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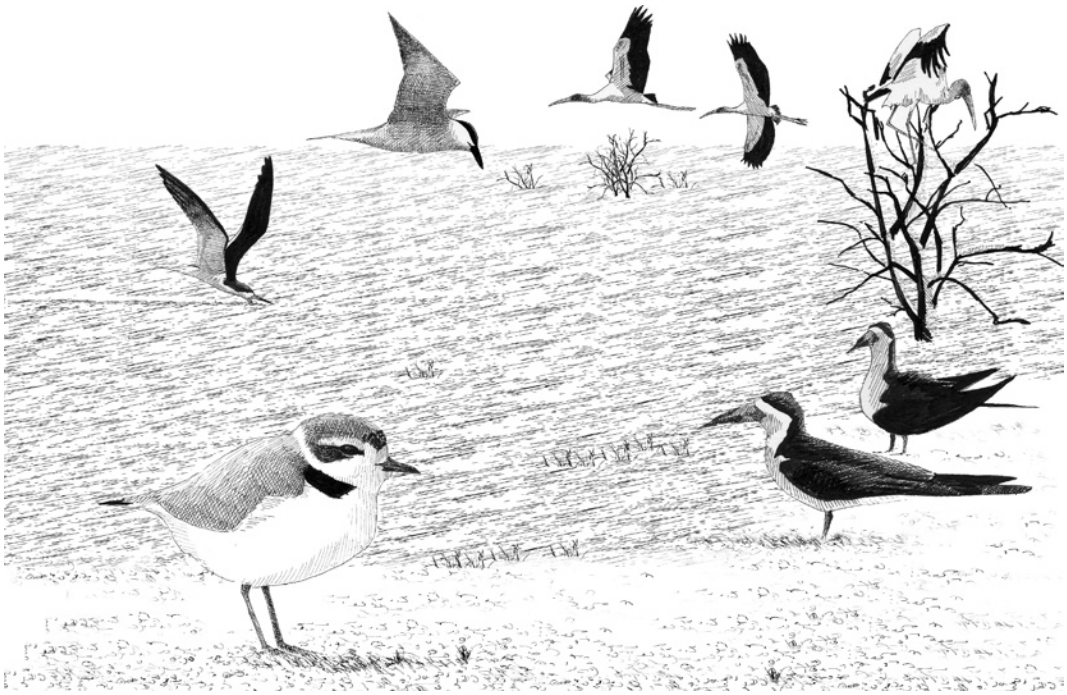
Species Accounts



