Return of the Peregrine

A North American Saga of Tenacity and Teamwork

Tom J. Cade
with thanks for
all your good work
with the great peregrines

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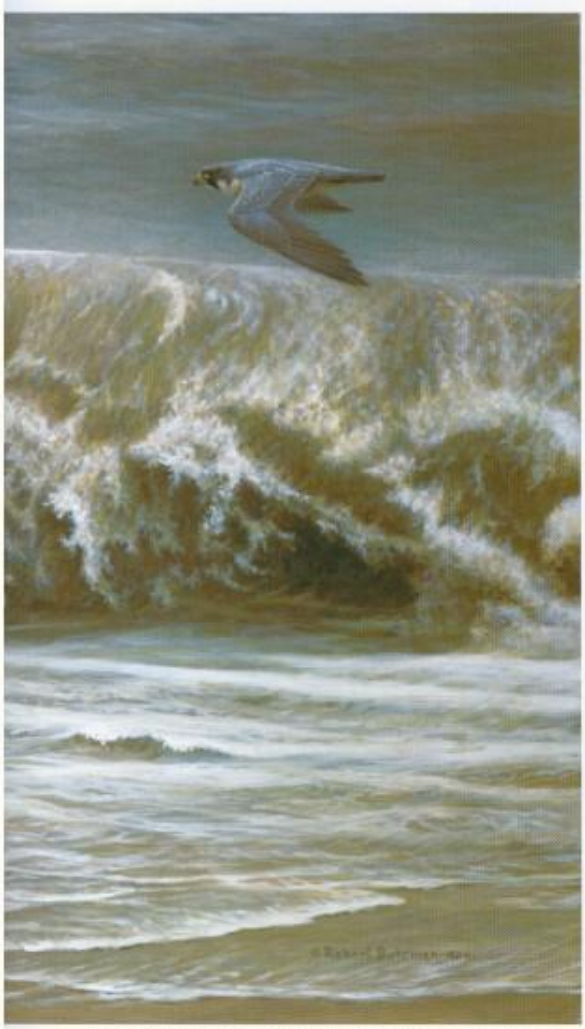
Chapter 13

Research on Migratory Peregrines

William S. Seegar, Mike Yates, and Tom Maechtle



Tundra Peregrines (F. p. tundrius) were in steep decline by 1970 according to nesting surveys in the Arctic and accounts by banders at traditional migratory trapping sites. Concerned scientists sought the best method to monitor populations of this highly migratory subspecies that nests in remote areas in the Arctic and winters throughout the Americas in diverse and geopolitically sensitive areas. Jim Enderson advocated standardized surveys at known migratory locations. Counts at Cape May, New Jersey, Hawk Mountain, Pennsylvania, and Cedar Grove, Wisconsin, helped address this need for information, but Assateague Island, Maryland/Virginia, offered a unique opportunity because of the historical database that existed. Falconers Alva Nye and Bill Turner discovered the autumn concentration of Tundra Peregrines on Assateague Island in 1938, and trappers subsequently frequented the island each year. Falcons were captured and kept for falconry, but many more were banded and released. Because of the observed decline in Tundra Peregrine populations, falconers were no longer allowed to trap at Assateague after the 1969 migration. A three-decade legacy of detailed notes on dates, observations, captures, and weather was still available from such serious and credible naturalists as Al Nye, Jim Rice, Brian McDonald, Bob Berry, and Lou Woyce.

▲ **Figure 13.1** *Peregrine and Ruddy Turnstones* ©Robert Bateman. Reproduction rights courtesy Boshkung Inc. and Mill Pond Press.

A. Nye, courtesy Archives of American Falconry

Courtesy Archives of American Falconry, Stabler Collection

▲ **Figure 13.2** (Above) Abandoned Green Run Hotel on Assateague Island in the 1930s. Falconers camped here while capturing Peregrines. Note hooded Peregrines on crude screen perch.

Courtesy Archives of American Falconry, Stabler Collection

▲ **Figure 13.3** (Below) Al Nye emerging from the sand after capturing a Peregrine, 24 October 1940 (see Figure 2.4 for explanation of trapping method). The falcon was kept in falconry and later named Kokomo.

▲ **Figure 13.4** Nye later gave Kokomo to Bill Turner, shown holding her in 1942.

The Assateague Island Survey

In September 1970, F. Prescott (Scott) Ward and Bob Berry began a standardized study at Assateague, with assistance at times from Lou Woyce. Scott, a civilian scientist with the Ecology Branch at Edgewood Arsenal, Maryland, obtained operating funds through the Department of the Army's environmental programs to support the survey. Assateague Island is owned and managed by a consortium, which includes the Assateague Island National Seashore, Chincoteague National Wildlife Refuge, and Assateague State Park, Maryland. After the Tundra Peregrine was placed on the list of endangered species in 1970, full access to the survey area was difficult to secure and retain in the early years. Three decades of field research later, our program is now fully supported by the state and federal agencies involved, as well as by countless visitors who follow our activities through public talks and other forums. Bob Berry left the survey in 1976, and Mike Yates joined Ward in 1977. Bill Seegar made the duo a trio from 1981 through Ward's departure after the 1990 survey, and Jim Dayton came on board in 1995.

