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MIGRATION OF NORTHERN PINTAIL ACROSS THE PACIFIC WITH REFERENCE TO THE HAWAIIAN ISLANDS

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Abstract. Northern Pintails (*Anas acuta*) regularly occur as winter visitors on most Pacific islands with suitable habitat. Their breeding distribution includes both sides of the Pacific Rim. While large populations breed in Siberia and winter in California, numerous North American breeders also winter in areas near the Sea of Japan, Hawaiian Islands, and other Pacific island groups. Though pintail flights across the Pacific have not been well documented, scrutiny of banding returns shows that an exclusive California-Hawai'i flyway does not exist, as was earlier proposed. Data support a more complex movement of birds from numerous breeding locations in the Holarctic. We summarize movements of Holarctic nesting pintails to wintering grounds in the Hawaiian Islands that include birds originating from northeastern Siberia, Alaska, and the interior prairie provinces and states of North America. We also summarize pintail movements to other Pacific archipelagoes. Finally, to close the circle around the North Pacific, we summarize movements of birds between Canadian and Alaskan breeding grounds to wintering sites in Japan. We also discuss other panmictic, Holarctic migrants and their colonization attempts in Hawai'i.

Key Words: *Anas acuta*; banding return; Holarctic; migration; Northern Pintail; Oceania; panmixis.

The primary interest of a faunist is in establishing the list of species that regularly occur in the area under scrutiny. Data of a species' regular occurrence increase knowledge of their total distribution, which is the aim of the zoogeographer. Regularly occurring species are recognized as influential members of local ecosystems; thus, they play a prominent role in ecogeographical studies. Often less attention is paid to scarce, rare, or irregularly occurring species, for chance seems to determine their detection, and their role in community ecology appears negligible.

Regarding these "lesser" elements of local fauna, interest increases when a chance visitor comes from afar. Lately, the study of rarities became important on two accounts. First, it is realized that bird species are to an extent dynamic; the "stray" individuals caught outside of their regular distributional range are all potential colonists. The trends in their occurrence outside the "normal" range and throughout a longer time period may reveal the nature and extent of the pioneering tendency of the species. Second, it is also realized that species composition of faunas fluctuates; thus rare visitors may reveal trends in faunal changes.

Holarctic waterfowl are among the most successful colonizers owing to their exceptional powers of flight between breeding and nonbreeding areas. Their ability to move long distances and tendency for dispersal have resulted in establishment of waterfowl on many remote land masses where food and freshwater resources are available (Weller 1980).

As with all remote oceanic islands, the Hawaiian Archipelago received its endemic avifauna through over-water dispersal and subsequent local speciation. The Hawaiian avifauna consists of year-round residents (the landbirds) and seasonal but regular visitors (seabirds that come to breed, and Anseriformes and Charadriiformes that winter in Hawai'i). Thirty-three species of migratory waterfowl have been recorded in the Hawaiian Islands (Pyle 1997). Ten species are annual visitors with Northern Pintail (*Anas acuta*), Northern Shoveler (*Anas clypeata*), Lesser Scaup (*Aythya affinis*), American (*Anas americana*) and Eurasian (*A. penelope*) wigeons, and Green-winged Teal (*Anas crecca*) accounting for 95% of those birds wintering in the islands (Engilis 1988).

Our focus in this paper, the pintail, is a regularly occurring winter visitor in Hawai'i and is a scarce or irregular visitor to other Pacific island groups. Reliable but general historical accounts claim that pintail came in large numbers to Hawai'i (Munro 1944). Earlier evidence is suggested by the fact that the Hawaiians recognized two species by name: pintail (Koloa Māpu) and shoveler (Koloa Mohā), indicating that they were an obvious component to the Hawaiian avifauna before Captain Cook discovered the islands in the 1770s. Surveys have documented migratory ducks exceeding 10,000 birds in the mid-1950s (Medeiros 1958). We examined the data from biannual waterbird surveys conducted on most lowland wetlands since the 1940s (Table 1). We omit data collected from 1960 through 1977 (Ni'ihau, Hawai'i, and Moloka'i not regularly surveyed during those periods). These data, summarized in Engilis (1988), confirm that the population size of wintering pintails in Hawai'i have declined tenfold. This decline has led to added interest by conservationists to address habitat needs in the Hawaiian Islands benefiting migratory waterfowl and

TABLE 1. CENSUS OF PINTAILS IN HAWAI'I

Year	Total Pintails
1950	1,593
1951	1,875
1952	7,094
1953	8,226
1954	1,950
1955	2,653
1956	3,045
1957	1,619
1958	1,126
1959	1,249
1978	897
1979	490
1980	923
1981	377
1982	150
1983	60
1984	235
1985	150
1986	501
1987	203

Notes: Data from 1950 to 1959 from Meideros (1950–1959). Counts were taken on Maui, Hawai'i, O'ahu, and Kaua'i. Data from 1978 to 1987 from Engilis (1988). During 1960–1977 not all islands were surveyed and records are sketchy. The period of 1978–1987 represents the best modern data set as all eight main islands including Ni'ihau were surveyed.

shorebirds. Understanding pintail movements to Hawai'i will assist in these efforts.

