

Return of the Peregrine

A North American Saga of Tenacity and Teamwork



*Tom J. Cade
with thanks for
all your goose work
with migrant peregrines*

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for Mikey.
One of the keys to our success
is Greenland, and for many years.
Your skills are legendary, but for me
the best is friendship
Jim

Chapter 12

The Greenland Peregrine Falcon Survey

William G. Mattox

*Extirpation of the anatum Duck Hawk in
eastern North America, and declines
of Peregrine populations elsewhere,*

have been discussed in other chapters of this book. The 1969 publication of Hickey's *Peregrine Falcon Populations* spurred interest in possible causes of this decline, among which chemically affected behavior seemed one possibility (Hickey 1969). At that time we thought studying a "normal" population could contribute to explaining the causes of the decline. Greenland was reported to have breeding Peregrines, but their status had not been determined through field studies.

Another meeting on the Peregrine question, organized by Tom Cade and held at Cornell University in November 1969, recommended a North American Peregrine Survey (under Cade and Hickey) and designated a group of "regional captains" who would be responsible for operation in their respective areas (T. Cade 2 December 1969 to World Wildlife Fund). Greenland would be covered by Finn Salomonsen, Curator of Birds at the University of Copenhagen's Zoological Museum and the dean of Greenland ornithology. Salomon-

sen encouraged such a study, and indeed supported our early efforts to locate the necessary funding. He had noted in his monumental *The Birds of Greenland* (Salomonsen 1950–1951) that the Peregrine "is a common breeding bird in the southern parts of the West-coast northwards to Nügssuaq Pen." No reports of population declines in Greenland had been made, nor were any studies then in place to determine the status of the species. In fact, no species-specific work had been done at all.

Strong attempts by Cade in late 1969 and early 1970 to secure funding for a Peregrine survey in Greenland failed; and the Danes indicated they had no money for this activity, although they supported such a survey (Salomonsen pers. comm.).

I then tried and failed to get the needed support over a period of several years. In 1972, LTC Richard Graham, U.S. Air Force (USAF), and I scraped together money to buy basic equipment; and three college students succeeded in obtaining small grants: Bill Burnham (grant from Southern Colorado State College), and Jim Harris and Dave Clement (Mellon Fund grant from Dartmouth College). The first season of what came to be known as the Greenland Peregrine Falcon Survey began with shaky support in unknown territory, but with great enthusiasm.

◀ Figure 12.1 Painting by George E. Lodge from the collection of Bill Mattox. Reproduction by kind permission of copyright-holder Tryon Gallery.



Bill Burnham

▲ **Figure 12.2** Finn Salomonsen with Bill Burnham, July 1973, at crossing to Between Rivers cliff.



Bill Burnham

▶ **Figure 12.3** F. Prescott Ward atop saddle south of Ringsø (cliff in background), 4 August 1973.



Jim Pepp

▶ **Figure 12.4** Adult female and brood of four young at Ringsø, July 1990.

Details of those first years came out in brief field reports published mainly in the journals *Arctic* and *Polar Record*, in Jim Harris's Master's thesis (a shortened version published as *The Peregrine Falcon in Greenland* [Harris 1978]), and in Bill Burnham's book *A Fascination with Falcons* (Burnham 1997). After the first season, the U.S. Army, through F. Prescott (Scott) Ward, provided the real impetus for a long-term study through travel expense and per-diem payments to team members. From 1973 we were also able to travel to Greenland on invitational orders from the USAF arranged by Scott Ward. Ward's interest (through a notable prescience) centered not only on the species itself but also on the growing indications of environmental pollution. As everyone now knows, the Peregrine provides an unparalleled species to monitor pollution.

Graham and I had picked central West Greenland as the study area because a USAF base at Søndre Strømfjord received weekly flights from the United States (McGuire AFB, New Jersey) and maintained the usual well-stocked BX and Visiting Officer's Quarters, the so-called "Arctic Hotel." Our study could not have succeeded without this base and the friendly support of American and Danish personnel there. The base closed in September 1992, but the study has continued each year since. Although no native settlement ever existed at Søndre Strømfjord (now called Kangerlussuaq), Greenlanders showed interest in our project. They welcomed us to their country, and each team member recognized what a privilege it was to walk the hills of this foreign land and to carry out fieldwork in the wilderness of inner West Greenland.

Our first summer proved to be a tough one. We had maps, both Danish and U.S. military, but could not actually see our survey area from the air because the only available small aircraft were out of service. The USAF never stationed planes there.