Assateague is a barrier island 60 km long, and it varies in width from 200 m to 5 km. A hurricane in 1933 detached Assateague from Fenwick Island, and a jetty was built to preserve the inlet and the newly formed island to the south. Assateague is separated from mainland Maryland and Virginia by a series of shallow bays and narrow inlets. Access to the island was by ferry until construction of two bridges, one in Virginia (1962) and another in Maryland (1963). During a normal high tide, the front beach varies from nonexistent to about 100 m in width along the length of the island. The beach backs naturally to a low, unstable dune line. A manmade dune line was created in the 1950s to protect "improvements" and is still maintained in some places. Behind the dunes lie vegetation, swamps, tidal flats, marshes, and forests. The public has access to the entire island during the study period by foot and boat, and to 26 km of beachfront by four-wheel-drive vehicle.

We have historically observed and captured migrating Peregrines on the beachfront, sand roadways, and tidal flats and have recorded Peregrine observations when traveling in areas not conducive to trapping. A database on all other species of raptors observed during the survey has also been compiled. Since 1970 we have conducted the study yearly in September and October, operating two research vehicles from dawn to dusk except in cases of vehicle breakdown, high winds (>25 kt), or dangerously high tides. The

Courtesy Archives of American Falconry, Nye Collection

Bob Berry

Bob Berry

island is divided at the state line, and each area to the north and south is surveyed in the morning by single vehicles, which switch sides of the island at midday. The workday for each field biologist during the four-week period averages 16 hours, including approximately 12 hours in the field, maintenance of equipment, and production of extensive field notes.

The National Park Service (NPS) has provided quarters for the survey on the island since the inception of the program, initially at private dwellings that were acquired by the Seashore when it was established. Since 1983 we have been based at the historic Assateague Beach Station of the U.S. Life-Saving Service (later U.S. Coast Guard), built in 1875. Early on, the survey had a distinct U.S. Army flavor and an olive-drab color. Scott's vehicle was a canvas-topped military Jeep checked out of the Edgewood motor pool. Both doors were removed for access, visibility, and capture efficiency. This arrangement made for some cold, wet, and uncomfortable days on the beach; you may be sure that all who accompanied Scott were dedicated to the importance of the work. An open military trailer full of jerry cans to transport gasoline was periodically replenished off the island to keep the vehicles going. To sustain the researchers by day, Scott brought cases of C-rations. At night, we generally ate better. Few successful surf fishermen could resist Scott Ward's persuasive powers. Often he not only got the best of their catch but also charmed them into delivering the goods to our headquarters so he would lose no beach time trapping falcons. During the early years that beach time could be brutally unproductive. It is much more physically and mentally exhausting to have spent 12 hours looking in vain for a Peregrine than to have been busy all day trapping a large number of them.

Although monitoring migratory Peregrine populations has been the primary objective of the survey, we also use the program to investigate many other aspects of the falcons' natural history and ecology. Color bands with alpha-numeric codes that can be read at a distance through binoculars or a spotting scope were deployed to enhance recapture data. This technique provided us information (without recapture) on the length of time falcons stayed on the island, and we periodically received returns on falcon bands read by others off the study area (Ward 1975). One of the most interesting sightings was a falcon that spent a day on the Russian ship *Belagorsk* off the east coast of the United States. The ship was doing a pelagic bird survey, and the falcon was clearly seen and the band read by several ornithologists on board. We conducted field studies on the prey species taken by Peregrines while hunting and resting on the island during migration (Ward and Laybourne 1985). Another research project involved the collection of small feather samples from captured Peregrines for trace element analysis. This work

◀ **Figure 13.5** (Left) Brian McDonald and Bill Shinners banding a Peregrine, Assateague Island, 30 September 1963.

▲ **Figure 13.6** (Above) Scott Ward and Bob Berry repairing falcon trapping equipment, an every day/evening activity when capturing Peregrines, Assateague Island, 1974.

▲ **Figure 13.7** Relaxing on the beach to cocktails and steaks gratis Corny McFadden, Assateague, October 1964. Standing, left to right: Jim Rice, Sr., Max Berger, Jerry McFadden, Jim Gerlach, and Bill Mattox. Seated/kneeling: Corny McFadden, Jimmy Rice, Barbara Berry, and Carol Berry.

Figure 13.8 Hank Paulson prepares to release two adult Peregrines, Assateague Island, October 1978. In 1996 he became Chairman of the Board of The Peregrine Fund. He also became Chairman and CEO of The Goldman Sachs Group, Inc.

Figure 13.9 Wendy Paulson releases an immature Peregrine after banding, Assateague Island, October 1973.

Figure 13.10 Migrating Peregrine being fitted with a radio telemetry device.

