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Virginia Peregrine Falcon monitoring and management program: Year 2009 report

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VIRGINIA PEREGRINE FALCON MONITORING AND MANAGEMENT PROGRAM: YEAR 2009 REPORT

Center for Conservation Biology
College of William and Mary
& Virginia Commonwealth University

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Project Partners:

The Virginia Department of Game and Inland Fisheries
(Wildlife Diversity Program)
National Aeronautics and Space Administration
National Park Service
United States Fish and Wildlife Service
Virginia Department of Transportation
The Nature Conservancy
Dominion Power
Center for Conservation Biology

Front Cover: *Adult female defending nest on the roof of the Riverfront Plaza building in Richmond. Photograph by Barton Paxton.*

The Center for Conservation Biology is an organization dedicated to discovering innovative solutions to environmental problems that are both scientifically sound and practical within today's social context. Our philosophy has been to use a general systems approach to locate critical information needs and to plot a deliberate course of action to reach what we believe are essential information endpoints.

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EXECUTIVE SUMMARY

The Peregrine Falcon (*Falco peregrinus*) was believed to be extinct as a breeding species in Virginia by the mid-1960s. Intensive management efforts since the late 1970s have resulted in a known breeding population that has now exceeded 20 pairs. However, most known breeding pairs currently nests on artificial structures and reproductive performance continues to be erratic. The primary objective of this program is to continue to monitor population trends and to improve reproductive performance through active management. The ultimate goal of the program is to recover a population that is self-sustaining.

The Virginia breeding population supported 21 known pairs during the 2009 breeding season. Since 1982, the population has exhibited a steady recovery with an average doubling time of 5.4 years. Fifty-six nesting structures were surveyed for Peregrine Falcon activity during the breeding season. The survey documented 21 resident pairs. Nesting structures included 10 peregrine towers and 1 fishing shack on the Delmarva Peninsula and 6 bridges; 1 reserve ship, 1 power plant stack, and 1 high-rise building in the coastal plain; and 1 cliff site in the mountains. Twenty falcon pairs made breeding attempts producing 65 eggs and 50 chicks that survived to banding age. Reproductive rate was 2.4 chicks/occupied territory and 2.5 chicks/active territory. Of 19 clutches that were followed completely from laying to fledging, 53 of 61 (86.9%) eggs hatched, 48 of the 53 (90.6%) chicks survived to banding age, and 41 (77.4%) fledged successfully.

Nineteen young falcons representing 40% of the chicks produced in the state were translocated from the coast to the mountains during the 2009 breeding season. This included 9 females and 10 males. Ten of these chicks originated on bridges that have a history of poor fledging success. The remaining 9 chicks were from towers along the Delmarva Peninsula (5) and a ship in the James River Reserve Fleet (4). New breeding pairs at both historic hack sites forced National Park Service biologists to move the hack boxes to new areas within each park. Birds collected from territories were transported to Black Rock in Shenandoah National Park, and Grandview in New River Gorge National River. Seven birds were hacked at Black Rock and 12 at Grandview. The management strategy initiated in 2006 to utilize productivity along the Delmarva to fuel targeted hacks in the mountains was continued in 2009. This strategy meets the objective of both repopulating the mountain range and reducing impacts to sensitive waterbirds. New breeding pairs were documented near both hack sites confirming the success of the reintroduction program.

BACKGROUND

Context

The original population of Peregrine Falcons in the eastern United States was estimated to contain approximately 350 breeding pairs (Hickey 1942). From published records and accounts, there have been 24 historical Peregrine eyries documented in the Appalachians of Virginia (Gabler 1983). Two additional nesting sites were documented on old osprey nests along the Virginia portion of the Delmarva Peninsula (Jones 1946). Throughout the 1950s, and into the 1960s, Peregrine Falcon populations throughout parts of Europe and North America experienced a precipitous decline (Hickey 1969). A survey of 133 historic eyries east of the Mississippi River in 1964 failed to find any active sites (Berger et al. 1969). The Peregrine Falcon was believed to be extinct in Virginia as a breeding species by the early 1960s.

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, 149 wild-reared falcons have been translocated from coastal breeding sites in Virginia to mountain release sites in Virginia and Maryland. Such movements have taken advantage of young produced from sites where fledging success is known to be poor.

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 the coastal plain has now exceeded 20 pairs (Figure 1). However, both hatching rate and chick survival remain somewhat erratic. An analysis by the U.S. Fish and Wildlife Service in the early 1990's 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.

