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Virginia peregrine falcon monitoring and management program: Year 2021 report

Bryan Watts
William & Mary

Marian Watts
William & Mary

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VIRGINIA PEREGRINE FALCON MONITORING AND MANAGEMENT PROGRAM: YEAR 2021 REPORT



THE CENTER FOR CONSERVATION BIOLOGY
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Bryan D. Watts, PhD
Marian U. Watts
The Center for Conservation Biology
William & Mary

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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: Male peregrine from Mills Godwin Bridge in Suffolk, VA. 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 2021, Virginia supported a known falcon population of 29 breeding pairs including 21 within the Coastal Plain, 3 in the Piedmont and 5 in the mountains. The population continues to hover round 30 breeding pairs. A new pair was discovered on Knob Mountain and a single male was resident near Saxis Virginia.

The 2021 breeding season was the most productive in the state's history producing 68 young. A minimum of 90 eggs were laid with at least 72 hatching. The reproductive rate was 2.38 young/occupied territory. Of 18 clutches that were followed completely from laying to fledging, 55 of 66 (83.3%) eggs hatched, and 52 of 55 (94.5%) young survived to banding age. Three young were known to have problems after fledging including birds recovered on the ground in Norfolk, Richmond and Reston that were taken for rehab.

Efforts continued in 2021 to identify breeding adults via field-readable bands to better understand dispersal and demography throughout the mid-Atlantic region. The banding status of 48 (82.8%) of the 58 adult peregrines known within the breeding population was determined. Nine (18.8%) of the 48 birds where status was determined were unbanded. Of the banded birds where state of origin could be determined, 25 were from VA, 2 from MD, 3 from NJ, 1 from DE and 1 from PA. The natal territories were determined for 34 adults. Birds ranged in age from 3 to 20 years old.

During the 2021 season, 4 young falcons (2 males and 2 females) were translocated to Shenandoah National Park and hacked. Birds were released on 29 May 2021 and were fine on release. Nine addled falcon eggs were recovered during the 2021 breeding season. Eggs were recovered from 5 sites including 2 bridges, 2 smoke stacks and 1 tower.

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 2021 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 2021 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 (1977-2021). 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 2021 breeding season.

Site Code	Location Description	Structure Type	Year Est	2021
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	2021
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 ^b
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
VA-PEFA-83	Knob Mountain	Natural Cliff Face	-----	Y ^b

^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-five 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. Twenty-nine sites supported occupied territories. Breeding sites were found across the state (Figure 1). Occupied territories were distributed within the Coastal Plain (n = 22), Piedmont (n = 2) and mountains (n = 5).

