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Virginia peregrine falcon monitoring and management program: Year 2022 report

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VIRGINIA PEREGRINE FALCON MONITORING AND MANAGEMENT PROGRAM: YEAR 2022 REPORT



THE CENTER FOR CONSERVATION BIOLOGY
WILLIAM & MARY

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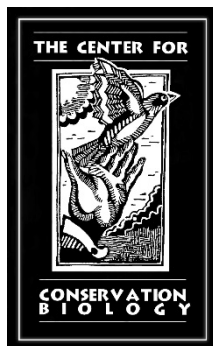
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Project Partners:

Virginia Department of Wildlife Resources
National Aeronautics and Space Administration
National Park Service
United States Fish and Wildlife Service
United States Forest Service
Virginia Department of Transportation
The Nature Conservancy
Dominion Energy
United States Coast Guard
The Center for Conservation Biology

Front Cover: Breeding female from West Norfolk Bridge that was hatched in Milford, CT. Photo by Bryan Watts.



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EXECUTIVE SUMMARY

The peregrine falcon (*Falco peregrinus*) was believed to be extirpated as a breeding species in Virginia by the early 1960s. An aggressive restoration program was initiated in 1978 that included the release of 115 captive-reared birds on the Coastal Plain (1978-1985) and 127 birds in the mountains (1985-1993). This program resulted in the first breeding of the modern era in 1982. Since this time, the population has proceeded through a rapid establishment phase followed by a consolidation phase. However, more than 95% of all breeding activity over the past 30 years has occurred on the Coastal Plain with very limited breeding within the historic mountain range. Since 2000 a dedicated translocation program has moved more than 250 birds from eyries on the coast to hack sites in the mountains in an effort to restore the mountain breeding population. Restoration of the breeding population in the mountains continues to be a management priority for the state.

In 2022, Virginia supported a known falcon population of 34 breeding pairs including 25 within the Coastal Plain, 5 in the Piedmont and 4 in the mountains. This is the highest number of occupied territories known in Virginia and compares to 32 pairs in 2020 and 30 pairs in 2019. An unusually high number of pairs (7) were not documented to make breeding attempts during the 2022 season including pairs on Saxis tower, Mockhorn tower, Possum Point stack, Norfolk Naval Shipyard, Chesapeake Bay Bridge Tunnel, White Rocks and Stony Man.

The 2022 breeding season was the second most productive in the state's history, producing 59 young. The 27 falcon pairs that were documented making breeding attempts produced at least 90 eggs, 70 of which hatched. Six (8.6%) of the 70 hatchlings did not survive to banding age. The reproductive rate was 1.9 young/occupied territory. Although this reproductive rate is lower than most recent years the population did manage eight 4-young broods. Of 82 eggs followed through to fledging, 65 (79.3%) hatched and 54 (83.1%) of hatched young survived to banding age. Seven pairs were not documented to make breeding attempts including two cliff pairs, two bridge pairs, one tower pair that was newly formed, one tower pair with owl interference and one smokestack pair where the box was moved prior to the season. Success rate for pairs that made breeding attempts and with known outcome (N = 24) was 79.2%.

Efforts continued in 2022 to identify breeding adults via field-readable bands to better understand dispersal and demography throughout the mid-Atlantic region. The banding status of 45 (66.2%) of the 68 adult peregrines known within the breeding population was determined. Eleven (24.4%) of the 45 birds were unbanded. The alpha-numeric bands were read for 28 adults and of these the USGS bands have been recorded for 25. Of the banded birds where state of origin could be determined, 22 were from VA, 3 from MD, 2 from NJ, 1 from DE, 1 from PA and 1 from CT. Birds ranged in age from 2 to 13 years old.

During the 2022 season, 5 young falcons were translocated to Shenandoah National Park and hacked. Birds were released on 31 May and 30 June 2022 and were fine on release. Twelve addled falcon eggs were recovered during the 2022 season from 7 eyries.

BACKGROUND

Context

The historical population of peregrine falcons (*Falco peregrinus*) in the eastern United States was estimated to contain approximately 350 breeding pairs, relied on open cliff faces and cut-banks for nesting, and was mostly confined to the Appalachian Mountains (Hickey 1942). The population experienced a precipitous decline throughout the 1950s (Hickey 1969) due to contaminant-induced reproductive suppression (Anderson and Hickey 1972) and was believed to have been extirpated by the early 1960s (Berger et al. 1969). The peregrine falcon was listed as endangered on the U.S. Federal List of Endangered and Threatened Wildlife (50 CFR 17.11-17.12) in June 1970. In 1975, the U.S. Fish and Wildlife Service appointed an Eastern Peregrine Falcon Recovery Team to develop and implement a recovery plan (Bollengier et al. 1979). A retrospective assessment of the historic peregrine falcon population in Virginia identified 24 historical eyries in the Appalachian Mountains (Gabler 1983). Two additional nesting sites were documented on old osprey nests along the Virginia portion of the Delmarva Peninsula (Jones 1946).

As part of a national effort to restore the eastern peregrine population, the Virginia Department of Game and Inland Fisheries, Cornell University, and the College of William and Mary initiated a hacking program for Virginia in 1978. The program involved the release of captive-reared peregrines with the hope that these birds would re-colonize the historic breeding range. Between 1978 and 1993, approximately 250 young falcons were released in Virginia. Since the close of this program, captive-reared peregrines have been released on a limited basis within the state. Such releases have involved more targeted projects. Beginning in 2000, Virginia initiated a translocation program that has moved birds from coastal territories to be hacked from mountain release sites. The program has taken advantage of young produced from sites where fledging success has been poor. More than 250 birds have been moved since the inception of the program.

The first successful nesting of peregrines falcons in Virginia after the DDT era occurred in 1982 on Assateague Island. Since that time, the breeding population has continued a slow but steady increase. The size of the known breeding population within Virginia is hovering around 30 pairs. However, both hatching rate and chick survival remain somewhat erratic in both the coastal and mountain breeding populations. An analysis by the U.S. Fish and Wildlife Service in the early 1990s of addled eggs collected in Virginia, showed levels of DDE, Dieldrin, and egg-shell thinning that have been shown previously to have an adverse impact on reproduction. An additional problem that has been suspected but not fully quantified is that the turnover rate of breeding adults appears to be high. At present, the long-term viability of the Virginia population in the absence of continued immigration from surrounding populations remains questionable. Continued monitoring and management of this population is needed to ensure that the population will continue to recover.

