BANDING RECOVERIES: A 48-YEAR EXPERIENCE OR: "IT'S REALLY MRS. PRIESTLY'S FAULT"

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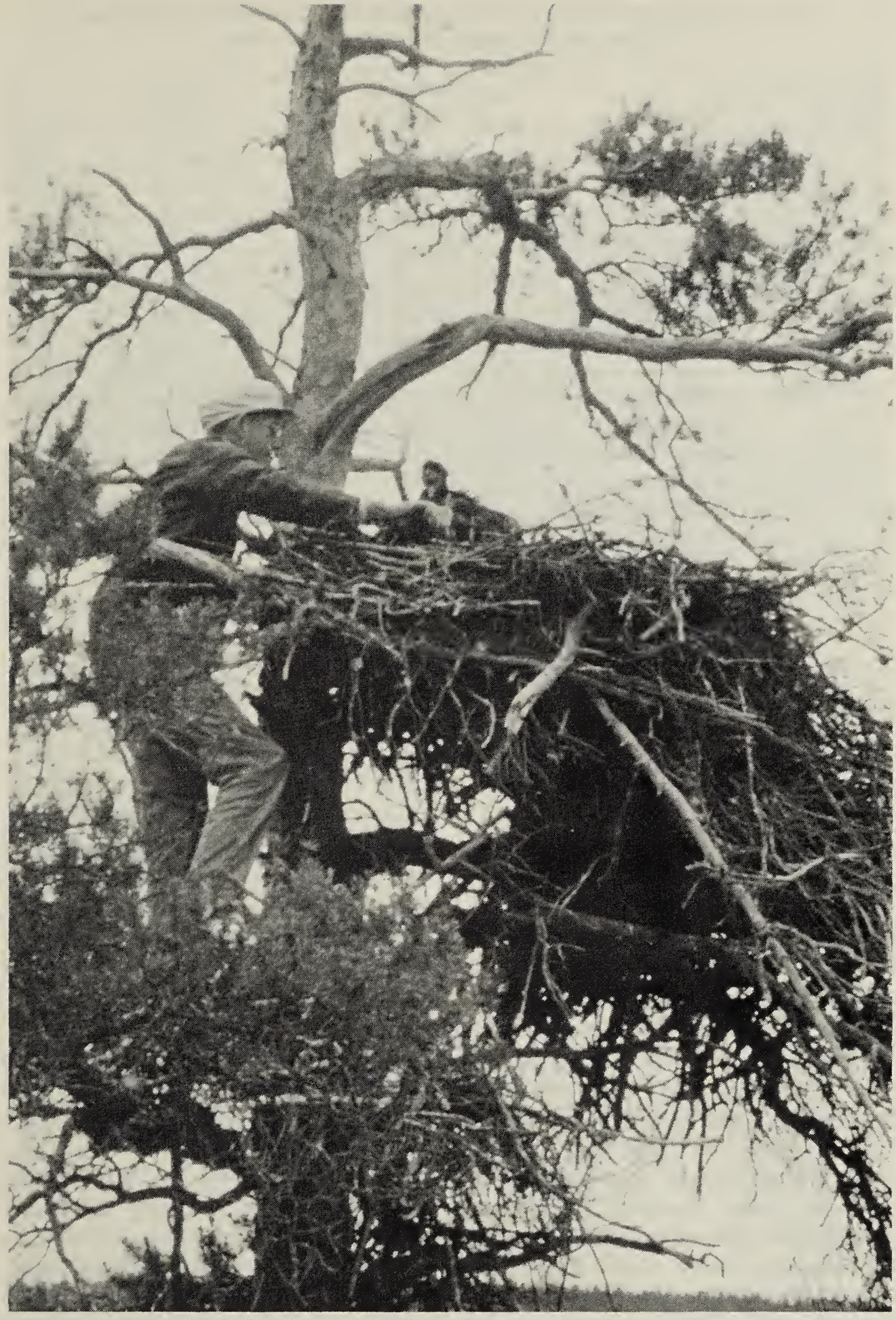
(Based on a paper read at the annual meeting of the Western Bird Banding Association, Edmonton, 25 August 1990)

Having passed the 100,000 mark in birds banded and having completed 48 field seasons, we felt it appropriate to calculate our overall recovery rate and the recovery rates for the 69 species for which 2,727 recoveries have been received. This paper, as with our spoken presentations, must begin with Mrs. Isabel Priestly who first proposed that Stuart begin banding.

