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Dirk V. Derksen

*U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center*

David H. Ward

*U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center*

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## 13.1.15. Life History and Habitat Needs of the Black Brant



Dirk V. Derksen and David H. Ward  
U.S. Fish and Wildlife Service  
Alaska Fish and Wildlife Research Center  
1011 East Tudor Road  
Anchorage, AK 99503

The black brant is a sea goose that depends on coastal habitats from high arctic nesting sites in Canada, Alaska, and Russia to wintering areas in the Pacific coastal states, the Baja California peninsula, and mainland Mexico estuaries. Population estimates are based on aerial surveys in Mexico, California, Oregon, and Washington during mid-winter. Despite much annual variability in estimates, a plot of the counts from 1964 to 1992 reveals a significant downward trend in the winter populations (Fig. 1). Three of four major colonies on the Yukon-Kuskokwim (Y-K) delta declined an average of 60% during the first half of the 1980's. This is significant because about 79% of the world population of the black brant nest in these colonies (Table). Because few other breeding colonies have been consistently monitored, we have little understanding of their dynamics.

Spring subsistence harvest in western Alaska coupled with fox predation on reduced Y-K delta populations, has limited the recovery of key nesting colonies. Degradation and loss of important staging and winter estuarine habitats from commercial and recreational development and disturbance are largely responsible for population reductions in British Columbia and the Pacific coastal states. In

### Species Profile—Black Brant

**Scientific name:** *Branta bernicla nigricans*

**Weight\* in pounds (grams):**

Adults—male 3.6 (1,802), female 3.3 (1,648)

Immatures—male 3.4 (1,710), female 2.9 (1,456)

**Age at first breeding:** 2–4 years

**Clutch size:** 3.3–3.5, range 1–7

**Incubation period:** 24 days

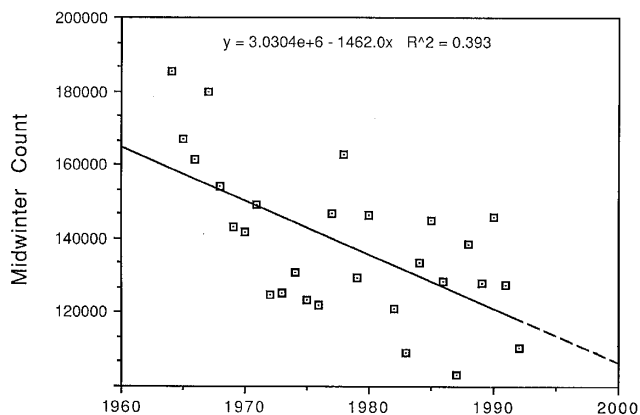
**Age at fledging:** 45–50 days

**Nest sites:** Grass-sedge tundra communities on islands or peninsulas in large, shallow ponds along low coastal floodplains to 5 miles inland

**Food habits:** Predominantly herbivorous, except for small amounts of fish eggs, crustaceans, and mollusks

\*October weights at Izembek Lagoon, Alaska

Mexico, industrial and recreational development in several estuaries may further limit winter habitats. Wildlife conservation agencies in Canada, Mexico, Russia, and the United States recently cooperated to examine population dynamics and factors that limit recovery of the black brant. This examination revealed important discoveries for management. This leaflet is a summary of these findings. More complete information on the life history of the black brant is in Bellrose (1980) and Palmer (1976).



**Fig. 1.** Status of the black brant based on midwinter aerial surveys with the calculated regression line indicated.

## Distribution

The black brant nests from Prince Patrick and Melville islands in the western Canadian high arctic and the Beaufort Sea islands to the coastal plain of Canada and Alaska. Small colonies occur on the north side of the Chukotka Peninsula in Russia and on Wrangel Island. The largest concentration of nesting brants is on the delta of the Yukon and Kuskokwim rivers in western Alaska (Table; Fig. 2).

In the arctic, molting areas support as many as 32,000 birds near Teshekpuk Lake on Alaska's coastal plain and 4,000 birds on Wrangel Island (Fig. 2). Brants also molt in large but uncounted flocks on the Y-K delta.