OBJECTIVES

The objectives of this project were:

- 1) to track the recovery of the breeding population of peregrine falcons in Virginia (both in terms of the size and distribution of the breeding population and the number of young produced),
- 2) to evaluate the success of past and present management techniques used with the breeding population,
- 3) to improve productivity of nesting pairs through active management, and
- 4) to increase our understanding of peregrine falcon natural history in the mid-Atlantic region.

METHODS

Geographic Focus

As in previous years, monitoring in 2022 was focused on the Coastal Plain where most breeding activity has been known. Additional efforts focused on mountain sites (Harding 2020) and those efforts are summarized in this report to provide a state-wide overview.

Nest Site Surveys

Between 1977 and 2009, more than 60 structures were established specifically for breeding peregrine falcons within the Coastal Plain of Virginia (Table 1). An effort was made to check all of the existing structures on the Coastal Plain that survived to the 2022 breeding season for evidence of resident falcons. An initial survey of breeding structures on the Coastal Plain was conducted between 1 March and 30 April by foot, boat or aircraft. The number of adults attending sites and/or activity within the nest box was recorded. Remaining sites on bridges or within urban areas were surveyed on the ground for occupation and activity. Sites were surveyed in the mountains by the Virginia Department of Wildlife Resources (DWR), U.S. Forest Service (USFS) and the National Park Service (NPS).

Coastal sites that were confirmed to have peregrine activity were monitored with 2-5 additional ground visits to document breeding activity, to band young and to document fledging success. A breeding territory was considered to be “occupied” if a pair of adult peregrines was resident during the breeding season. Nests were considered to be “active” if eggs or young were detected (Postupalsky 1974). Complete breeding information (e.g. clutch size, hatching rate) could not be obtained for a small portion of active sites due to poor access. However, the number of birds surviving to banding age was determined for all active sites when possible. Reproductive rates were calculated using number of chicks reaching banding age.

Table 1. Catalog of nesting structures established for Peregrine Falcons in Virginia (1977-2022). Table gives the type of structure, year of establishment where appropriate and whether or not the site was checked for Peregrine Falcon activity during the 2022 breeding season.

Site Code	Location Description	Structure Type	Year Est	2022
VA-PEFA-02	Cobb Island Tower	Peregrine Tower	1978	Y
VA-PEFA-06	Wallops Island Tower	Peregrine Tower	1981	Y
VA-PEFA-09	Watts Island Tower	Peregrine Tower	1997	Y
VA-PEFA-10	Finney's Island Tower	Peregrine Tower	1997	Y
VA-PEFA-12	Hyslop Marsh Tower	Peregrine Tower	1995	Y
VA-PEFA-13	Saxis Marsh N. Tower	Peregrine Tower	1996	Y
VA-PEFA-14	Saxis Marsh S. Tower	Peregrine Tower	1998	Y
VA-PEFA-15	Parker Marsh Tower	Peregrine Tower	1997	Y
VA-PEFA-16	Elkins Marsh Chimney	Nest Box	1995	Y
VA-PEFA-17	Elkins Marsh Shack Tower	Nest Box/Tower	1997/2004	Y
VA-PEFA-18	Wachapreague Shack Tower	Peregrine Tower	1994/2000	Y
VA-PEFA-20	Coleman Bridge Box Rt 17	Nest Box	1989	Y
VA-PEFA-21	Norfolk Southern RxR Bridge	Bridge	1992	Y
VA-PEFA-22	James River Bridge Rt 17	Nest Box	1991	Y
VA-PEFA-23	Berkley Bridge I-264	Nest Box	1996	Y
VA-PEFA-24	Benjamin Harrison Bridge Rt 106	Nest Box	1996	Y
VA-PEFA-25	Mills Godwin Bridge Rt 17	Nest Box	1996	Y
VA-PEFA-26	West Norfolk Bridge Rt 164	Nest Box	1996	Y
VA-PEFA-27	Norris Bridge Rt 3	Nest Box	1989	Y
VA-PEFA-28	Little Stony Man, SNP	Natural Cliff Face	-----	Y ^a
VA-PEFA-29	Old Rag, SNP	Natural Cliff Face	-----	Y ^a
VA-PEFA-34	Mockhorn Island Tower	Peregrine Tower	1997	Y
VA-PEFA-36	Upsher Bay Tower	Peregrine Tower	2000	Y
VA-PEFA-37	Silver Beach Range Tower	Nest Box	1997	Y
VA-PEFA-38	Hawksbill Mountain, SNP	Natural Cliff Face	-----	Y ^a
VA-PEFA-39	Concrete Ships	Nest Box	1995	Y
VA-PEFA-40	Chesterfield Substation	Nest Box	1998	Y
VA-PEFA-41	Holiday Inn VA Beach	Nest Box	1997	Y
VA-PEFA-42	Possum Point Substation	Nest Box	1998	Y
VA-PEFA-43	Newport News City Hall	Nest Box	1993	Y
VA-PEFA-45	Cargill Grain Elevator	Nest Box	1993	Y