Figure 13.11 Peregrines from many locations pass over Assateague Island.

was directed at determining the natal origins of falcons captured on migration. Colleague Jim Parrish demonstrated that ratios of trace elements in the falcon feathers were unique within discrete geographic populations (Parrish et al. 1983). Accordingly, a migrant's natal origin could be determined if baseline data for that location were available. Developing technologies of this type was part of the Army research and development program and was directed at understanding how geographically discrete breeding populations of Tundra Peregrines were distributed in the flyway and wintering grounds. We color-marked banded falcons with dye to avoid recapturing individuals and also to generate information from sightings of marked birds south of Assateague before the color faded. During the late 1970s Bill Seegar and Tom Ray did standardized Peregrine counts by fixed-wing aircraft along the barrier island chain between north Assateague and Cape Charles to the south. In concert with Bill Cochran, we outfitted Peregrines with some of the early VHF radio transmitters. Cochran tracked them south by fixed-wing aircraft and learned about Peregrine migration dynamics along the eastern coastal zone (Cochran 1985). Mark Fuller and Kim Titus assisted in a study using pulse-coded VHF transmitters on uniquely color-marked Peregrines. We were able to determine not only how long those migrants remained on the island but how likely we were to observe them during the normal course of the survey (Howey et al. 1984). Blood sampling has been a routine part of our protocol and was initially used to monitor pesticide levels of migrants (Henny et al. 1982). Later we used blood samples in collaborative genetics studies, and more recently we joined with the National Wildlife Health Center to investigate the Peregrine's possible role as a reservoir of West Nile encephalitis virus and a vector that could quickly spread this arbovirus into the Southern Hemisphere. We have provided a comprehensive file of Peregrine captures and sightings according to Global Positioning System (GPS) coordinates. When these data are integrated with the NPS Geographic Information System (GIS) database, resource managers can look at land use in regard to Peregrine distribution. We have hosted visiting scientists from the former Soviet Union, Russian Federation, Greenland, Mexico, Canada, and People's Republic of China in order to foster cooperative ventures benefitting scientists worldwide.

In 1981 we began a technical development effort that would take 10 years to achieve. Our goal was to develop a space-based system to track and monitor Peregrine movements anywhere on the surface of the earth. We started the effort with The Johns Hopkins University Applied Physics Laboratory, which at the time was one of the most experienced groups in the world in space tracking

Figure 13.12 Lou Woyce leaps through the air to capture a Peregrine, a dramatization for a 1963 *Saturday Evening Post* article on falconry.

Figure 13.13 Willard Heck (left), Ken Riddle, and Mike Brewer band and collect blood from a captured Peregrine, Padre Island, 1979.

systems. Within the first year we identified the French Argos System, which had satellites in Low Earth Orbit capable of providing global tracking coverage. We were successful in developing a new Temperature Compensated Crystal Oscillator and a unique solar power source that allowed us to miniaturize then-current transmitter terminals from their 2- to 3-kg size to 180 g for use on large birds. The units on the birds, Platform Transmitter Terminals (PTTs), transmit signals at programmed intervals to orbiting satellites, and Service Argos computes PTT locations using Doppler Shift algorithms (Fuller et al. 1995). The accuracy of the location estimates is between 150 m and several kilometers. We fielded prototype PTTs on larger birds by 1984 and gradually achieved miniaturization of the units until we were able to track successfully a Gyrfalcon in West Greenland in 1990.

In October 1993 two adult female Peregrines were harnessed at Assateague with 30-g PTTs equipped with activity, temperature, and battery voltage sensors. One of the 1993 adults wintered in a unique wetland habitat, at 14,000 ft in the central Argentine altiplano. Members of our research team visited that area in February 1994 and made detailed observations on the wintering behavior of the falcon and 23 other species of birds. These included three species of Neotropical migrants sharing the same high-mountain wintering habitat. It was determined that an immature female Peregrine also wintered in this small wetland with the adult we tracked from Assateague Island (Seegar and Yates 1994).

Since that time we have continued to develop, miniaturize, and apply these technologies to unlock the remaining mysteries of the Peregrine's ecology. Migrating falcons were not only *tundrius* but boreal forest *anatum* Peregrines. Studies by our group at both Assateague and Padre Islands have shown that contaminant levels attributed to the use of DDT have declined. Migrants may, however, still face toxic threats in their Central and South American wintering grounds from new pesticides or misuse of existing agricultural chemicals.

Satellite telemetry represents an invaluable tool in identifying critical habitats and in pinpointing and mitigating global sources of contaminants affecting Peregrines and the Neotropical migrants with which their life histories are so irrevocably intertwined. Future systems with improved electronics and new sensors hold great promise for the management of species on a local, regional, and global scale. Through this technology we now look into the most remote places on the surface of the earth, seeing relationships we could only imagine when we began this quest in 1981, between Peregrines, their prey, and their habitat.

The Assateague survey continues each autumn with private support from interested foundations and individuals.

Figure 13.14 Immature Peregrine at sunset.

Figure 13.15 (Opposite page) Randy Townsend on North Padre Island, autumn 1985.

▲ Figure 13.16 Padre Island, Texas is a focal area for migrating Peregrines to pass before continuing south either along the coast or across the Gulf of Mexico.