Medeiros (1958) documented the movement of pintails between the Hawaiian Islands and North America, speculating a California-Hawai'i flyway. Although this connection is correct, the true migration patterns are more complex. We analyzed banding data from the U.S. Migratory Bird Management Office (MBMO), Yamashina Institute for Ornithology, Japan, and the Russia Bird Ringing Center. Included in our data collection was a summary of available literature, examination of specimens from the American Museum of Natural History (AMNH), National Museum of Natural History (USNM), and Bernice P. Bishop Museum (BPBM), examination of bird observation records from the Hawaii Rare Bird Database (HRBD), and fieldwork conducted by us (Udvardy 1958–1960 and Engilis 1984–1997). These sources enabled us to gather considerable amounts of data indicating that pintails from at least half of the species circumpolar distribution are potential winter visitors to Hawai'i and that their movements across the Pacific are complex. In the following discussion we try to document these assumptions.

NORTHERN PINTAIL MIGRATION TO THE HAWAIIAN ISLANDS

Of the 2,811 pintails banded in Hawai'i, 107 have been recovered on the North American mainland and 16 have been retrapped on the islands. Additionally, a pintail banded on Maui in October 1952 was reported taken a month later from Pukapuka (Danger) Atoll in the Tuamotu Archipelago. Significantly, the Tuamotus are almost due south from the Hawaiian chain, as are the Line Islands, where two pintails were recovered two to three months after same-year autumnal banding in North America (MBMO data). Medeiros' analysis of these returns lead him to the conclusion that the islands' wintering pintail population is not blown off course but are deliberately flying from central California to, and return there from, their wintering areas in Hawai'i. Of the above mentioned 107 Hawai'i-banded pintails, 45 were recovered in the San Francisco Estuary, California (Fig. 1). These returns also confirmed that pintails return to the islands one or several years after the initial banding there. Thus, pintails repeatedly and deliberately visit Hawai'i to spend the winter, with some flying further southward after having used the islands in transit (Medeiros 1958). Medeiros speculated that the autumnal flight probably used the northerly trade winds that originate outside central California, while for the return flight in the spring the ducks probably are helped by the westerlies.

According to the MBMO banding/recovery data, 165 pintails have been banded in Hawai'i and recovered (including 16 in Hawai'i) between 1953 and 1960 (Fig. 1). The data reveal that the high number of California returns in the total of Hawai'i-banded ducks matches the distribution pattern, at banding, of 14 pintails banded from 1951 to 1954 in North America and later recovered in the Pacific (Fig. 2). In addition, the proportion of California's share in the total of 165 records is 77.6% against all other localities; if we compare California only with the coastal entities of Alaska, British Columbia, Washington, and Oregon, the proportions are 128 against 24, or 84.2%.

In order to assess the relation of mainland populations of pintail to the population visiting the Hawaiian Islands, according to the banding and recovery results, we have compared the figures of banding effort, recoveries, and hunting pressure on the Pacific coastal areas of North America for the years of Medeiros's project (Tables 2, 3). We excluded Alaska from these tables because there were no data available for hunting pressure or banding efforts in Alaska for the 1950s.

Comparing the data in Tables 3 and 4, we concluded that during the 1950s, California pintails were indeed providers of over 90% of the birds annually harvested by hunters in the temperate Pacific Coast of North America and also