A major shift in the winter distribution of the black brant occurred during the 1950's and 1960's. The species traditionally wintered on the Pacific coast from Puget Sound south to Baja California. In 1958, black brants were discovered using lagoons on the Mexican mainland bordering the Gulf of California. Concomitantly the number of wintering birds in California declined drastically from a 10-year (1949–1958) mean of 42,000 to a mean of 6,800 between 1959 and 1968. In two years since 1968, no brants have wintered in California. Since 1965, in excess of 80% of the black brants counted during winter surveys in Mexico, California, Oregon, and Washington were observed in Mexico. From 1981 to 1988, an average of 4,400 brants wintered in the Izembek Lagoon area of the Alaska Peninsula. Whether these wintering brants are from specific breeding colonies or their physiological condition prevents them from

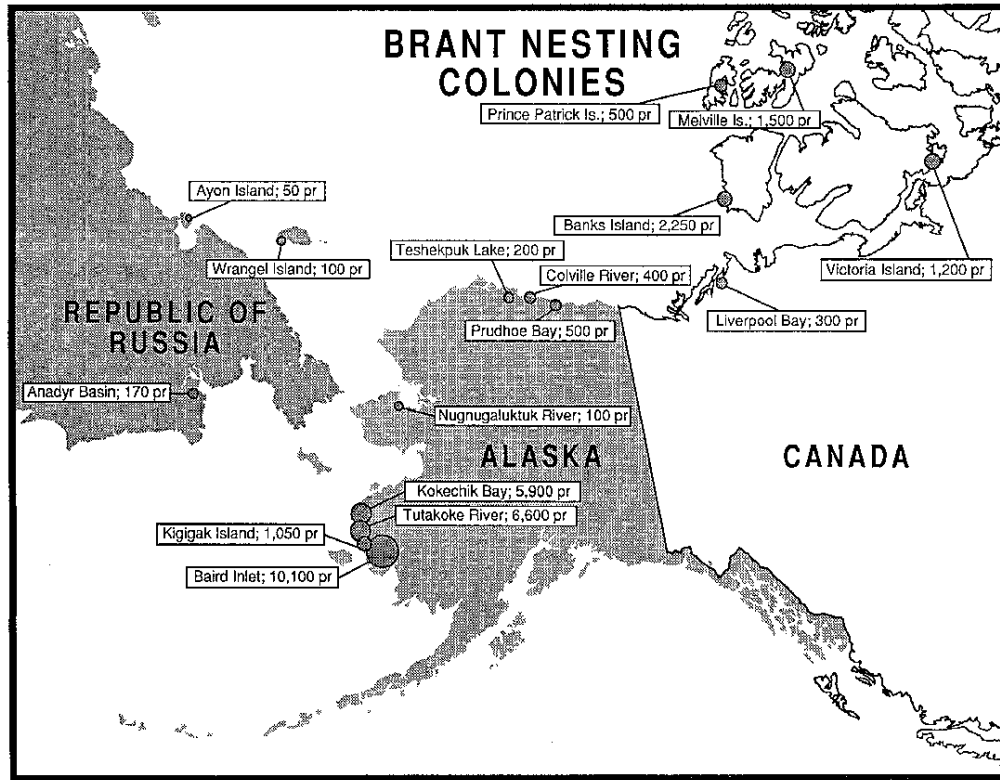
**Table.** Number of nests and percent of total nests in colonies throughout the population of the black brant.

Location and colony	Number of nests	Percent of total
<b>Alaska</b>		
<b>Yukon–Kuskokwim Delta</b>		
Kigigak Island	1,050	
Baird Inlet	10,122	
Tutakoke River	6,591	
Kokechik Bay	5,874	
Small colonies	4,163	
Subtotal	27,800	78.9
<b>Seward Peninsula–Chukchi Sea</b>		
Arctic Lagoon	50	
Nugnugaluktuk River	100	
Kasegaluk Lagoon	50	
Subtotal	200	0.6
<b>North Slope Coastal Plain</b>		
Meade River Delta	50	
Teshekpuk Lake	200	
Colville River	400	
Prudhoe Bay	500	
Subtotal	1,150	3.3
<b>Russia</b>		
Wrangel Island	100	
Ayon Island	50	
Anadyr Basin	170	
Subtotal	320	0.9
<b>Canada</b>		
<b>Low Arctic</b>		
Liverpool Bay	300	
Banks Island	2,250	
Victoria Island	1,200	
Subtotal	3,750	10.6
<b>High Arctic</b>		
Prince Patrick Island	500	
Melville Island	1,500	
Subtotal	2,000	5.7
<b>Total</b>	<b>35,220</b>	