Site Code	Location Description	Structure Type	Year Est	2022
VA-PEFA-46	Lafayette Bridge Rt 337	Nest Box	1998	Y
VA-PEFA-48	Churchland Bridge US 17	Nest Box	1999	Y
VA-PEFA-49	Yorktown Substation	Nest Box	1998	Y
VA-PEFA-51	Campostella Bridge Rt 168	Nest Box	1998	Y
VA-PEFA-52	Highrise Bridge I-64	Nest Box	1999	Y
VA-PEFA-53	ALCOA RxR Bridge	Nest Box	1999	Y
VA-PEFA-54	I-295 Bridge	Nest Box	2001	Y
VA-PEFA-56	River Front Plaza Building	Nest Box	2002	Y ^b
VA-PEFA-57	BB&T Building	Nest Box	1984	Y ^b
VA-PEFA-59	Bermuda Hundred	Nest Box	1998	Y
VA-PEFA-60	Chesapeake Bay Bridge Tunnel	Pier Cap	2004	Y
VA-PEFA-61	Tappahannock Bridge Rt 360	Nest Box	2004	Y
VA-PEFA-62	Gull Marsh Tower	Peregrine Tower	2004	Y
VA-PEFA-63	Godwin Island Box	Nest Box	2004	Y
VA-PEFA-65	Craddock Neck	Peregrine Tower	1995	Y
VA-PEFA-66	Hoffler Building Virginia Beach	Nest Box	2009	Y
VA-PEFA-67	White Rocks	Natural Cliff Face	----	Y ^a
VA-PEFA-68	Big House Mountain	Natural Cliff Face	----	Y ^b
VA-PEFA-69	Breaks Interstate Park	Natural Cliff Face	----	Y ^b
VA-PEFA-70	Pamunkey Eltham Bridge Rt 33	Nest Box	2017	Y
VA-PEFA-71	Cedar Island	Ground Nest	----	Y ^b
VA-PEFA-72	Stony Man, SNP	Natural Cliff Face	----	Y ^a
VA-PEFA-74	Birchwood Power Plant	Nest Box	2014	Y
VA-PEFA-75	Reston Town Center	Air Intake Vent	2015	Y
VA-PEFA-76	New Jordan Bridge	Pier Cap	2016	Y
VA-PEFA-77	Hazelwood Bridge	Pier Cap	2016	Y
VA-PEFA-78	Dresser Bridge Rt 5	Pier Cap	2017	Y
VA-PEFA-79	Norfolk Naval Shipyard	Unknown	----	Y
VA-PEFA-80	Ashburn Quarry	Quarry High Wall	----	Y
VA-PEFA-81	Occoquan Quarry	Quarry High Wall	----	Y
VA-PEFA-82	Jump Mountain	Natural Cliff Face	----	Y ^b
VA-PEFA-83	Knob Mountain	Natural Cliff Face	----	Y ^b
VA-PEFA-84	Westin Hotel	Hotel Balcony	----	Y
VA-PEFA-85	Fairfax Quarry	Quarry High Wall	----	Y

Site Code	Location Description	Structure Type	Year Est	2022
VA-PEFA-86	Clearbrook Quarry	Quarry High Wall	-----	Y

^a Nest monitored by NPS.

^b Nest monitored by VDWR.

Banding

An attempt was made to band all chicks surviving to banding age (18-35 d). Chicks were banded with a USGS lock-on, aluminum tarsal band on the right leg and a bi-colored, green and black, alpha-numeric auxiliary band on the left leg. USGS bands used in Virginia during the 2021 breeding season were anodized green. Band size 6 and 7a were used for male and female chicks respectively. Auxiliary bands were applied with two pop rivets. Hacked falcons were also identified with colored electrical tape applied to the USGS band for temporary identification at the hack site. Accessing nests required coordination and assistance from state, federal, NGO, and corporate partners.

Band Resights

Effort was made to identify individual breeding adults at each nest by reading band codes. Bands were identified through a Bushnell Natureview Cam HD max game camera mounted on the nest box platform, live webcams broadcast online, and by digital photos taken during visits to the nest.

Translocations

Since the early 1990s, many young have been lost at fledging age on coastal bridges. Numerous chicks have been lost in the water during early flights when they are unable to fly back up to nest structures. Other chicks have flown down to the roadbed and been killed by automobiles.

In order to improve survivorship for high-risk sites, a program was initiated to translocate chicks to mountain release sites. Chicks are typically removed from nest sites, transported to mountain sites, and released using standard hacking techniques (Sherrod et al. 1981). In keeping with the objectives of facilitating the re-colonization of the historic mountain range chicks were hacked from a high priority mountain site in Shenandoah National Park (SNP). Only chicks from bridge nests were removed for the hacking program because of limited space in the hack box. SNP has a single hack box and the hacking program takes up to 6 birds aged for synchronous release. SNP staff led by Rolf Gubler open the door to the hack box at 45-50 days old. Food is provided at the hack site for 6 weeks. Survival is confirmed when the falcons return to the hack site to feed each day (Sherrod et al 1981).

Addled Eggs

Unhatched eggs were collected from nests if eggs were no longer being incubated. Eggs were washed, air dried, covered with aluminum foil and frozen.

RESULTS

Site Surveys

Fifty-six structures were surveyed for peregrine falcon activity within the Coastal Plain (Table 1) and several additional sites were surveyed by DWR and NPS in the mountains during the breeding season. In addition, thirteen quarries within the Piedmont (N=11) and mountains (N= 2) were surveyed in 2022. Thirty-four sites supported occupied territories. Breeding sites were found across the state (Figure 1). Occupied territories were distributed within the Coastal Plain (n = 25), Piedmont (n = 5) and mountains (n = 4).