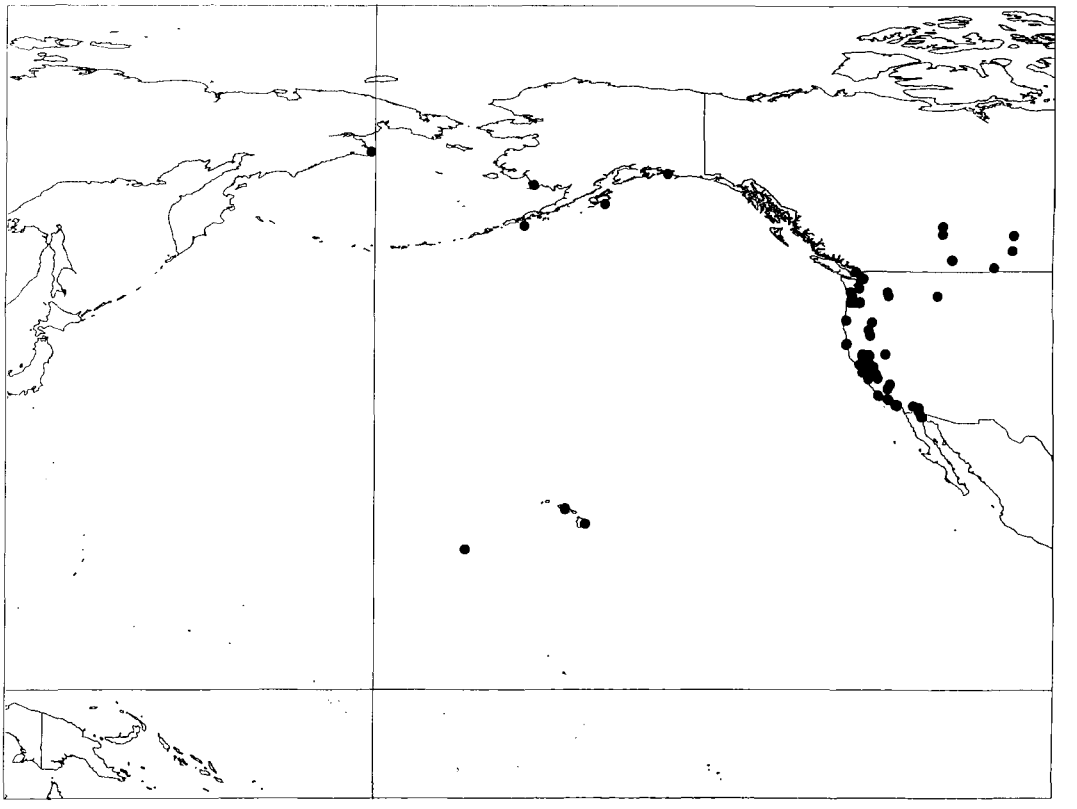

FIGURE 1. Northern Pintails banded in Hawai'i and recovered anywhere.

of pintails annually banded there. The recoveries in California are predominately from the fall when hunting pressure is at its highest. Also, pintails arrive in California earlier than most species of migratory waterfowl, boosting the California figures (Miller 1985). These facts, overlooked by Medeiros, contributed to the predominance of California in the Hawaiian banding and recovery data. However, California remains a critical area for pintail, supporting over 50% of those wintering in the United States (Heitmeyer et. al. 1989); thus it probably serves as a principle staging area for Hawaiian-bound pintails. This still needs to be confirmed through modern marking and tracking studies. We note that banding recoveries support the notion that pintails could equally originate from other Pacific Coast localities such as Mexico, Oregon, or Washington (Figs. 1, 2).

A second pattern of movement can be seen from birds banded in Hawai'i and recovered in the Arctic. Five birds banded in Hawai'i in the 1950s were recovered in the Arctic: one in the Aleutian Islands; another in the Yukon-Kuskokwin Delta, an important breeding ground in western Alaska; and two on Alaska's South Coast (Fig. 1). One bird was recovered in the Anadyr Region of eastern Russia (lat. 62° 5′ N, long. 179° 1′ E). The later bird was a hatching-year male banded on Maui, Hawai'i, 22 February 1954. It was shot on the breeding grounds 29 May 1960. These multiple recoveries straddling the Bering Sea provide another migration link from the Holarctic to the Hawaiian Islands. We speculate that Arctic nesting pintail probably make the transoceanic flight direct from southern Alaska/Siberia to the Hawaiian Islands, intercepting the leeward islands (e.g., Midway and Laysan), resting, and then moving to the main islands. Just as plausible, however, is a movement of Alaskan birds south along the Pacific Coast of North America, into California, and then across the Pacific. This movement may be indirectly supported by banding evidence of Alaskan birds as nearly 80% of those recovered have been taken in California (Austin and Miller 1995). The early arrival of pintails to California—males arrive in numbers by late August (Miller 1985)—could allow time for birds to refuel and make the flight to the Hawaiian Islands. Again, this high return rate of Alaskan-banded