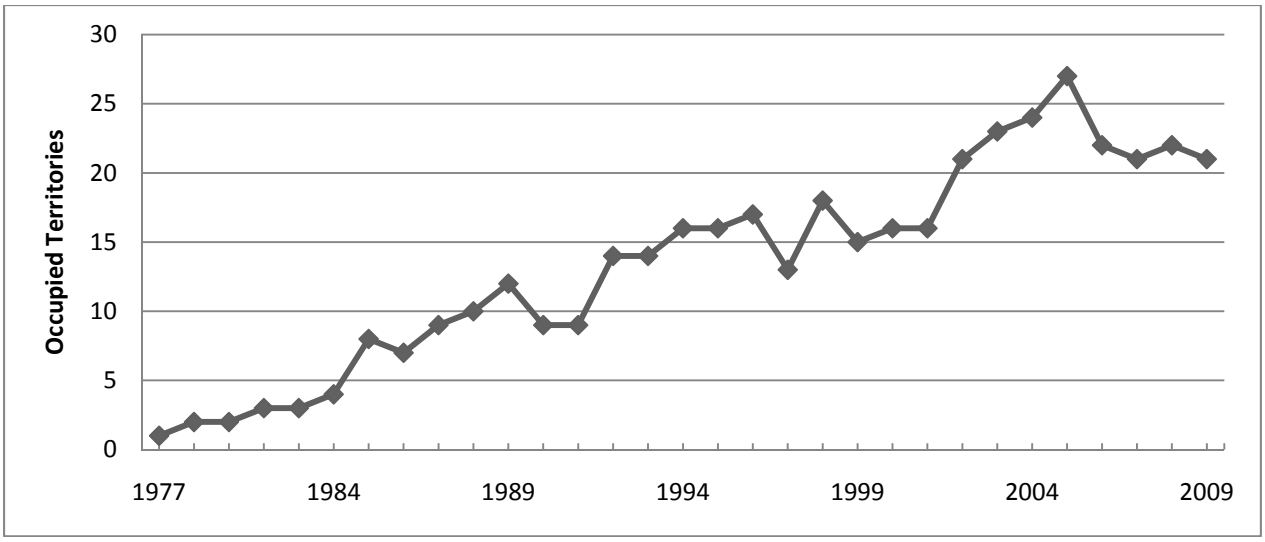

Figure 1. Breeding population of Peregrine Falcons in Virginia 1977-2009.

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

In 2009, the geographic scope of this project included breeding locations within the coastal plain, mountain nesting site in Shenandoah National Park, and two mountain hack sites at Black Rock in Shenandoah National Park and Grandview in New River Gorge National River, WV (Figures 2 and 3). Most of the effort was focused on the coastal plain where the majority of breeding pairs occur.

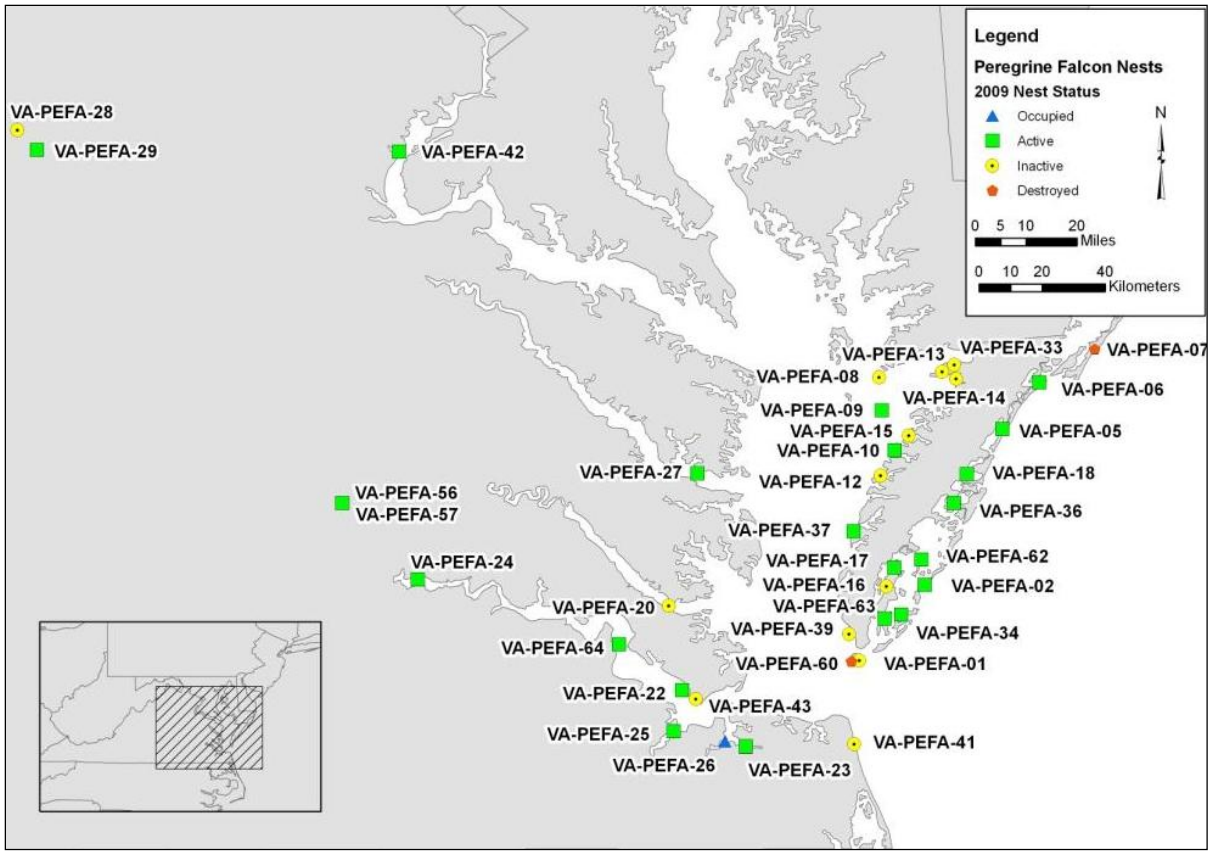

Figure 2. Map of nesting structures for Peregrine Falcons surveyed during the 2009 breeding season.

