are mostly located in upper portions of large trees and were quite visible given that the trees were without leaf cover. These species had their highest reported numbers during the April event; consistent with 2014 results (Table 5). By the May survey event Motor Island and Observation Station # 2 were accessible, allowing for greater coverage of other areas of the island not previously visible from Observation Station #1. During these surveys biologists were able to obtain better visibility of other areas of the island, particularly the shrub and sapling trees that are dominated by the smaller heron species. Unfortunately, by May leaf growth had already significantly concealed many nests (see photographs in Appendix A). In an effort to remedy this, biologists initially entered onto portions of Motor Island on foot to track nests from alternate locations. However, the movements within the island caused distress to the nesting birds and as a result biologists limited their activities to the locations along the perimeter of the island that did not cause disturbance to the herons. This approach facilitated the overall monitoring of breeding activities but still fell short of allowing biologists to consistently track most of the individual nests.

The highest number of active nests observed during any one survey event, based on presence of tending or incubating adult or chicks, included 117 pairs of Great Blue Herons, 57 pairs of Black-crowned Night Herons, 41 pairs of Great Egrets and 87 pairs of Cormorants (Table 5). Of these, the highest number of nests with confirmed young in the nest included 84 Great Blue Herons (72% of the Great Blue Heron nests believed to be active), 34 Black-crowned Night Herons (60% of the nests believed to be active), 18 Great Egrets (44% of the nests believed to be active), and 77 Cormorants (89% of the nests believed to be active). In all cases, the relatively low number of nests where young could be confirmed is believed to be attributed to inability to see the young and tie them to specific nest locations due to the dense vegetation, and not due to low nesting success.

Table 5. Heron and Egret Nest Observations on Motor Island (April–July, 2014 and 2015).

	Black-crowned Night Heron	Great Blue Heron	Great Egret	Double-crested Cormorant¹	Inactive^{1, 4}
Nests available based on Fall 2014 island tree survey and nest count ²	168	132	180	299	
April 18 (Made from Station # 1)					23 (NA) ³
Total Number of Active Nests	8 (16)	117 (105)	21 (28)	87 (NA)	
Nests with Adults Tending	7 (13)	35 (28)	13 (17)	39 (NA)	
Nests with Adult Incubating	1 (3)	82 (77)	8 (11)	48 (NA)	
Nests with Young	0 (0)	0 (0)	0 (0)	0 (NA)	
May 16					17 (NA)
Total Number of Active Nests	57 (40)	87 (69)	41 (24)	64 (NA)	
Nests with Adults Tending	5 (3)	10 (34)	4 (5)	19 (NA)	
Nests with Adult Incubating	18 (37)	42 (6)	19 (18)	45 (NA)	
Nests with Young	34 (0)	35 (29)	18 (1)	0 (NA)	
June 14					32 (NA)
Total Number of Active Nests	8 (15)	55 (18)	9 (12)	62 (NA)	
Nests with Adults Tending	3 (2)	0 (1)	0 (3)	16 (NA)	
Nests with Adult Incubating	3 (4)	24 (0)	5 (5)	46 (NA)	
Nests with Young	2 (9)	31 (17)	4 (4)	0 (NA)	
June 28					39 (NA)
Total Number of Active Nests	2 (3)	84 (10)	8 (5)	79 (NA)	
Nests with Adults Tending	0 (0)	0 (0)	(0)	0 (NA)	
Nests with Adult Incubating	0 (0)	0 (0)	(0)	2 (NA)	
Nests with Young	2 (3)	84 (10)	8 (5)	77 (NA)	
Chicks Nearby-not on nests ¹	17 (NA)	0 (NA)	31 (NA)	0 (NA)	
July 12					74 (NA)
Total Number of Active Nests	4 (NA)	49 (NA)	10 (NA)	71 (NA)	
Nests with Adults Tending	0 (NA)	0 (NA)	0 (NA)	0 (NA)	
Nests with Adult Incubating	0 (NA)	0 (NA)	0 (NA)	0 (NA)	
Nests with Young	4 (NA)	49 (NA)	10 (NA)	71 (NA)	
Chicks Nearby-not on nests ¹	22 (NA)	16 (NA)	19 (NA)	0 (NA)	

¹ NA = Not Applicable (parameter not tracked in 2014).

² GBHE Nest = those above 20 ft. and large (relative to others in stratum); DCCO Nest = above 20 ft. and small; GREG Nest = below 20 ft. and large (relative to others in stratum); BCNH Nest = nest below 20 ft. and small.

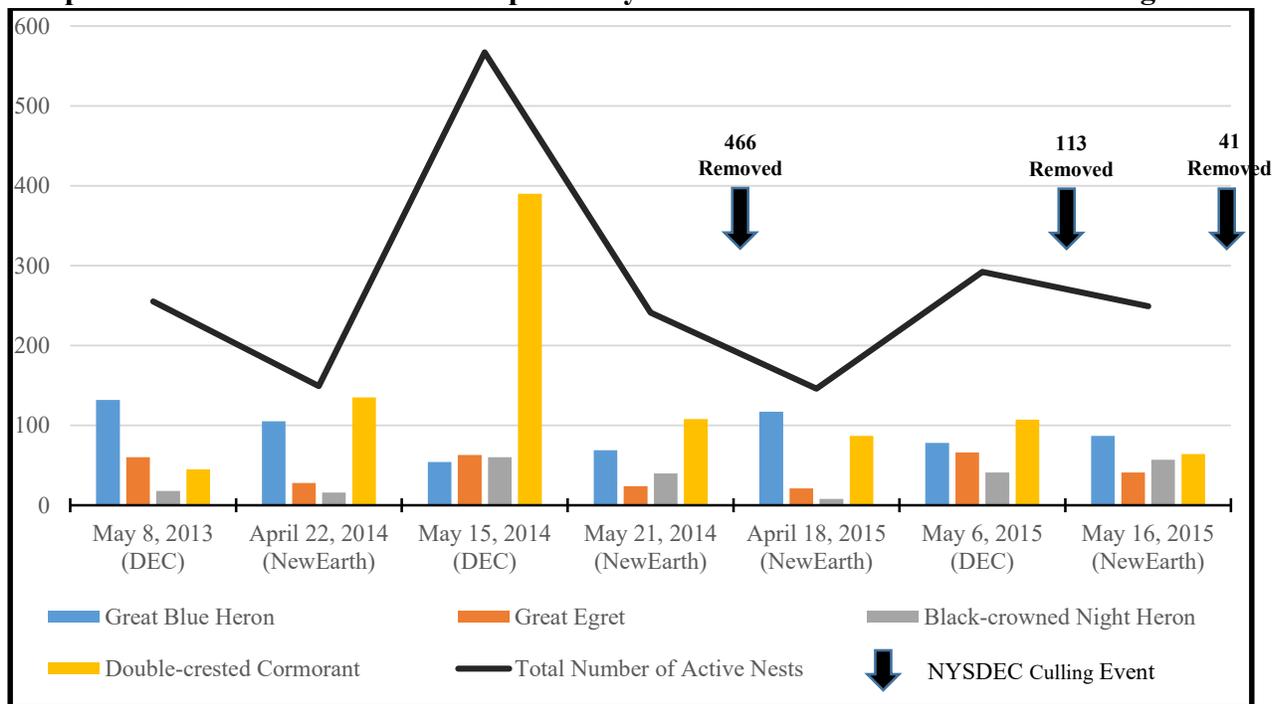
³ 2014 results are in parenthesis.