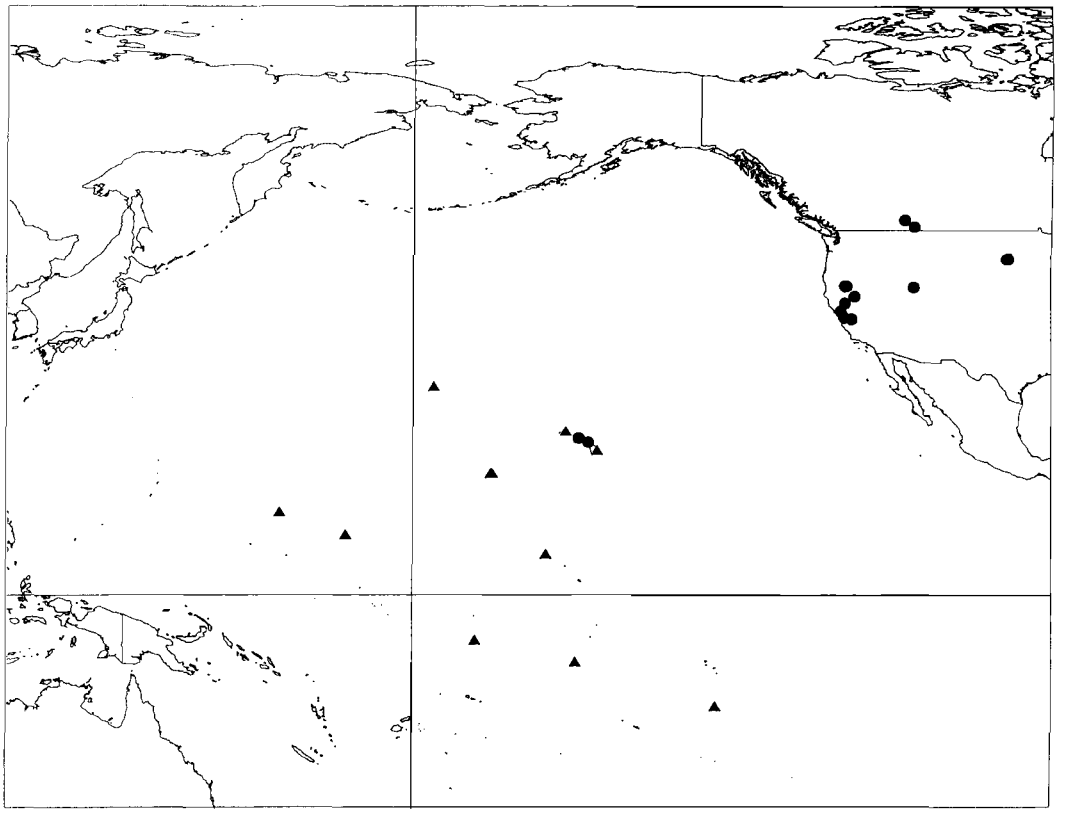

FIGURE 2. Northern Pintails banded anywhere and recovered in the Pacific Ocean (triangles = recovery location, dots = banding location).

pintails can be biased by the high number of birds shot in California.

POPULATION DEMOGRAPHY OF PINTAIL WINTERING IN THE HAWAIIAN ISLANDS

From Medeiros's banding data we note that Hawai'i had a sex ratio skewed towards females (Table 4). This is atypical for what has been reported for pintails (and other ducks) of North America, where males tend to outnumber females in most studies on the wintering and breeding grounds (Bellrose et al. 1961, Miller 1985, Rienecker 1987, Austin and Miller 1995, Migoya and Baldassarre 1995). The higher number of males recorded in waterfowl populations has been speculated to be the result of a high mortality rate (increased predation due to habitat fragmentation) of adult females during the

TABLE 2. HUNTING PRESSURE[a] ON PINTAIL 1950–1956 AT PACIFIC COASTAL AREAS

Year	British Columbia	Washington	Oregon	California
1950	69,600	109,500 (est.)	—	1,945,300
1951	94,830	114,900	—	2,966,000
1952	72,620	111,250	—	4,659,000
1953	94,940	97,800	—	4,599,500
1954	93,940	112,600	—	3,461,600
1955	70,490	128,200	—	3,312,700
1956	71,940	117,700	—	3,526,000
Totals	568,360	791,950	913,620 (est.)	24,470,100
Yearly Mean	81,194	113,136	130,517	3,495,729

[a] Figures represent reported birds taken by hunters during the legal hunting season of each year. Source: state and provincial hunting records obtained in writing by M.D.F. Udvardy.

TABLE 3. BANDING OF PINTAIL 1950–1956 AT PACIFIC COASTAL AREAS

Year	British Columbia	Washington	Oregon	California
1950	28	110	234	9,334
1951	26	774	544	19,360
1952	31	656	102	17,570
1953	0	433	574	16,737
1954	5	143	1,000	16,514
1955	5	625	2,931	21,475
1956	0	988	1,651	15,759
Total	95	3,729	7,036	116,749

Source: U.S. Migratory Bird Management office records.

TABLE 4. SEX RATIOS OF BIRDS BANDED IN THE HAWAIIAN ISLANDS (MEDEIROS 1950–1959)

Year	N	Sex ratio (Males to Females)
1951	417	0.63
1952	856	0.84
1953	644	0.65
1954	446	0.94
1955	478	0.50

breeding season (Johnson and Sargeant 1977). The disproportionate numbers of females seen in Hawai'i may therefore be the result of female pintail's tendency to exhibit philopatry to their winter quarters (Rienecker 1987, Anderson et al. 1992), coupled with the effort required to reach the Hawaiian Islands. In addition, pintails undergo a sex-segregated migration as males move to molting grounds earlier than females, in some cases arriving months earlier (Fuller 1953, Oring 1964, Salomonsen 1968, Bellrose 1976). Both sexes appear prone to wander, particularly young birds, as is revealed in the specimen record. Of the 42 pintail specimens examined from Pacific islands, 25 were hatching-year birds and 17 were adults. Medeiros's trapping and banding data also revealed a decline in pintail age ratio throughout his study (Table 5). This decline was also reflected in the Pacific flyway pintail population and was the result of a severe drought in the prairie provinces of Canada depressing continental waterfowl populations (Ducks Unlimited 1990).