Nest Site Surveys

Between 1977 and 2004, more than 60 structures were established specifically for breeding Peregrine Falcons within the coastal plain of Virginia (Table 1, Figure 2). Nearly all of the structures that survived to the 2009 breeding season were checked for evidence of resident falcons. An initial survey of breeding structures was conducted between 1 March and 30 April. All surveys of towers and boxes along the Delmarva Peninsula and fringe of the western shore were surveyed from the air using a Cessna 172, high-wing aircraft. Fly bys were conducted at low altitude to flush attending adults and to view the inside of nest boxes for activity. 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 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, fledging rate was determined for all active sites when possible. Nest sites were visited approximately 2 weeks after projected fledging date to determine

fledging success. This time threshold was developed from satellite tracking data (2001-2002) that indicates a pulse of mortality just prior to fledging and in the 2 weeks following fledging (Watts et al. 2002).

Banding

An attempt was made to band all chicks surviving to banding age (18-32 d). Chicks were banded with a U.S. Fish and Wildlife Service lock-on, aluminum tarsal band on the right leg and a bi-colored, green and black, alpha-numeric auxiliary band on the left leg. USFWS bands used in Virginia during the 2009 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.

Translocations

Over the past several years, some breeding sites on bridges have been known to experience low fledging rates. Observations indicate that losses occur during initial flight attempts or when chicks are near fledging age. 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 and reducing the impacts of the breeding Peregrine population on sensitive waterbirds (Long and Watts, unpublished data), chicks were taken from selected nesting sites along the seaside of the Delmarva Peninsula to be hacked from high priority mountain sites (Figure 3).

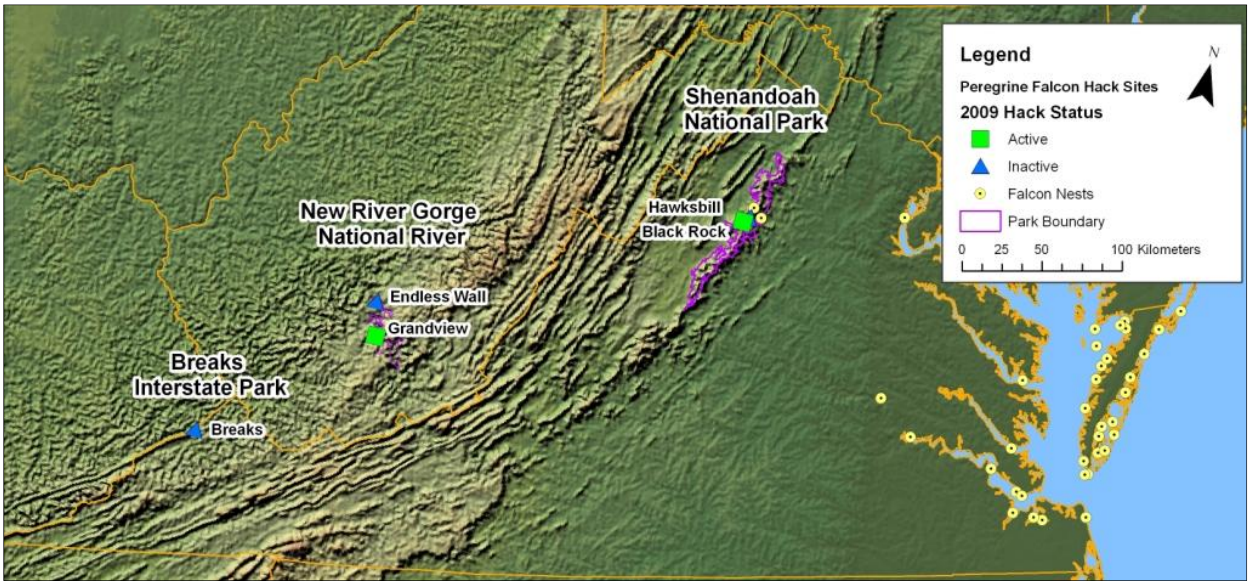

Figure 3. Hack sites where Virginia falcons were released 2006-2009.









Photos from top left to right –Bill Bolin and Jeff Marcell with nestlings from Dominion's Possum Point Plant; Upsher Bay nest tower; Julie Kelso and Dave Curtis checking Wachapreague nest tower; adult female on Riverfront Plaza building; young in Gull Marsh nest; Libby Mojica and Fletcher Smith banding at Watts Island; young falcon at Watts Island; 2 falcons in nest box overlooking Potomac River; 3 falcons seeking shelter in Godwin shack outhouse.

RESULTS

Site Surveys

Fifty-six nesting structures were surveyed for Peregrine Falcon activity during the breeding season (Table 1). Of the sites with known occupation, 21 supported resident pairs. These included 10 peregrine towers, 6 bridges, 1 reserve ship, 1 power plant stack, 1 fishing shack, 1 cliff sites, and 1 high-rise building (Table 2).

Breeding Results

Virginia supported 21 known breeding pairs of Peregrine Falcons during 2009 (Table 2). The 20 falcon pairs that made breeding attempts produced 65 eggs, at least 55 of which hatched. Only 43 survived to fledging age. Fledging success was 2.4 chicks/occupied territory and 2.5 chicks/active territory (Figure 4). It should be noted that much of the chick production resulted from management actions taken during the breeding season. Nineteen (40%) of the 43 chicks produced were the result of translocations. Many of these birds would most likely have died within weeks of fledging if left in place. During the 2009 breeding season, hatching rates were at a record high while fledging rates continued below 80% (Figure 5). Of 19 clutches that were followed completely from laying to fledging, 53 of 61 (86.9%) eggs hatched, 48 of the 53 (90.6%) chicks survived to banding age, and 41 (77.4%) fledged successfully.