⁴ Inactive nests included any visibly empty nest (not a total count of all possible nests that were unused).

In comparison, based on survey events conducted on Motor Island on May 6, 2015 by NYSDEC staff, 78 pair of Great Blue Herons, 66 pair of Great Egrets, 107 Cormorants, and 41 Black-crowned Night Herons were using the island (Walters 2016) (Graph 1).

Graph 1 summarizes data collected on Motor Island by NYSDEC since 2013 when the numbers of target species on the island began to rise, and by NewEarth in 2014 and 2015. A noted increase in the overall numbers of active nests for all species as reported by NewEarth from 2014 to 2015 (Graph 1). This may be a reflection of the change in survey approach used by NewEarth, whereby observers accessed portions of the island on foot to locate nests; subsequent surveys in 2016-2018 will help to evaluate this. Nevertheless, there is a shift from Cormorant as the most commonly observed nesting species during NewEarth surveys in 2014 to Great Blue Heron in 2015, and this shift can likely be attributed to NYSDEC Cormorant culling efforts in 2014 and 2015. Based on an evaluation of photographs alone one can see higher numbers of individual Cormorant in April 2014 compared to April 2015 following culling (Appendix A; Photographs). Not reported are the numbers of each species that were observed on the island but were not paired or tied to nest sites.

Graph 1. Number of Active Nests Reported by NYSDEC and NewEarth-2014 through 2015.



Nearly all heron nesting activities had been completed by late-June. Nonetheless, biologists visited the site on July 12th to perform a follow up count, during which they identified 49 nests with Great Blue Heron chicks, 4 nests with Black-crowned Night Heron chicks, 10 nests with Great Egret chicks, and 71 nests with Cormorant chicks (Table 5). All chicks were fully-developed and many were observed near the nest site, but out of the nest. Additionally, 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. Numbers of active nests were

not reported for the July 2014 survey since most chicks were off their nests by mid-July and the lack of foot access onto the island (per the survey protocol) made it impossible to get a reasonable count of those that remained within the dense vegetation. The change in survey approach in 2015 made the July count possible.

Nesting activity was confirmed at only 39% of the estimated 779 heron and Cormorant nests believed to be available on Motor Island (NewEarth 2015). This is without question a low estimate of nest use given the poor visibility of nest sites during the peak of nesting activities. In many areas of the site, young chicks could be heard in relatively large numbers within the vegetation, but many were not visible despite attempts to utilize a number of different locations as vantage points. A wide diversity of tree species and size classes undoubtedly continue to be used by the target species and nearly every species of tree and shrub available on the island has evidence of nesting activity (i.e., fresh guano stains and food scraps). 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 continues to be in overall good health, although many bare areas and sloughing bark of trees was observed and is likely indicative of declining tree/shrub health. Beaver activity, the spread of grape vines, natural succession, and even the roosting activities themselves (particularly the highly acidic avian guano) each pose threats to the vegetation that 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.

Subset Nest Site Monitoring

A subset of 28 Great Blue Heron and Double-crested Cormorant nests were tracked throughout the May to July period. Biologists attempted to identify a subset of Great Egret and Black-crowned Night Heron nests for tracking, but by May the vegetation was already too dense to observe from a distance and attempts to get closer agitated the birds and caused many to flush from their nests. The effort to track egret and Black-crowned Night Heron nests within the shrub and sapling tree layer was abandoned rather than risk unintended negative consequences for the nesting birds.

A total of 28 nests were included in monitoring, this includes 27 nests originally identified in May and another which was active, but not discovered until late in the monitoring effort. Of the 28 nests monitored, the highest number of active nests observed during any one survey event, based on presence of tending or incubating adult or chicks, included 16 active Great Blue Heron nests and 10 active Cormorant nests (Table 6). However, this result is somewhat misleading. As with attempts to monitor the larger rookery, some active nests that were visible at the onset of monitoring were concealed as the monitoring progressed, and activities at other previously

undetected nests became more obvious as young grew. Seven of the 27 nests originally visible in May, were not visible beginning in June (26% of the original nests) and remained concealed throughout the monitoring effort. This included five active Double-crested Cormorant nests and two active Great Blue Heron nests. Nesting success and productivity at these nests could not be determined. Another nest was not noticed during the May event, but was discovered after the June 14th event; leaving 21 nests that could be tracked enough during the monitoring effort to determine productivity. Of these 21 nests, 12 were Great Blue Heron, which produced 22 young (average of 1.83 chicks per nest), and six were Cormorant which produced seven young (average of 1.17 chicks per nest).

Table 6. Results of Subset Nest Site Monitoring-2015.