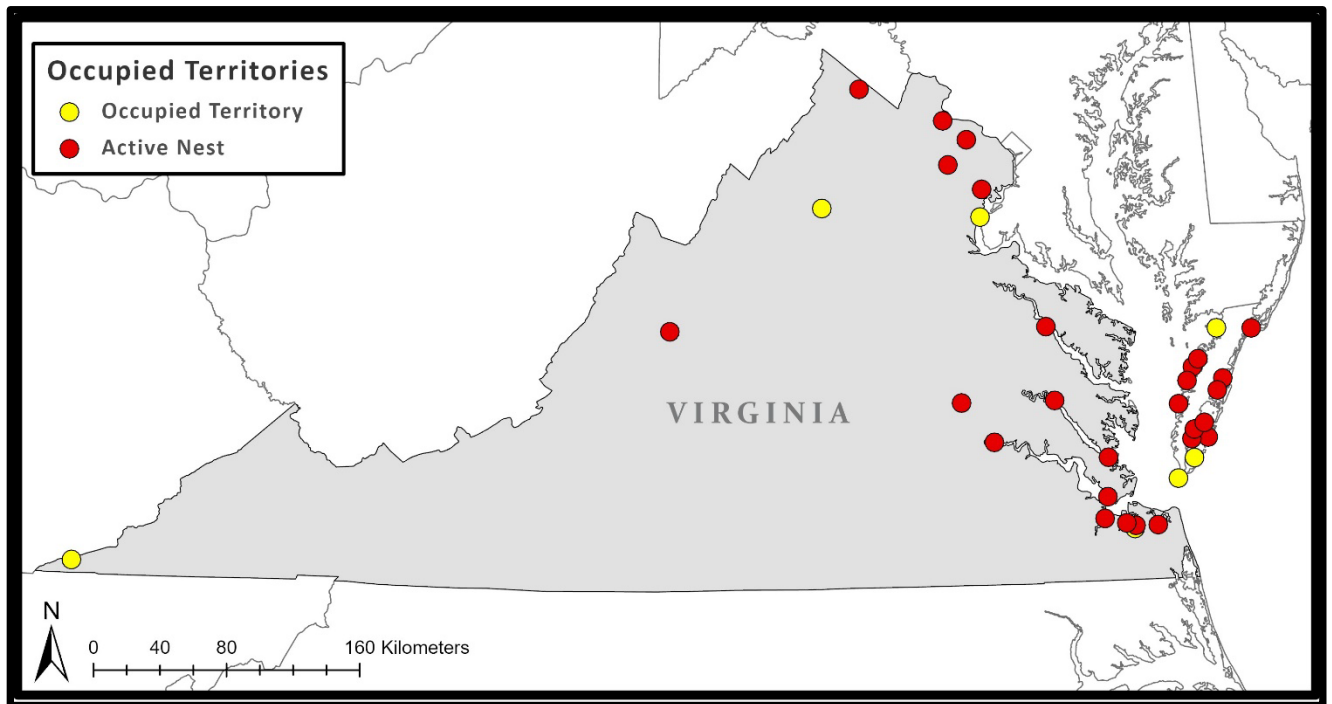
Structures supporting occupied territories included 12 peregrine towers, 9 bridges, 7 cliffs, 3 buildings, 2 power plant stacks and 1 marsh shack (Table 2). For the sixth year, no pairs were detected in association with the Norris Bridge and the I-64 High-rise Bridge. New pairs were discovered within 2 quarry sites and on the tower behind the town of Saxis.

Table 2. Summary of breeding activity for peregrine falcon pairs in Virginia during the 2022 breeding season.

Site Code	Nest name	Occ Terr	Active Nest	Eggs	Young Hatched	Band Age
VA-PEFA-02	Cobb Island Tower	Y	Y	3	3	3
VA-PEFA-06	Wallops Island Tower	Y	Y	3	0	0
VA-PEFA-10	Finney’s Island Tower	Y	Y	4	2	2
VA-PEFA-12	Hyslop Marsh Tower	Y	Y	2	2	0
VA-PEFA-14	Saxis Marsh S. Tower	Y	N	-----	-----	-----
VA-PEFA-15	Parker’s Marsh Tower	Y	Y	4	4	4
VA-PEFA-16	Elkins Marsh Chimney	Y	Y	4	4	4
VA-PEFA-17	Elkins Marsh Shack Tower	Y	Y	4	4	4
VA-PEFA-18	Wachapreague Shack Tower	Y	Y	4	4	1
VA-PEFA-22	James River Bridge Rt 17	Y	Y	4	3	3
VA-PEFA-23	Berkley Bridge I-264	Y	Y	≥4	4	4
VA-PEFA-24	Benjamin Harrison Bridge	Y	Y	4	3	1
VA-PEFA-25	Mills Godwin Bridge Rt 17	Y	Y	2	1	0
VA-PEFA-26	West Norfolk Bridge Rt 164	Y	Y	≥1	≥1	0
VA-PEFA-34	Mockhorn Island Tower	Y	N	-----	-----	-----
VA-PEFA-36	Upsher Bay Tower	Y	Y	4	4	4
VA-PEFA-37	Silver Beach Range Tower	Y	Y	5	0	0
VA-PEFA-42	Possum Point Substation	Y	N	-----	-----	-----

Site Code	Nest name	Occ Terr	Active Nest	Eggs	Young Hatched	Band Age
VA-PEFA-49	Yorktown Substation	Y	Y	4	3	3
VA-PEFA-56	River Front Plaza Building	Y	Y	4	4	4
VA-PEFA-60	Chesapeake Bay Bridge Tunnel	Y	N	----	----	----
VA-PEFA-61	Tappahannock Bridge Rt 360	Y	Y	4	3	3
VA-PEFA-62	Gull Marsh Tower	Y	Y	3	3	3
VA-PEFA-67	White Rocks	Y	N	----	----	----
VA-PEFA-70	Pamunkey Eltham Bridge Rt 33	Y	Y	4	1-3	1
VA-PEFA-72	Stony Man, SNP	Y	N	----	----	----
VA-PEFA-75	Reston Town Center	Y	Y	4	4	3
VA-PEFA-79	Norfolk Naval Shipyard	Y	N	----	----	----
VA-PEFA-80	Ashburn Quarry	Y	Y	4	4	4
VA-PEFA-81	Occoquan Quarry	Y	Y	4	3	3
VA-PEFA-82	Jump Mountain	Y	Y	≥1	≥1	≥1
VA-PEFA-84	Westin Hotel	Y	Y	4	4	4
VA-PEFA-85	Fairfax Quarry	Y	Y	≥1	U	U
VA-PEFA-86	Clearbrook Quarry	Y	Y	≥1	≥1	U

Figure 1. Distribution of Peregrine Falcon occupied territories and single individuals for the 2022 breeding season in Virginia.