The Richmond pair initially laid a single egg on the balcony on the BB&T building sometime in the spring but did not attempt to incubate. The pair disappeared for several weeks and possibly made another nesting attempt at an unknown location. The pair reappeared on the Bank of America building in mid-May where an egg was apparently laid on a ventilation shaft. The following day the pair moved to the roof of the Riverfront Plaza building and laid an additional 4 eggs in the nest box. Several nests on the Eastern Shore were depredated during the course of the breeding season by raccoons and Great-horned Owls. Predator guards will be repaired or replaced on peregrine towers over the winter to reduce raccoon access into nests.

New breeding pairs were documented in the mountains by the National Park Service in Shenandoah NP and New River Gorge. The pair at Shenandoah was seen with fledged young near Old Rag Mountain and Hawksbill Mountain. The location of the eyrie is unknown but is likely at Old Rag. It's suspected but unconfirmed that the male of this pair is the falcon (FWS band 2206-81658) from the 2007 hack seen last summer feeding and socializing with the 2008 hacked falcons at Hawksbill (R. Gubler, pers. comm.). NPS staff at the New River Gorge and Three Rivers Avian Center documented a pair in a cliff cavity below the hack boxes used in 2008. The pair was seen bringing prey deliveries into the eyrie but no young were confirmed. The nest was abandoned but the cause is unclear. NPS staff found a falcon band on the ground below the eyrie (and hack site) belonging to a 2006 hacked falcon from New Jersey, FWS band 2206-87024 (W. Perrone, per. comm.). It's unknown how long this band was on the ground and if it belonged to the resident breeding pair. Band IDs were not recorded for either

adult falcon but the close proximity of the eyrie to the hack boxes suggest at least one of the adults was released at the hack site. A third possible pair was observed in March by birdwatchers at Breaks Interstate Park on the state line between Kentucky and Virginia. One or more of these birds may have been released during the park's hacking programs in 2007 and 2008. Effort should be made next year to confirm this is an occupied territory and location of an eyrie.

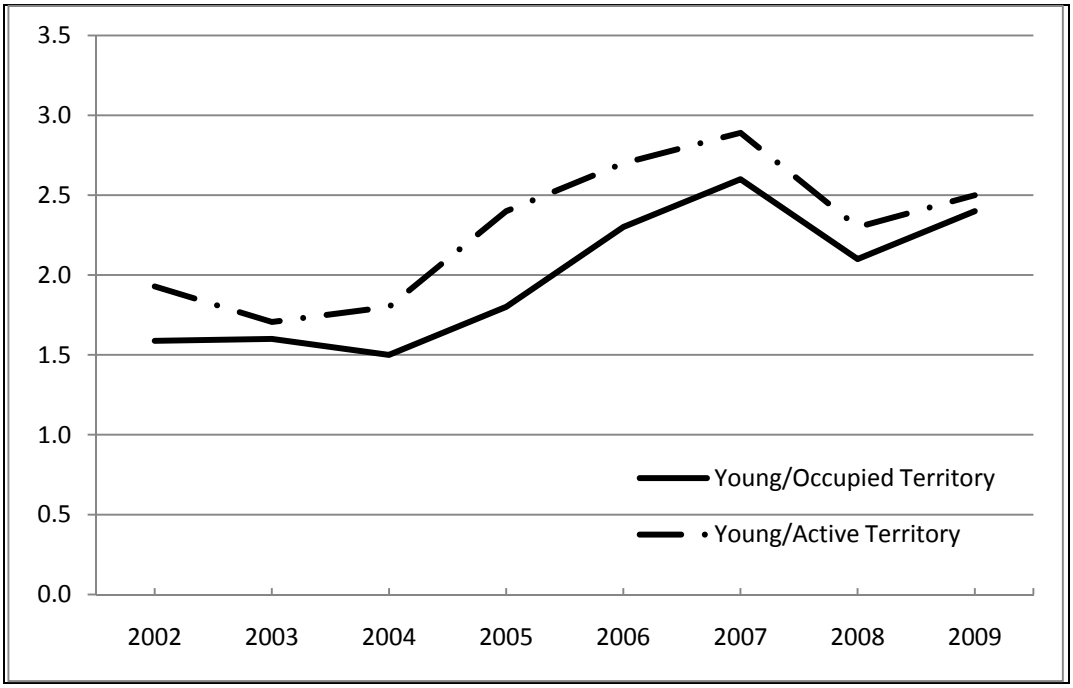

Figure 4. Productivity rates of Peregrine Falcon nests in Virginia.