During wartime, with a shortage of available biologists, B. W. Cartwright, Chief Naturalist for Ducks Unlimited, learned of Stuart through Mrs. Isabel Priestly and the newly-formed

Stuart and Mary Houston show banding procedures to a group of young naturalists, Yellow Creek.



Stuart Houston bands Bald Eagle, Cree Lake, 1965. *Wayne Davis*

Yorkton Natural History Society. Since at 15 Stuart did not meet the minimum age requirement of 18 years, he omitted his age from the banding application form on the advice of Hoyes Lloyd in the Canadian Wildlife Service in Ottawa. Many years later, Allen Duvall at an American Ornithologists' Union meeting volunteered that this was

Table 1: RECOVERY RATES FOR WATERFOWL, BANDED 1943-1988
Recoveries received through 31 July 1990

Number Banded	Species	Number of Recoveries	Percent Recoveries
5	Tundra Swan	1	20.0%
26	Snow Goose	3	11.5%
37	Canada Goose	4	10.8%
82	Green-winged Teal	4	4.9%
2	Am Black Duck	2	100.0%
2,018	Mallard	419 *	20.8%
642	Northern Pintail	93*	14.5%
1,501	Blue-winged Teal	72*	4.8%
77	Northern Shoveler	7	9.1%
15	Gadwall	2	13.3%
85	Am Wigeon	14	16.5%
94	Canvasback	27*	28.7%
378	Redhead	80*	21.2%
5	Ring-necked Duck	1	20.0%
17	Lesser Scaup	1	5.9%
113	White-winged Scoter	4	3.5%
147	Common Goldeneye	9	6.1%
11	Bufflehead	3	27.3%
4	Common Merganser	1	25.0%
651	Am Coot	27 *	4.1%
5,910	TOTAL	774 *	13.1%

Note: Only those numbers with * are a statistically significant sample.

the only time during his tenure at the banding office that the United States Fish and Wildlife Service knowingly concurred in the issue of an underage permit.

Why does anyone band birds? The usual reasons given are to learn where birds go and how long they live. Banding also tells us much about bird behaviour, including such matters as birth rates, death rates, breeding site fidelity and dispersal of breeding pairs. Banding is a method of monitoring populations of raptors and colonial birds at the top of the food chain, important because they are sensitive indicators of the health of our environment. These are adequate reasons for banding. Banding carries with it an inherent and sometimes overlooked responsibility: the results of this scientific endeavor should be shared whenever possible, exactly in keeping with Mrs. Priestly's philosophy. The results are of little value until they are published.

The following studies would never have taken place had it not been for the influence of Isabel M. Priestly.

Banding for Ducks Unlimited
Stuart banded 556 ducks in 1943, for which he was paid $55.60 (10 cents per duck), big money in those days. But imagine! In the first winter, this high school boy received recoveries of birds shot in Jamaica (American Coot), Cuba and Puerto Rico (Blue-winged Teal). Banding in 1944 added another Blue-winged Teal from Venezuela and in 1945 one from Colombia. Mrs. Priestly, who had participated in some of the banding, was almost as excited over these results as he was.

With recovery rates as high as 21% for the Mallard and Redhead and nearly 29% for the Canvasback, it wasn't difficult to obtain representative samples. From five summers of banding with Ducks Unlimited, interesting information was amassed (Table 1). Stuart was hooked on banding but also had expectations of high band recovery rates. After marriage in 1951, we have shared these high expectations. Based on our gradually accumulating experience with recovery rates, we have changed the emphasis of our banding activities.

