Osprey Nation 2016 Report

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Osprey Nation is a project of the Connecticut Audubon Society

In collaboration with the Connecticut Department of Energy and Environmental Protection

Dedicated to the Osprey stewards of 2016

Two Osprey on nest Norwalk #1/Manresa Island (Photo by Hugh McManus)

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Executive Summary

Osprey Nation is a citizen science monitoring program organized in 2014 by the Connecticut Audubon Society, in collaboration with the state Department of Energy and Environmental Protection (DEEP). Previously, the DEEP collected data on Osprey nesting sites and population, beginning in 1969, after the Osprey population plummeted because of DDT exposure. The goal of Osprey Nation is to engage citizen scientists in collecting important data on the activity of Osprey nests, particularly the number of active nests and the number of young that successfully fledge.

In each of the three years of Osprey Nation, we have observed more active nests and fledglings due to the increasing citizen science efforts. These numbers tell us that the Osprey population continues to grow in Connecticut.

Since 2014, we have added over 200 nest locations to the Osprey Nation map. In 2016, there were 337 active nests and 490 total fledglings observed in the state, which are record numbers in the dataset. We have seen Osprey occupy new nesting sites that are further inland than their historical range along the coast of Connecticut. In 2016, Osprey Nation stewards reported new nest locations in many towns, especially those in the southern part the state such as Madison and Guilford. The trend may be due to a combination of an expanding availability of nesting platforms and abundant food sources throughout the state. This pattern indicates a healthy aquatic environment in Connecticut since Osprey eat only fish and therefore rely on aquatic ecosystems for food.

Even though the Osprey population appears to be thriving, we must continue to observe it. Osprey are predators that rely on a complex food chain and healthy aquatic environment. Their success in upcoming years can tell us how the environment in Connecticut is being upheld in the face of threats such as habitat degradation and climate change. For example, although DDT has been removed from the environment, new toxicants can present new problems. Toxicants from household items, industrial byproducts, and agricultural waste are continuously introduced into septic systems, local rivers, and Long Island Sound. We do not know the full extent of the environmental damage they cause, or how they affect fish and other aquatic organisms. By monitoring Osprey, we hope to be able to determine if and how the fish populations respond to various toxicants and whether this negatively affects the predators that eat them. Climate change also threatens the welfare of aquatic ecosystems. As temperatures warm, fish species in Connecticut may shift their range or migration timing to compensate for the changing environment. This pattern will be detectable through Osprey that cue their migration and range with the availability of fish.

"Osprey Nation is a fantastic model. It's a great citizen science effort." **~ Alan Poole, Osprey Biologist, author of *Ospreys: A Natural and Unnatural History***

Background

Osprey are fish-eating raptors that migrate seasonally. In the 1960s and 1970s, DDT exposure caused shell thinning in Osprey eggs, which resulted in failed nests and a drastic population decline (Henny and Wight 1969). In 1976, there were fewer than 10 nesting Osprey pairs in Connecticut. Since the late 1970s, the Osprey population has recovered due to a ban on DDT and efforts to create nest platforms and improve water quality (Bierregaard et al. 2014, Henny et al. 2010). Although the population is recovering well, it is still important to monitor this species as it is an indicator of environmental health (Ewins 1997).

Because Osprey rely on fish as a food source, they are good indicators of the welfare of marine and freshwater ecosystems. The success of Osprey in an area can be attributed, at least partly, to an abundance of fish and a clean water source.

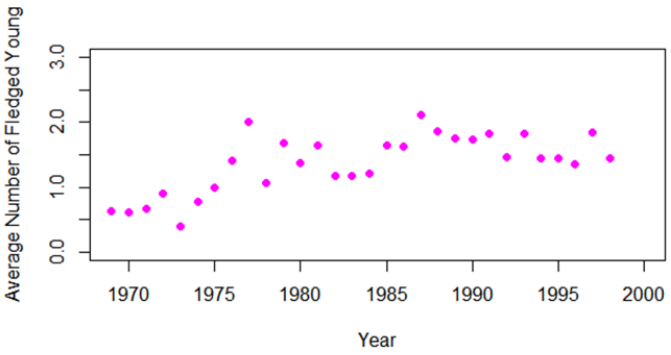
Most Osprey spend the winter in South America. Osprey migrate to New England in late March to start nest construction or maintenance. Although individuals of an Osprey pair do not spend the winter together, they will reunite every breeding season and most likely return to the same nest they have used in previous years. This high nest site fidelity is one of the many traits of Osprey that make them truly unusual in Connecticut. After repairing the nest in early spring, the pair will lay one to four eggs and take turns incubating the eggs for approximately 40 days. On average, two or three of the young per nest will survive to fledgling in a given year (Poole et al. 2016).