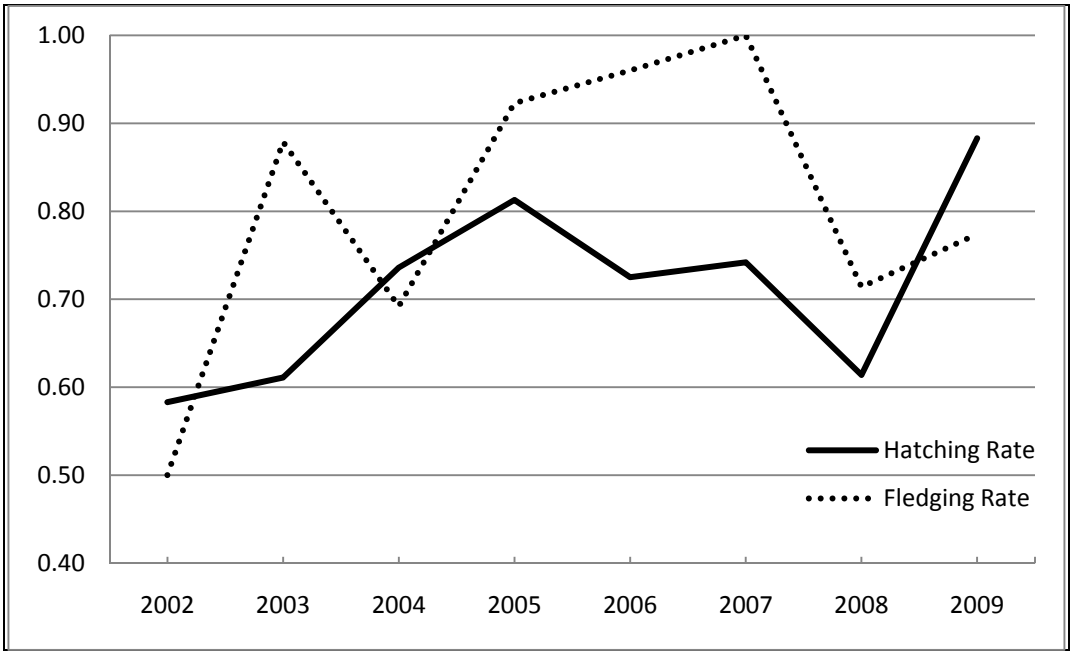

Figure 5. Hatching and fledging rates of Peregrine Falcon nests in Virginia.

Table 1. Catalog of nesting structures established for Peregrine Falcons in Virginia (1977-2004). Table gives year of establishment and whether or not the site was checked for Peregrine Falcon activity during the 2009 breeding season. Dashed lines indicate that the structure is no longer present.

Site Code	Location Description	Structure Type	Year Established	Checked 2009
VA-PEFA-01	Fisherman's Island Tower	Peregrine Tower	1980	Y
VA-PEFA-02	Cobb Island Tower	Peregrine Tower	1978	Y
VA-PEFA-03	Hog Island Tower	Peregrine Tower	1977	Y
VA-PEFA-04	Paramore Island Tower	Peregrine Tower	1982	-----
VA-PEFA-05	Metompkin Island Tower	Peregrine Tower	1982	Y
VA-PEFA-06	Wallops Island Tower	Peregrine Tower	1981	Y
VA-PEFA-07	Chincoteague Tower	Peregrine Tower	1979	Y[1]
VA-PEFA-08	Great Fox 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-11	Tangier Island Water Tower	Nest Box	1999	-----
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-19	James River Ghost Ship 1	Moth Ball Fleet	1987	-----
VA-PEFA-20	Coleman Bridge Box	Nest Box	1989	Y
VA-PEFA-21	Norfolk Southern RR Bridge	Bridge	1992	N
VA-PEFA-22	James River Bridge	Nest Box	1991	Y
VA-PEFA-23	Berkley Bridge	Nest Box	1996	Y
VA-PEFA-24	Benjamin Harrison Bridge	Nest Box	1996	Y
VA-PEFA-25	Mills Godwin Bridge	Nest Box	1996	Y
VA-PEFA-26	West Norfolk Bridge	Nest Box	1996	Y
VA-PEFA-27	Norris Bridge	Nest Box	1989	Y
VA-PEFA-28	Little Stony Man, SNP	Natural Cliff Face	-----	Y
VA-PEFA-29	Old Rag, SNP	Natural Cliff Face	-----	Y
VA-PEFA-30	Back Bay Tower	Peregrine Tower	1982	-----
VA-PEFA-31	Plum Tree Island Tower	Peregrine Tower	1998	-----
VA-PEFA-32	Plum Tree Island Box	Nest Box	1990	Y
VA-PEFA-33	Saxis Marsh W. Tower	Peregrine Tower	1998	Y
VA-PEFA-34	Mockhorn Island Tower	Peregrine Tower	1997	Y

Table 1. Continued.

Site Code	Location Description	Structure Type	Year Established	Checked 2009
VA-PEFA-35	Tangier Island Tower	Peregrine Tower	2000	-----
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	Natural Cliff Face	-----	Y
VA-PEFA-39	Concrete Ships	Nest Box	1995	Y
VA-PEFA-40	Chesapeake 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-44	Elizabeth River Substation	Nest Box	1998	Y
VA-PEFA-45	Cargill Grain Elevator	Nest Box	1993	Y
VA-PEFA-46	Lafayette Bridge	Nest Box	1998	Y
VA-PEFA-47	North Elkins Shack	Nest Box	1994	Y
VA-PEFA-48	Churchland Bridge	Nest Box	1999	Y
VA-PEFA-49	Yorktown Substation	Nest Box	1998	Y
VA-PEFA-50	Jordan Bridge	Nest Box	1995	Y
VA-PEFA-51	Campostella Bridge	Nest Box	1998	Y
VA-PEFA-52	I-64 Bridge	Nest Box	1999	Y
VA-PEFA-53	ALCOA Bridge	Nest Box	1999	Y
VA-PEFA-54	I-295 Bridge	Nest Box	2001	Y
VA-PEFA-55	Dominion Building	Nest Box	2000	Y
VA-PEFA-56	River Front Plaza Building	Nest Box	2002	Y
VA-PEFA-57	BB&T Building	Nest Box	1984	Y
VA-PEFA-58	Russell Island Tower	Peregrine Tower	1982	Y
VA-PEFA-59	Bermuda Hundred	Nest Box	1998	Y
VA-PEFA-60	Chesapeake Bay Bridge	Nest Box	2004	-----
VA-PEFA-61	Tappahannock Bridge	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-64	James River Ghost Ship 2	Moth Ball Fleet	------	Y

[1] Nest tower removed by Chincoteague NWR staff in November 2008.
[2] Nest box removed by Fisherman Island NWR staff in January 2009.