After getting Harris and Clement established at two local falcon cliffs where they would carry out behavioral observations from a blind, Graham, Burnham, and I started out with heavy packs on a walking tour north of the base. We had marked our planned route on a map for the base security office. Soon after we started out, word had arrived at the base that Graham was needed back in the United States because of an emergency. When we arrived back at the base, the security search and rescue team was suited up and ready to head out to look for us. Our return at that point was lucky for them: they would not have found us easily, because our week's backpacking route turned out far different from the one we had marked on their map.

After Graham left for the States, Bill Burnham and I began backpacking trips of up to eight days, trying to locate breeding cliffs and band young. We occasionally visited the Harris/Clement camps. They had arranged with the air-base radio station to broadcast any messages, and were able to receive the local station's music, weather, and news broadcasts intermittently on a small portable radio. The station's cryptic announcement, "You've got mail!" meant something only to Dave and Jim at their camp, but now means another thing to Tom Hanks, Meg Ryan, and millions of E-mail recipients.

During our long, tiring walks across the tundra under heavy packs, we found eight Peregrine and three Gyrfalcon eyries, with 18 Peregrine nestlings and eight gyrs. We banded some of them and collected prey remains and addled eggs; we concluded after that first season that "Peregrine Falcons in West Greenland appear to be in a healthy state as evidenced by a high nesting density (1/100 sq mi) and a high production rate (2.25/eyrie)" (Mattox et al. 1972).

From that modest beginning, the survey grew in a real extent and scientific scope. Never in my wildest dreams could I have guessed that by 1998 the survey would have included over 90 volunteer participants who expanded the study area to over 1,200 sq mi with 126 known Peregrine territories. Nor, after banding those first 13 nestlings, would I have guessed that by 1998 we would have banded over 1,800 nestlings and 150 adults. For me, the greatest pleasure came from those 90 participants, who demonstrated a singular love of Greenland and the Peregrine Falcon. Without



Tom Iryle

that love, the countless miles of tough walking over the rugged Greenland terrain would not have been possible. This story of Greenland's part in the recent Peregrine restoration is the story of individuals who worked hard and came back for more. But of equal significance to me, Greenland's wilderness areas, which happen to be home for Peregrine Falcons, have incomparable worth. That tundra wilderness, in a world rife with development, is for us a Shangri-La of stark beauty, silence, and peace. Those wanting to intrude upon this arctic wilderness learn immediately that they face a serious challenge. We tried to change nothing and leave few traces of our intrusion, but that land surely changed us! For the better—and forever.

People studying Peregrine Falcons in Greenland, and elsewhere, require three main qualities: they must be rock climbers, wilderness survivors, and raptorophiles, including experience in banding nestlings. I learned that such outdoor people come mainly from the West in our country, and that they are strong, resourceful, and upbeat. They also take seriously the responsibility of carrying out scientific research in a foreign land, and they value the privilege they had been offered by Greenland, and by Mother Denmark.

▲ Figure 12.5 Adult female at Taseressuaq.

*"It was not
lonely, but
made all the
earth lonely
beneath it."*

*—Henry David
Thoreau*

Greenland Falcons

William Burnham



▲ Kurt and Bill Burnham, Thule, Greenland, 1998.

The stark beauty of the arctic landscape is unsurpassed in nature. Greenland is the unspoiled frontier for Arctic North America. Vast areas remain largely unchanged from time immemorial. In the late 1970s a positive change did begin, an increase in Peregrine Falcon populations within the large ice-free area to the north and south of Sønder Strømfjord and probably along much of the island's west coast. Thanks to Bill Mattox and his multitude of field biologists, we know a great deal about the Peregrine there and its expanding population.

I was invited to join Mattox in 1972, the first and then many following years of what became known as the Greenland Peregrine Falcon Survey. We walked hundreds of miles together in search of falcon eyries and shared many memorable experiences. The experiences were both enjoyable and formative. In 1998 Bill requested that The Peregrine Fund and I assume responsibility from him for continuing the work on falcons in Greenland. We were honored by his trust and reassured by the foundation of knowledge he had established and knowing he will never truly not be involved.

Rewarding were not only the experiences in search of eyries and studying the falcons we found, but the resulting friendships, especially with Bill Mattox. A further highlight was sharing the Arctic with my son, Kurt. In a single field season he also became infatuated with the Far North and has returned each year since. Spring 2001, as The Peregrine Fund's Greenland Projects Manager, he completed his 12th field season there. Working with him and other young biologists as the transfer of knowledge and responsibility are passed between generations, I become increasingly optimistic for the future of falcons and humanity.