Andy Birch

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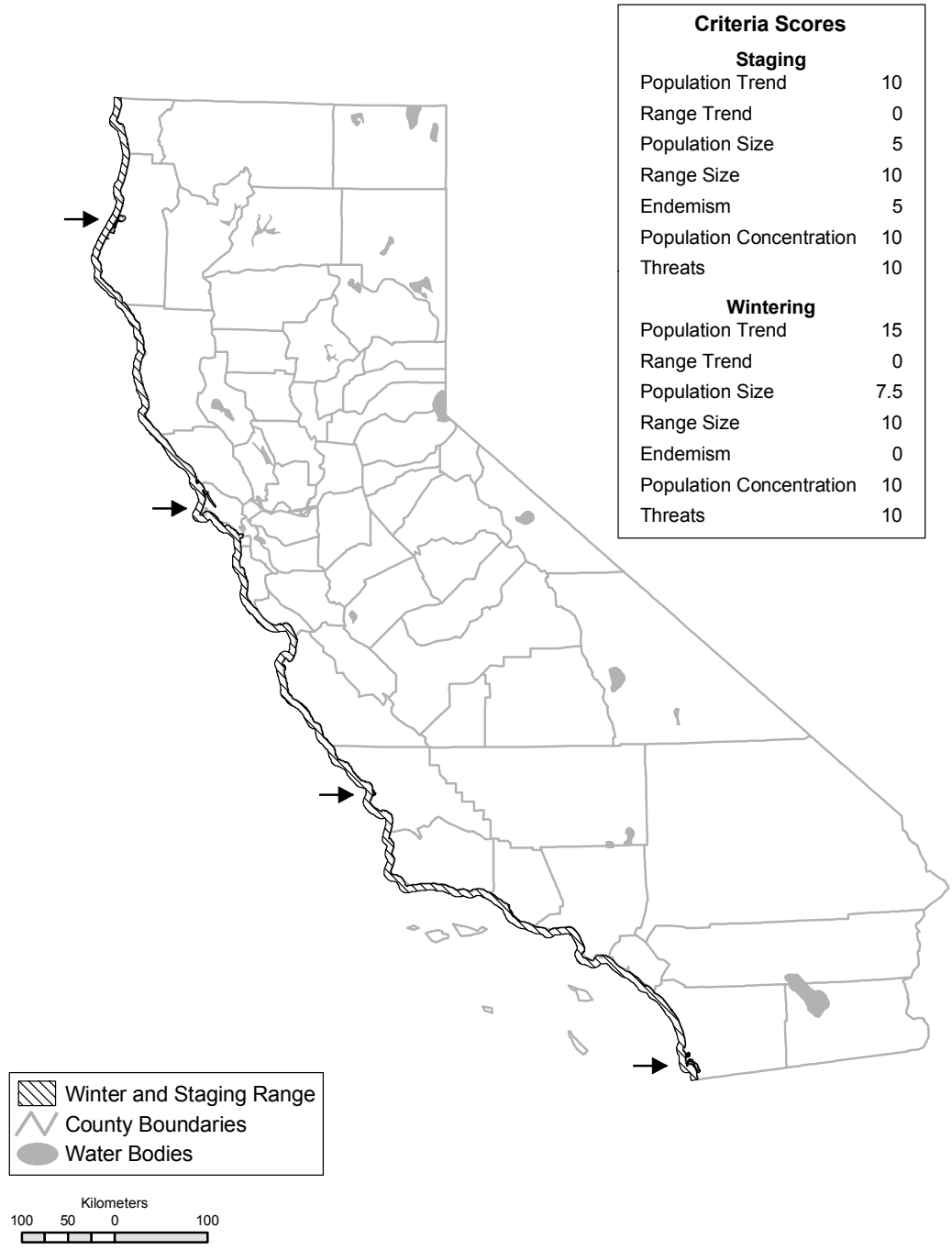
BRANT (*Branta bernicla*)

Jeff N. Davis and Bruce E. Deuel



Winter and migrant staging range of the Brant in California. Birds concentrate very locally the length of the state in several large coastal bays with eel-grass (indicated by arrows on map): Humboldt Bay, Pt. Reyes–Bodega estuaries, Morro Bay, and San Diego Bay. Numbers reduced, or absent from some bays, both prior to and since 1945. Overall, numbers have declined greatly in winter and moderately in migration. Very numerous in coastal bays during spring migration, but most pass well offshore during fall.

Special Concern Priority

Currently considered a Bird Species of Special Concern (wintering, staging), priority 2. Not included on prior special concern lists (Remsen 1978, CDFG 1992).

Breeding Bird Survey Statistics for California

Does not breed in California.

General Range and Abundance

Taxonomy of species unresolved. Three subspecies recognized, but five populations identified based on genetics, location of breeding and wintering areas, and migration routes (Reed et al. 1998). *B. b. bernicla*, the "Brent Goose," breeds in the central Russian Arctic and winters in western Europe; *B. b. hrota* includes the "Atlantic Brant," which breeds in the eastern Canadian low and mid-Arctic and winters on the Atlantic coast of the United States, and the "Eastern High-Arctic Brant," which breeds in the eastern Canadian high Arctic and winters in northwestern Europe (mainly Ireland); *B. b. nigricans*, the "Black Brant" of this account, breeds in the western Canadian low Arctic, northern and western Alaska, and northeastern Russia and winters along the eastern Pacific coast from Alaska to Mexico and the western Pacific coast from Kamchatka to Korea and Japan; and the "Western High-Arctic Brant" (no subspecies designation) breeds in the western Canadian high Arctic and winters mainly in Washington (Shields 1990, Reed et al. 1998).