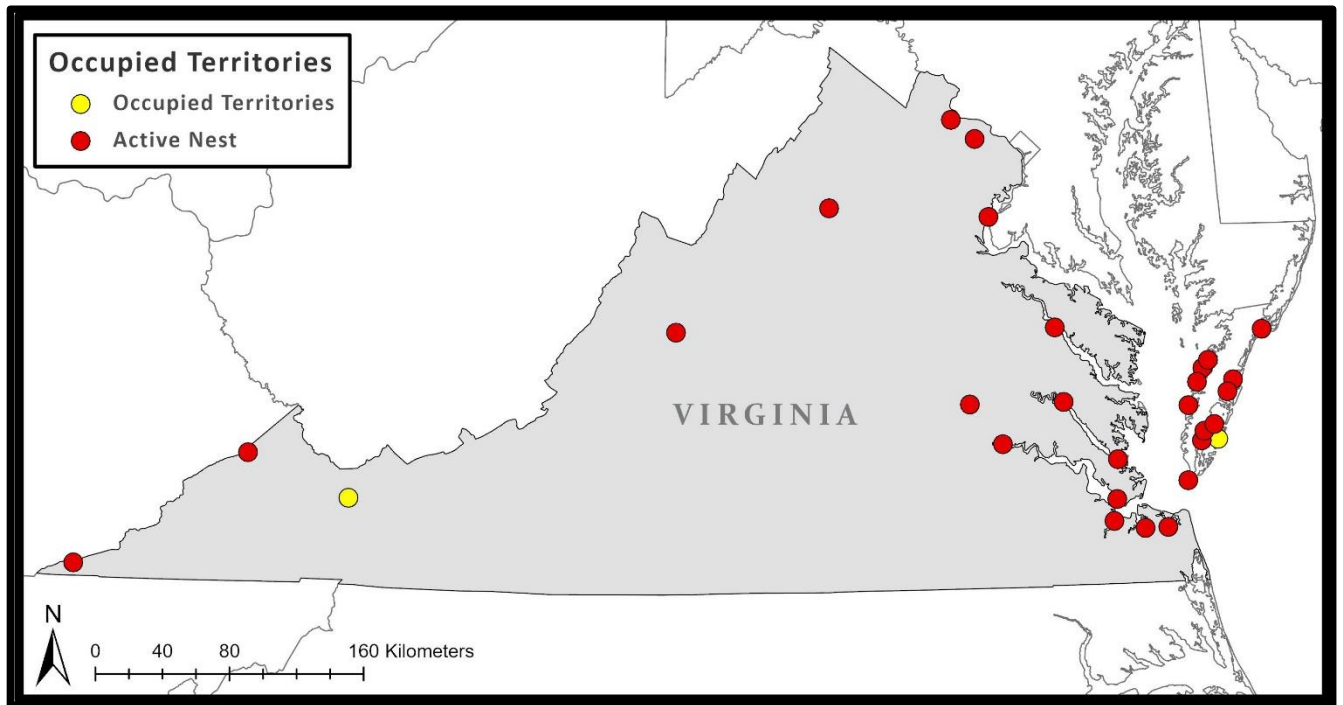
Structures supporting occupied territories included 9 peregrine towers, 7 bridges, 6 cliffs, 3 buildings, 2 marsh shacks, and 2 power plant stacks (Table 2). For the fifth year, no pairs were detected in association with the Norris Bridge and the I-64 High-rise Bridge. A new pair was discovered on Knob Mountain (Tazewell County).

Table 2. Summary of breeding activity for peregrine falcon pairs in Virginia during the 2021 breeding season.

Site Code	Nest name	Occ Terr	Active Nest	Eggs	Young Hatched	Band Age
VA-PEFA-02	Cobb Island Tower	Y	N	----	----	----
VA-PEFA-06	Wallops Island Tower	Y	Y	<u>3</u>	3	0
VA-PEFA-10	Finney's Island Tower	Y	Y	<u>≥3</u>	3	3
VA-PEFA-12	Hyslop Marsh Tower	Y	Y	4	4	4
VA-PEFA-15	Parker's Marsh Tower	Y	Y	3	3	3
VA-PEFA-16	Elkins Marsh Chimney	Y	Y	4	3	3
VA-PEFA-17	Elkins Marsh Shack Tower	Y	Y	3	3	3
VA-PEFA-18	Wachapreague Shack Tower	Y	Y	4	4	4
VA-PEFA-22	James River Bridge Rt 17	Y	Y	3	3	3
VA-PEFA-23	Berkley Bridge I-264	Y	Y	<u>≥3</u>	3	3
VA-PEFA-24	Benjamin Harrison Bridge	Y	Y	4	4	4
VA-PEFA-25	Mills Godwin Bridge Rt 17	Y	Y	4	4	4
VA-PEFA-36	Upsher Bay Tower	Y	Y	3	3	3
VA-PEFA-37	Silver Beach Range Tower	Y	Y	<u>≥2</u>	<u>≥2</u>	2
VA-PEFA-42	Possum Point Substation	Y	Y	4	0	0
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	Y	<u>≥2</u>	2	2
VA-PEFA-61	Tappahannock Bridge Rt 360	Y	Y	5	5	5

Site Code	Nest name	Occ Terr	Active Nest	Eggs	Young Hatched	Band Age
VA-PEFA-62	Gull Marsh Tower	Y	Y	3	3	3
VA-PEFA-66	Armada Hoffer Building	Y	y	3	≥1	1
VA-PEFA-67	White Rocks	Y	Y	≥1	U	U
VA-PEFA-69	Breaks Interstate Park	Y	Y	≥3	≥3	3
VA-PEFA-70	Pamunkey Eltham Bridge Rt 33	Y	Y	5	2	2
VA-PEFA-72	Stony Man, SNP	Y	Y	2	0	0
VA-PEFA-75	Reston Town Center	Y	Y	4	4	4
VA-PEFA-80	Ashburn Quarry	Y	Y	≥3	≥3	3
VA-PEFA-82	Jump Mountain	Y	Y	≥1	U	0
VA-PEFA-83	Knob Mountain	Y	N	----	----	----

Figure 1. Distribution of Peregrine Falcon occupied territories and single individuals for the 2021 breeding season in Virginia.