Bill Burnham For biographical information see Chapter 8.

Those Lean Years

Burnham, Harris, and Clement all returned in 1973. Burnham and Clement walked the tundra (they also visited East Greenland but found no Peregrines); Harris spent time at one of his 1972 cliffs and, with me, visited Alan Jenkins who was studying nesting Gyrfalcons at two cliffs (Burnham et al. 1974). With us that summer was Scott Ward, who was to play a major role in that and future years, supporting our work and bringing a new technique to bear, in the form of plastic color bands. These red leg bands had large numbers which could be read at a distance through binoculars or spotting scopes (Ward 1975).

The following year two more students from Dartmouth, Thom Snowman and Ginger Cox, placed time-lapse cameras at two cliffs; Burnham and Steve Sherrod traveled north to Disko in search of falcons; and Jim Weaver pioneered the use of a two-man kayak, with me as field companion (Mattox 1975). After that 1974 season we had banded 55 nestlings and received our first recovery—Cape Charles Charlie captured at Cape Charles, Virginia, by Bill Clark's team (a hatch-year male banded at Dome in July by Burnham and Weaver).

It was obvious that we were involved in a numbers game and that we had to band more falcons in order to learn more about the locations of migratory routes and wintering areas. So in 1975, while Burnham hosted Peregrine experts Tom Cade, Jim Enderson, and Clayton White in our survey area, I attempted autumn trapping on the outer coast. With hawk trappers Dan Berger and Bill Clark, I traveled in September to southwest Greenland where the icecap narrowed to the sea. There we saw only a few Peregrines and caught one hatch-year male, which we instrumented with a microtransmitter for Bill Cochran. This effort, and a similar one with Steve Sherrod in 1976, did nothing to increase the number of Peregrines banded in Greenland, although we did band a number of Gyrfalcons. Steve had spent the summer in the survey area studying nestling behavior up to and following fledging. Those two summers saw only 22 nestlings banded, nine or more in 1977, and 17 in 1978 (Mattox et al. 1980).

In 1979, however, we banded 20, and in 1980 we reached 30. Of the 160 nestlings banded since the beginning, we had received but six recoveries. We did not realize it then, but we were seeing the low point of Peregrine populations in Greenland (Burnham and Mattox 1984). By 1983 we had increased the annual banding to 53 nestlings, and it was all up from there (Mattox and Seegar 1988).



◀ Figure 12.6 Bill Seegar with adult female tagged with Platform Transmitter Terminal (PTT), June 1994.

Adult Banding

By banding only nestlings we obtained little data about adult Peregrines, so in 1983 we began capturing adults at the eyrie. This operation was carried out at active eyries by the so-called Advance Team (known behind their backs as the “Backward Team!”—they were envied by the backpackers because they rode in a helicopter) led by Bill Seegar, who by then had taken over from Scott Ward the securing of funding for the project—a task he performed with outstanding success.

Bill Seegar and his regulars (most of whom stayed and walked the tiring survey routes like everyone else) captured over 200 adults (148 individual birds) over the 15-year period from 1983. From 1986 we used color alpha bands of blue anodized aluminum, which worked better than Scott Ward’s red plastic bands because they were stronger and could not be removed by the bird. In all, between 1983 and 1998 we captured or read the alpha band of 403 falcons, which provided superb data on adult population dynamics: turnover, nest-site fidelity, loss, and individual longevity.

Larger Teams

All this time we were able to support larger teams who found more cliffs and banded more nestlings. From the 51 banded in 1983, we banded

68 in 1984, 102 in 1985, 99 in 1986, 112 in 1987, 159 in 1990, and a record 190 in 1991, a season fielding 22 team members. Team members peaked in 1992 with 24; in 1990 and 1991, we had begun to study Gyrfalcons, so we needed extra field people. The impressive numbers resulted solely from Bill Seegar’s solid support through the U.S. Army Edgewood Research, Development, and Engineering Center. Our team members were volunteers, but we needed equipment, food, and travel money, plus many hours of expensive helicopter charter for the adult banding.

The work incorporated other activities beyond climbing to eyries and banding adults and young. From the early days, ancillary studies undertaken by the project included brooding behavior, trace element analysis of feathers, eggshell thickness and pollutant loading, embryonic abnormality (we found an unusual twin embryo egg), prey species density and distribution, radio-tracking of adult home ranges, ectoparasites, blood-pollutant analysis, nest-detritus analysis, blood parasites, and prey-species analysis. Some of these subjects formed the basis for graduate degrees by team members, or detailed studies by their faculty advisors.