The timing of pintail migration to Hawai'i has apparently changed in the past five decades. The decline of pintails in North America has been well documented, and we have seen a similar decline in Hawai'i (Engilis 1988, Ducks Unlimited 1990, Austin and Miller 1995). Not only has there been a decline in numbers, but the period of arrival has decreased as well. In the 1950s, Medeiros documented birds arriving, in numbers, as early as mid-September. His banding records revealed that the early arrival was marked by small flocks of males, followed by females and hatching-year birds that arrived in October. Pintail numbers peaked in November. This sex-segregated migration pattern has been documented for other waterfowl in North America, particularly in California where male pintail comprised over 90% of the total birds arriving in August but only 53% of the total wintering population once females arrived (Miller 1985).

By the mid-1980s to present, pintail arrival patterns changed in Hawai'i. A more abbreviated migration occurs with the main bulk of pintail arriving in the islands, marked by hatching-year birds (based on the timing of their body molt; A. Engilis, unpubl. data) by late October, peaking in November, and stabilizing at a few hundred birds through the winter. We speculate that the early arrival of male pintails to Hawai'i was lost during the years of continental decline (mortality?) from 1975 to 1985 leading to the observed, abbreviated migration and decline in Hawai'i. In the late 1990s, a few early flocks have again been observed in late September; most are comprised of male birds (A. Engilis and A. J. McCafferty, pers. obs.). During the same period, pintail numbers have increased on the continent (USFWS 1996b).

MOVEMENT OF NORTHERN PINTAIL ACROSS THE PACIFIC

To complete the assessment of pintails migrating across the Pacific, we assembled data for pintail banded in North American and recovered in Eurasia. One movement of birds between the continents has been documented, with part of the population breeding in eastern Siberia and wintering in the western United States (Dement'ev and Gladkov 1952, Henny 1973). Again the banding recoveries (N = 423) yield a more complex pattern of movement across the North Pacific than first thought. To make sense of these data, we combined the patterns of movement into three groups.

TABLE 5. RATIOS OF WINTERING NORTHERN PINTAIL ADULTS TO JUVENILES IN THE PACIFIC FLYWAY AND THE HAWAIIAN ISLANDS BASED ON BANDING RECORDS (MEDEIROS 1950–1959)

Year	Hawai'i	Pacific Flyway[a]
1951	1.19	3.50
1952	2.07	3.70
1953	0.51	0.50
1954	0.72	0.50

[a] Extrapolated from Bellrose et al. 1961.