Once the chicks hatch, they remain in the nest for about 50 days and are fed fish by their parents. When the young start to fledge, they will remain in the nest area for two to three weeks, learning to feed independently. After this period, the fledglings leave their nest to start their southward migration. Each fledgling travels independently, and the parents generally wait to migrate until all young have left the nest. (Poole et al. 2002, Poole et al. 2016).

Osprey Nation Foundation

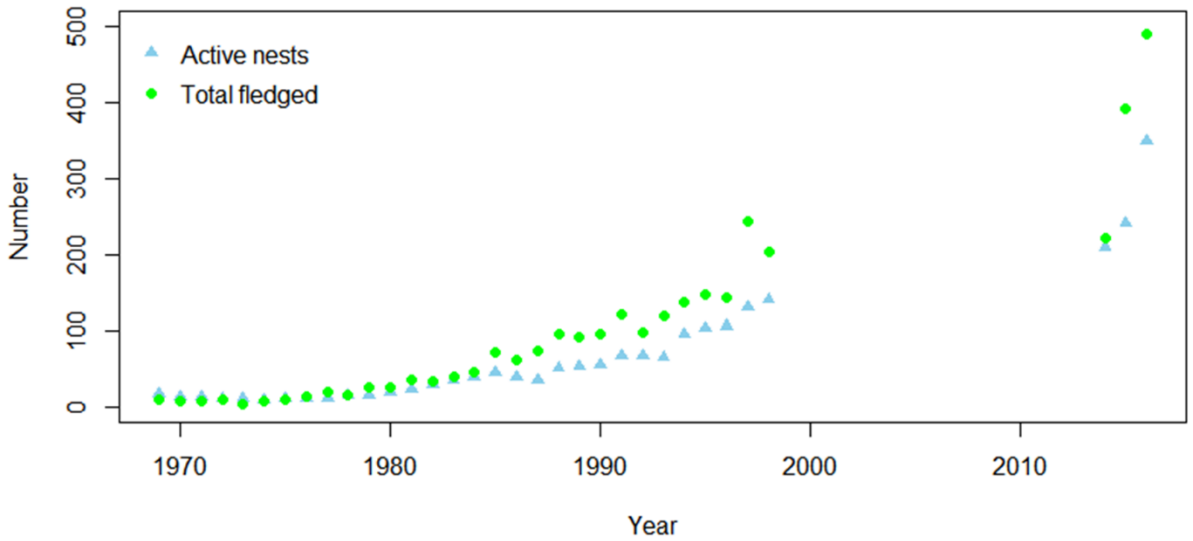
In 1969, DEEP began a long term study on the Osprey population. Each year, biologists recorded the number of active nests in the state and number of successful fledglings. These numbers were used to calculate the average number of fledged young per nest, which is a value that can be compared across years to determine the overall success of the species.

The average number of fledged young per nest has improved since its minimum in 1973 (Graph 1). This improvement goes hand in hand with the conservation actions taken to help Osprey.



Graph 1 Average number of fledged young per year from 1969 to 1999 (Data collected by DEEP)**.**

Once the adverse effects of DDT were realized, the Environmental Protection Agency banned the toxicant in 1972. The ban led to the removal from the environment as, over time, the compound broke down. Eventually the fish consumed by Osprey were no longer contaminated. This meant that adult Osprey did not accumulate DDT in their bodies, which allowed females to lay eggs with healthy shells. With strong protective shells, more chicks were able to hatch each year, allowing the Osprey population to recover (Graph 2).



Graph 2 Population trend since 1969. DEEP collected data from 1969 to 1999. After 1999, the population grew too large for the state agency to effectively monitor, so Osprey Nation was designed in 2014 to take over the role of Osprey monitoring using a citizen science program. Although there is a gap in data between 2000 and 2013, the data collected in 2014 shows that the Osprey population has been increasing since the last previous records in 1999.

The success of this species can also be attributed to citizens and organizations who built nesting platforms for the Osprey. As the population increased, there became a need for more nesting locations. Wooden platforms were built in marshes and other wetlands to encourage Osprey to nest in a safe, protected areas (Figure 1). These platforms have been instrumental in the recovery of the Osprey.

Figure 1 A wooden Osprey platform with a well-constructed nest on top (Photo by Rick Newton).