The Personal Commitment

The survey attracted several stalwarts over the years, some of whom spent many summers in

We did not realize it then, but we were seeing the low point of Peregrine populations in Greenland.



David Clement

▲ **Figure 12.7** All of Greenland is influenced by the huge icecap, which covers about 85% of the island's area. Note the backpacker walking alongside the stream.

Greenland. All their contributions cannot be detailed here because of space, but the dedication of a few must be recorded to underline the importance of their long-term commitments. And too often forgotten is the long-term support of their work by spouses and companions.

The pioneers of the early years returned to Greenland for only a few seasons, with the exception of Bill Burnham who surveyed for falcons up to 1979 and again for two years in the early 1990s. In the late 1970s the survey had the involvement of Peregrine friends who also would take an active role in the Peregrine restoration effort.

Although the Greenland study has no direct connection with Peregrine restoration, many people working in Greenland later participated in that effort in various ways. Jim Weaver, a Peregrine Fund director who participated early on, installed the time-lapse cameras at two cliffs for the Snowman-Cox effort in 1974. Peregrine

Greenland Peregrine Falcon Research

Tom Maechtle

What I remember most, as I reflect upon 18 summers of Peregrine Falcon nest surveys in Greenland, is the haunting silence at most of the cliffs I visited during my first survey in 1981. My field companion, Jack Oar, and I walked and kayaked from cliff to cliff searching for Peregrines and were seldom rewarded. We spent hours at each cliff expectantly waiting for the "food wail" of an adult female—a transfer from an incoming male, and the food begging of nestlings. Time after time we left disappointed by negative results. When we did encounter a Peregrine, it was often a lone adult female. Hours of observation confirmed there was not a male in residence. Jack and I brainstormed for the reason why. Despite our relatively small sample size, we could not escape the fact that the females could shed accumulated loads of contaminants through the fats in their eggs. The males had no mechanism to eliminate chemical residues from their bodies. Were males still dying from toxins in greater numbers, leaving these females with no available mates? I suppose we will never know. Jack and I did find two productive nests that summer, and we banded



Tom Maechtle

▲ Tom Maechtle and Jack Oar at Sunshine Point, Greenland, 1981.

three nestlings at one site. The others were too young to band. After 18 days in the field, we returned from our area and joined the rest of the team who also had spent weeks searching. We were elated to have set a new record of 33 nestlings banded, a result of five two-man teams searching long days and walking hundreds of miles throughout the tundra of Greenland.

As dramatic as the paucity of Peregrines in 1981, by 1983 the same cliffs showed signs of becoming one of the most densely occupied regions in our study area. Many of the sites silent in 1981 now had pairs in residence, and most were producing young. As the years passed, my partners and I worked faster to visit each cliff during the short window of time we had to band nestlings. Our only mode of transportation remained our kayak and traveling on foot. By 1986, we could expect to band 40 or more young falcons on this same route.

Today chances are when you visit a cliff in the Kangerlussuaq area you will find

Peregrines. Production is high, and it seems the only restriction to an expanding population is the availability of suitable cliffs and prey. These cliffs are no longer silent. Female Peregrines wait for food from males who busily search for prey in their territory. The nestlings reveal their presence at every feeding as they noisily scramble for their share.

In the final analysis, the primary reason we averted the extirpation of Arctic-nesting Peregrines was the restriction of DDT use. Peregrine reproduction in our Greenland study area grew dramatically in response to less contaminated prey.

Peregrines are adapting to changes they encounter in their winter habitat. As I write this during the spring migration on South Padre Island, Texas, there is a Peregrine visible from my window. Perched on a 10-story condominium, she faces the Gulf of Mexico, presumably waiting to prey on an exhausted migrant passerine, perhaps a warbler first hitting landfall after hours of uninterrupted flight

that may have started in the Yucatan. Tourists stroll on the beach below her, and cars pass by nonstop in her view. She appears unconcerned as she shares her manmade cliff in close proximity to thousands of people. In a few weeks, she will once again arrive at her arctic cliff, far from the dense human populations in parts of her southern winter territory.

I am honored to have participated in the Greenland survey. I made lifelong friends with those I traveled with and will always have a love for and miss what others consider an austere landscape. For me, my finest memories of Greenland will always be the sounds of Peregrines at their cliffs.