Species	# Nests Adults Incubating	# Nests with Chicks	# Chicks Visible in Nest	# Nests Inactive	# Nests Not Visible	Total Nests	# Nests Active	Average # Chicks per Nest
May 16								
GBHE	12	2	4			14	14	2.0
DCCO	10	0	0			10	10	0.0
Inactive				3		3		
Not Visible ¹					1	1		
						28	24	
June 14								
GBHE	0	16	31			16	16	1.9
DCCO	4	0	0			4	4	0
Inactive				0		0		
Not Visible ¹					8	8		
						28	20	
June 28								
GBHE	0	12	20			12	12	1.7
DCCO	1	5	6			6	6	1.2
Inactive				3		3		
Not Visible					7	7		
						28	18	
July 12								
GBHE	0	8	9			8	8	1.1
DCCO	2	4	5			6	6	1.3
Inactive				7		7		
Not Visible					7	7		
						28	14	

¹ One nest discovered after June 14th survey event.

Three Great Blue Heron nests failed, whereas no Cormorant nests failed despite culling efforts on the island. Two dead Cormorant were observed in the subset nest site following NYSDEC culling efforts, but only one instance was noted of a Great Blue Heron occupying a nest formerly occupied by a Cormorant and this was not at one of the nests a dead/culled Cormorant was noted. If Cormorant were culled at a level sufficient for nest abandonment, those nests may have been one of the five nests that became concealed, or other DCCO took over incubation efforts at those nests before observers were able to document the re-nesting. No actual displacements of Great Blue Heron by Cormorant were observed.

3.1.3 Incidental Observations

Bald Eagles, a state Threatened species, were observed nesting on Strawberry Island and were seen flying in the vicinity of Motor Island on at least one occasion during most survey events. Eagles were also observed along the shoreline 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. Eagles are a desirable species in the NR AOC, although their presence may be detrimental to the target heron species. Heron and Cormorant reportedly nested on Strawberry Island prior to the arrival of bald eagles on the island in 2011, and their presence on the island is believed to be the reason behind large increases in the numbers of colonial waterbirds on Motor Island since 2013 (Adams and Walters 2014). 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.

Many state Threatened Common Tern (*Sterna hirundo*), and Caspian Tern (*Hydroprogne caspia*, formerly *Sterna caspia*), were observed flying, foraging, and roosting in and along the Niagara River during 2015 surveys and relatively high numbers were confirmed on the newly established Frog Island restoration site. Reports by NYSDEC indicate increased sightings of terns throughout the NR AOC (Adams and Walters 2014). This suggests that these protected species are benefitting from restoration efforts in the NR AOC.

3.1.4 Disturbances Noted During Survey Efforts

Numerous disruptions to nesting and roosting herons were noted throughout the survey effort and primarily included recreational boaters that encroached close to the edge of the island, and also excessively loud jet boats on the river. In addition, wakes from boats overtopped many of the rock structures at Frog Island and caused birds to disperse from the site. Wakes of this nature would likely make most of the island unproductive if used as avian nesting sites. Additional signage and enforcement of speed limits and resource protection zones would likely help to reduce these types of disturbances.

NYSDEC Cormorant removal efforts (i.e., shooting), took place on Motor Island on May 13th and May 21st, followed by the oiling of Canada Goose eggs in June; during peak heron breeding activities. One hundred fifty-three (153) Cormorants were reportedly eliminated during the culling effort (Walters Personal Communication 2016). While the control efforts most certainly cause disturbance to all birds nesting on the island, there is high potential for Cormorant numbers to

increase to the detriment of desirable target species in the rookery without lethal control measures. Although several dead Cormorants were observed on the island following the control effort, there were no significant changes noted in the number of active nests sites for Great Blue Heron or Cormorant following the culling effort (Table 5, Table 6). Based only on two years of data, the notable difference appears to be a reduction in the numbers of Cormorants returning to the island the following breeding season (Graph 1).

3.2 OSPREY

A site reconnaissance survey was performed on April 18, and Osprey nest monitoring surveys were conducted on May 15th and 16th, June 14th and 15th, June 27th and 28th and July 12th, 2015 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 in April, 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).

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 7). 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 upstream (south) and downstream (north) 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 (Table 7). 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 7 shows the structure and type of nest platforms monitored during this effort and the identification code assigned to each HIP-related platform by NYPA. Due to interferences with power line activities, the natural nest at Site OSPR-10 was removed in 2007 and was relocated to a man-made nesting platform (OSPR-2) (Gerlach Personal Communication 2016). 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) from 2009 through 2012.

Table 7. Osprey Nest Site Types and Corresponding New York Power Authority Identification Number.

Site ID	Location	Structure/Nest Site Type	Corresponding NYPA ID ¹
OSPR-1	Adams Slip, Niagara Falls	Untreated wood pole/ manmade metal nest platform	OP-6
OSPR-2	Buckhorn State Park West- Relocation, Grand Island	Untreated wood pole/ manmade metal nest platform	OP-1, originally relocated nest from OSPR-10
OSPR-3	Buckhorn State Park Central, Grand Island	Utility pole/ manmade wood nest platform	OP-3
OSPR-4	Buckhorn State Park East, Grand Island	Utility pole/ manmade wood nest platform	OP-2
OSPR-5	Beaver Island State Park, Grand Island	H-pile, steel, & untreated wood pole/ manmade metal nest	OP-7
OSPR-6	East River Marsh, Grand Island	H-pile, steel, & untreated wood	OP-4
OSPR-7	Tiff Nature Preserve, Buffalo	Untreated wood pole/ manmade 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/ <u>natural</u> nest	Nest relocated to OSPR-2 but Osprey rebuilt it
OSPR-11	Tiff Nature Preserve, Buffalo	Utility pole/ manmade wood nest platform	NA
OSPR-12	Tonawanda Coke Plant, Kenmore	Steel abandoned crane/ <u>natural</u> nest	NA

¹ Source: New York Power Authority 2013.

While a thorough assessment of potential natural sites (i.e., stable, large diameter trees in close proximity to suitable foraging habitat) was not conducted as part of this survey, there appears to be a lack of suitable natural structures available in the NR AOC. Of the 10 Osprey nest sites monitored, all were either platforms installed specifically for Osprey nesting (OSPR-2, OSPR-7) or natural nests that were built on man-made structures (OSPR-12) (i.e., utility poles, cranes, abandoned structures). This validates the usefulness of nest platform 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 nest platforms as well as many additional man-made features (utility poles, abandoned equipment and structures) are available within suitable habitat in the NR AOC, and are not being utilized. This suggests that the density of suitable structures has likely been maximized for the number of Osprey currently using the AOC.