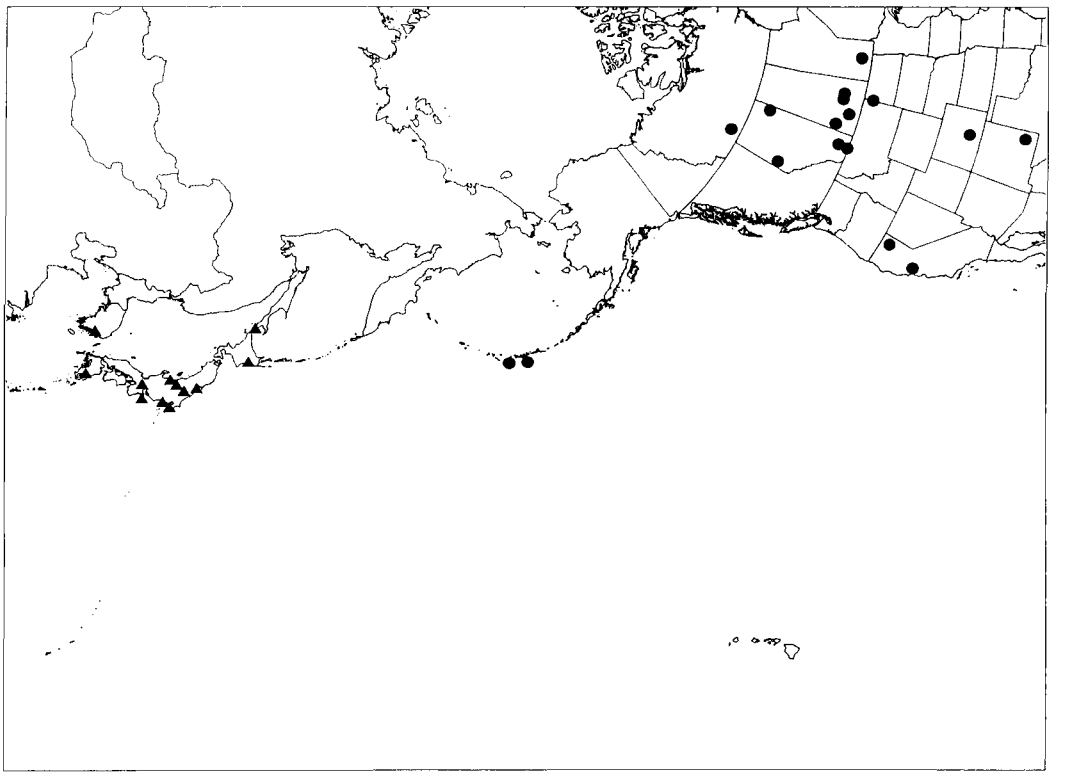

FIGURE 3. Northern Pintail banding recoveries in Asia below 50° N; birds banded in North America (triangles = recovery location, dots = banding location).

GROUP 1

Three birds were recovered in Europe and one in western Siberia. The first bird, a drake, was banded in northern California and shot eight years later in western Siberia. Another drake, also from California, and was recovered two years later from the Arctic coast of Russia's Kara Sea. A third, an immature drake from the Canadian maritime province of Nova Scotia, was found in Chechia two and a half years later. These records provide an example of the mechanism whereby these circumpolar, wetland species mix their genotype so that no specialization could occur, supporting the notion that the Holarctic pintail population remains panmictic and opportunistic, thus adapted to varying climate conditions (Udvardy 1969:180–181). The last of these cases defies all speculations; an adult female from northern California that was found six years later in the Ukraine (Rienecker 1987, 1988).

The remaining 420 pintails mentioned above were divide into two groups: those recovered in Asia below 50° N (group 2) and those above it (group 3).

GROUP 2

Below the 50° N parallel, 21 North American-banded pintails have been recovered in Japan, 1 in Korea, and 2 in Sakhalin Island, Russia. Of these 24 birds, all were winter visitors: 5 were banded on the Aleutian Islands; a scattering came from the tundra or northern parklands of Canada; 11 were in a cluster from the southern Canadian and northern U.S. prairies; and another scattering originates in California and other western states (Fig. 3). These data corroborate Henny's data (1973) and, in addition, show that there is an unknown, but sizable number of North American pintails that regularly winter in the region of the Sea of Japan, the area which is also a wintering ground for some portion of the East Asian breeding population (Dement'ev and Gladkov 1952, Ornithological Society Japan 1974, Meyer de Schauensee 1984). Further, four female pintails, all banded within 5 days of one another on the Aleutian Islands, were recovered in Japan: three of them 40, 52, and 64 days after their banding date, respectively. The fourth was recovered, also in Japan, a year later. These four females, banded in "immature" plumage, ex-