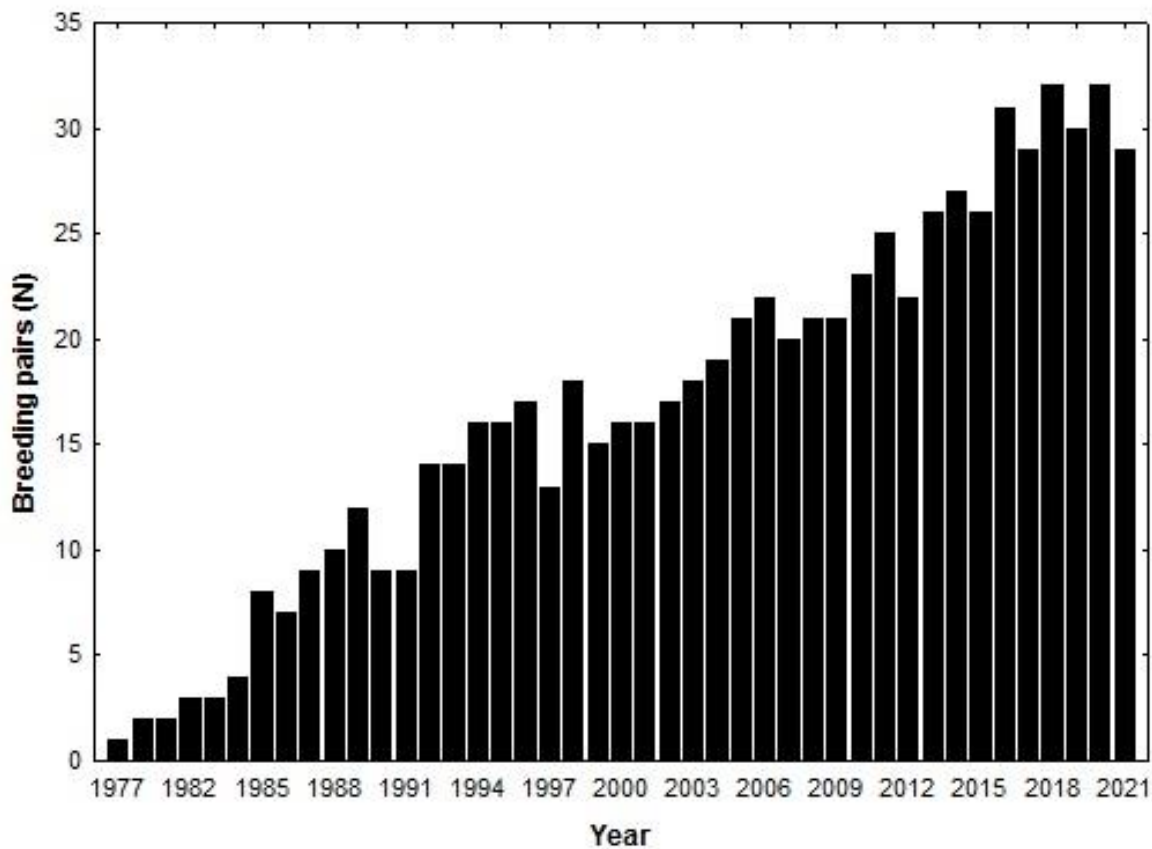
Breeding Results

Virginia supported 29 known breeding pairs of peregrine falcons during the 2021 breeding season. This compares to 32 pairs in 2020 and 30 pairs in 2019 (Figure 2). A single male was observed perched on the Saxis tower throughout the breeding season.