3.2.2 Productivity Monitoring

Consistent with 2014 observations, Osprey incubation/brooding was confirmed at three of the ten potential nest sites located during the 2015 effort (30%); recall, two potential sites (OSPR-8, OSPR-9) were never located. An Osprey consistently attended a nest throughout the season at a fourth nest site (OSPR-5), but did not successfully pair/mate. The same three nest sites were active in 2015 as were used in 2014 and included two on man-made nest platforms (OSPR-2, and OSPR-7), and one on an abandoned crane in the Tonawanda Coke facility (OSPR-12) (Table 8). In 2014 two of the three sites failed prior to fledging young, but in 2015 all three sites fledged young; for a total of six chicks produced within the Niagara AOC (up from the two fledged in 2014). The mean brood size was two young per successful nest.

Table 8. Summary of 2015 Osprey Nest Status.

Site ID	General Location	Nest Status ¹					2015 Final Status	2014 Status
		April	May	June (1)	June (2)	July		
OSPR-1	Adams Slip	IA	IA	IA	IA	IA	No signs of activity noted.	No signs of activity noted.
OSPR-2	Buckhorn SP	IA	IN	YN	YN	YN	Successfully fledged three young.	Successfully fledged two
OSPR-3	Buckhorn SP	IA	IA	IA	IA	IA	No signs of activity noted.	No signs of activity noted.
OSPR-4	Buckhorn SP	IA	IA	IA	IA	IA	No signs of activity noted. Platform needs	No signs of activity noted.
OSPR-5	Beaver Island	AD	AD	AD	AD	IA	One adult consistently at nest platform, no evidence of nesting.	No signs of activity noted.
OSPR-6	East River	IA	IA	IA	IA	IA	No signs of activity noted.	A pair in area, but no use of nest site.
OSPR-7	Tiff	IA	IN	IN	YN	YN	Successfully fledged one young².	Nest active, but ultimately failed.
OSPR-8	Power Plant	NA	NA	NA	NA	NA	No structure or nest site found.	No structure or nest site found.
OSPR-9	Sewer Plant	NA	NA	NA	NA	NA	No structure or nest site found.	No structure or nest site found.
OSPR-10	Buckhorn	IA	IA	IA	IA	IA	Occupied by a duck (unknown species) in May, then empty	Male observed near nest site; no nesting activity noted.
OSPR-11	Tiff	IA	IA	IA	IA	IA	No signs of activity noted. Platform needs	No signs of activity noted.
OSPR-12	Tonawanda Coke	IA	IN	YN	YN	YN	Successfully fledged at least two young.	Nest active, but ultimately failed.

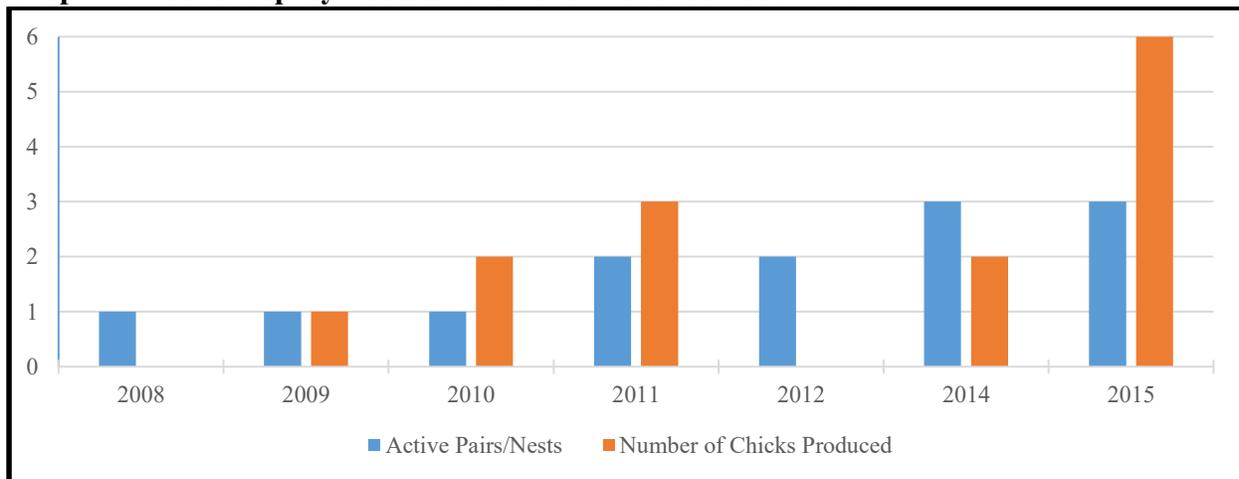
¹ Nest Status Codes: AD = adult present at site, not incubating; FL = failed nest; FY = young fledged/ready to depart nest; IA = inactive (status unknown); IN = incubating/brooding; NA = no nest site located; YN = hatched young in nest.

² Also confirmed by refuge manager David Spiering.

Many of the man-made nesting platforms monitored had several scattered twigs on them, but only OSPR-2, OSPR-10, and OSPR-11 had actual nests. The nest at OSPR-10 was occupied by a duck species through at least mid-May and then was abandoned. 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.

The mean number of young produced from the three pairs actively nesting in the area (average of 2.0 chicks per pair) is much higher than the 0.67 mean number of chicks fledged per pair in 2014, and is typical of the highly variable Osprey productivity in the Niagara AOC (Graph 2). Results from the only known consistent nest monitoring effort in the NR AOC prior to this study found that six chicks have been fledged from the area since installation of nesting platforms in 2007, including one in 2009, two in 2010, three in 2011, and none in 2012 (NYPA 2013). 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 2008 (Adams 2015, NYPA 2013). Overall, the aquatic resources available for foraging habitat for Osprey may be of low quality due to the types of prey species present (a high proportion of carp), high boating activity, shallow water depths, and fast flowing water. The high level of disturbance and noise in the general area of nesting platforms may also be a contributing factor. Nesting Osprey may be more inclined to utilize areas outside of the study area which are less developed and have deeper relatively slow moving water, and an abundance of preferred prey species.