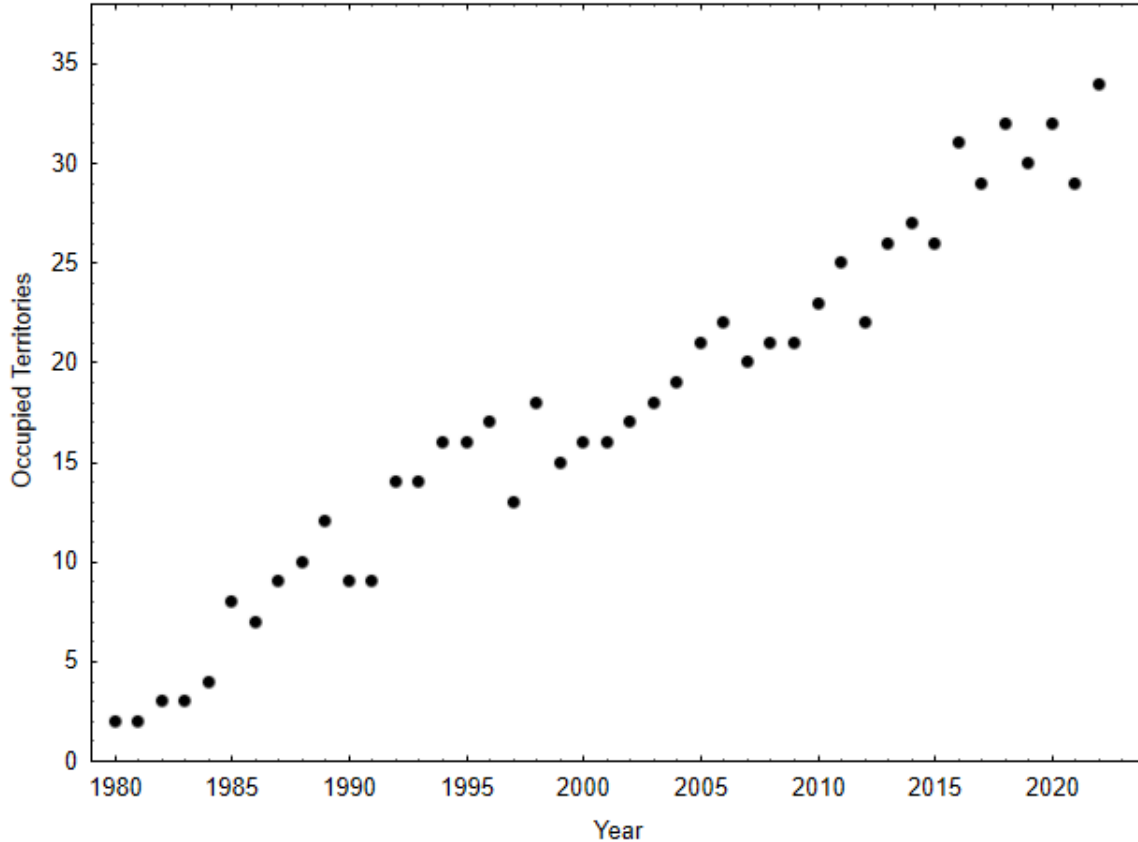
Breeding Results

Virginia supported 34 known breeding pairs of peregrine falcons during the 2022 breeding season. This is the highest number of occupied territories known in Virginia and compares to 32 pairs in 2020 and 30 pairs in 2019 (Figure 2). An unusually high number of pairs (7) were not documented to make breeding attempts during the 2022 season including pairs on Saxis tower, Mockhorn tower, Possum Point stack, Norfolk Naval Shipyard, Chesapeake Bay Bridge Tunnel, White Rocks and Stony Man. This was the first year the Saxis pair was on territory and one of the birds was a second-year. The pair on Mockhorn tower was resident throughout the spring but had conflicts with nesting owls. A pair of great horned owls nested in the Godwin box and a pair of barn owls nested in the Mockhorn box. The stack at Possum Point where the birds have nested for several years was taken down and the box was moved to another stack. The resident pair was not observed early in the season but appeared too late to attempt breeding. The space along the east span of the Chesapeake Bay Bridge Tunnel where the pair has nested for several years was completely filled with asphalt from the paving. The pair moved over to the west span but a breeding attempt was not documented. The pair that is resident along the Norfolk Naval Shipyard was present during the breeding season but no breeding attempt was documented. Pairs were present early in the nesting season on both Stony Man and White Rocks. It is possible that the birds made nesting attempts but none were documented.

The 27 falcon pairs that were documented making breeding attempts produced at least 90 eggs (Table 2). At least 70 of the 90 eggs hatched. Six (8.6%) of the 70 hatchlings did not survive to banding age. All of these young disappeared between the last hatching check and the scheduled day of banding (26 to 28 days old). Cause of the loss is not known. The falcon population produced at least 59 young (the outcome of three territories could not be determined) resulting in a reproductive rate of 1.9 young/pair. Although this reproductive rate is lower than most recent years the population did manage eight 4-young broods. Of 82 eggs followed through to fledging, 65 (79.3%) hatched and 54 (83.1%) of hatched young survived to banding age. Seven pairs were not documented to make breeding attempts including two cliff pairs, two bridge pairs, one tower pair that was newly formed, one tower pair with owl interference and one smoke stack pair where the box was moved prior to the season. Success rate for pairs that made breeding attempts and with known outcome (N = 24) was 79.2%.

Five young were known to have problems after fledging. Two fledglings (male 46/BN and female 22/BK) produced on the Reston Town Center were picked up from the road below the building on 1 June and taken to the Blue Ridge Wildlife Center. The birds were released back on the Reston Town Center on 3 June. The female survived to dispersal but the male subsequently flew into the building and died. A female produced on the Berkley Bridge flew into a building, was picked up on the road on 8 June and was taken to the Wildlife Center of Virginia. A female (47/BK) produced on the James River Bridge was picked up on the roadbed of the bridge and was taken to the Wildlife Center of Virginia. These two birds recovered and were later taken to the Blue Ridge Wildlife Center for flying and successfully released. A female (78/AU) produced on Riverfront Plaza in Richmond was picked up on 17 June on the canal Walk and taken to the Wildlife Center of Virginia for treatment. The bird was later placed in the hack box on Franklin Cliffs in Shenandoah National Park and successfully released.

Figure 2. Virginia Peregrine Falcon breeding population (1977-2022).



Selected Site and Breeding Observations

- The 20-year-old male on the James River Bridge was lost during the nonbreeding season and replaced by an unbanded male.
- A single male was observed and photographed on the I-295 bridge across the James River.
- At least one young was produced on Jump Mountain.

Banding

All young falcons that survived to banding age and that could be accessed were fitted with both USGS and alpha-numeric bands.