As the number of platforms increased and the Osprey population seemingly thrived, DEEP worked with Connecticut Audubon to expand the monitoring project. Although the conservation actions to help the Osprey have succeeded thus far, the preservation of this species is not guaranteed. It is important to monitor the population trends of the Osprey as they are susceptible to changes in their environments in Connecticut, along their migratory route, and on their wintering grounds. Long term monitoring of a species that was once at risk of extinction is an essential component of the Osprey conservation strategy.

With so many nests located all over the state, Connecticut Audubon designed a citizen science monitoring program as a method to efficiently collect data on Osprey nests and involve the public in this conservation effort. Since 2014, Osprey Nation has plotted over 600 nests on an interactive map found on the Connecticut Audubon Society's website, www.ctaudubon.org. Hundreds of these nests are monitored throughout the breeding season by volunteer nest stewards who are assigned to a specific nest. Stewards are asked to determine if their assigned nest is active in a given year, record observations on adult behavior, and count the number of successful young that fledge at the end of the season. Using this information collected by stewards, Connecticut Audubon has been able to resume the long term data set started by DEEP in 1969 (Graph 2). The data set can be graphed and analyzed to determine the growth of the Osprey population and understand how Osprey respond to their environment.

Data Collection

Mapping Nests

The Osprey Nation map is an ongoing project. There are many nesting sites that have not been reported to Osprey Nation yet, and many new platforms are constructed each year. One of the goals of the program is to eventually include every nesting location on the Osprey Nation map.

When we receive reports of unmapped nests, we ask the Osprey Nation steward for specific details on the location and/or coordinates of the nest. Coordinates can be found by locating the nest spot on Google Earth, and dropping a pin marker on this location. The pin provides coordinates that can be entered into the mapping system for the Osprey Nation map (Figure 2).

Figure 2 The Osprey Nation Map for 2016.

Once the newly reported nest has been located on the map, it is saved as a red pin and assigned a name and number according to the town it's in and a nearby landmark (Figure 2). For example, if a newly reported nest is the fifth in New London, and is near Bank Street, it will be titled New London #5/Bank Street. This nomenclature helps stewards easily find their nests and allows the collected data to be systematically organized.

If a mapped nest has been assigned to a steward, the pin marker is changed to the color green, indicating that it is being monitored in a given year. Red pin markers are available to interested stewards and can be requested at any point through the monitoring season, although most nests are claimed at the beginning of the reproductive season.

Steward Assignments

In the early spring of 2016, stewards from previous years were invited to a training session held by Milan Bull, Connecticut Audubon's senior director of science and conservation, who provided information on Osprey biology and observation techniques. Interested stewards then completed an online form that asked for their name and email, and the nest they wanted to monitor. Osprey Nation Coordinator Genevieve Nuttall assigned nests on a first come, first served basis. Stewards were contacted via email to confirm which nests they were assigned to monitor. Once confirmation took place, the assigned nests were marked with a green pin on the Osprey Nation map, and the steward was listed under the description of each nest, found by clicking on the pin marker.

Steward Observations

Stewards monitored their designated nests every two weeks for fifteen minutes, on average. After every monitoring session, they sent in their data reports using an online reporting form.

The online reporting system was implemented in 2016 to increase the efficiency of the data collection process. The form asks stewards for the name and number of the nest, the date of the observation, the number and activity of adults at the nest, and the number of nestlings and fledglings, along with any additional notes. In 2017, we will also ask stewards to provide information on the detailed location of their nest and the type of nest so that the nest will be easy to locate in future years.

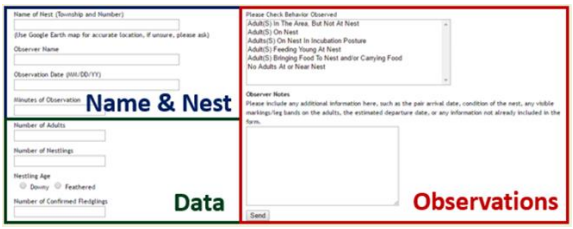


Figure 3 The template of the online reporting form which has sections for steward name and assigned nest information, data, and independent observations.

We received these reports and manually entered the data into the Osprey Nation database. The database holds the information for the entire breeding season for every nest. Although the database has been private in the past years, we will try to make it publicly accessible for stewards on the Osprey Nation webpage in the future.

We completed the data entry two to three times a week and manually transferred the information to the map so stewards and others could keep track of the activity of the nests.

The data for a specific nest can been seen by clicking on the pin marker for the nest on the map. The information for this nest will appear to the side and observations are listed in chronological order.