Graph 2. Active Osprey Nests and Chicks Produced 2008-2015.



Nest Site OSPR-2, in Buckhorn State Park, was installed in 2007 and hosts the oldest known successfully nesting pair of Osprey in the NR AOC. This relatively remote site produced two chicks in 2014 and three in 2015. Previous monitoring efforts report one chick fledged in 2009, two in 2010, two in 2011, and none in 2012 (NYPA 2013) (Graph 2). 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 2007 when maintenance work was done on the power lines (Gerlach Personal

Communication 2016). Since then, Osprey again built a nest on the power lines (nest OSPR-10). Nest OSPR-10 hosted a duck species early in the breeding season, but the site was abandoned mid-summer. The nest site on the abandoned Tonawanda Coke Plant crane (OSPR-12) is the oldest known nest site in the Niagara AOC, but activity at the nest is inconsistent and the nest is known to fail often (NYPA 2013, Adams Personal Communication 2015). A pair hatched two young at the nest in 2014, but the nest ultimately failed. In 2015, at least two young were produced from this location. The nest platform at Tiff Nature Preserve (OSPR-7) also installed in 2007, has also inconsistently hosted successful nesting pairs. One chick fledged at Tiff in 2011, the nest failed in 2012 and 2013, and one chick fledged in 2015 (NewEarth 2014, NYPA 2013).

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. Eagle activities do not appear to be affecting Osprey nesting.

3.2.4 Disturbances Noted During Survey Efforts

Excessively loud jet boat activity was noted during June and July Osprey survey efforts. Osprey roosting along the river shoreline do flush when boats approach, but it is unknown whether the disturbances are affecting nesting activities. Platforms OSPR-4 and OSPR-11 are leaning and are in need of repair/stabilization. OSPR-11 is also likely not at a suitable height for Osprey use.

3.3 FROG ISLAND RESTORATION SITE

Although the intent of the island is to provide fish habitat, the site is being used by several bird species including herons and terns. Eight species were documented on Frog Island between early June and mid-July (Table 9). Excessive boat activity/noise, close encounters of boaters to the island, and high water levels that left only small portions of the rock roosting areas exposed, resulted in limited roosting space and frequent flushing of birds from the site and would likely deter species from nesting on the small island.

Table 9. Avian Species on the Frog Island Restoration Site.

Species	June 14	June 28	July 12
Caspian Tern	0	26	36
Common Tern	0	8	92
Double-crested Cormorant	39	18	11
Great Blue Heron	3	9	5
Great Egret	0	0	7
Herring Gull	3	2	9
Ring-billed Gull	52	12	65
Spotted Sandpiper	0	0	1

4.0 CONCLUSIONS

This study is the second 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. 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.

5.0 LITERATURE CITED

- Adams, C. 2015. Personal Communication During January 5, 2015 Niagara AOC Project Team Conference Call Involving: Connie Adams, Mark Filipiski, and Jennifer Dunn of NYSDEC; Amy Roe of USFWS; and, Stacie Grove of NewEarth Ecological Consulting.
- Adams, C. 2016. Personal Communication During February 17, 2015 Niagara AOC Project Team Conference Call Involving: Connie Adams, Mark Filipiski, and Jennifer Dunn of NYSDEC; Amy Roe of USFWS; and, Stacie Grove of NewEarth Ecological Consulting.
- 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. Colonial Waterbirds of the Niagara Frontier 2014 Nesting Season. New York State Department of Environmental Conservation (NYSDEC), Region 9, Buffalo, New York. December 2014.
- Adams, C. and J. Walters. 2015. Buffalo Harbor and Niagara River Common Terns Summary of the 2014 Nesting Season. New York State Department of Environmental Conservation (NYSDEC), Region 9, Buffalo, New York. January 2015.
- Baicich, 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.
- Filipiski, M. 2012. Remedial Action Plan Stage 2 Addendum, Niagara River Area of Concern. New York State Department of Environmental Conservation. January 2012.

- Gerlach, J.D. 2016. Personal Communication via email February 17, 2016 between Connie Adams, NYSDEC and Jeff D. Gerlach, New York Power Authority, White Plains, NY Regarding Relocation of OSPREY Nests.
- 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\1T> -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>
- Walters, J. 2016. Personal Communication via Email between Jacquine Walters of NYSDEC and Stacie Grove of NewEarth Ecological Consulting Regarding 2015 Motor Island Surveys and Predator Control Efforts.
- Weseloh, Chip. 2016. Personal Communication via Emails between Chip Weseloh, of the Canadian Wildlife Service, Ontario Region and Stacie Grove, of NewEarth Ecological Consulting Regarding Banding Activities on Motor Island.

APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

Photographic Documentation
NR AOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 2 (2015) Survey



Motor Island in Leaf Off Conditions (April 2014)-note number of Individual Cormorants



Motor Island in Leaf Off Conditions (April 2015)-note Lack of Individual Cormorants Compared to 2014



Motor Island in Leaf Out Conditions (May 2015)



Motor Island in Leaf Out Conditions (June 2015)

Photographic Documentation
NR AOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 2 (2015) Survey



Motor Island From Station #1 – April 18, 2015



Motor Island From Station #1 – May 16, 2015



Motor Island From Station #1 – June 14, 2015



Great Egret Near Motor Island Rookery

Photographic Documentation
NR AOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 2 (2015) Survey



Black-crowned Night Heron



Double-crested Cormorants



Great Egret



Great Blue Herons

Photographic Documentation
NR AOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 2 (2015) Survey



Osprey Nest Platform OSPR-1



Osprey Nest Platform OSPR-2 (Active Pair)



Osprey Nest Platform OSPR-3



Osprey Nest Platform OSPR-4

Photographic Documentation
NR AOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 2 (2015) Survey



Osprey Nest Platform OSPR-5 (Adult-no pair)