This included 28 males and 19 females (Tables 3a and 3b). Birds known to be unbanded were 4 young from the Berkley Bridge (3 females, 1 male), 4 young on the wall of Ashburn Quarry, 3 young on Occoquan quarry, at least 1 young on Jump Mountain and at least 1 young on Clearbrook Quarry.

Table 3a. List of band codes for female peregrine falcon chicks banded in Virginia during the 2022 breeding season.

USGS Band	Alpha-numeric Band	Nest	Date
1807-46882	19/BK	Yorktown Substation	5/3/2022
1807-46883	20/BK	Downing Bridge	5/13/2022
1807-46884	21/BK	Downing Bridge	5/13/2022
1807-46885	22/BK	Reston Town Center	5/14/2022
1807-46886	23/BK	Gull Marsh	5/15/2022
1807-46887	24/BK	Gull Marsh	5/15/2022
1807-46888	25/BK	Elkins Shack	5/15/2022
1807-46889	26/BK	Elkins Shack	5/15/2022
1807-46890	27/BK	Elkins Chimney	5/15/2022
1807-46891	28/BK	Westin Hotel	5/17/2022
1807-46892	29/BK	Westin Hotel	5/17/2022
1807-46893	30/BK	Parkers Marsh	5/23/2022
1807-46894	31/BK	Parkers Marsh	5/23/2022
1807-46895	32/BK	James River Bridge	6/7/2022
1807-46896	33/BK	Upshers Neck	6/16/2022
1907-01952	77/AU	Riverfront Plaza	5/26/2022
1907-01953	78/AU	Riverfront Plaza	5/26/2022
987-59851	34/BK	Upshers Neck	6/16/2022
987-59864	47/BK	James River Bridge	6/7/2022

Table 3b. List of band codes for male peregrine falcon chicks banded in Virginia during the 2022 breeding season.

USGS Band	Alpha-numeric Band	Nest	Date
2206-54716	42/BN	Benjamin Harrison Bridge	4/28/2022
2206-54717	43/BN	Yorktown Substation	5/3/2022
2206-54718	44/BN	Yorktown Substation	5/3/2022
2206-54719	45/BN	Downing Bridge	5/13/2022
2206-54720	46/BN	Reston Town Center	5/14/2022
2206-54721	47/BN	Reston Town Center	5/14/2022
2206-54722	48/BN	Gull Marsh	5/15/2022
2206-54723	49/BN	Elkins Shack	5/15/2022

USGS Band	Alpha-numeric Band	Nest	Date
2206-54724	50/BN	Elkins Shack	5/15/2022
2206-54725	51/BN	Elkins Chimney	5/15/2022
2206-54726	52/BN	Elkins Chimney	5/15/2022
2206-54727	53/BN	Elkins Chimney	5/15/2022
2206-54728	54/BN	Westin Hotel	5/17/2022
2206-54729	55/BN	Westin Hotel	5/17/2022
2206-54730	56/BN	Parkers Marsh	5/23/2022
2206-54731	57/BN	Parkers Marsh	5/23/2022
2206-54732	58/BN	Wachapreague	5/23/2022
2206-54733	59/BN	James River Bridge	6/7/2022
2206-54734	60/BN	Eltham Bridge	6/8/2022
2206-54735	61/BN	Upshers Neck	6/16/2022
2206-54736	62/BN	Upshers Neck	6/16/2022
2206-54737	63/BN	Finney's Marsh	6/16/2022
2206-54738	64/BN	Finney's Marsh	6/16/2022
2206-54739	65/BN	Cobb Island	6/24/2022
2206-54740	66/BN	Cobb Island	6/24/2022
2206-54741	67/BN	Cobb Island	6/24/2022
2206-54789	49/AU	Riverfront Plaza	5/26/2022
2206-54790	88/BN	Riverfront Plaza	5/26/2022

Band Resights

The banding status of 45 (66.2%) of the 68 adult peregrines known within the breeding population was determined during the 2022 season (Table 4). Eleven (24.4%) of the 45 birds where status was determined were unbanded. The level of unbanded birds suggests the possibility of unknown eyries within Virginia or surrounding states. Of the banded birds where state of origin could be determined, 22 were from VA, 3 from MD, 2 from NJ, 1 from DE, 1 from PA and 1 from CT. The alpha-numeric were read for 28 adults and of these the USGS bands have been recorded for 25. All three of the unknown birds had silver USGS and were likely from MD. The natal territories were determined for 25 adults. Birds ranged in age from 2 to 13 years old.

Eighteen Virginia falcon encounters outside of banding activities were reported since the 2021 report (Tables 5 and 6). Three of these birds (all females) originated in Virginia and were found breeding in other states (Table 5). Fifteen encounters including 15 birds were reported. Virginia birds were encountered in Canada, Virginia, New Jersey, Maryland and Florida (Table 6).

Table 4. Banding status and identification of Virginia breeding peregrine falcons during the 2022 season.

Territory Code	Territory	Sex	USGS Band Color	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
VA-PEFA-02	Cobb Island Tower	M	-----	Unbanded	-----	-----	Unknown	
	Cobb Island Tower	F	-----	Unbanded	-----	-----	Unknown	
VA-PEFA-06	Wallops Island Tower	M	Green	Unknown	B/G	Unknown	VA	
	Wallops Island Tower	F	Green	1907-01947	B/G	73/AU	Watts Island, VA	7
VA-PEFA-10	Finney's Island Tower	M	Green	1126-11983	B/G	09/BM	Tappahannock, VA	7
	Finney's Island Tower	F	Black	1687-02832	B/G	A/15	Dividing Creek, NJ	13
VA-PEFA-12	Hyslop Marsh Tower	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Hyslop Marsh Tower	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-14	Saxis Marsh South	M	Unknown	Unknown	Unknown	Unknown	Unknown	2
	Saxis Marsh South	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-15	Parker Marsh Tower	M	-----	Unbanded	-----	-----	Unknown	
	Parker Marsh Tower	F	Green	Unknown	B/G	7?/A?	Unknown, VA	
VA-PEFA-16	Elkins Marsh Chimney	M	Green	Unknown	B/G	Unknown	VA	
	Elkins Marsh Chimney	F	Green	1907-01491	B/G	67/AU	Finneys Tower, VA	6
VA-PEFA-17	Elkins Marsh Shack Tower	M	-----	Unknown	-----	-----	Unknown	
	Elkins Marsh Shack Tower	F	Green	1907-01993	B/G	31/BH	Upsher Bay tower, VA	5
VA-PEFA-18	Wachapreague Shack Tower	M	Silver	?????	-----	-----	Unknown	
	Wachapreague Shack Tower	F	-----	Unbanded	-----	-----	Unknown	
VA-PEFA-22	James River Bridge Rt 17	M	-----	Unknown	-----	Unknown	Unknown	
	James River Bridge Rt 17	F	Silver	?????	-----	-----	Unknown	5
VA-PEFA-23	Berkley Bridge I-264	M1	Green	1126-11953	B/G	29/AU	Yorktown, VA	8
	Berkley Bridge I-264	F	Green	1907-01994	B/G	32/BH	Yorktown, VA	6