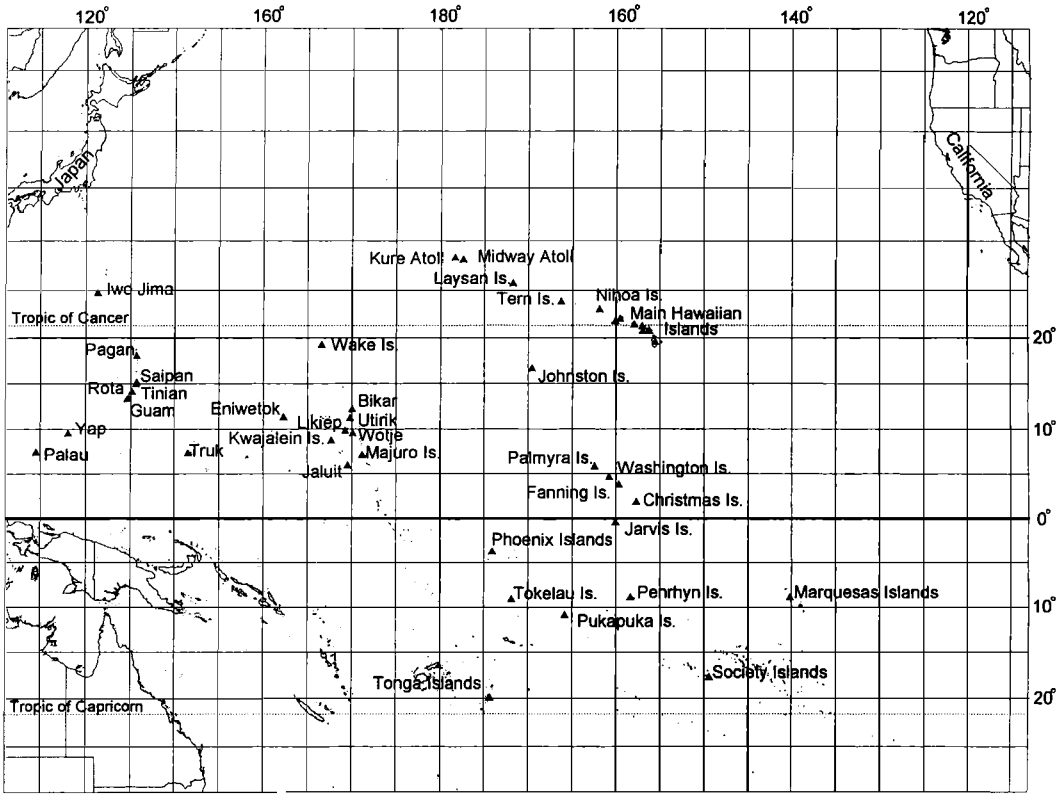

FIGURE 4. Localities where Northern Pintails have been recorded in the Pacific Ocean (banding, sight and specimen records). Sources: Reichenow (1899, 1901), Schnee (1901), Baker (1946), Gallagher (1958–1959), Yocum (1964), Fosberg (1966), Amerson (1969), Ely and Clapp (1973), Palmer (1976), Pratt et al. (1987), Engilis (1988), Stinson et al. (1997), specimens from American Museum of Natural History, National Museum of Natural History, Bernice P. Bishop Museum, and sight observation records Hawaii Rare Bird Database).

emplify the regularity of visiting and returning to winter grounds (cf. philopatry of Rohwer and Anderson 1988), reminding us of similar data from Medeiros's banding returns in the Hawaiian Islands. It is tempting to suggest a Canada-Japan flyway on a great circle route from the North American prairies through the Aleutian Chain, Kamchatka, and the Kuril Islands.

Group 3

The remaining 396 banded birds recovered in Asia were there predominantly as spring-summer arrivals because 338 of them were found from April to July, 55 in the fall months, and only 3 in the winter. Beside Henny (1973), a number of publications deal with drought displacement of pintails to Alaska and beyond (Derksen and Eldridge 1980; Hestbeck 1995, 1996). Thus, there is a sizable movement between breeding grounds in eastern Siberia and wintering areas in North America. It is not known whether these birds fly over the ocean or in a great circle route or follow a coastal route along the Pacific Rim.

To close the circle around the pintails of the Hawaiian Islands, we looked at the rest of Oceania (Fig. 4). Our scrutiny of the pertinent literature, banding records, and museum specimens shows that every island group of central Oceania has received pintail visitors, often in numbers. We mention here two special cases as extremes. During the period when the Marshall Islands were German colonies, Anton Reichenow reported in 1899 about an autumnal duck migration viewed at Jaluit Atoll by reliable public officers and documented by specimens sent to the Berlin Museum as pintails, Green-winged Teals, and Canvasbacks (*Aythya valisineria*). "*In ununterbrochener Folge ungeheure keilformige Schwärme*" (large numbers in uninterrupted sequence of enormous v-shaped flocks) moved over the atolls of Bikar, Utirik, Ailuk, Jemo, Likiep, and Wotje from north to south in the fall, and back again in May (Reichenow

1899, 1901). Another observed migration toward north and north-east in the vicinity of Kwajalein Atoll was documented in May 1900 (Schnee 1901).

The pintail is also an uncommon, but regular winter visitor to the Mariana Islands, occurring regularly on the main islands of Guam (numerous sites), Saipan (Lake Susupe), and Tinian (Hagoi Marsh; Stinson et al. 1997). Kuroda (1961) linked the pintail that reach Micronesia to the "Nearctic Hawaiian Flyway" (cf. Baker 1953), referring to the now unrecognized North American race (*A. acuta tzitzihoa*). However, with the prevailing storms across Japan moving east and southeast, it is conceivable that the North American connection to the Marianas are actually birds originating from the "Canada-Japan" corridor.

SUMMARY OF COLONIZATION EVENTS BY HOLARCTIC MIGRANTS IN HAWAI'I

The winter range of Northern Pintail is perhaps the most widespread distribution area of all species of waterfowl (Palmer 1976, Austin and Miller 1995). Pintail are prone to disperse and wander as is evident by the banding, observation, and specimen information synthesized here. The species has been recorded on all continents except Antarctica and shares ancestry with the endemic island form in the Southern Hemisphere, Eaton's Pintail (*Anas eatoni*). Holarctic species prone to wandering have given rise to the majority of known endemic waterbirds and most landbirds of North Pacific islands (Fleischer and McIntosh *this volume*). The majority of the species that have colonized are those whose resources naturally fluctuate, both on a regional and seasonal pattern. Many of these are representative of highly volatile species such as fringillid finches, frugivorous thrushes, waterbirds (rallids, shorebirds, and ducks), and raptors, the latter whose populations erupt relative to fluctuating small mammal numbers. Colonization events have been rarely documented on island groups, and although pintail have yet to be recorded nesting in Hawai'i, other Holarctic migrants have. We summarize three cases where colonization has led to, or is suspected to have lead to, a Hawaiian breeding population of a Holarctic migrant.