Osprey Nest Platform OSPR-6



Osprey Nest Platform OSPR-7 (Active Pair)



Osprey Natural Nest on Utility Tower OSPR-10

Photographic Documentation
NR AOC Heron and Osprey Nesting Success and Productivity Monitoring, Year 2 (2015) Survey



Osprey Nest Platform OSPR-11



Osprey Natural Nest on Crane OSPR-12 (Active Pair)



Three Chicks Ready to Fledge at Nest OSPR-02



Common and Caspian Terns on Frog Island Restoration Site

APPENDIX B

2015 HERON NEST MONITORING AND NEST SITE SURVEY DATA AND FORMS

Date 4/18/15 Start Time 1000 End Time 1100 Colony Motor Island Obs Point #1 Observer(s) GROVEWind 2 Temp (F) 65 Clouds (%) 10 Events That May Have Affected Nesting _____Comments/General Assessment of Site LEAF-OFF CONDITIONS, COUNT FROM OBSV. STA 1 ONLY

Species	Nests Adult Tending	Nests Adult Incubating ¹	Nests With Chicks ²	Adults Not Tied To Nest	Dead	Empty
GBHE 117	IWT IWT IWT IWT IWT IWT IWT (35)	IWT IWT IWT IWT IWT IWT IWT IWT IWT IWT IWT IWT IWT IWT-IWT IWT II (52)	NONE	IWT IWT IWT IWT IWT III (28)	∅	IWT IWT IWT IWT III (23)
DCCO 87	IWT IWT IWT IWT IWT IWT IWT IIII (39)	IWT IWT IWT IWT IWT IWT IWT IWT IWT III (48)	NONE	IWT IWT IWT IWT IWT IWT IWT IWT IWT III (48)	∅	∅
GREG 21	IWT IWT III (13)	IWT III UNABLE TO SEE MOST OF THE AREA (8)	NONE	IWT IWT IWT III (18)	∅	∅
BCNH 8	IWT II (7)	I UNABLE TO SEE MOST OF THE AREA (1)	NONE	IWT IWT III (13)	∅	∅

¹ Indicates # of nests where incubation is taking place (each entry is the number of nests noted); ² Indicates the # chicks visible per each nest (each entry is for 1 nest)

(23)

Date 6/14/15 Start Time 1025 End Time 1415 Colony Motor Island Obs Point 2, ON ISLAND Observer(s) GROVE
 Wind 3 Temp (F) 75 Clouds (%) 100 Events That May Have Affected Nesting RAIN INTERMITTENT THROUGHOUT SURVEY
 Comments/General Assessment of Site _____

Species	Nests Adult Tending	Nests Adult Incubating ¹	Nests With Chicks ²	Adults Not Tied To Nest	Dead	Empty
GBHE 55	φ	 	2, 2, 2, 2, 2, 2, 1, 2, 1, 2, 1, 1, 1, 2, 1, 1, 2, 1, 1, 2, 2, 2, 1, 2 1, 2, 1, 3, 1, 3, 1 31 NESTS / 50 CHICKS	 		
DCCO 62	 1	 1	φ	 		
GREG 9	φ	 		 		
BCNH 8			1, 1	 		

¹ Indicates # of nests where incubation is taking place (each entry is the number of nests noted); ² Indicates the # chicks visible per each nest (each entry is for 1 nest)

32

Date 6/28/15 Start Time 1125 End Time 1540 Colony Motor Island Obs Point 2, ON ISLAND Observer(s) GROVE

Wind 3 Temp (F) 59 Clouds (%) 100 Events That May Have Affected Nesting OCCASIONAL DRIZZLE

Comments/General Assessment of Site _____

Species	Nests Adult Tending	Nests Adult Incubating ¹	Nests With Chicks ²	Adults Not Tied To Nest	Dead	Empty
GBHE	φ	φ	2, 1, 1, 2, 3, 1, 2, 1, 2, 2, 2 3, 2, 3, 3, 1, 2, 3, 3, 2, 2, 2 1, 2, 2, 3, 1, 2, 1, 2, 2, 2 2, 1, 2, 1, 2, 1, 1, 1, 1, 2, 2 2, 1, 1, 3, 2, 2, 2, 1, 1, 1 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 1	 		
DCCO	φ		1, 1, 1, 1, 1, 2, 2, 2, 1, 2, 1 2, 2, 1, 2, 2, 2, 2 2, 1, 1, 2, 1, 1, 1, 2, 1, 1, 1, 1 1, 1, 1, 2, 1, 1, 2, 2, 2, 1, 1, 1, 1 1, 1, 1, 1, 1, 2, 1, 1, 1, 1, 1, 1, 1 2, 1, 1, 1, 1, 2, 2, 1, 1, 2, 1	 	1	
GREG	φ	φ	1, 1, 1, 2, 1, 1, 1, 1, 2, 2, 1, 2 2, 2, 1, 1, 1, 1, 2, 2, 2, 1, 1 1, 1, 1	 		
	φ	φ	2, 1, 2, 3, 2, 2, 2, 1	9 NESTS / 15 CHICKS		
BCNH	φ	φ	2, 2	 		↓ 39

¹ Indicates # of nests where incubation is taking place (each entry is the number of nests noted); ² Indicates the # chicks visible per each nest (each entry is for 1 nest)

Date 7/12/15 Start Time 1250 End Time 1610 Colony Motor Island Obs Point 2, ON ISLAND Observer(s) GROVEWind 2 Temp (F) 75 Clouds (%) 50 Events That May Have Affected Nesting _____Comments/General Assessment of Site EXTREMELY DENSE VEG, CHICKS & ADULTS MOVING THROUGHOUT AREA, JUMPING FROM NEST-NEST-LIMBS