Territory Code	Territory	Sex	USGS Band Color	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
	Berkley Bridge I-264	M2	Green	1126-11972	B/G	47/Au	Richmond, VA	2
VA-PEFA-24	Benjamin Harrison Bridge Rt 106	M	-----	Unbanded				
	Benjamin Harrison Bridge Rt 106	F	Green	1807-02775	B/G	70/Z	Benjamin Harrison, VA	13
VA-PEFA-25	Mills Godwin Bridge Rt 17	M	-----	Unbanded	-----	-----	Unknown	
	Mills Godwin Bridge Rt 17	F	Green	1807-65098	B/G	57/AV	Mockhorn Island, VA	9
VA-PEFA-26	West Norfolk Bridge Rt 164	M	Green	1126-11994	B/G	20/BM	Yorktown, VA	6
	West Norfolk Bridge Rt 164	F	Silver	1947-02141	B/G	V/68	Milford, CT	4
VA-PEFA-24	Mockhorn Island Tower	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Mockhorn Island Tower	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-36	Upsher Bay Tower	M	Green	1126-11959	B/G	35/AU	Finneys Tower, VA	8
	Upsher Bay Tower	F	Green	1907-01967	B/G	05/BH	Elkins Chimney, VA	8
VA-PEFA-37	Silver Beach Range Tower	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Silver Beach Range Tower	F	-----	Unbanded	-----	-----	Unknown	
VA-PEFA-42	Possum Point Substation	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Possum Point Substation	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-49	Yorktown Substation	M	-----	Unbanded	-----	-----	Unknown	
	Yorktown Substation	F	Green	1907-01914	B/G	70/AV	Silver Beach Tower, VA	9
VA-PEFA-56	River Front Plaza Building	M	Green	2206-54833	B/G	59/BM	Yorktown Plant, VA	4
	River Front Plaza Building	F	Silver	1907-03426	B/G	95/AK	St. George's Bridge, DE	5
VA-PEFA-60	Chesapeake Bay Bridge Tunnel	M	-----	Unbanded	-----	-----	Unknown	
	Chesapeake Bay Bridge Tunnel	F	Silver	1907-03541	B/G	16/AK	Clay Island WMA, MD	10
VA-PEFA-61	Tappahannock Bridge Rt 360	M	Silver	1126-15169	B/G	30/AH	Unknown	
	Tappahannock Bridge Rt 360	F	Silver	Unknown	B/G	26/AK	Unknown	

Territory Code	Territory	Sex	USGS Band Color	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
VA-PEFA-62	Gull Marsh Tower	M	Green	1126-11919	B/G	97/AS	Elkins Shack, VA	10
	Gull Marsh Tower	F	-----	Unbanded	-----	-----	Unknown	
VA-PEFA-67	White Rocks	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	White Rocks	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-69	Breaks Interstate Park	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Breaks Interstate Park	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-70	Pamunkey Eltham Bridge Rt 33	M	Green		B/B		VA	2
	Pamunkey Eltham Bridge Rt 33	F	Green	1807-65016	B/G	11/AD	Elkins Shack Tower, VA	10
VA-PEFA-72	Stony Man, SNP	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Stony Man, SNP	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-75	Reston Town Center	M	Silver	1126-15168	B/G	29/AH	Chalk Point Plant, MD	11
	Reston Town Center	F	Silver	1687-00582	B/G	61/AR	Philadelphia, PA	11
VA-PEFA-79	Norfolk Naval Shipyard	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Norfolk Naval Shipyard	F	Unbanded	-----	-----	-----	Unknown	
VA-PEFA-80	Ashburn Quarry	M	Green	2206-54805	B/G	31/BM	James River Bridge, VA	6
	Ashburn Quarry	F	Silver	1907-03417	B/G	87/AK	MD	6
VA-PEFA-81	Occoquan Quarry	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Occoquan Quarry	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-82	Jump Mountain	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Jump Mountain	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-84	Westin Hotel	M	Green	1126-11943	B/G	19/AU	Elkins Shack Tower, VA	8
	Westin Hotel	F	Black	1947-31867	B/G	BM/03	Ocean Gate, NJ	4
VA-PEFA-85	Fairfax Quarry	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Fairfax Quarry	F	Unknown	Unknown	Unknown	Unknown	Unknown	

Territory Code	Territory	Sex	USGS Band Color	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
VA-PEFA-86	Clearbrook Quarry	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Clearbrook Quarry	F	Unknown	Unknown	Unknown	Unknown	Unknown	

Table 5. Identification of Virginia-hatched birds known to breed in other states during 2022.

Breeding Territory	Sex	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
Columbia, PA Rt 462 Bridge	F	1807-65014	B/G	09/AD	James River Br, VA	11
Safe Harbor cliff site, PA	F	1807-65083	B/G	45/AV	Mills Godwin Br, VA	8
Burlington-Bristol Bridge, NJ	F	1807-65053	B/G	14/AV	Possum Point, VA	10

Table 6. Encounter reports of Virginia peregrine falcons received since the 2021 report.