Tom Maechtle went to Greenland first in 1981 and participated in the survey for 18 seasons. He made valuable contributions to all aspects of the project. His skills in falcon capture on cliffs enabled the adult study to begin successfully in 1983. He attached PTTs to several adult Peregrines.

My field companion, Jack Oar, and I walked and kayaked from cliff to cliff searching for Peregrines and were seldom rewarded.



▲ Figure 12.8 The adult female at Ringsø, July 1990.

experts Cade, Enderson, and White have already been mentioned as early visitors to the study area (in 1975 with Bill Burnham and Bob Martin). Steve Sherrod did part of his Ph.D. fieldwork in the study area. Bill Heinrich (1977, 1978, and 1980) teamed with Jack Oar (13 seasons) and Dan O'Brien in those years, and even survived a piteraq wind (catabatic gale from the icecap) with Tom Smylie in 1978. Well-known medical researcher and raptor rehabilitator Pat Redig helped the effort with long trips in new territory (1979 and 1980). He also piloted a small plane for team resupply. Other veterinarians who helped us were Bob Whitney (three seasons), Bill Satterfield (three seasons), Ken Riddle, Tom Ray (1985), and of course Scott Ward.

In the late 1970s, several people began long field careers in Greenland: Bill Seegar (18 seasons), Bud Anderson (four seasons), and early Peregrine Fund employee Tom Maechtle began his 18-season string in 1981. Mike Yates began in 1983 with the new effort to capture adult Peregrines. He contributed significantly for 14 seasons. Sidebars in this chapter by Maechtle and Yates provide a different perspective on the Greenland experience. The six stalwarts—Oar, Seegar, Maechtle, Yates, Bob Rosenfield (13 seasons), and Joe Papp (10 seasons)—contributed a cumulative 86 seasons to the Greenland Peregrine study, evidence of an incomparable love of Peregrines and of Greenland.

In later years, other team members gave many seasons as well. Tom Nichols (four seasons), Ralph Rogers (seven seasons), Greenlander Kåle Siegstad (six seasons), Father Phil Vance (five seasons), Chris Schultz (four seasons), Bob Murphy (four seasons), Denis Case (four seasons), and Mark Robertson (four seasons) all made valuable contributions.

The study lasted so long that even a second generation of Greenland teams arrived: Scott Rogers in 1987, Tim Mattox in 1989, Kurt Burnham and Jeff Yates in 1991, William H. Seegar in 1994, and Brandon Fuller in 1996.

Early team member Mark Fuller (1977) pioneered remote sensing techniques and walked the tundra for eight seasons; he instrumented both Peregrines and Gyrfalcons and organized a wide-ranging habitat and prey-species study that continues to the present. He instrumented adult falcons to determine home range in 1992, and Colin Pennycuik picked up their radio signals during daily flights in his Cessna.

Bob Rosenfield and Joe Papp teamed to carry out valuable prey habit studies, in addition to their regular survey backpacking routes. One year

Adult Capture

Mike Yates

In 1983 we began capturing adult Peregrines for a new study on longevity and nest-site fidelity. Over the years, this involved travel by foot, kayak, and helicopter and used several different capture methods. Other individuals (most notably Mark Robertson) were involved, but the adult capture team was usually Bill Seegar, Tom Maechtle, and myself. Typically we would travel by Bell 206 helicopter and capture falcons at their nest ledge via noose gin over dummy eggs. Blood samples were taken and blue alpha-numeric bands affixed for subsequent identification of individuals by scope. In 1994 we first used backpacked satellite-received telemetry on nesting females to garner home range, migration, and wintering data.

Although we each performed all necessary duties at one time or another, our roles within the team became quickly defined. Bill was the spotter, below and facing the cliff. A talented multitasker, Bill could locate an eyrie, position climbers, read a band, catch a char, and pick up a pound of qiviut (muskox wool) simultaneously. Tom, the youngest and possessed of simian qualities uncommon in a man his size, was the default climber. Substantial yet cerebral, I became the backup climber and scribe. Tom and I often found it quickest to forego the search for a suitable anchor; a quick body belay from me would have him at the scrape in no time flat. I often mused that, when asked my occupa-

tion, "Maechtle's tie-off" would be the most proper response.

We saw and knew the whole of the study area like no others, save Bill Mattox. The challenge of flying a 206 in the manner required with three big guys aboard was daunting for our series of pilots, but most adapted well. There were close calls, such as the time we lost hydraulic control on takeoff. The pilot literally flew us onto the ground amidst a sea of emergency response vehicles, and we lived to trap another day.