Species	Nests Adult Tending	Nests Adult Incubating ¹	Nests With Chicks ²	Adults Not Tied To Nest	Dead	Empty	
GBHE	φ	φ	2 1 2 1 2 2 2 3 3 1 1 1 2 2 2 1 2 1 1 1 1 1 1 1 2 1 1 1 1 2 1 1 1 1 1 1 1 2 2 1 1 3 1 1 1 1 1 <u>49 NESTS / 70 CHICKS</u>	DOZENS 16 CHICKS		X X X X	
DCCO	φ	φ	1 2 1 2 2 1 2 2 2 2 2 1 1 2 2 1 1 1 2 2 2 2 2 1 2 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 1 2 1 2 2 1 2 2 2 1 2 2 2 2 1 1 2 2 2 1 3 1 2 1 1 2 1 2 2 2 <u>71 NESTS / 112 CHICKS</u>		DOZENS 0 CHICKS		X X X X X X
GREG	φ	φ	3, 2, 2, 2, 2, 2, 1, 3, 2, 2 <u>10 NESTS / 21 CHICKS</u>	DOZENS 19 CHICKS		X X X	
BCNH	φ	φ	2, 2, 2, 2 <u>4 NESTS / 8 CHICKS</u>	DOZENS 22 CHICKS		X X X	

¹ Indicates # of nests where incubation is taking place (each entry is the number of nests noted); ² Indicates the # chicks visible per each nest (each entry is for 1 nest)

VERY CHALLENGING TO GET # GREG/BCNH

CHICK ADULTS - CHICKS ADULTS

RH

Control Tree



Niagara River Area of Concern Heron Colony Observation Datasheet

Date 5/16/15 Start Time 1530 End Time 1545 Colony MOTOR Obs Point ON ISL. Observer(s) GRONE
 Wind 2 Temp (F) 63 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	X					X										
2				X		X	X					1				
3					E											
4	X					X	X					2				
5	X					X	X					1				
6					E											
7	X							X				1	2	1		
8	X						X					1				
9	X						X					1				
10					E											
11	X							X					2	1		
12	X						X					2				
13	X						X					1				
14	X						X					1				
15				X		X	X					2				

Date 5/16/15 Start Time 1530 End Time 1545 Colony MOTOR Obs Point ONISL Observer(s) GROVE
 Wind 2 Temp (F) 63 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				X		X	X						2			
17				X		X	X						1			
18	X					X	X						1			
19	X					X	X						1			
20	X					X	X						2			
21				X		X	X						1			
22				X		X	X						1			
23				X		X	X						1			
24				X		X	X						1			
25	X					X	X						2			
26				X		X	X						1			
27				X		X	X						1			

Date 6/14/15 Start Time 1245 End Time 1300 Colony MOTOR Obs Point DN1SL Observer(s) GROVE

Wind 3 Temp (F) 75 Clouds (%) 100 Events That May Have Affected Nesting RAIN

Comments/General Assessment of Site FIVE DCCO HANGING OUT - NOT TIED TO SPECIFIC NEST

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							X						2	2	
2				X			X						1			
3	X							X						3	2	
4	X							X						2	2	
5	X							X						2	2	
6	X							X						2	2	
7	X							X						2	2	
8	X							X						2	2	
9	X							X						2	2	
10				X			X	X				1				
11	X							X						2	2	
12	X							X						2	2	
13	X							X						2	2	
14	X							X						2	2	
15				X			X					1				

Date 6/28/15 Start Time 1320 End Time 1340 Colony MOTOR Obs Point ON ISL. Observer(s) GROVE
 Wind 3 Temp (F) 59 Clouds (%) 100 Events That May Have Affected Nesting RAIN

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				
1	X							X					2	3	
2									X						
3	X							X					2	2	
4	X							X					1	2	
5	X							X					1	2	
6	X							X					2	2	
7											X				
8	X							X					1	2	
9											X				
10				X				X					1	1	
11	X							X					2	3	
12	X							X					2	3	
13	X							X					2	3	
14									X						
15									X						

Date 6/28/15 Start Time 1320 End Time 1340 Colony MOTOR Obs Point ON ISL Observer(s) GROVE

Wind 3 Temp (F) 59 Clouds (%) 100 Events That May Have Affected Nesting RAIN

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										X		X				
17	X							X					2	2		
18										X						
19	X							X					2	2		
20												X				
21										X			1	1		
22				X				X					1	1		
23				X				X					2	2		
24										X						
25	X							X					2	3		
26				X				X					2	1		
27										X						
28				X			X						1			New NEST

Date 7/12/15 Start Time 1455 End Time 1515 Colony MOTOR Obs Point ON ISL Observer(s) GROVEWind 2 Temp (F) 75 Clouds (%) 50 Events That May Have Affected Nesting _____Comments/General Assessment of Site DENSE VEG, CHICKS & ADULTS MOVING THROUGHOUT AREA, FEW TIED TO 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																
2										X						UNABLE TO LOCATE
3	X								X				1	3		CHICK NEXT TO NEST
4	X							X					1	3		
5	X							X					1	3		CHICK NEXT TO NEST
6	X							X	X				2	3		1 CHICK IN NEST, 1 NEXT TO IT
7																X
8	X								X				1	3		CHICK ON EDGE OF NEST
9																X
10				X				X					1	1	2	CHICK NEXT TO NEST
11																X
12	X							X					1	3		CHICK NEXT TO NEST
13																X
14									X							UNABLE TO LOCATE
15									X							UNABLE TO LOCATE

Date 7/12/15 Start Time 1455 End Time 1515 Colony MOTOR Obs Point ON 15L Observer(s) GROVE
 Wind 2 Temp (F) 75 Clouds (%) 50 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										X						UNABLE TO LOCATE
17	X								X				1	3		CHICK NEXT TO NEST
18										X						UNABLE TO LOCATE
19	X								X				1	3		CHICK NEAR NEST
20												X				
21				X			X						1			
22				X				X					1	1	2	CHICK NEXT TO NEST
23				X				X					1	1	2	
24									X							
25												X				
26				X		X		X					1	2	2	
27									X							UNABLE TO LOCATE
28				X			X						1			NEW NEST

APPENDIX C

2104 OSPREY NEST MONITORING SURVEY DATA AND FORMS

Niagara River Area of Concern Osprey Nest Observation Datasheet

Date 4/18/2015 Start Time 1132 End Time 1815 Observer(s) S.GROVE/M.GROVE Wind 2
 Temp (F) 67 Clouds (%) 0 Events That May Have Affected Nesting ALONG RIVER