The Padre Island Survey

The Texas Gulf Coast has been known as an autumn concentration point for migratory Peregrines since 1890, as described by Griscom and Crosby (1925) in a paper published in *The Auk*. This phenomenon did not receive much attention until one of the pioneers of North American falconry, the late Colonel R. L. Meredith, retired in the region and explored the beaches of Padre Island in search of migratory Peregrines during the 1950s. His observations and baseline notes brought attention to this concentration of falcons, and falconers who had a keen interest in the biology of the birds soon followed. These included W. Grainger Hunt, who studied the migratory Peregrines that visited Padre Island (Hunt 1966) for his Master's degree while a student at Sul Ross State College in the mid-1960s. Biologist and falconer Ralph Rogers also researched Peregrines at Padre while a student in the Wildlife Department at Texas Tech. The late falconer and naturalist Daniel Slowe worked with Rogers and Hunt in these first systematic surveys of migratory Peregrines in coastal Texas. Together they published in *The Canadian Field-Naturalist* (Hunt et al. 1975) the first details of chronology of migration, age and sex ratios, banding data, and predatory behavior of Peregrines using Padre Island.

The Texas surveys continued with involvement from the Texas Department of Parks and Wildlife. Most notably, Ken Riddle in 1973 began annual autumn surveys on High, Matagorda, and South Padre Islands. In 1977 Mustang and North Padre Islands were added to the survey, and with support from the Ecology Branch at Edgewood Arsenal, Riddle was able to maintain systematic counts. In 1978, Ward discovered the springtime concentration of migratory Peregrines at Padre, and Riddle added a spring survey in 1979. Ward had looked for a spring focal point exhaustively, visiting Assateague in late April and May of 1972, 1973, 1974, and 1976, Panama in March of 1973 and 1974, and the Dry Tortugas, Florida, in early April of 1974. He had contractors make springtime visits to the Dry Tortugas in 1975, Cumberland Island, Georgia, in 1976, and Sandy Hook, New Jersey, in 1977 and 1978. All those efforts resulted in only 15 sightings and one capture.

It is important to note that all the initial surveys in Texas were restricted to the beachfronts of the barrier islands. There simply was no way to drive a conventional vehicle safely on the expansive wind-tidal flats that lie behind the dune barrier. It was not until the spring of 1981 that Riddle and his team had access to the flats by means of all-terrain cycles (ATCs). The advent of this vehicle was revolutionary in accessing the vast habitats and in encounters with Peregrines that were previously out of reach.

In 1981, the survey expanded to include not only the beachfronts of North and South Padre Island but also the wind-tidal flats of both islands. Riddle established a system of monitoring North Padre Island using a remote field camp that

Tom Maechtle

included tents to house the researchers. Equipment and ATCs were transported from South Padre via inflatable boat, or at times by helicopters from the Corpus Christi Army Depot. Teams of two or three individuals on each island would split their time between the North Padre field camp and a rented house located in the Town of South Padre Island. From these two stations, the team left before dawn and surveyed throughout the day on the respective islands, typically not returning until after dark. Because the ATCs had only a few pounds of air pressure in each tire, they were able to traverse the soft terrain without becoming mired, leaving little evidence of their passing. Wind and rain erased our tracks after each season, leaving a blank slate for the next survey.

In 1985, Tom Maechtle took over the operation of the survey from Riddle, proceeding with the continued support of Ward and Seegar at Edgewood. From 1985 through 1994 we ran surveys on both islands and benefitted from advances in ATC technology. The machines became four-wheeled instead of three, making them safer and more comfortable. During years when the survey covered North and South Padre Islands, it was not uncommon to drive 320 km a day on a land mass that stretched 130 km long and ranged from 1 to16 km wide.

Since autumn of 1994 we have concentrated our survey efforts on South Padre Island. This change in operation has decreased the overall volume of sightings and captures. Data collection using a smaller landmass remains, however, relevant to the detection of population trends and the collection of biological samples for analyses of contaminants, disease, and natal origin.

Today our survey consists of the 40 km long beachfront north of the Town of South Padre Island to the Mansfield Channel which separates the south and north islands. We also survey the wind-tidal flats west to the Laguna Madre. The landmass can vary daily because of wind-driven

Bill Byrne/Wash. Division of Fisheries and Wildlife

South Padre Island, 1965

Grainger Hunt

I was speeding 45 mph down the beach in a stripped-down (frame and windshield only) VW bug, a pigeon in one hand, steering wheel in the other, my attention focused straight overhead on a fast-moving, low-flying tiercel that refused to look my way. At mid-shout—to get his attention—my situation suddenly changed to smooth, rapid deceleration, a brief sinking, a second of quiet confusion, followed by a cold, excessive drenching from above. It took seconds to realize I had planed out through the surf, sunk to my waist, and ruined, among many other items, the foolishly kind motel owner's brand spanking new pair of 10 x 50 binoculars. The 8-mi walk back included almost catching a passage female, just down from the high latitudes, and tame enough to follow a wet lure pigeon to my feet.

Grainger Hunt *For biographical information see sidebar, A Pile of Prey Remains, Chapter 4.*

▲ **Figure 13.17** (Above) Exquisite newly-captured immature Peregrine.

Figure 13.18 (Right) ▶ Halter Cunningham. With Brian McDonald, he developed the modern pigeon noose harness for trapping falcons that revolutionized Peregrine capture in North America.

▲ **Figure 13.19** (Below) Dave Remple releasing a Peregrine, South Padre Island.

tides on beaches and flats and rainfall that, along with high winds and lightning storms, can prevent our access to the study area.