Pictures

Many stewards are involved in photography and ask to share the pictures of their nest with Osprey Nation. We strongly encourage stewards to send pictures as they help identify the nest, provide information on the type of nest, and capture the charisma of Osprey. When available, photos are added to the map for a specific nest (Figure 4).

Volunteer Time

Stewards record the number of minutes they spent during every monitoring session. This information will be used in 2016 by DEEP to apply for federal wildlife grants to promote conservation in Connecticut.

Figure 4 Adult on Greenwich #8/Greenwich Point Park (Photo by Lynnette Clemens).

Data from Previous Years

Osprey Nation began in 2014. Prior to this year, DEEP collected data on Osprey nests in Connecticut. Since Osprey Nation is a relatively young program, our dataset is small but it can be supplemented by DEEP's data to understand the long term population trends of Osprey in Connecticut (Table 1, Graph 3).

2016 Findings

The data collected in 2016 are consistent with the projection of an increasing Osprey population in Connecticut. In 2016, there were record numbers of nests mapped and monitored, as well as record numbers of active nests and fledglings.

This year, there were a total of 606 nest locations on the map. Some of these not monitored in 2016 may be historic (i.e. no longer present). With help from 224 stewards, we collected information on 420 of the 606 nests. Of these 420 nests, at least 337 were active (meaning that they were occupied by an adult pair). Throughout the season, at least 12 of these were abandoned and another 20 failed to produce any young. There were at least 73 nests that were not active this year.

These numbers are not exact due to some sources of potential error. Because, presumably,

not all of the nests in the state are mapped, the number of nests on the Osprey Nation map may not reflect the true number. Additionally, we know nothing of the activity of nests that were not monitored so the count of active verses inactive nests may, in reality, differ.

This gap in information becomes smaller each year as the program grows and, we hope, will eventually be inconsequential.

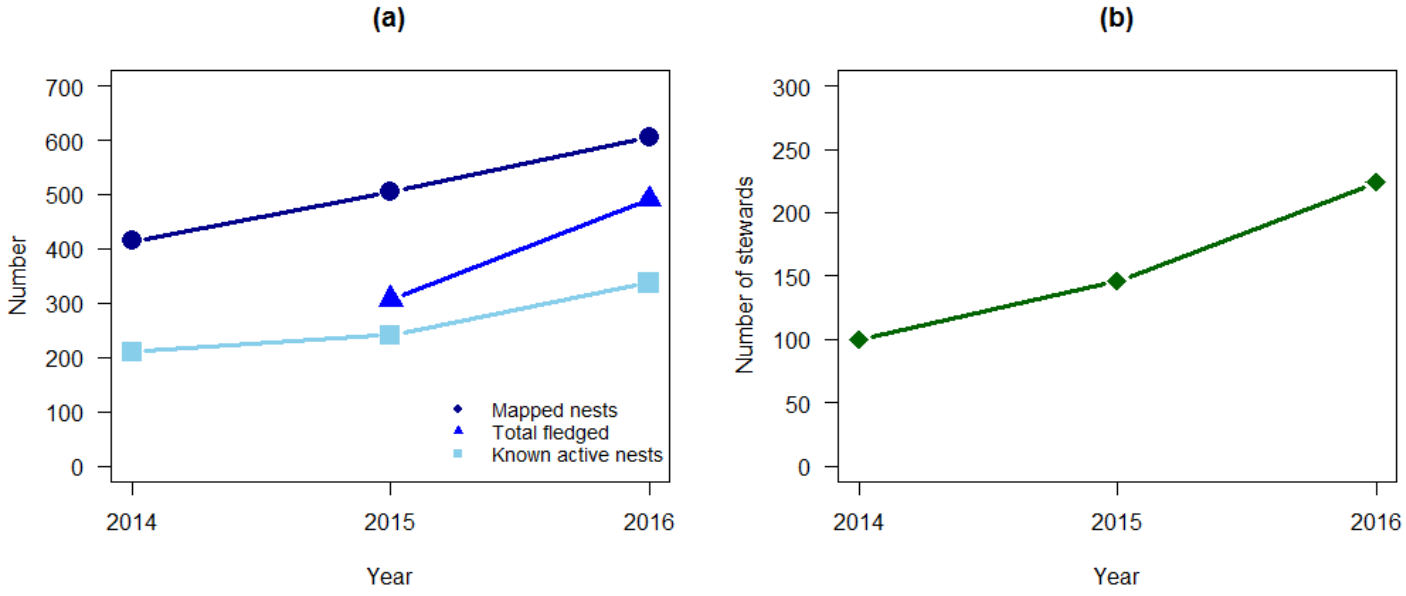
In July and August, we asked stewards to carefully observe fledglings, as the fledgling count is the most important piece of data for Osprey Nation. By mid-August, approximately 490 fledglings had been reported. If a steward was unable to observe the fledglings at a nest, we used the nestling count from the last reported date instead of a fledgling count for this nest.