Comments/General Assessment of Site OSPR SEEN FLYING TO SE OF VANTAGE PT FOR 2/10 NEAR MARSH OF MA OSPR 3,4

Start Time	End time	nest ID	nest status	# of adults	# of young	age of young	Comments
1139	1159	OSPR5	AD	1	0	0	SOME STICKS ON PLATFORM ADULT ON PLATFORM EATING FISH
1300	1320	OSPR6	IA	0	0	0	NO ACTIVITY A FEW STICKS
1320	1340	12	IA	0	0	0	NO ACTIVITY NEST PRESENT
1340	1400	08	NA	0	0	0	UNABLE TO LOCATE
1445	1505	02	IA	0	0	0	STICKS NO BIRDS
1445	1505	10	IA	0	0	0	STICKS NO BIRDS
1550	1605	04	IA	0	0	0	PLATFORM LEANING NO BIRDS
1550	1605	03	IA	0	0	0	NO STICKS NO BIRDS
1620	1640	01	IA	0	0	0	STICKS NO BIRDS
1805	1815	09	NA	0	0	0	NOT FOUND
1720	1740	011	IA	0	0	0	OSPR FLYING TO N/TO SW
1640	1700	07	IA	0	0	0	OSPR FLYING TO N/SE BETWEEN 7/11

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 5/16/2015 Start Time 0545 End Time 1855 Observer(s) S. GROVE Wind 2
 Temp (F) 57-73 Clouds (%) 2 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
0545	0605	5	AD	1	0	0	OSPRE STANDING ON PLATFORM
0620	0640	6	IA	0	0	0	
0755	0820	3	IA	0	0	0	
0820	0840	4	IA	0	0	0	
1030	1100	2	IN	1	0	0	
1030	1100	10	IA	0	0	0	NEST OCCUPIED BY DUCK SPP - INCUBATING
1205	1215	9	NA	0	0	0	NEST NOT FOUND
1230	1240	8	NA	0	0	0	NEST NOT FOUND
1315	1347	12	IN	2	0	0	
1835	1855	1	IA	0	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 6/13/2015 Start Time 0600 End Time 0905 Observer(s) S. GROVE / M. GROVE Wind 2
 Temp (F) 59-75 Clouds (%) 2-3 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
0600	0605	03	IA	0	0	0	NO NEST MATERIAL - NO ACTIVITY
0605	0610	04	IA	0	0	0	NO NEST NO ACTIVITY
0735	0750	02	NN	2	0	2	ADULT ON NEST, SECOND DELIVERING FOOD, CHICKS, NOT VISIBLE
0740	0805	10	IA	0	0	0	NO "DUCK", SOME STICKS APPEAR TO BE MISSING FROM NEST
0851	0905	06	IA	0	0	0	STICKS PRESENT (POSS PARTIAL NEST) NO BIRDS
0851	0905	05	AD	1	0	0	STICKS, ONE ADULT PERCHED ON POLE

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 6/14/2015 Start Time 0600 End Time 1738 Observer(s) S. GROVE, M. GROVE Wind 2
 Temp (F) 65-75 Clouds (%) 2-3 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
0600	0620	OSPR7	IN	2	-	-	1 ADULT ON NEST, 2 ND PERCHED @ TOP OF NEST POLE
0635	0640	OSPR11	IA	-	-	-	NO NEST
1550	1615	OSPR12	YN	2	1	2	POSS 2 ND CHICK IN NEST
-	-	08/09	-	-	-	-	NEST LOCATIONS NOT FOUND
1720	1738	01	-	-	-	-	NO NEST, 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 6/27/2015 Start Time 0500 End Time 0835 Observer(s) S. GROVE Wind 1-3

Temp (F) 59-64 Clouds (%) 100 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
0500	0505	03	IA	-	-	-	NO NEST ON PLATFORM
0550	0555	04	IA	-	-	-	NO NEST ON PLATFORM
0700	0725	02	YN	2	1	2	1 ADULT IN NEST, 1 ON SIDE THEN FLEW, JUV STRETCHING WINGS
0700	0725	10	IA	-	-	-	NEST PRESENT FORMERLY OCCUPIED BY A DUCK SPP
0735	0740	06	IA	-	-	-	
0750	0805	12	YN	2	1	2	1 ADULT FEEDING, ONE ON NEST EDGE JUV STRETCHING WINGS
0820	0835	05	IA	1	-	-	ADULT ON ROOST POLE

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 6/28/2015 Start Time 0455 End Time 1715 Observer(s) SGROVE Wind 23
 Temp (F) 57-63 Clouds (%) 100 Events That May Have Affected Nesting _____
 Comments/General Assessment of Site OCCASIONAL RAIN THROUGHOUT DAY

Start Time	End time	nest ID	nest status	# of adults	# of young	age of young	Comments
0455	0510	11	IA	-	-	-	MAP HAS NEST @ WRONG LOCATION
0637	0701	07	YN	2	1	1	1 ADULT ON NEST, 1 COMING-GOING (NO FOOD)
		08	NA	-	-	-	1 CHICK BEGGING - HUNKERED DOWN IN RAIN
/	/	08	NA	-	-	-	UNABLE TO LOCATE
		09	NA	-	-	-	UNABLE TO LOCATE
1650	1715	01	IA	-	-	-	NO EVIDENCE OF USE

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 7/12/2015 Observer(s) S. GROVE Wind 2 START TIME: 1050 END: 1735

Temp (F) 68-82 Clouds (%) 2 (50%) 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
1050	1144	2	YN	1	3	3	ADULT ON PERCH BAR, YOUNG IN NEST / 3 STRETCHING, PREENING, CALLING EXTREMELY LOUD JET BOATS BIRDS AGITATED
1200	1230	5	IA	0	0	-	NO OSPR - NO CHANGE IN NEST SIZE / SHAPE
1635	1645	12	YN	1	2	3	ADULT PERCHED NEAR NEST ON CRANE YOUNG PREENING, STRETCHING SIGNIFICANT BOAT TRAFFIC
1710	1735	7	YN	1	1	2	1 CHICK FLEDGED - CONFIRMED BY TIFT STAFF DAVID SPEIRING AFTER THIS SITE VISIT

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