Table 2. Summary of productivity results for Peregrine Falcon pairs in Virginia during the 2009 breeding season.

Site Code	Location Description	Occupied Territory	Active Nest	Eggs	Chicks Hatched	Banding Age	Fledged
VA-PEFA-02	Cobb Island Tower	Y	Y	4	4	4	4[1]
VA-PEFA-05	Metompkin Island Tower	Y	Y	>=1	0[2]	0	0
VA-PEFA-06	Wallops Island Tower	Y	Y	3	3	0	0
VA-PEFA-09	Watts Island Tower	Y	Y	4	4	4	>=2
VA-PEFA-10	Finney's Island Tower	Y	Y	3	3	3	>=2
VA-PEFA-17	Elkins Marsh Shack Tower	Y	Y	3	2	2	1[3]
VA-PEFA-18	Wachapreague Shack Tower	Y	Y	4	4	4	4
VA-PEFA-22	James River Bridge	Y	Y	4	4	3	3[4]
VA-PEFA-23	Berkley Bridge	Y	Y	>=1	>=1[5]	0	0
VA-PEFA-24	Benjamin Harrison Bridge	Y	Y	3	3	3	3[6]
VA-PEFA-25	Mills Godwin Bridge	Y	Y	3	2	2	2[1]
VA-PEFA-26	West Norfolk Bridge	Y	N	0			
VA-PEFA-27	Norris Bridge	Y	Y	4	2	2	2[7]
VA-PEFA-29	Old Rag, SNP	Y	Y	>=2	>=2	>=2	>=2[8]
VA-PEFA-34	Mockhorn Island Tower	Y	Y	3	3	3	>=1
VA-PEFA-36	Upsher Bay Tower	Y	Y	3	1	1	1
VA-PEFA-37	Silver Beach Range Tower	N	N	0	0[9]		
VA-PEFA-42	Possum Point Substation	Y	Y	2	2	2	2
VA-PEFA-56	Riverfront Plaza	Y	Y	5[10]	3	3	3
VA-PEFA-57	BB&T Building	Y	Y	1[11]	0	0	0
VA-PEFA-62	Gull Marsh Tower	Y	Y	4	4	4	3[12]
VA-PEFA-63	Godwin Island Box	Y	Y	4	4	4	4
VA-PEFA-64	James River Ghost Ship	Y	Y	4	4	4	4[13]
	Totals	21	20	65	55	50	43

[1] 2 young translocated to Shenandoah National Park and released
[2] raccoon found in nest box
[3] juvenile peregrine feathers found on nest tower, only one juvenile confirmed fledged
[4] 3 young translocated to New River Gorge and released. 1 chick died < 1 week after hatching likely from dehydration during a heat wave.
[5] Pair observed brooding. Cause of nest failure unknown.
[6] 3 young translocated to New River Gorge and released
[7] 2 young translocated to New River Gorge and released.
[8] Shenandoah National Park staff suspect 2-3 young fledged from a new territory at Old Rag
[9] No access to tower. Adults seen entering nest box but could not confirm number of chicks.
[10] Pair laid one egg on a rooftop ventilation shaft of the Bank of America building. Egg was found broken and the following day the pair moved to the River Front Plaza building.
[11] Pair laid one egg on the BB&T building in early spring but did not incubate. Pair later returned to alternate site within territory on the River Front Plaza building and successfully nested.
[12] 3 young translocated to Shenandoah National Park and released. Remains of one juvenile found under nest tower.
[13] 4 young translocated to New River Gorge and released.

Banding

All but two of the falcon chicks that survived to banding age were fitted with both FWS and alpha-numeric bands. This included 23 females and 25 males (Tables 3a and 3b). A breeding pair with at least two fledged young were documented near Old Rag Mountain in Shenandoah National Park. The fledged young were not captured and banded.

Table 3a. List of band codes for female peregrine falcon chicks banded in Virginia during the 2009 breeding season.