Sample Size Science brings with it the concept of appropriate sample size. After 48 banding seasons, without including repeats (recaptured alive at same place the same season) and returns (recaptured alive in a different season), we have 2,721 recoveries (terminal records of dead birds) to date from 69 species of the 201 species banded, for an overall rate of 2.7%. Although every individual recovery has some potential value (for example, our knowledge of the wintering grounds of the Chimney Swift became known from a very few recoveries of swifts banded by Ben Coffey, Jr.[3] and the figure-eight migration of the Arctic Tern to Europe and Africa and home via South America from only eight recoveries[40]), we have tried to concentrate on species that in our experience have produced a recovery rate near or above 1%. As recoveries accumulated slowly but disproportionately, we ceased all mist-netting and concentrated on raptors, colonial birds, box nesting birds and winter birds. For fourteen species we have 30 or more recoveries and for another five species, between 25 and 30 recoveries. Such sample sizes are large enough to give a fair indication of migration patterns for these Saskatchewan species. Even eight recoveries may show a pattern worth sharing.[29] Another 50 species have produced from 1 to 24 recoveries each as a contribution to North American banding data. Some individual recoveries, such as a Common Tern from the Cook Islands, have merited publication.[6,20] There have been no recoveries from 132 species banded.

If one were planning a new banding study, one might hope to amass sufficient data to achieve "a publishable sample" of returns or recoveries for at least a few of the species. How many individuals must one band?

Sample Size to Yield 30 Recoveries

For recovery rate of	You need
30%	100 birds
3%	1,000 birds
.3%	10,000 birds
.1%	30,000 birds

This brings us to "Willie Sutton's Law." Willie Sutton was a famous bank robber. When asked why he robbed banks, he answered, "Because that's where the money is." Where is the payoff in bird banding? One can't help thinking that if Willie Sutton had banded birds, he would have concentrated on species that have at least a 1% recovery rate.

Nestlings We have devoted most of our time and effort to banding nestling raptors, colonial birds and those in nest boxes. By concentrating on nestlings one has birds of a **known age** and of a **known origin**. These are important scientific base data points. Similarly, if one bands an incubating adult, one has an individual of **known breeding**

Marc Bechard, David Miller and Stuart Houston banding cormorants at Last Mountain Lake, 1987.

site. The scientific value of the information is thereby increased.

It is fortunate that it is safe to band nestlings of these groups. The raptors are able to defend their young. The colonial birds nest on remote and inaccessible islands where disturbance is at a minimum. In Saskatchewan (though not everywhere) birds using nest-boxes are inaccessible to most predators.

Colonial Birds Soon after we began banding colonial birds, we began to receive reports of encounters coded "52," sighted by telescope. R.F. Oldaker spent his days at the city dump near Vancouver, British Columbia, reading band numbers. He amassed booklets full of incomplete numbers, since the numbers go around the entire circumference of each band. By keeping a given bird in view until it turned or raised its foot to scratch behind its ear, Oldaker read the complete number for 39 sightings of 35 of our California Gulls, including 19 of 1,145 banded at Redberry Lake (1.7%), 8 of 346 from Crane Lake (2.3%), 6 of 149 from Last Mountain Lake (4.0%), and 2 of 104 (1.9%) from Kindersley.[7] Oldaker read bands as the gulls arrived from Saskatchewan before they moved south to California and the western coast of Mexico to winter. For the next three years he sampled band numbers as the gulls summered near Vancouver. Only when they were four years old did the gulls return east to their breeding grounds in Saskatchewan. After Oldaker died, Ian R. McGregor of Seattle visited the new dump at Burns Bog south of Vancouver and read the band numbers on another 22 of our gulls. Laurence C. Binford and John G. Shaw had two sightings each in California. Thus, from our first 117 California Gull encounters, 66 had been by telescope.[25] Our behaviour changed, too. Instead of applying bands indiscriminately, upside down or rightside up, Oldaker persuaded us to place all bands rightside up to aid in reading numbers.