The 27 falcon pairs that were documented making breeding attempts produced at least 90 eggs (Table 2). At least 72 of the 90 eggs hatched. Only 3 (4.2%) of the 72 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 reproductive rate was 2.38 young/occupied territory and 2.56 young/active territory. Of 18 clutches that were followed completely from laying to fledging, 55 of 66 (83.3%) eggs hatched, and 52 of 55 (94.5%) young survived to banding age.

Three young were known to have problems after fledging. A female produced on the Berkley Bridge was recovered from a parking garage in Norfolk and taken to a rehabber for treatment. Birds from buildings in both Richmond and Reston were found on the ground taken to the Wildlife Center, assessed and released.

Figure 2. Virginia Peregrine Falcon breeding population (1977-2021).



Selected Site and Breeding Observations

- Five breeding pairs were documented in the mountains – the most since reintroductions began to focus on the mountains in 1985.
- The adult male on the James River Bridge bred successfully in his 20th year.
- A second-year male was resident on the south Saxis tower through the breeding season but no female was ever detected.

- An HY falcon was observed on Fisherman Island by Pam Denmon after fledging from the Chesapeake Bay Bridge Tunnel confirming that birds can fledge successfully from this site.
- Reese Lukei monitored the single young produced on the Armada Hoffer building and documented the bird was resident for up to 54 days after fledging.
- Female from Reston Town Center that was captured in Quebec in 2020 was observed in Chillicothe, OH during the breeding season.

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 31 males and 26 females (Tables 3a and 3b). Birds known to be unbanded were 3 young within Breaks Interstate Park, 2 young on the Chesapeake Bay Bridge Tunnel, 3 young on the Berkley Bridge and 3 young in the Ashburn Quarry.

Table 3a. List of band codes for female peregrine falcon chicks banded in Virginia during the 2021 breeding season.

USGS Band	Alpha-numeric Band	Nest	Date
1807-46856	93/BH	Benjamin Harrison Bridge	4/29/2021
1807-46857	94/BH	Benjamin Harrison Bridge	4/29/2021
1807-46858	95/BH	Yorktown Substation	4/29/2021
1807-46859	96/BH	Yorktown Substation	4/29/2021
1807-46860	97/BH	Reston Town Center	5/15/2021
1807-46861	98/BH	Reston Town Center	5/15/2021
1807-46862	99/BH	Elkins Marsh Chimney	5/16/2021
1807-46863	00/BK	Elkins Marsh Chimney	5/16/2021
1807-46864	01/BK	Gull Marsh Tower	5/16/2021
1807-46865	02/BK	Gull Marsh Tower	5/16/2021
1807-46866	03/BK	Elkins Marsh Shack Tower	5/16/2021
1807-46867	04/BK	Godwin Bridge	5/17/2021
1807-46868	05/BK	Godwin Bridge	5/17/2021
1807-46869	06/BK	Silver Beach Range Tower	5/19/2021
1807-46870	07/BK	Parkers Marsh Tower	5/20/2021
1807-46871	08/BK	Parkers Marsh Tower	5/20/2021
1807-46872	09/BK	Wachapreague Shack Tower	5/25/2021

USGS Band	Alpha-numeric Band	Nest	Date
1807-46873	10/BK	Wachapreague Shack Tower	5/25/2021
1807-46874	11/BK	Upsher Bay Tower	5/25/2021
1807-46875	12/BK	Upsher Bay Tower	5/25/2021
1807-46876	13/BK	Downing Bridge	5/14/2021
1807-46877	14/BK	James River Bridge	5/28/2021
1807-46878	15/BK	Finney's Island Tower	6/9/2021
1807-46879	16/BK	Finney's Island Tower	6/9/2021
1807-46880	17/BK	Finney's Island Tower	6/9/2021
1807-46881	18/BK	Hyslop MarshTower	6/9/2021
1907-01950	75/AU	River Front Plaza Building	6/3/2021
1907-01951	76/AU	River Front Plaza Building	6/3/2021

Table 3b. List of band codes for male peregrine falcon chicks banded in Virginia during the 2021 breeding season.