Individual Peregrines became part of the fabric of our lives. We encountered falcons nesting in Greenland that we had banded on migration at Assateague and Padre Islands, and the reverse as well. There was the elation each year of seeing an old friend back at its cliff, and sometimes the disconsolate feeling when its absence was confirmed.

More years ago than I care to admit, I captured my first Tundra Peregrine at Assateague Island. Over 3,000 more have since followed in various locales worldwide. Yet in retrospect, it was the first falcon that captured me; my life since has been intertwined with this most remarkable and compelling of organisms. The Peregrine has given me so much. The strongest bonds of friendship in my life have been with fellow falconers and biologists. No one lacking the connection we have to the Peregrine can ever truly understand us or why we've spent the best



Photo provided by Mike Yates

▲ Mike Yates in front of the Elisabeth Peregrine eyrie after capturing an adult.

years of our lives trying to give something back to it. My 14 summers on the study passed all too quickly, and I will forever hear Greenland's siren call. In 1995 we last confirmed the presence at one cliff of a breeding adult male I had banded as a nestling 11 years earlier. In my thoughts and my hopes, he is there still. The view from his eyrie comes to me clearly, and I am with him once more.

Mike Yates went to Greenland first in 1983 and was active through 1996, or 14 seasons. He worked with Tom Maechtle on the advance team capturing and tagging adult Peregrines. He found many new Peregrine territories on the ground and in small aircraft surveys.

*The pilot
literally flew us
onto the ground
amidst a sea of
emergency
response vehicles,
and we lived to
trap another day.*



Joe Papp

▲ Figure 12.9 Joe Papp.

Figure 12.10 Kåle ▶
Siegstad and Bob
Rosenfield.



Kåle Siegstad

(1989) they set up a blind at the eyrie at Golden Child in T-South, and the following year used the same technique at Ringsø, with the help of James Schneider.

Marco Restani (six seasons) started a study of ravens (banding mainly at the Søndre Strømfjord dump, but also at the nest), helped by Rick Yates in 1993 and 1994 and Henrik Vang Christensen in 1995. Henrik had been with us the year before, when he placed his bird-banding camp near the “villa,” and succeeded in banding thousands of small birds by working almost around the clock.

We made use of other rock-climbing experts, Terry McEneaney, Bob Meese, Mike Root, Tom Nichols, Mark Robertson, and Alberto Palleroni, gentlemen to whom even a rather hard technical climb always seemed to be described as a “walk-in.”

The early 1990s saw larger teams, made up mainly of veterans, but each year had a sprinkling of new climbers and graduate students who have continued to present: Gregg Doney, Catherine Wightman, and Travis Booms.

Recoveries

Bird-banding (or ringing, in the rest of the world) allows us to glean many facts about the birds we study. This key activity of any study of birds consists of placing a small metal band on the bird’s leg (tarsus). The large numbers can be easily read, and the words inscribed on this small band tell the finder where to send the recovery information. In recent years we have elaborated on this simple system by placing a second ring on the other tarsus. This ring, usually anodized a bright color and scribed with several large letters

or numerals, allows an observer to read the lettering with binoculars or spotting scope and thus identify the bird. This method elaborated somewhat on Scott Ward’s original idea.

Our most exciting recovery in the early years was the first. In our third season we banded a male nestling at a local cliff called Dome on 27 July 1974. This male also carried a red plastic tarsal band (A-24). Banders at Cape Charles, Virginia, captured the bird on 13 October 1974. As of then, we had banded 55 nestlings but had no recoveries. So this was news heard around our Greenland project world!

Then, in what became one of the most fascinating recoveries, Bud Anderson banded four young at Between Rivers on 22 July 1979. The nestlings were 23 days old, three females and a male. Bud’s photograph of that brood was published in Cade et al. 1988 and later in a review of that book in *Science*. The male, smaller than his sisters, stood proudly in front of the group. He wore a red plastic leg band (3A0). On 3 October of that year the Russian oceanographic research vessel *Belagorsk* had on board an American guest scientist, Dottie Holcomb. She spotted a Peregrine Falcon perched in the rigging; it left to catch and bring back to the vessel a Yellow-billed Cuckoo. The bird perched in the rigging for 36 hours, leaving the vessel once to make another catch. Holcomb noticed a red band on the bird’s right tarsus and used her spotting scope to read the white letters 3A0. The bird left the vessel for good on 4 October, presumably to continue migrating. The vessel was then 120 mi at sea, east of Long Island, New York. Was the young male Peregrine blown off course, or was he heading south in normal fashion?