TABLE 2: RECOVERY RATES FOR COLONIAL BIRDS, BANDED 1944-1987
Recoveries received through 31 July 1990

Number Banded	Species	Number of Recoveries	Percent Recoveries
5,512	Am White Pelican	248*	4.5%
4,467	D-c Cormorant	257*	5.8%
84	Great Blue Heron	2	2.4%
247	Black-cr Night Heron	5	2.0%
1,177	Franklin's Gull	4	0.3%
20,342	Ring-billed Gull	409*	2.0%
9,875	California Gull	203*	2.1%
391	Caspian Tern	6	1.5%
3,107	Common Tern	25	0.8%
45,202	TOTAL	1,159 *	2.6%

Note: Only those numbers with * are a statistically significant sample.

Colonial birds have shown consistently satisfactory recovery rates (Table 2). We banded Franklin's Gulls for only a few years because we felt our visits, wading through waist-deep water, were too disturbing to the gulls — and we'd already had the satisfaction of a recovery from Chile.[21]

Scoters and Goldeneye Adults While banding pelicans, cormorants and gulls at Redberry Lake, we frequently chased a bird into a gooseberry bush, only to have a White-winged Scoter erupt from its nest. These ducks are so heavy and so slow at takeoff that most may be caught by hand. Many of the same scoters were recaught in later years, especially when graduate biology students Pat Brown and later Pat Kehoe spent a total of seven summers studying the scoters on these islands. The result of this fortunate symbiosis with thesis research was that the graduate students knew the minimum age of a number of their nesting birds and we received return records for many of our scoters.[1,33,34] The oldest scoter was caught on her nest 16 years after being banded as an incubating adult; since scoters do not nest until at least two years of age, she was at least 18 years old. Of the 83 we had banded, 45 (54%) were recaught on their nests in subsequent years. At last report we had the next five oldest White-winged Scoters in North America.[37]

One of our sub-permittees, Dr. Maureen Rever DuWors, bands Common Goldeneye ducks in University field station nest boxes at Emma Lake, Saskatchewan. From 113 adult females banded, 52 (46%) were recaptured on their nests in subsequent years.[4]

Raptors Since 1957, every weekend in May has been devoted to Great Horned Owls.[4,17] Four climbers take turns. Incredibly, the requisite number of climbers always materializes to make the project possible. We have visited and climbed as many as 28 owl nests in one day, not counting failed nests or those with young too small to band. About 6% of the females draw bander's blood. For three Snowshoe Hare peaks, Great Horned Owl numbers followed the same 10-year-cycle as the Snowshoe Hare and

Lynx; at the peak of the hare cycle, not only did all owl pairs attempt to nest with a consequent increase in the number of nests, but production of young per nest increased with the production of three and even four young.[24,30] When the hares crash, the resulting food shortage drives many owls to move in a consistent southeasterly direction as far as Minnesota, Iowa and Nebraska.[27]

We have had remarkable assistance from the most friendly, most observant and most conservation-minded farmers in Saskatchewan. Since 1967, four farmers (Pete Hill at Duval, Leif Nordal at Bulyea, Leslie Nemeth at Yellow Creek and Ian Lochtie at Kelliher), have each found more than 100 successful Great Horned Owl nests.[31] To date, Great Horned Owls are third on our all-time list, surpassed in total recoveries only by the Mallard and Ring-billed Gull. With 352 banded in 1989 and 585 banded in 1990, this owl will by the time of this publication be our number one species in terms of recovery totals.

Since 1967, we have studied other raptors in the Kindersley area. One or two June weekends are devoted to Golden Eagles and Prairie Falcons, and the last two weekends to Ferruginous Hawks. The first weekend in July is sometimes devoted to Bald Eagles, the next to Ospreys and the last two to Swainson's Hawks. For three years we have also used noose carpets to trap adult Ospreys on their nests during the first weekend in June. Recovery rates for raptors are in the range of 1 to 10% (Table 3). Computer printouts come in small batches every month all winter — a fine antidote for "mid-winter blues" at latitude 52 degrees north when winter nights are long and cold.

Bill Horseman of Saltcoats, Saskatchewan, found ten Great Horned Owl nests, May 1957.