We can speculate that there are more than 490 fledglings this year if taking into account the unmonitored nests. However, we can compensate for the lack of data on fledglings by finding the average number of fledglings per active nest, which eliminates the source of error associated with the unmonitored nests.

Overall, the 2016 season has been extremely successful. We know there is an increasing number of nests in the state, which indicates that the population is still growing and adult pairs need additional nesting spots. We also know from data that the number of fledglings reported this year is higher than any year in the past which may indicate an increasing population (Table 1, Graph 3).

Table 1 The data collected through Osprey Nation from 2014 to 2016. Stewards collected this information throughout each Osprey season. The increases from 2014 to 2016 reflect both an increasing Osprey population and increasing citizen science program. As more nests are monitored, we know more about a greater number of nests. When all nests are monitored in the future, the data collected will be complete. The fledgling count was not taken in 2014.

Osprey Nation Data	**2014**	**2015**	**2016**
Mapped Nest Locations	414	506	606
Stewards	100	146	224
Nests Observed	174	285	420
Active Nests	210	241	337
Abandoned Nests	9	22	12
Inactive Nests	29	34	73
Total Fledgling Count	N/A	307	490



Graph 3 The number of mapped nests, total recorded fledglings, and known active nests has increased each year since the start of Osprey Nation in 2016 (a). If the trend of steward recruitment continues, we will be able to have all nests monitored by volunteers in the future (b).

Future Work

The future of this program is promising as we engage more citizen scientists in monitoring the prospering and charismatic Osprey. In future years, we hope data will be collected on all mapped nests so that the analysis of population growth at the end of each season will be complete.

Next year, we plan to organize more training sessions at the beginning of the season, distribute monitoring guides to all stewards, and give t-shirts for stewards to wear when they are monitoring. In addition, we will try to increase the efficiency of assigning stewards to nests to avoid conflict between stewards who have requested the same nest(s).

To improve the data entry process, we will transition to a using computer program that reduces the manual data entry process. In doing so, we can keep the map fully up to date.

In addition, we hope to improve the Osprey Nation webpage to include more resources for stewards such as access to the database and a slideshow of pictures sent in by stewards.

In future years, we hope to have an individual responsible for platform construction and maintenance to help build or fix platforms when needed.

Figure 5 Fledglings representing the bright future for Osprey (Photo by Lynn Craska).

Acknowledgements

First and foremost, we would like to thank all of the 224 stewards who dedicated their time to monitor Osprey nests throughout the state. Without your efforts, we would not be able to have the important data that we need to understand Osprey population growth.

We would like to thank DEEP for its collaboration with Osprey Nation, especially, wildlife biologists Brian Hess and Jenny Dickson for their assistance.

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2016 Osprey Nation Stewards

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Rick Allison

Mark Anderson

David Arena

Mark Aronson

Betsy Arpin

Martha Asarisi

Ann Astarita

Lori Baker

Mary Barravecchia

Heidi Bartolotta

Lori Bassett

Laura Bastien

Kate Bellandese

Bruce Bentley

Jay Berardino

Marica Beres

Krista Berish

Jerry Blore

Robert Boissevain

Maura Bonafede

Lesley Borelli

Thomas Bransfield

Greg Brenner

Scott Brinckerhoff

Susan Brooks

Renee Brown

Sally Brown

Dawn Brucale

Jane Cable

Nick Calabrese

David Callan

Susan Carpenter

Richard Carrozza

Wayne Carver

Sabrina Castagna

Bonnie Castellani

Bridget Cervero

Peg Chester

Lee Ellen Chontos

Lynnette Clemens

Naomi Coleman

Becky Coley

Patricia Collins

Mark Connors

Bean Corcoran

Bob Corroon

Catherine Craighead

Lynn Craska

Glen Cummings

Kimberly Curry

Tasha Cusson

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Jo Ann Davidson

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Jim Denham

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Laurie Desmet

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Peter Dickinson

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Judy Doering

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Fiona Fine

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Jessie, Nick, and Susan Foss

Jim Frayer

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Jack Gagne

Betsy Gara

Barry Garvin

Ray Gaulke

Denise Gesner

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Linda Goodbrand

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