Much of South Padre Island is privately owned, although The Nature Conservancy recently purchased a significant portion of the study area. It is now conserved in perpetuity, with management by the Laguna Atascosa National Wildlife Refuge (NWR).

During the course of our studies at Padre Island, we have taken blood samples from thousands of falcons which have been analyzed every six to 10 years by Charles Henny of the U.S. Geological Survey (USGS). We learned early on that Peregrines were becoming contaminated with organochlorine pesticides while wintering in Latin America (Henny et al. 1982). More recent blood analyses have shown that organochlorine concentrations in Peregrines captured at Padre are no longer the threat they were a decade ago (Henny et al. 1988, 1996). Our blood sampling remains important not only for continued monitoring of contaminants but also for analyses of other threats (i.e., West Nile encephalitis virus, which appears to be spreading through migratory birds). Blood and feather samples have also played an important role in learning about the geographic origins of the Padre migrants.

All these tools assist in not only understanding the biology of migrant Peregrines but also in the ongoing conservation of Peregrines and other species of migratory birds on which this large falcon preys. The autumn and spring surveys at Padre continue today with private support from interested foundations and individuals, along with a legion of highly experienced and dedicated colleagues who donate their time to maintain this unusually long-term database.

Results

During the past 32 seasons at Assateague, the principals have spent 16,186 man-hours in the field, observing 14,550 Peregrines and capturing 4,110 (Table 13.1). Yearly sighting and capture totals have increased exponentially since the 1972 U.S. ban on DDT. Observations and captures at Assateague were at all-time lows of 41 and 8 that year, and a mean 10-man-hour period in the field produced only 1.26 sightings (Berry and Ward 1975, Ward et al. 1988). By 1998, observations and captures were 999 and 261 respectively, and that same mean effort produced 17.96 sightings (Seegar et al. 1998).

Since 1977 we have surveyed for Peregrines on Padre Island during 24 autumn seasons and 23 spring seasons; these 47 survey periods lasted an average of 30 days each. We spent 25,147 man-hours in the field, observing 33,452 Peregrines and capturing 6,905 (Table 13.2).

Analyzing the Padre data presents a more complex problem than at Assateague because of the increased number of personnel involved, the variety of routes driven during the survey, and the different capture methods used over the years with varying success rates. We have used trucks along the beachfront, fixed trapping stations, ATCs, and experimented with hovercraft. By far, the ATCs are most efficient since they can access the soft terrain of the wind-tidal flats where the majority of falcons are found. The use of ATCs quickly increased the sightings per 10-hr block from an average of three to eight sightings during the late 1970s. Fixed trapping stations are not as productive because Peregrines are not concentrated at any point along Padre Island. Trucks along the beachfront are useful but limited to the relatively small and linear landmass of the high-tide zone.

It is apparent from our data that even in a completely recovered population, yearly counts on a highly standardized study such as ours can vary significantly. Contributing factors are local and continental weather patterns, and also the timing of events that prevent full conduct of the study (vehicle breakdown, high wind and tide, flooding of inland flat by rain, etc.). Continental weather patterns play a major role in the overall number of Peregrines encountered at Padre. For example, in the autumn of 1993 alone we captured 696 Peregrines and observed 2,416 in 995 man-hours. Meanwhile, the Assateague survey had an average year with 192 captured and 595 observed in 593 man-hours. These confounding factors further illustrate the value of our long-term studies as such yearly aberrations are balanced and distributed over time and a more accurate index of populations emerges.

We know from band returns that migratory Peregrines throughout the North American Arctic can be encountered at Padre during autumn, although the majority are from the western and central Arctic. This distribution changes during spring migration, when Peregrines from all natal regions pass through Padre Island from their winter quarters in Central and South America, resulting in a natural concentration point for falcons traveling north to their breeding grounds. When analyzing data for detection of trends, we have been careful to consider only those dates for each survey for where we have multiple years of data; we have also considered spring surveys separately from those in autumn. Data have not revealed statistically significant trends that suggest a decrease or increase in Padre numbers since 1986 (Seegar et al. 1998).

A principal finding of our research identifies Padre Island as a major staging area for northward migrating Peregrines in this hemisphere. Our efforts to identify a springtime concentration of Peregrines on the East Coast have been unsuccessful. Captures of previously banded falcons on Padre Island and satellite tracking results reveal that autumn East Coast migrants wintering in Central and South America commonly appear at Padre Island on their way north and do not retrace the route they followed south. Therefore a high percentage of all migratory Peregrines pass through Padre Island in springtime. Conclusions drawn from our work there carry implications pertinent to the migratory Peregrine population as a whole.

Satellite Tracking— To date we have deployed 17 PTTs at Assateague and 21 at Padre Island. Through the use of satellite tracking we have been able to evaluate the migration strategy of

Table 13.1 Assateague Island Peregrine Falcon survey totals—1970-2001.