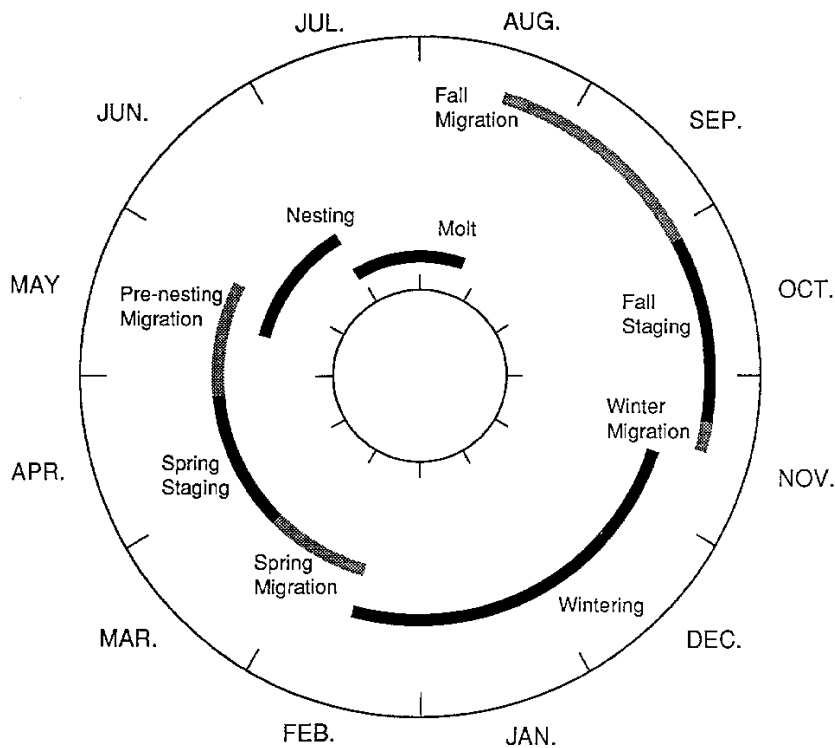
migrating from Izembek Lagoon to more southerly habitats is not clear.

## Spring Migration and Breeding

Spring migration occurs during a 4-month period (Fig. 3) starting in mid-February when the birds begin northward movement from winter areas to staging habitats in California, Oregon, Washington, and British Columbia. Eelgrass and



**Fig. 2.** Distribution of major black brant colonies and number of nesting pairs.



**Fig. 3.** The chronology of important life history events in the annual cycle of the black brant (irrespective of sex).

sea lettuce and other marine algae are important in the diet of migrants at these staging habitats; they also feed on roe of Pacific herring, on crustaceans, and on mollusks. By late April, brants reach Izembek Lagoon, Alaska, where they may spend from 2 to 4 weeks feeding on eelgrass before emigration to nesting areas.

The birds establish bonds during the winter and arrive at breeding areas as pairs. They attain maximum numbers on the Y-K delta in late May and in arctic and western Canada by mid-June. Preferred nest sites are on peninsulas or islets in large wetland complexes, some of which are subject to tidal action. Most brants first breed when they are 3 years of age; fewer than 50% nest at age 2.

Brants lay from one to seven eggs and an average clutch of 3.5 eggs at Y-K delta colonies and 3.8 eggs at Colville River delta colonies in northern Alaska. The mean incubation period is 24 days. The arctic fox is the most important predator of eggs and goslings on the Y-K delta colonies. Control measures to eliminate foxes enhanced nesting success and significantly increased nesting brants at the Tutakoke River colony on the Y-K delta. Glaucous gulls and parasitic jaegers also take eggs and goslings.

Adults with broods move from colony sites to rearing habitats along tidal flats. Broods sometimes congregate in large creches. Creeping alkali grass and Hoppner sedge are the most important plants in the diet of adults and developing young. Adults with broods begin to molt their flight feathers in the second week of July and most can fly by the second week of August. Young fledge in 45–50 days, and most birds are capable of flight by mid-August (Fig. 3). Brants remain in family groups throughout the brood-rearing period.

## Postbreeding Dispersal and Fall Migration

Brants that lose their clutches or do not nest undertake a molt migration, usually in late June, to secluded areas in the high arctic. They congregate in large numbers on molting areas for a month or more (Fig. 3) until new flight feathers are grown. Important molting areas have been discovered on Alaska's north slope and Wrangel Island (Fig. 2). These areas, dominated by large freshwater lakes and ocean estuaries, provide essential habitat for tens of thousands of brants

from many different nesting colonies during the annual wing molt. At the Teshekpuk Lake molting area, there are more males (57.2%) than females and more After Second Year (76.6%) than Second Year birds. Failed breeding birds are 61.7% and non-breeding birds are 38.3% of the molting population.

Molt is a nutritionally demanding process in many species of birds, including the black brant. During the molt at Teshekpuk Lake, adult females lose more carcass mass, lipid, and protein than adult males and subadults. Males lose an average 122 g and females 141 g of lipid during the molt process. For brants to complete the molt and regain the necessary lipid reserves for migration, managers must insure minimal disturbance in molting areas. Feeding is the predominant behavior (52% of all activities) of molting brants throughout the 24-h cycle. Protein-rich tufted hairgrass and sedges are the most important plants in the diet of molting brants at Teshekpuk Lake.