USGS Band	Alpha-numeric Band	Nest	Date
1126-11972	47/AU	River Front Plaza Building	6/3/2021
1126-11973	48/AU	River Front Plaza Building	6/3/2021
2206-54701	27/BN	Elkins Marsh Shack Tower	5/16/2021
2206-54702	28/BN	Godwin Bridge	5/17/2021
2206-54703	29/BN	Godwin Bridge	5/17/2021
2206-54704	30/BN	Silver Beach Range Tower	5/19/2021
2206-54705	31/BN	Parkers Marsh Tower	5/20/2021
2206-54706	32/BN	Parkers Marsh Tower	5/20/2021
2206-54707	33/BN	Wachapreague Shack Tower	5/25/2021
2206-54708	34/BN	Wachapreague Shack Tower	5/25/2021
2206-54709	35/BN	Upsher Bay Tower	5/25/2021
2206-54710	36/BN	James River Bridge	5/28/2021
2206-54711	37/BN	James River Bridge	5/28/2021
2206-54712	38/BN	Hyslop MarshTower	6/9/2021
2206-54713	39/BN	Hyslop MarshTower	6/9/2021
2206-54714	40/BN	Hyslop MarshTower	6/9/2021
2206-54715	41/BN	Armada Hoffler Building	6/15/2021
2206-54887	13/BN	Benjamin Harrison Bridge	4/29/2021

USGS Band	Alpha-numeric Band	Nest	Date
2206-54888	14/BN	Benjamin Harrison Bridge	4/29/2021
2206-54889	15/BN	Yorktown Substation	4/29/2021
2206-54890	16/BN	Eltham Bridge	5/5/2021
2206-54891	17/BN	Eltham Bridge	5/5/2021
2206-54892	18/BN	Downing Bridge	5/14/2021
2206-54893	19/BN	Downing Bridge	5/14/2021
2206-54894	20/BN	Downing Bridge	5/14/2021
2206-54895	21/BN	Downing Bridge	5/14/2021
2206-54896	22/BN	Reston Town Center	5/15/2021
2206-54897	23/BN	Reston Town Center	5/15/2021
2206-54898	24/BN	Elkins Marsh Chimney	5/16/2021
2206-54899	25/BN	Gull Marsh Tower	5/16/2021
2206-54900	26/BN	Elkins Marsh Shack Tower	5/16/2021

Band Resights

The banding status of 48 (82.8%) of the 58 adult peregrines known within the breeding population was determined during the 2021 season (Table 4). Nine (18.8%) of the 48 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, 25 were from VA, 2 from MD, 3 from NJ, 1 from DE and 1 from PA. The alpha-numeric were read for 34 adults and of these the USGS bands have been recorded for 31. All three of the unknown birds had silver USGS and were likely from MD. The natal territories were determined for 34 adults. Birds ranged in age from 3 to 20 years old.

Twenty-one Virginia falcon encounters outside of banding activities were reported since the 2020 report (Tables 5 and 6). Seven of these birds (6 females, 1 male) originated in Virginia and were found breeding in other states (Table 5). Fourteen encounters including 13 birds were reported. Included was a female that was hatched on Reston Town Center that was captured on the international airport in Quebec during the summer of 2020 and then observed in Chillicothe, OH in March of 2021. Virginia birds were encountered in Canada, Ohio, New York, New Jersey, Maryland, Delaware and Virginia (Table 6).