Year	Man-hours expended	Peregrine Falcons sighted	Peregrine Falcons sighted/10 man-hours	Peregrine Falcons captured	Peregrine Falcons captured/10 man-hours
1970	310.0	66	2.13	23	0.74
1971	222.1	120	5.40	35	1.58
1972	325.7	41	1.26	8	0.25
1973	360.7	136	3.77	47	1.30
1974	360.3	59	1.64	22	0.61
1975	332.5	186	5.59	40	1.20
1976	336.2	176	5.23	48	1.43
1977	468.2	209	4.46	75	1.60
1978	436.2	259	5.94	64	1.47
1979	427.4	598	13.99	127	2.97
1980	451.1	512	11.35	110	2.44
1981	564.7	347	6.15	89	1.58
1982	632.3	591	9.35	121	1.91
1983	637.2	562	8.82	116	1.82
1984	724.9	547	7.55	150	2.07
1985	683.0	483	7.07	147	2.15
1986	704.1	838	11.90	230	3.27
1987	607.4	327	5.38	112	1.84
1988	671.7	409	6.09	132	1.97
1989	601.2	813	13.52	203	3.38
1990	509.3	659	12.94	248	4.87
1991	630.3	743	11.78	227	3.60
1992	558.8	340	6.08	116	2.08
1993	593.2	595	10.03	192	3.24
1994	557.3	467	8.38	133	2.39
1995	485.4	525	10.82	139	2.86
1996	374.3	568	15.17	192	5.13
1997	516.5	889	17.21	254	4.91
1998	556.3	999	17.96	261	4.69
1999	504.3	560	11.10	179	3.55
2000	536.8	522	9.73	155	2.89
2001	507.3	404	7.96	115	2.27
Total	16186.7	14550	8.99	4110	2.54

The Scent of a Peregrine

William Burnham

Bill Burnham

Struggling to escape the monofilament nooses and drag that are keeping her from flying, she turns toward me in defense. Defiance, not fear, shows in her dark eyes. Silent. She is perfect. Every feather exact, as if new. They almost are, as she only hatched in June or July and this is early October, but she has already flown thousands of miles. Picking her up, I am extra careful with her flight feathers which will not be replaced until next summer. Her ability in flight and to catch food will largely determine whether she lives or dies. Surviving to breed and replace herself with young is critical to ensure the future of her kind. With the first grasp, experienced hands and mind register she is in good condition. In particular, the feel of the breast muscles in relation to her keel bone tells she has been eating well. Changing my grip from two hands to one, I slip the hood on, keeping her calm so she does not struggle for the few minutes I need to band her. One hood brace in my teeth and the other between my thumb and fingers, tension closes the hood back, making it snug on her head but not touching the eyes or interfering with her breathing. My face next to hers, I catch the fresh scent of her breath—a further indication of good health.

Only the laws of nature govern her life, and the drive to survive and reproduce provide direction.

She is unbanded. Where did she come from? Maybe an eyrie in the High Arctic of Greenland or from a river cliff in the taiga zone of Alaska, between tundra and forest. We will never know that, but now with the aluminum band she wears we may know where she reappears in the future. What has she already witnessed? What has she done without government telling her what she can or cannot do, or when. No thought of heaven or hell. No physical possessions to worry over or devices to depend on. Only the laws of nature govern her life, and the drive to survive and reproduce provide direction.

Loosening the hood, then shifting my grip back to two hands, I gently bury my nose in the feathers between her wings and sniff. There is nothing in the world that smells like a newly captured Peregrine. She smells like a mix of willow and birch of a green arctic tundra, the scent of pine as the rays of sun pierce the forest to dry the needles of the morning dew, the freshness of the golden prairie grass on an autumn day, and the fragrance of the sea breeze through marsh flowers. The Peregrine smells like freedom.

Goodbye; have a good life. You make ours richer by your presence.

Bill Burnham *For biographical information see Chapter 8.*

the Tundra Peregrine and fully establish the wintering range of this subspecies. Unlike bird bands, which yield a 2 to 3% recovery, satellite tracking follows individual sentinel animals in the population through time and space, collecting thousands of locations on the living bird. In the first 20 years of trapping and banding Peregrines on Padre and Assateague Islands, we received recovery information on or recaptured about 400 falcons. Most recoveries were of dead individuals, whereas recaptured falcons were usually encountered on the same beaches where they were banded. In 18 months of satellite tracking 40 Tundra Peregrines, we recovered thousands of independent location estimates on the birds and completely defined their range and migration routes in the Americas.

Perhaps one of the most interesting examples of Tundra Peregrine migration was an adult female we tracked off the Assateague beach in 1998. This falcon was released and flew normally down the eastern coastal zone to southern Florida, leaving the Keys on 22 October heading SSW. At the same time, Hurricane Mitch was building to the south in Central America. By 25 October Mitch was reaching full strength and hit land in Nicaragua. Several hundred miles off the Florida coast, the falcon sensed the presence of the hurricane dead ahead and flew west from her position into the middle of the Caribbean. On 27 October the falcon must have found refuge on a ship headed to Galveston Bay, an inference from the locations received on the falcon over an 18-hour period, all in a straight line and headed for Galveston harbor at approximately 9 kt per hour. The falcon sought refuge to the west of Galveston Bay in a well-known stopover spot for Neotropical migrants.

On 2 November the falcon took off at 0200 hours local time and headed out into the Gulf for a second crossing attempt. Mitch had hit Central America and swung northeast toward Florida. At this point the storm winds had subsided and the front was carrying a great deal of rain. For a second time the falcon headed straight into the storm, and this time ended up on a platform in the middle of the Gulf for two days, generating several locations showing her to be stationary. On 5 November Mitch passed Florida and headed out to sea; the falcon made landfall on the Yucatan Peninsula later that day.