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Upon return to the United States, Holcomb notified the Bird Banding Laboratory of her observation; the lab knew Scott Ward was developing tarsal bands and notified him of Holcomb's observation. So the fifth recovery on our list became known as the *Belagorsk* male.

Five years later, in July 1984, Bud Anderson climbed a cliff to band young at Mariann, 17 km southeast of Between Rivers. The resident adult male Peregrine defended the cliff in the usual fashion, got tired, and perched close to Anderson, who noticed that the male had a silver band on his left tarsus. This was duly noted, and no more thought about it until two years later (22 June 1986) when the trapping team captured the adult male at Mariann and read his band of 422585. They didn't know it at the time, but he was the *Belagorsk* male, probably the same bird observed there by Anderson in 1984. They added a blue alpha band to his right tarsus. He was identified at the cliff in 1985 and 1986 but was gone in 1987.

Recruitment

The *Belagorsk* male was our first "recruit," a bird hatched in the area and returned to breed as an adult.

In a study of natal recruitment in our study area, Restani and Mattox (2000) looked at the 583 broods (1,702 nestlings) banded during the 1978

to 1997 breeding seasons. At least one nestling could not be identified to sex in 56 of those 583 broods, so they calculated nestling sex ratio from the sample of 527 broods (1,566 nestlings). They found an overall sex ratio that approached parity (774 males, 792 females). They found that teams had documented the identity of 42 banded nestlings that were recruited into the study population. Of these 42, 35 were males, seven females, and they dispersed to breed about the same distance in the study area. But the unequal number of females indicated that they disperse farther in general. Indeed, we have received reports (Falk pers. comm.) that our colleagues Knud Falk and Søren Møller in South Greenland have captured two adult females we banded as nestlings in our study area 700 km to the north! And a third female banded as a nestling was videotaped by a Greenlandic sheep farmer in the same area. The blue alpha band is clearly legible in the videotape!

More on Recoveries

Banding birds gives us valuable information about migratory routes, wintering areas, longevity, nest-site fidelity, and much more. In the case of the Peregrine Falcon, a species in trouble, we hoped especially to gain knowledge about areas where the falcons might spend more time on migration or concentrate during the winter. Stud-

▲ Figure 12.11 A cool, damp evening above the Arctic Circle, Kangerlussuaq, Greenland.



M. Brubaker

▲ Figure 12.12 Søndre Strømfjord.

ies of their blood samples showed higher levels of various pollutants when returning on spring migration from Central and South America (Henny et al. 1996).

But band returns could not pinpoint exact wintering locations as was later provided by remote sensing techniques. We did learn, however, that the females rarely reached South America at the end of their autumn migration, whereas many males did. In fact, males migrated over twice as far as females to reach their wintering grounds. Why was this?

Information through banding has been augmented many fold through the use of microtransmitters attached to the falcon by a backpack. The radio transmits signals which are received by polar-orbiting satellites. This technique, pioneered by Skip Ambrose in Alaska and Bill Seegar in Greenland, has provided a wealth of data on migratory routes and wintering areas.

Through band returns we found that many falcons are still shot, despite modern awareness of the need to protect all species. But the shooting of all birds banded is still under 10%. Half of our recoveries were birds captured on migration by bird-banders at autumn and spring falcon staging

areas. Through our adult trapping project in Greenland we recaptured or read the bands of many falcons, including the 27 "recruits," nestlings returning to breed (Restani and Mattox 2000) mentioned above. From year to year we noted that a small number of adult females moved from one cliff to another (often close to the first), even returning to the original cliff to breed.

Support for a Dream Project

Words often fail us when emotions are involved. Words, expressed by rational thought, also might fail to convey, or seem to trivialize, important feelings.

The Peregrine elicits deep feelings in many people. Yes, emotions reign. Words fail.

The same holds true about Greenland, the tundra, Peregrines, and the people who have sought them out in the wilderness. Words cannot even approach my feelings about the field people on our Greenland teams. A special feeling binds us. It cannot be described, but it is there and everyone who has studied Peregrines in Greenland feels it.

I do not have to thank these people. The bond I feel for them suffices. Their bond with Greenland and the Peregrine provides a lifelong link to carry

throughout good times and not so good. Their studies of Peregrines in Greenland, some for many years, have been unique in arctic work. But the unique aspect has not been limited to Greenland and the Peregrine. It has pervaded the lives of all of us, and we have been changed forever.