Table 4. Banding status and identification of Virginia breeding peregrine falcons during the 2021 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	6
VA-PEFA-10	Finney's Island Tower	M	Green	?????	B/G	09/B?	VA	
	Finney's Island Tower	F	Black	1687-02832	B/G	A/15	Dividing Creek, NJ	12
VA-PEFA-12	Hyslop Marsh Tower	M	Green	1126-11824	B/G	15/AB	Godwin Island, VA	13
	Hyslop Marsh Tower	F	Green	1807-65006	B/G	01/AD	Upsher Bay Tower, VA	13
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	1126-11939	B/G	15/AU	Watts Island, VA	7
	Elkins Marsh Chimney	F	Green	1907-01491	B/G	67/AU	Finneys Tower, VA	6
VA-PEFA-17	Elkins Marsh Shack Tower	M	Green	2206-81637	B/G	09/W	Upsher Bay Tower, VA	13
	Elkins Marsh Shack Tower	F	Green	1907-01993	B/G	31/BH	Upsher Bay tower, VA	4
VA-PEFA-18	Wachapreague Shack Tower	M	Silver	?????	----	----	Unknown	
	Wachapreague Shack Tower	F	----	Unbanded	----	----	Unknown	
VA-PEFA-22	James River Bridge Rt 17	M	Green	2206-43454	B/G	*7/*C	James River Bridge, VA	20
	James River Bridge Rt 17	F	Silver	?????	----	----	Unknown	4
VA-PEFA-23	Berkley Bridge I-264	M	Green	1126-11953	B/G	29/AU	Yorktown, VA	7
	Berkley Bridge I-264	F	Green	1907-01994	B/G	32/BH	Yorktown, VA	5
VA-PEFA-24	Benjamin Harrison Bridge Rt 106	M	Green	2206-81605	B/G	05/Y	BB&T Richmond, VA	16

Territory Code	Territory	Sex	USGS Band Color	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
	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	8
VA-PEFA-36	Upsher Bay Tower	M	Green	1126-11959	B/G	35/AU	Finneys Tower, VA	7
	Upsher Bay Tower	F	Green	1907-01967	B/G	05/BH	Elkins Chimney, VA	7
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	Silver	816-69379	B/G	X/78	Chalk Point Plant, MD	12
	Possum Point Substation	F	Black	987-95657	B/G	*Y/*4	Betsy Ross Bridge, NJ	14
VA-PEFA-49	Yorktown Substation	M	----	Unbanded	----	----	Unknown	
	Yorktown Substation	F	Green	1907-01914	B/G	70/AV	Silver Beach Tower, VA	8
VA-PEFA-56	River Front Plaza Building	M	Green	2206-54833	B/G	59/BM	Yorktown Plant, VA	3
	River Front Plaza Building	F	Silver	1907-03426	B/G	95/AK	St. George's Bridge, DE	4
VA-PEFA-60	Chesapeake Bay Bridge Tunnel	M	Silver	?????	B/G	16/AK	Clay Island WMA, MD	9
	Chesapeake Bay Bridge Tunnel	F	----	Unbanded	----	----	Unknown	
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	8
VA-PEFA-62	Gull Marsh Tower	M	Green	1126-11919	B/G	97/AS	VA	
	Gull Marsh Tower	F	----	Unbanded	----	----	Unknown	7
VA-PEFA-66	Hoffler Building Virginia Beach	M	Green	1126-11943	B/G	19/AU	Elkins Shack Tower, VA	3
	Hoffler Building Virginia Beach	F	Black	1947-31867	B/G	BM/03	Ocean Gate, NJ	
VA-PEFA-67	White Rocks	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	White Rocks	F	Unknown	Unknown	Unknown	Unknown	Unknown	

Territory Code	Territory	Sex	USGS Band Color	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
VA-PEFA-69	Breaks Interstate Park	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Breaks Interstate Park	F	Unknown	Unknown	Unknown	Unknown	Unknown	7
VA-PEFA-70	Pamunkey Eltham Bridge Rt 33	M	Green	1126-11954	B/G	30/AU	Yorktown Plant, VA	10
	Pamunkey Eltham Bridge Rt 33	F	Green	1807-65016	B/G	11/AD	Elkins Shack Tower, VA	
VA-PEFA-72	Stony Man, SNP	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Stony Man, SNP	F	Unknown	Unknown	Unknown	Unknown	Unknown	10
VA-PEFA-75	Reston Town Center	M	Silver	1126-15168	B/G	29/AH	Chalk Point Plant, MD	10
	Reston Town Center	F	Silver	1687-00582	B/G	61/AR	Philadelphia, PA	5
VA-PEFA-80	Ashburn Quarry	M	Green	2206-54805	B/G	31/BM	James River Bridge, VA	5
	Ashburn Quarry	F	Silver	1907-03417	B/G	87/AK	MD	
VA-PEFA-82	Jump Mountain	M	----	Unbanded	----	----	Unknown	
	Jump Mountain	F	Unknown	Unknown	Unknown	Unknown	Unknown	
VA-PEFA-83	Knob Mountain	M	Unknown	Unknown	Unknown	Unknown	Unknown	
	Knob Mountain	F	Unknown	Unknown	Unknown	Unknown	Unknown	

Table 5. Identification of Virginia-hatched birds known to breed in other states during 2021.