Another revelation of our PTT tracking has been the confirmation that some Tundra Peregrines winter at more northern latitudes than had previously been known. One female outfitted at Assateague in October 1996 was captured and wintered on the

Table 13.2 Autumn and spring Padre Island Peregrine Falcon survey totals—1977-2001.

Year	Season	Man-hours expended	Peregrines sighted	Peregrines captured	Peregrines sighted/ 10 man-hours	Vehicles used
1977	Autumn	467	121	31	2.59	Trucks/beachfront
1978	Autumn	384	118	33	2.90	t/b(12) & PTS (21)
1979	Spring	154	58	8	3.77	t/b (8) & PTS (0)
1979	Autumn	420	377	89	8.98	t/b (41) PTS (24) ATC
1980	Spring	542	473	54	8.73	t/b-PTS-ATC
1980	Autumn	0	0	0	0.00	Hurricane Allen
1981	Spring	448	271	32	6.05	t/b ATC
1981	Autumn	602	599	152	9.95	t/b ATC
1982	Spring	950	781	92	8.22	t/b ATC
1982	Autumn	734	815	155	11.10	t/b ATC
1983	Spring	1150	1364	149	11.86	t/b ATC
1983	Autumn	986	1092	283	11.08	t/b ATC
1984	Spring	1240	906	88	7.31	t/b ATC
1984	Autumn	809	1171	196	14.47	t/b ATC PTS
1985	Spring	895	900	152	10.06	t/b ATC
1985	Autumn	409	451	128	11.00	ATC
1986	Spring	597	933	102	15.60	ATC
1986	Autumn	632	840	216	13.20	ATC
1987	Spring	828	1056	140	12.70	ATC
1987	Autumn	433	692	188	15.90	ATC
1988	Spring	770	1497	209	19.40	ATC
1988*	Autumn	656	953	296	14.50	ATC/began using dye in fall.
1989	Spring	864	1254	127	14.50	ATC
1989	Autumn	701	778	248	11.00	ATC
1990	Spring	817	1112	129	13.60	ATC
1990	Autumn	735	1341	298	18.20	ATC/TBF
1991	Spring	670	914	114	13.60	ATC
1991	Autumn	580	780	250	13.40	ATC/TBF
1992	Spring	578	624	89	10.70	ATC
1992	Autumn	114	210	64	18.00	ATC/TBF
1993	Spring	618	807	127	13.00	ATC
1993	Autumn	995	2416	694	24.20	ATC/TBF
1994	Spring	319	390	83	12.20	ATC/hovercraft
1994	Autumn	276	616	118	22.30	ATC/SPI only
1995	Spring	139	209	43	15.00	ATC/SPI only
1995	Autumn	192	313	84	16.30	ATC/SPI only/hurricanes
1996	Spring	54	92	19	17.00	ATC/SPI only
1996	Autumn	397	484	198	8.20	ATC/SPI only
1997	Spring	87	54	16	6.21	ATC/SPI only
1997	Autumn	328	440	183	13.41	ATC/SPI only
1998	Spring	164	252	44	15.37	ATC/SPI only
1998	Autumn	605	1152	309	19.04	ATC/SPI only
1999	Spring	160	326	78	20.38	ATC/SPI only
1999	Autumn	512	891	275	17.40	ATC/SPI only
2000	Spring	195	480	80	24.62	ATC/SPI only
2000	Autumn	400	790	151	19.75	ATC/SPI only
2001	Spring	251	544	105	21.67	ATC/SPI only
2001	Autumn	290	715	186	24.66	ATC/SPI only
Total		25147	33452	6905	13.40	

From autumn 1988 on, all captured Peregrines had their breasts dyed. This allowed for easy identification of Peregrines that had already been captured and greatly reduced re-capture, improving efficiency.

Vehicles and locations used: truck = t, beachfront = b, Permanent Trapping Station = PTS, all terrain cycle = ATC, Truck Beach Front = TBF, South Padre Island = SPI

Figure 13.20 A good day trapping. Ruth Mutch, South Padre Island, October 1993.

Figure 13.21 Bob Berry and "an unassuming little body of water" on the Fox Hill Level, Assateague Island, 1971.

island's northernmost limits. She spent the summer of 1997 to the northwest of Hudson Bay and then returned to Assateague in the fall. We captured her (and removed the PTT) within a mile of the 1996 encounter. The same female was again captured on the same wintering spot in the fall of 1998, and each year through 2001 we have observed her wintering in the same area. In 1996 we outfitted eight nesting females in West Greenland with PTTs, and from this sample three wintered along the mid-Atlantic coast between Delaware Bay and Norfolk, Virginia. The coast of Tamaulipas, Mexico, immediately south of Padre Island, has also been identified as a winter area for Tundra Peregrines (McGrady et al. 2002).