Band	Alpha-numeric Band	Nest	Date
1807-02786	Z/21	James River Bridge	5/17/2009
1807-02787	Z/22	James River Bridge	5/17/2009
1807-02788	Z/23	Wachapreague Shack Tower	5/22/2009
1807-02789	Z/24	Wachapreague Shack Tower	5/22/2009
1807-02790	Z/25	Finney's Island Tower	5/22/2009
1807-02791	Z/26	Watts Island Tower	5/22/2009
1807-02792	Z/27	Benjamin Harrison Bridge	5/21/2009
1807-02793	Z/28	Norris Bridge	5/21/2009
1807-02794	Z/29	James River Ghost Ship	5/21/2009
1807-02795	Z/30	James River Ghost Ship	5/21/2009
1807-02796	Z/31	Watts Island Tower	5/22/2009
1807-02797	Z/32	Watts Island Tower	5/22/2009
1807-02798	Z/33	Gull Marsh Tower	6/4/2009
1807-02799	Z/34	Cobb Island Tower	6/4/2009
1807-02800	Z/35	Cobb Island Tower	6/4/2009
1807-65001	Z/36	Cobb Island Tower	6/4/2009
1807-65002	Z/37	Gull Marsh Tower	6/4/2009
1807-65003	Z/38	Godwin Island Box	6/7/2009
1807-65004	Z/39	Mockhorn Island Tower	6/7/2009
1807-65005	00/AD	Mockhorn Island Tower	6/7/2009
1807-65006	01/AD	Upsher Bay Tower	6/29/2009
1807-65007	02/AD	River Front Plaza	7/29/2009
1807-65008	03/AD	River Front Plaza	7/29/2009

Table 3b. List of band codes for male peregrine falcon chicks banded in Virginia during the 2009 breeding season.

Band	Alpha-numeric Band	Nest	Date
1126-11804	X/55	Finney's Island Tower	5/22/2009
1126-11805	X/56	Finney's Island Tower	5/22/2009
1126-11806	X/57	Wachapreague Shack Tower	5/22/2009
1126-11807	X/58	Wachapreague Shack Tower	5/22/2009
1126-11808	X/59	James River Bridge	5/17/2009
1126-11809	00/AB	Benjamin Harrison Bridge	5/21/2009
1126-11810	01/AB	Benjamin Harrison Bridge	5/21/2009
1126-11811	02/AB	Norris Bridge	5/21/2009
1126-11812	03/AB	James River Ghost Ship	5/21/2009
1126-11813	04/AB	James River Ghost Ship	5/21/2009
1126-11814	05/AB	Watts Island Tower	5/22/2009
1126-11815	06/AB	Elkins Marsh Shack Tower	5/23/2009
1126-11816	07/AB	Elkins Marsh Shack Tower	5/23/2009
1126-11817	08/AB	Cobb Island Tower	6/4/2009
1126-11818	09/AB	Gull Marsh Tower	6/4/2009
1126-11819	10/AB	Gull Marsh Tower	6/4/2009
1126-11820	11/AB	Mills Godwin Bridge	6/4/2009
1126-11821	12/AB	Mills Godwin Bridge	6/4/2009
1126-11822	13/AB	Godwin Island Box	6/7/2009
1126-11823	14/AB	Godwin Island Box	6/7/2009
1126-11824	15/AB	Godwin Island Box	6/7/2009
1126-11825	16/AB	Mockhorn Island Tower	6/7/2009
1126-11826	17/AB	Possum Point Substation	6/18/2009
1126-11827	18/AB	Possum Point Substation	6/18/2009
1126-11828	19/AB	River Front Plaza	7/29/2009

Translocations

Nineteen young falcons were translocated to be hacked during the course of the 2009 breeding season (Table 4). This included 9 females and 10 males. Ten of these chicks originated on bridges that have a history of poor fledging success. The remaining 9 chicks were from towers along the Delmarva Peninsula (5), and a ship in the James River Reserve Fleet at Fort Eustis(4).

The birds removed from towers were taken from one of the highest density breeding areas in Virginia where concern for the impact of peregrines on beach and colonial nesting birds is the highest. The nest site chosen on the reserve ship was in a doorway that was lower than the surrounding structure making it unlikely that the birds could fledge without falling into the water. Birds collected from these territories were transported to Black Rock in Shenandoah National Park and Grandview in New River Gorge National River.

Table 4. Summary of translocation activities for Peregrine Falcons in Virginia during the 2009 breeding season.

Translocation Site	Band	Nest Site	Date Collected
New River Gorge, NPS	1126-11808	James River Bridge	5/17/2009
New River Gorge, NPS	1126-11809	Benjamin Harrison Bridge	5/21/2009
New River Gorge, NPS	1126-11810	Benjamin Harrison Bridge	5/21/2009
New River Gorge, NPS	1126-11811	Norris Bridge	5/21/2009
New River Gorge, NPS	1126-11812	James River Ghost Ship	5/21/2009
New River Gorge, NPS	1126-11813	James River Ghost Ship	5/21/2009
New River Gorge, NPS	1807-02786	James River Bridge	5/17/2009
New River Gorge, NPS	1807-02787	James River Bridge	5/17/2009
New River Gorge, NPS	1807-02792	Benjamin Harrison Bridge	5/21/2009
New River Gorge, NPS	1807-02793	Norris Bridge	5/21/2009
New River Gorge, NPS	1807-02794	James River Ghost Ship	5/21/2009
New River Gorge, NPS	1807-02795	James River Ghost Ship	5/21/2009
Shenandoah, NPS	1126-11818	Gull Marsh Tower	6/4/2009
Shenandoah, NPS	1126-11819	Gull Marsh Tower	6/4/2009
Shenandoah, NPS	1126-11820	Mills Godwin Bridge	6/4/2009
Shenandoah, NPS	1126-11821	Mills Godwin Bridge	6/4/2009
Shenandoah, NPS	1807-02800	Cobb Island Tower	6/4/2009
Shenandoah, NPS	1807-65001	Cobb Island Tower	6/4/2009
Shenandoah, NPS	1807-65002	Gull Marsh Tower	6/4/2009

During the 2009 season, 5 addled eggs were collected and transported for analysis of organochloride and polybrominated diphenyl ether contaminants by Da Chen and Rob

Hale at the Virginia Institute of Marine Science (Table 5). Additional eggs from the Richmond pair were collected by VDGIF staff and submitted separately for testing.