C. Stuart Houston

Jean Harris, bookkeeper for her husband's oilfield construction business north of Kindersley, and Dean Francis, wildlife artist at Mantario, are clearly the world's foremost non-professional Swainson's Hawk nest finders; since 1972 we have banded 693 young Swainson's Hawks in 362 of the nests found by Jean Harris.

Waders Seven days after we had banded it on 2 September 1967, there was a fortuitous recovery of a Least Sandpiper near Great Bend, Kansas, in a mist net operated by Edmund F. Martinez.[15] From 19 Pectoral Sandpipers banded, there was a Pectoral Sandpiper recovery in May 1963 from the base of the Taimyr Peninsula in Siberia.[8] These exemplify the interest that may accrue from a solitary recovery. On the other hand, there were no recoveries from 162 Semipalmated Sandpipers, 81 Killdeer, 110 Least Sandpipers, 39 Piping Plovers and

Table 3: RECOVERY RATES FOR RAPTORS, BANDED 1944-1988
Recoveries received through 31 July 1990

Number Banded	Species	Number of Recoveries	Percent Recoveries
231	Osprey	11	4.8%
58	Bald Eagle	1	1.7%
385	Northern Harrier	5	1.3%
73	Cooper's Hawk	1	1.4%
16	Northern Goshawk	1	6.3%
2,226	Swainson's Hawk	76*	3.4%
543	Red-tailed Hawk	30*	5.5%
1,259	Ferruginous Hawk	32*	2.5%
145	Golden Eagle	14	9.7%
456	Am Kestrel	8	1.8%
349	Merlin	6	1.7%
305	Prairie Falcon	6	2.0%
5,016	Great Horned Owl	389*	7.8%
13	Burrowing Owl	1	7.7%
6	Barred Owl	1	16.7%
9	Great Gray Owl	1	11.1%
466	Long-eared Owl	5	1.1%
25	Boreal Owl	3	12.0%
11,581	TOTAL	191*	1.6%

Note: Only those numbers with * are a statistically significant sample.

142 individuals of another 15 species of waders. We gave up mist-netting of waders in 1968.

Corvids, Doves and Grackles Banding of doves, corvids, and grackles is encouraging, with recovery rates of 3 to 7%, while shrikes run close to 1% (Table 4).

When these species are nesting in the same clump of trees as a hawk, we band their young *en passant.*

Bluebirds and Tree Swallows Mary spends four days of every ten all summer, visiting 240 nest boxes on our 76-mile portion of the "longest bluebird house trail in the world."[26] From over 10,000 nestling Tree Swallows banded, we have had numerous returns which give us an idea of the dispersal of the young.[36] Distant recoveries have been disappointing; we have published one recovery from Manitoba and three from Minnesota; recently we have had two more distant recoveries, one from Missouri and one from Louisiana. The greatest benefit is the study of nest site fidelity of females, who more often than had been expected use a different, distant box in a subsequent season. There have been only 13 recoveries from 4,615 Mountain Bluebirds banded. However, for both swallows and bluebirds, the dividend is in the increasing populations locally and the returns of adult females recaptured on their nests in subsequent years.

Small Birds in Winter and in Migration We have found it worthwhile to band winter birds at our backyard feeder, with particular mention of 36 recoveries from 4,629 Bohemian Waxwings banded (Table 5). On the other hand, banding of 858 Common Redpolls has not yet led to a single recovery.

Table 4: RECOVERY RATES FOR DOVE, CORVIDS, SHRIKE, GRACKLE
Recoveries received through 31 July 1990

Number Banded	Species	Number of Recoveries	Percent Recoveries
32	Mourning Dove	1	3.1%
74	Blue Jay	7	9.5%
708	Black-billed Magpie	28	4.0%
406	Common Crow	12	3.0%
10	Common Raven	1	10.0%
223	Loggerhead Shrike	2	0.9%
659	Common Grackle	47 *	7.1%
2,112	TOTAL	98 *	4.6%

Note: Only those numbers with * are a statistically significant sample.

Trapping of other small birds, chiefly in migration, has been unproductive in terms of recoveries. From 2,358 Slate-colored Juncos, we have had only two recoveries, one from Alaska and one from Alabama. There have been five recoveries from 340 Robins banded, all near the place of banding.