It has, of course, also pervaded the lives of those dear to us. Only the team members can fully appreciate the importance of support from home. But all too often, despite our deep feelings about this support, these feelings seem to go unstated, unacknowledged, and even forgotten in the rush to finish up one season and prepare for the next.

Acknowledging by name the many team members has been difficult enough because of space; to do so for all the supporters is out of the question. But some of them have been rewarded with trips to Greenland so they could see for themselves why the place elicits the emotion it does.

The Future

The Peregrine Falcon today thrives in West Greenland. In 1972 we found 10 cliffs occupied by Peregrines. Today within the study area we know of over 125 cliffs that are regularly occupied. We would like to continue monitoring to detect any changes, but resources are slim. The Peregrine Fund has begun a project to study Gyrfalcons and thereby will be able to note Peregrine nesting as well. Gyrfalcons vary in number cyclically over the years, with other arctic animals. They have not been studied in any great detail in Greenland, so promising projects abound. The excitement of the unknown, as we experienced with the Peregrine, awaits future researchers.

Participants in the Greenland Peregrine Falcon Survey, 1972 - 1998

Joelle Affeldt	Bill Heinrich	Scott Rogers
Bud Anderson	Paul Howey	Mike Root
Rita Apanius	Alan Jenkins	Bob Rosenfield
Tom Bain	Hal Jones	Carl Safina
Steve Belardo	Randy Knapp	Bill Satterfield
Ed Bender	Dan Korkei	Jim Schneider
Dan Berger	Julie Ann Lee	Linda Schueck
Birs Binswanger	Tom Maechtle	Chris Schultz
Travis Booms	Bob Martin	Bill Seegar
Bill Burnham (senior)	Bill Mattox	Jim Seegar
Bill Burnham	Tim Mattox	William Seegar
Kurt Burnham	Terry McEneaney	Steve Sherrod
Tom Cade	Richard Mearns	Kåle Siegstad
Denis Case	Bob Meese	Karen Smith
Janis Chase	Bob Murphy	Tom Smylie
Henrik Christensen	Gerry Myers	Thom Snowman
Bill Clark	Tom Nichols	Steve Taft
Dave Clement	Connie Oar	Mark Thwaits
Lisa Clepper	Jack Oar	Phil Vance
Ginger Cox	Dan O'Brien	Scott Ward
Jim Dayton	Alberto Palleroni	Jim Weaver
Gregg Doney	Joe Papp	Clay White
Jim Enderson	Jimmie Parrish	Bob Whitney
Brandon Fuller	Colin Pennycook	Joyce Whitney
Mark Fuller	Arlo Raim	Catherine Wightman
Bill Gould	Tom Ray	Jon Wilde
Dick Graham	Pat Redig	Vince Yannone
Dick Gritman	Marco Restani	Jeff Yates
Mark Haley	Ken Riddle	Karen Yates
Jim Harris	Mark Robertson	Mike Yates
Willard Heck	Ralph Rogers	Rick Yates



Bill Mattox began studying Duck Hawks (Peregrines) in 1949 while an undergraduate at Dartmouth College. He went to Greenland for Gyrfalcons in 1951; surveyed Peregrine cliffs in Vermont and New Hampshire until 1953; and then went to Scandinavia on a Swedish government grant. He spent a year in Iceland researching the fishing industry for his Master's degree. After two years in Germany with the U.S. Army, he

entered McGill University, completed his Master's, and worked as Assistant Professor and Director of McGill's Sub-arctic Research Lab in Schefferville, Quebec. He began research on the Greenlandic fishery in 1960. From 1964 to 1968 he did research and writing in Copenhagen as a Fellow of the Institute of Current World Affairs. His Ph.D. dissertation for McGill University was published in 1973 in the Danish arctic series *Meddelelser om Grønland*. In 1972 he began the survey of Peregrines in West Greenland, a project he led for 28 years. In autumn 1972, he joined the Ohio Department of Natural Resources (ODNR) and worked for 20 years in charge of water planning, groundwater mapping, floodplain management, and the state water data system. Upon retirement from ODNR in 1992, he joined his wife, Joan, full time in their environmental firm of Greenfalk Consultants to carry out an assessment of birds of prey in the Idaho Army National Guard's Orchard Training Area. He moved to Boise permanently in 1998 where he lives with his wife. He is President and a director of the Conservation Research Foundation and currently studies Swainson's Hawks and philopatry of wintering raptors.