Authors' Reminiscences and Perspectives—Mike Yates

In the early years Scott's partners most often used their own vehicles, and sometimes the results were not pretty. There is a classic slide of Bob Berry's Wagoneer on the Fox Hill Level, front end immersed in an unassuming little body of water. In 1978 I traversed that self-same level in a brand new Ramcharger just before dawn. It had rained overnight, and a "puddle" through which I drove turned out to be the rediscovered "Berry's Hole." Ramchargers, as I soon learned, do not float indefinitely. My companions (Hank Paulson and John and Kiku Hanes) scrambled out the tailgate to safety; still in disbelief, I went down with the ship. Once the water inside and out stabilized at chest level, I knew we'd struck bottom and reluctantly exited. A few days and a lot of dollars later, the truck was back at work. At the end of October I unloaded it to a wholesaler, and I still lose sleep thinking of the unsuspecting sap who became its next owner.

My quarter century on the Assateague study and work on the Padre spring survey since 1982 have enriched my life in countless ways. I have come to know these unique places like few others, and to witness and sometimes participate in natural dramas that amaze, amuse, dishearten, and inspire. I've been able to share it all with my wife, Karen, and with my kids from childhood through adulthood. I have forged the closest friendships of my life with the coauthors and some of the others acknowledged in this chapter. These men are my true brothers, and time and trial have not and cannot weaken the bond between us.

The principals of the Assateague survey have always been mindful of the rich history and lore of the pursuit of falcons on that beach. Our

respect for those who came before us and showed the way with their energy and ingenuity is boundless. We enjoyed the participation of Nye and Rice before their passing and still have the continuing benefit of Woyce and McDonald's help. All were and are our good friends, and we are proud to have hosted celebrations honoring Nye and McDonald on their respective 50-year anniversaries of trapping at Assateague.

I captured my first Peregrine there for falconry in 1967 and am grateful I was able to participate briefly in that era. In my estimation, the success of the Assateague survey has been, in large part, due to the fact that most of the principals have been falconers. How many others would toil 16 hours daily for a month, without added remuneration, in such a cause? Only an ingrained affection and concern for the Peregrine, and the knowledge that we are giving something back to it, can possibly induce such an effort year after year. As like-minded people know, however, the opportunity to be with the Peregrine in its element is more than adequate compensation. I have myself become more like the object of my extreme affection as the years pass. When autumn approaches I am drawn to Assateague just as surely as a passager fresh from its Greenland eyrie. In spring I am only content on the vast wind-tidal flats of Padre Island. On arrival I feel as if a circle has been completed; one with which I have been involved for countless centuries. I feel at peace when those places first come in view because I know I am where I'm meant to be. If Peregrines could articulate such a thought, I'd like to think they'd feel the same way.

Authors' Reminiscences and Perspectives—Tom Maechtle

Peregrines inhabit places I find awe inspiring. From the open tundra of the Arctic to the relatively featureless flats of Padre Island, I have found myself at home and comforted by these sometimes austere environments that come alive with the presence of falcons. I have been fortunate to follow the Peregrine's annual journey from the breeding grounds in the Arctic through stopover points at Padre Island and southward into Mexico and South America, and then back again. I have shared a kinship with fellow enthusiasts that has developed into lifelong friendships that can take up where they left off after months or years of separation. Padre Island will always be the central point of these life experiences for me, as it is with the falcons that visit there.

Bob Berry

Lynn Oliphant

▲ **Figure 13.22** (Above) Sunrise greets Assateague Island, October 1971.

▲ **Figure 13.23** Jim Rice (left) and Scott Ward hold three migrating Peregrines caught at sunset on the north tip of Assateague Island, 4 October 1979.

▲ **Figure 13.24** Dan Hayes releases a Peregrine at sunset, October 1972.

It has always been about the falcons and their conservation, and the people who have made the journey memorable.

Authors' Reminiscences and Perspectives—Bill Seegar

Like many involved in the study of Peregrines, I came by my interest in this species at a young age. I was extremely fortunate early on in my career as a scientist to meet key people who enabled me to make a life pursuit from this interest. Scott Ward led the way with his enthusiasm and passion for life and his love of Peregrines. Bill Mattox took me to the Arctic, and Joe Wall believed early on, as did I, that we could harness space technology to find better ways to understand the tundra falcons. It has always been about the falcons and their conservation, and the people who have made the journey memorable. My wife, Janis, supported and shared all of this with me and together with my three sons, William, Tom, and James, made this life work possible. I have forged relationships with people during this quest who are now my family. They know who they are and mentioning names is not necessary. My career in this global endeavor has been all the better for my involvement with the military, which has supported me through the years. The lessons of organization, delegation, improvisation, accountability, and all the other qualities the military develops have helped immensely in our getting the job of conserving the Tundra Peregrine accomplished. Indeed, getting a job done or accomplishing a mission is key to inner contentment that makes life such a happy place. Those without a useful mission are missing a key to real contentment. For now my colleagues and I can feel the contentment of accomplishing a great task in furthering our ability to conserve this species, although I, for one, shall remain ever vigilant on behalf of the Peregrine which is such a great part of all our lives.

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Editors' Note: The list of names provided by the authors, although extensive, represents only a portion of the many individuals who have participated in capture and banding of Peregrines at Assateague and Padre Islands and elsewhere in North America.

Mike Yates

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courtesy of Mike Yates

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