We gave up mist-netting in 1969, after seven seasons, for the following reasons: it was time-consuming and required one of us to get up before dawn for weeks on end. Most birds were of unknown origin and unknown destination, and many were of unknown age. Worse, the recovery rate was zero, and although we had only a very few instances of mortality, the mortality rate was greater than the recovery rate.[23] We found it disappointing, to cite only a few species, to band 457 Lincoln's and 224 Clay-colored Sparrows; 260 Swainson's, 150 Hermit and 113 Gray-cheeked Thrushes; 298 Myrtle, 145 Orange-crowned, and 103 Tennessee Warblers without a single recovery from any of them.

Recoveries per Hour of Effort

Mist-netting doesn't compare very well with banding of nestling cormorants and pelicans, where, transit time excluded, one may reach recoveries of eight and five birds, respectively, per hour of banding. California Gull banding might approach one recovery per hour of banding exertion. Great Horned Owls might gain a recovery for every two to four hours of banding. Mist-netting did give us an occasional confirmed record of a species we had not

Table 5: RECOVERY RATES FOR SELECTED WINTER FEEDER BIRDS
Recoveries received through 31 July 1990

Number Banded	Species	Number of Recoveries	Percent Recoveries
637	Black-capped Chickadee	5	0.8%
4,615	Bohemian Waxwing	36*	0.8%
340	Purple Finch	4	1.2%
20	Hoary Redpoll	1	5.0%
871	Evening Grosbeak	1	0.1%
6,483	TOTAL	47 *	0.7%

Note: Only those numbers with * are a statistically significant sample.

Stuart Houston banding Prairie Falcons.

identified with binoculars alone.

Clearly the choice of species is a personal decision to be made by every bander. Most of our effort is now directed towards banding raptors, all of which continue to produce gratifying recovery rates, and swallows and bluebirds, which provide satisfying return rates.

Migration Pathways of Individual Species Most Saskatchewan birds migrate somewhat east of south.[9,10,11,13,14,18,19] Some ducks such as the Canvasback, go all the

way to the Atlantic Ocean. Only the crow migrates directly south following a single tier of states.[16] The California Gull travels west to British Columbia before it moves south.[25] The Swainson's Hawk spends its breeding season of four months in prairie grasslands and the four months of austral summer in the pampas of Argentina, where we have had 14 recoveries; it spends nearly two months each year in travelling the 7,200 miles each way.[12,32]

Bird Behaviour One interesting fact emerged from banding waterfowl. The flightless young females banded one year had a good chance of returning to the same marsh to breed when one year old, whereas the young males dispersed widely, travelling to the place of origin of their mate. Some year-round residents such as the Great Horned Owl move south in winters when hares, their main food item, are scarce.[26]

Longevity of Birds As more recovery records accumulate, the record age achieved by each species in the wild gradually creeps upwards.[28] Meanwhile, we have proudly held the North American age record for shorter or longer times for the White-winged Scoter (15 years 7 months, then 18 years);[38,37] Great Horned Owl (13 years 6 months, then 20 years 7 months);[38] Black-crowned Night Heron (16 years 6 months);[22] Double-crested Cormorant (17 years 9 months);[38] Bohemian Waxwing (5 years 10 months);[39] and Black-billed Magpie (5 years).[2] Our Swainson's Hawk found dead in Argentina at 11 years 5 months was only the second oldest, eclipsed by Jack Millar's hawk found freshly dead near the banding site at Wymark, Saskatchewan, 15 years and 9 months later.[35]

Additional Motivation In all honesty we admit there are two reasons for banding that are above and beyond Science: first, banding is fun. Raptor banding must be one of the finest field sports ever invented. Second, banding has brought us in contact with the nicest people in Saskatchewan. Banding has been a cooperative project, involving nest finders, climbers, recorders, and sub-permittees. It is a privilege to hold a bird banding permit and it has been fun. I wish Mrs. Priestly had lived to see more of the results.

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Isabel Priestly holds American bittern for banding, Upper Rousay Lake, 1943.

James D. Smith