Fulvous Whistling-Duck

The Fulvous Whistling Duck (*Dendrocygna bicolor*) apparently reached Hawai'i under its own power in 1982 when a flock of six birds suddenly appeared on O'ahu (Leishman 1986). They began nesting on O'ahu's North Shore, expanding to nearly 30 birds in under five years. Dispersal records of individual birds were documented on Moloka'i, Maui, and Kaua'i during the late 1980s. After the decline of wetlands and aquaculture on O'ahu's North Shore in 1992, the population of Fulvous Whistling Ducks crashed dramatically, so that by 1998 only one bird remained on the James Campbell National Wildlife Refuge (A. Engilis, Jr., pers. obs.). It is of interest to note that the whistling duck has high populations on the Pacific Coast of North America only in western Mexico. Thus it is conceivable that these birds originated from there, as could migratory pintail as stated earlier. A Mexico-Hawai'i tie is also suggested by other vagrants that have occurred in Hawai'i: e.g., Little Blue Heron (*Egretta caerulea*), Laughing Gull (*Larus atricilla*), and Great-tailed Grackle (*Quiscalus mexicanus*; Pyle 1997).

Pied-billed Grebe

The Pied-billed Grebe (*Podilymbus podiceps*) has bred in Hawai'i since the mid-1980s. A single bird arrived to overwinter in 1984 on 'Aimakapā Pond, located on the Kona Coast of Hawai'i. It left in the spring of 1985. Two birds returned the following fall, remained, and gave rise to a population on the pond that remained stable at a dozen birds throughout the late 1990s (R. David, unpubl. data). These two birds remained and have given rise to a population on the pond that remains stable at about a dozen birds. Dispersal records on Kaua'i, Maui, and on other wetlands of the island of Hawai'i are becoming more frequent in recent years, probably representing young birds that may have originated from 'Aimakapā Pond (HRBD, unpubl. data).

Great Blue Heron and White-faced Ibis

Although they have not yet been recorded breeding, two Holarctic ciconids are now regular residents in small numbers, the Great Blue Heron (*Ardea herodias*) and White-faced Ibis (*Plegadis chihi*). Great Blue Herons continue to wander through the chain and at times form small groups, often roosting among nesting colonies of Cattle Egrets (*Bubulcus ibis*) and Black-crowned Night Herons (*Nycticorax nycticorax*).

What drives these birds to disperse to the Pacific islands remains unclear, as do the mechanisms of how they navigate to the islands year after year (wintering shorebirds and waterfowl). Mayr (1953) discussed the migration of birds across the Pacific speculating that historically the islands of the Pacific were more massive, thus providing better opportunity for colonization. He also suggested two patterns affecting Holarctic birds, that of route abbreviation and route prolongation. The Northern Pintail might more readily fall into the latter group of mi-

grants, a species whose migration patterns have been elongated as a result of global climate changes and expanding breeding range northward, away from traditional wintering grounds. Baker (1953) further alluded to the fact that oceanic islands provide excellent wintering grounds due to the absence of mammal and reptilian predators. Both authors discussed their findings with an emphasis on northern nesting shorebirds, including those species where the majority of the known population winters in the Pacific: Bristle-thighed Curlew (*Numenius tahitiensis*), Pacific Golden Plover (*Pluvialis fulva*), Wandering (*Heteroscelus incanus*) and Gray-tailed (*H. brevipes*) Tattlers, and Bar-tailed Godwit (*Limosa lapponica*; Baker 1951, Mayr 1953).

Finally, migration out over the Pacific Ocean has rarely been observed, owing to paucity of observers and opportunities. A great "corridor" of migrating Alaska pintails was observed in the fall in southern British Columbia, and another one moving from Alaska southwest across the Pacific has been postulated (Bellrose 1976, Campbell 1990) and backed by observations (Martin and Myres 1969). We uncovered one specimen of American Wigeon (AMNH 131716) collected by C. H. Townsend in 1891 from the USS Albatross, "500 miles NW of O'ahu", documenting yet another species' movement across the Pacific. Perhaps new technologies for tracking large birds (satellite telemetry and Doppler radar) may help shed light on these movements. The evidence bears out a complex setting for migratory waterfowl in the Pacific, fortunately observers of the past had the foresight to band pintails to help us elucidate these movements herein. What has become clear is that pintail remain a regularly occurring component of the Pacific island avifauna, representing a link to the mechanics of island colonization from the Holarctic faunal region.

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