Resight Location	Resight Date	Sex	USGS Band	Origin	Age
VA birds resighted					
Oceanville, NJ	8/19/2020	M	2206-54877	James River Bridge	HY
Addison Heights, VA	8/30/2020	M	2206-54867	Reston Town Center	HY
Norfolk, VA	8/2/2021	F	1907-01994	Yorktown	4
Assateague Island, MD	10/2/2021	M	2206-54852	Parkers Marsh	3
Belle Glade, FL	2/9/2022	F	1807-46863	Elkins Chimney	SY
Scotch Bonnet, NJ	3/20/2022	F	1807-46865	Gull Marsh	SY
Birdsnest, VA	4/4/2022	M	1126-11919 ¹	Elkins Shack	10
Stone Harbor, NJ	4/14/2022	F	1807-46865	Gull Marsh	SY
Smith Island, MD	4/25/2022	F	1807-46806 ¹	Wachapreague	5
Norfolk, VA	6/28/2022	M	1126-11953 ¹	Yorktown	8
Kiptopeke, VA	9/2/2022	M	2206-54722	Gull Marsh	HY
Montreal, Canada	9/3/2022	F	1807-46885	Reston Town Center	HY
Cherry Hill, NJ	10/18/2022	F	1907-01950	Richmond	SY
Virginia Beach, VA	11/2/2022	M	1126-11943	Elkins Shack	9
Chincoteague Bay, VA	1/5/2023	F	1807-46826 ¹	Wachapreague	5

¹Found dead or died later.

Adult Mortality

Four breeding adults were documented to be lost since the 2021 report. The Gull Marsh male (97/AS) was picked up in a farm field in Birdsnest, VA on 4 April 2022. The bird appears to have been killed by another peregrine possibly in a territorial contest. The Berkley male (29/AU) was picked up on a street in Norfolk after flying into a building. The bird had significant injuries and was put down. The Eltham Bridge female (11/AD) was picked up from the bed of a pick-up truck on 21 December 2022 within the West Point paper plant with a broken wing after an apparent collision with structures in the plant and was later put down.

The Chesapeake Bay Bridge Tunnel female (16/AK) was picked up in the dunes at Savage Neck on 27 December 2022. The bird may have been killed by an avian predator.

Translocations

During the 2022 season, 5 young falcons (2 males and 3 females) were translocated to Shenandoah National Park and hacked (Table 7). Four of the birds were from a balcony on the Westin Hotel in Virginia Beach. These birds were placed in a single hack box situated on Franklin Cliffs on 17 May 2022. Birds were released on 31 May 2022 and were fine on release. A fifth bird from the Riverfront Plaza was picked up after fledging, taken to the Wildlife Center of Virginia and later placed in the hack box on 23 June 2022. This bird was released on 25 June and was fine on release.

Table 7. Summary of translocation activities for peregrine falcons in Virginia during the 2022 breeding season. Electrical tape was applied to the USFWS band.

USGS Band	Location	Sex	Tape Color	Date Collected	Translocation Site
2206-54728	Westin Hotel	M	Yellow	5/17/2022	Shenandoah National Park
1807-46891	Westin Hotel	F	Red	5/17/2022	Shenandoah National Park
2206-54729	Westin Hotel	M	Blue	5/17/2022	Shenandoah National Park
1807-46892	Westin Hotel	F	White	5/17/2022	Shenandoah National Park
1907-01953	Riverfront Plaza	F	Yellow	6/23/2022	Shenandoah National Park

Addled Eggs

Twelve addled falcon eggs were recovered during the 2022 breeding season (Table 8). Eggs were recovered from 7 sites including 4 bridges, 2 towers and 1 smoke stack.

Table 8. Addled eggs collected during the 2022 breeding season.

Site	Date	Eggs
Yorktown	4/14/2022	1
Ben Harrison Bridge	4/28/2022	1
Tappahannock Bridge	5/1/2022	1
Silver Beach	5/16/2022	5
Hyslop Marsh	5/23/2022	2
Mills Godwin Bridge	5/29/2022	1
Eltham Bridge	6/8/2022	1

DISCUSSION

Between 1975 and 1993 more than 430 captive-reared falcons were released into the mid-Atlantic region as part of an effort to restore the eastern peregrine falcon population. The regional breeding population proceeded through an establishment phase (1979-1985) driven by releases with an average doubling time of 1.3 years to a consolidation phase (1986-) with an average doubling time of 23.4 years (Watts et al. 2015). Reproductive rates have increased significantly over this period from 1.18 young/occupied territory during establishment to 1.87 young/occupied territory as the population has become more stable.

Since the first breeding attempt was documented on Assateague Island in 1982, the Virginia population has exhibited steady growth. To date, growth has been driven by established pairs on the Coastal Plain. Pairs along the coast have accounted for more than 95% of all breeding attempts in the modern era and young produced are responsible for the ongoing formation of new territories. Currently, coastal pairs nesting on artificial substrates represent the demographic engine that is maintaining the state population.

Recent efforts to identify marked adults in both Virginia and New Jersey are providing significant information on dispersal, adult turnover rates, and the age structure of the breeding population. Capitalizing on efforts to mark all young in the region should be a priority for the foreseeable future. Expanding the effort to other neighboring states (e.g., MD, DE, NC, WV) would expand our understanding of movement patterns.

With few exceptions, establishment of breeding territories within the historic mountain range have been the result of the earlier hacking program (1985-1993) and the more recent translocation project (2000-2022) focused on the mountains. Since 2000, the latter has made use of young produced on bridge and building eyries that have experienced poor fledging success. This is a win-win situation and should continue as long as partners are willing and able to operate the hacks. If possible, new hack sites should be developed and operated in southwestern Virginia around historic breeding sites.

Recent efforts to survey a larger portion of the mountain range are exciting. Although effort-intensive, there is no way of assessing success of the ongoing management program except to continue survey work. Once breeding pairs have been located, increasing the frequency of monitoring may help to improve information on reproductive success.

Peregrine Falcons have contended with a wide array of contaminants since the re-establishment of the breeding population (Morse 1993, Chen et al 2008, 2010, Potter et al. 2009). Continuing the long-term collection and analysis of addled eggs provides a historical record of contaminant exposure within this breeding population.

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