Breeding Territory	Sex	USGS Band	ACRAFT Color	ACRAFT Code	Origin	Age
Pittsburgh, PA Cathedral	F	1807-02774	B/G	69/Z	Benjamin Harrison Br, VA	12
Columbia, PA Rt 462 Bridge	F	1807-65014	B/G	09/AD	James River Br, VA	10
Safe Harbor RR Bridge, PA	F	1807-65083	B/G	45/AV	Mills Godwin Br, VA	7
Pittsburgh, PA Westinghouse	M	2206-81647	B/G	19/W	Cobb Island, VA	14
Beesleys Point, NJ	F	1907-01996	B/G	34/BH	Silver Beach Tower, VA	3
Dividing Creek WMA, NJ	F	1807-02735	B/G	29/V	Wachapreague Tower, VA	14
Burlington-Bristol Bridge, NJ	F	1807-65053	B/G	14/AV	Possum Point, VA	9

Table 6. Encounter reports of Virginia peregrine falcons received since the 2020 report.

Resight Location	Resight Date	Sex	USGS Band	Origin	Age
VA birds resighted					
Timberville, VA	6/21/2020	M	2206-54878	James River Bridge	HY
Willard, VA	7/11/2020	M	2206-54866	Reston Town Center	HY
Dorval, CA	7/29/2020	F	1807-46843	Reston Town Center	HY
Assateague Island, MD	10/24/2020	F	1807-46853	Parkers Marsh Tower	HY
New Gretna, NJ	3/12/2021	F	1807-46852	Wachapreague Tower	SY
Chillicothe, OH	3/29/2021	F	1807-46843	Reston Town Center	SY
Northampton Co, VA	6/2/2021	M	2206-54704	Silver Beach	HY
Bombay Hook, DE	8/3/2021	F	1807-46859	Elkins Chimney	HY
Ewell, MD	8/17/2021	F	1807-46846	Elkins Chimney	SY
Norfolk, VA	8/24/2021	F	1907-01994	Yorktown	4
Alexandria, VA	9/1/2021	M	2206-54867	Reston Town Center	SY
Queens, NY	9/3/2021	F	1807-46861	Reston Town Center	HY
Ocean City, MD	9/23/2021	F	1807-46879	Finney's Island Tower	HY
Cape May, NJ	10/2/2021	F	1807-46873	Wachapreague Tower	HY

Translocations

During the 2021 season, 4 young falcons (2 males and 2 females) were translocated to Shenandoah National Park and hacked (Table 7). All birds were from bridges that have experienced poor fledging success. Birds were placed in a single hack box situated on Franklin Cliffs on 17 May 2021. Birds were released on 29 May 2021 and were fine on release.

Table 7. Summary of translocation activities for peregrine falcons in Virginia during the 2021 breeding season. Electrical tape was applied to the USFWS band.

USGS Band	Location	Sex	Tape Color	Date Collected	Translocation Site
1807-46867	Mills Godwin Bridge	F	Yellow	5/17/2021	Shenandoah National Park
1807-46868	Mills Godwin Bridge	F	White	5/17/2021	Shenandoah National Park
2206-54702	Mills Godwin Bridge	M	Red	5/17/2021	Shenandoah National Park
2206-54703	Mills Godwin Bridge	M	Blue	5/17/2021	Shenandoah National Park

Addled Eggs

Nine addled falcon eggs were recovered during the 2021 breeding season (Table 8). Eggs were recovered from 5 sites including 2 bridges, 2 smoke stacks and 1 tower.

Table 8. Addled eggs collected during the 2021 breeding season.

Site	Date	Eggs
Eltham Bridge	4/21/2021	1
Elkins Chimney	4/27/2021	1
Yorktown	4/29/2021	1
Possum Point	5/13/2021	5
James River Bridge	5/28/2021	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 (2000-2021) 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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