Adults with fledged young follow traditional routes from breeding areas to fall migration staging sites along the Siberian, Beaufort, Chukchi, and Bering seas (Fig. 2). The single most critical fall staging habitat is near the tip of the Alaska Peninsula at Izembek Lagoon. Nearly the entire world population of the black brant spends as long as 9 weeks there feeding on the extensive beds of eelgrass. Eelgrass is as much as 99% of their diet during this period. In the Izembek Lagoon complex, brants from high arctic colonies (e.g., Prince Patrick and Melville islands) are spatially segregated from birds that nest in western colonies (Mackenzie and Y-K deltas). This behavior allows assessment of productivity and age ratios of two distinct breeding stocks. Managers can establish appropriate harvest regulations and management for each stock.

Disturbance of staging brants is of concern because it could reduce foraging time and increase energetic costs and thus lower fat deposition, which may compromise successful migration to distant winter habitats. At Izembek Lagoon, aircraft flights were the most frequent (0.57 events/h) type of anthropogenic disturbance. Bald eagles caused 0.25 disturbances/h. All disturbances occurred at 1.07/h. A predictive model shows that if brants were exposed to 45–50 daily disturbances by aircraft, they would not gain any weight at Izembek Lagoon.

In late October or early November, brants depart Izembek Lagoon during low pressure systems that generate the favorable southerly winds for transoceanic migration. When meteorological conditions are appropriate, nearly all brants leave Izembek Lagoon within about 12 h, usually at night.

## Winter Ecology

Black brants arrive in winter habitats in Baja California within 60–95 h of departure from Izembek Lagoon. They metabolize nearly one-third of their body mass during the 2,600 nautical mile flight across the Pacific Ocean to San Quintin Bay Baja California, Mexico.

Most brants from the Y–K delta, low arctic Canada, and Russia winter in estuaries on the Baja California peninsula and mainland Mexico. Birds that nest in high arctic colonies in Canada winter in the Puget Sound area.

Black brants forage most (58–87%) of the day on marine plants to replace fat reserves expended during migration. Eelgrass is the primary food in San Quintin Bay. Farther south on the Baja California peninsula at San Ignacio Lagoon, Scammons Lagoon, and Magdalena Bay brants feed on eelgrass and widgeongrass.

At San Quintin Bay disturbances by hunters, aircraft, vessels, and avian predators occurred at an average rate of 1.21/h. Boat traffic caused 65% and hunters caused 23% of all disturbances. The level of disturbance is greater in this bay than in molting, staging (see above), and other winter habitats. Disturbance during winter is of special concern because it could harm the physiological condition of prenesting brants and thus lower reproductive success.

## Management

Effective management must focus on conservation of the terrestrial and marine habitats on which black brants depend during nesting, staging, and wintering. Some of these areas are protected as state and federal refuges, but many critical habitats remain outside conservation units. Even some habitats that are inside refuge boundaries are not free from activities that may affect brants. Management of refuges and other key habitats should include monitoring and, if necessary, regulation of disturbances, especially

from vessel and aircraft traffic, that may displace birds from traditional foraging areas.

The quality and quantity of important marine food plants such as eelgrass, widgeongrass, and sea lettuce must be maintained. Threats to these resources include increasing pollution, dredging, and other industrial and recreational development in estuaries in British Columbia, the Pacific coastal states, Baja California, and mainland Mexico.

Habitats in Alaska, Russia, and northern Canada are presently relatively secure, but petroleum and related development should be monitored and strategies developed for the protection of colonies, molting areas, and staging sites that are not managed for waterfowl. Methods to protect habitats include acquisitions, land exchanges, easements, and cooperative management agreements.

## Suggested Reading

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## Appendix. Common and Scientific Names of the Plants and Animals Named in the Text.

### Plants

Hoppner sedge . . . . .	<i>Carex subspathacea</i>
Sedges . . . . .	<i>Carex</i> spp.
Tufted hairgrass . . . . .	<i>Deschampsia caespitosa</i>
Creeping alkali grass . . . . .	<i>Puccinellia phraganodes</i>
Widgeongrass . . . . .	<i>Ruppia maritima</i>
Sea lettuce . . . . .	<i>Ulva lactuca</i>
Eelgrass . . . . .	<i>Zostera marina</i>

### Birds

Black brant . . . . .	<i>Branta bernicla nigricans</i>
Bald eagle . . . . .	<i>Haliaeetus leucocephalus</i>
Glaucous gull . . . . .	<i>Larus hyperboreus</i>
Parasitic jaeger . . . . .	<i>Stercorarius parasiticus</i>

### Mammals

Arctic fox . . . . .	<i>Alopex lagopus</i>
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### Fish

Pacific herring . . . . .	<i>Clupea harengus</i>
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**Note: Use of trade names does not imply U.S. Government endorsement of commercial products.**



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