Table 5. Addled eggs collected from Virginia Peregrine Falcon nests for contaminants analysis during the 2009 breeding season.

Site code	Location Description	No. Eggs
VA-PEFA-17	Elkins Marsh Shack Tower	1
VA-PEFA-27	Norris Bridge	2
VA-PEFA-57	BB&T Building	1
VA-PEFA-63	Godwin Island Box	1

DISCUSSION

The breeding population of Peregrine Falcons in Virginia has steadily increased since 1977. The number of breeding pairs in the state has leveled out to 21 - 22 pairs over the last 4 years.

The reproductive rate continued to decrease from rates recorded in 2007 when productivity was the highest since 1988. The hatching rate during the 2009 breeding season was the highest rate recorded in the past 8 years. The fledging rate also increased from last season but lower than the record 100% set during the 2007 season. Productivity data from select Virginia falcon nests (Appendix A) were compiled with other nests from the northeast region as part of the survey required by the national monitoring plan for the species (USFWS 2003). The productivity rates in Virginia were comparable to the average for peregrines in the NE region (2.1 young/active territory and 2.6/occupied territory; data collected by state wildlife agencies, USFWS *in litt.* 2009).

The falcon pair in Richmond made 3 unsuccessful nesting attempts before finally settling at the nest box on the River Front Plaza roof. The pair was actively discouraged from their first choice of nesting sites on the BB&T building. This led to several failed nesting attempts and a delay in initiating the final and successful nest on the River Front Plaza. Management of the Richmond pair should be reevaluated to reduce management-related disturbance during the breeding season.

The use of coastal productivity to fuel targeted hacks in priority sites is consistent with the objective of re-establishing a viable breeding population within the historic mountain range of Virginia. Fledging rates from the 6 bridge sites in the coastal plain has been very low. The translocation of these birds to the mountains is a good use of this production. Over the past decade, pairs along the lower Delmarva Peninsula have increased to a very high breeding density. This population exists completely on artificial structures and has been highly productive. Diet within this system is dominated by migrant shorebirds and nesting waterbirds that are themselves of conservation concern

(Long 2009). In recent years, concern about the impact of this breeding population on the management of waterbirds has increased. Two peregrine nest boxes were removed from key shorebird breeding areas (Chincoteague and Fisherman's Islands) in 2009 in an attempt to reduce peregrine predation and disturbance on these sensitive populations. The management strategy initiated in 2006 to utilize productivity along the Delmarva to fuel targeted hacks in the mountains was continued in 2009. This strategy meets the objective of both repopulating the mountain range and reducing impacts to sensitive waterbirds.

Fewer falcons were translocated in 2009 compared to the previous 2 years because the number of hack sites was reduced this season. A total of 19 birds representing more than 40% of the total production was moved to the mountains and released. Falcons were hacked from Black Rock in Shenandoah National Park, and Grandview in New River Gorge National River. Efforts in future years should continue to support the establishment of a breeding pair within these sites and should establish the infrastructure and partnerships necessary for at least 1 additional hack site in Virginia.

Nesting on natural cliff sites continues to be precarious. These nests have a history of problems from exposure, drainage, and depredation. The two nests reported near the hack sites in New River and Shenandoah are encouraging but the future success of these mountain territories is uncertain. The intensive management of the mountain falcon population through translocation and hacking should continue in the future until the mountain population is self sustaining.

During the 2009 season, 5 addled eggs were collected and analyzed at the Virginia Institute of Marine Science. This transfer represents a continuing effort to monitor contaminant levels in Virginia peregrines and to continue to explore the potential for this species to accumulate brominated fire retardants that remain on the market. These contaminants have been found in high level in falcon populations in the northeastern US and have the potential to affect avian productivity rates (Chen et al 2008, Potter 2004, Morse 1993, Weimeyer et al 1986).

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APPENDIX A. Virginia Peregrine Falcon nests monitored for the national monitoring plan survey conducted in 2009. Territories were randomly selected in 2003 for inclusion in the national survey conducted every three years.

Nest Code	Nest	Occupied Territory	Active Nest	Successful Nest	Eggs	Young Banded	Fledged
VA-PEFA-02	Cobb Island Tower	Y	Y	Y	4	4	4
VA-PEFA-05	Metompkin Island Tower	Y	Y	N	>=1	0	0
VA-PEFA-09	Watts Island Tower	Y	Y	Y	4	4	>=2
VA-PEFA-10	Finney's Island Tower	Y	Y	Y	3	3	>=2
VA-PEFA-17	Elkins Marsh Shack Tower	Y	Y	Y	3	2	1
VA-PEFA-18	Wachapreague Shack Tower	Y	Y	Y	4	4	4
VA-PEFA-22	James River Bridge	Y	Y	Y	4	3	3
VA-PEFA-24	Benjamin Harrison Bridge	Y	Y	Y	3	3	3
VA-PEFA-25	Mills Godwin Bridge	Y	Y	Y	3	2	2
VA-PEFA-33	Saxis Marsh S. Tower	N	N				
VA-PEFA-26	West Norfolk Bridge	Y	N				