Global population estimated at over half a million birds (Delany and Scott 2002). January surveys along the entire North American Pacific coast averaged 136,000 individuals from 1971 to 1980, 138,000 from 1981 to 1990, and 133,000 from 1991 to 2000 (Pacific Flyway Council 2002). More than 75% of these birds were in Mexico.

Seasonal Status in California

Occurs in the state primarily as a spring and fall migrant and winter visitor; passes mainly far offshore in fall and close inshore in spring, when staging birds are numerous in isolated coastal estuaries. Present mainly from late October to late May, with small numbers lingering through summer (Small 1994, Unitt 2004). Fall migration extends from late October to early December and peaks in early to mid-November; spring migration extends from mid-December to late May and generally peaks in March and April, varying somewhat by latitude (Roberson 2002, Harris 2005, Lee et al. 2007, J. Roser unpubl. data).

Historic Range and Abundance in California

The Brant concentrated in Humboldt, Bodega, Tomales, Drakes, Morro, Mission, and San Diego bays and was "abundant locally" (Grinnell and Miller 1944). It was "doubtless somewhat more abundant originally" than at the time Grinnell and Miller wrote. Grinnell et al. (1918) noted a "marked decrease" in the number of Brant visiting California estuaries that began in that late 1800s, which they attributed to hunting pressure. At San Diego Bay, which by one account held 50,000 to 100,000 birds in the 1880s, unregulated shooting was thought to have caused the near depletion of Brant by the early 1900s (Unitt 2004). By 1915, Brant were essentially restricted to Humboldt and Tomales bays (Grinnell et al. 1918). A hunting season (15 Oct to 1 Feb) was implemented in 1915 (Grinnell et al. 1918), which probably provided some relief to spring-staging birds. With diminished hunting pressure, Brant were again staging at all historic sites by the mid-1930s (Moffitt 1943), at least in small numbers. Complete counts during annual mid-February surveys in California from 1931 to 1942, which presumably included both wintering and spring-staging birds, averaged 61,000 individuals and ranged from 30,000 to 125,000 (Moffitt 1943). The three areas of greatest use during these surveys were Humboldt Bay, with about 71% of the state's population, Tomales Bay, with about 9%, and Morro Bay, with about 12% (Moffitt 1943). Specifically, numbers averaged 41,559 at Humboldt Bay (range = 5000–105,000, n = 11 years), 1425 at Bodega Bay (350–3200, n = 11), 5620 at Tomales Bay (1540–9445, n = 12), 2657 at Drakes Estero (318–6400, n = 9), 6228 at Morro Bay (2938–11,140, n = 11), 793 at Mission Bay (0–3900, n = 12), and 236 at San Diego Bay (0–1100, n = 12; Moffitt 1943).

Recent Range and Abundance in California

The recent range is essentially the same as in the early 1940s (see map), but the Brant generally is less abundant at wintering and staging sites within this range (Derksen and Ward 1993).

The Pacific Flyway hosts about 125,000 Black Brant (Pacific Flyway Council 2002). Up to 60% of these stage in California in spring, but only

3% winter here (Pacific Flyway Council 2002, D. E. Lee et al. unpubl. data). Midwinter surveys in California averaged about 27,000 individuals from 1953 to 1960, 5000 from 1961 to 1970, 350 from 1971 to 1980, 750 from 1981 to 1990, and 4000 from 1991 to 2000 (Pacific Flyway Council 2002). The steep decline beginning in the 1960s corresponds with the establishment of the wintering area in the Gulf of California (Derksen and Ward 1993). Causes for this shift in primary wintering areas, from California to Mexico, are thought to include disturbance from hunting and other human activities in California and a reduction in the abundance of Eel-grass (*Zostera marina*), the Brant's primary food (Derksen and Ward 1993, Unitt 2004, Harris 2005, Moore and Black 2006). Conversely, recent increases in wintering Brant have been attributed to a reduction in hunting disturbance (Moore and Black 2006) and the recovery of Eel-grass habitats (Unitt 2004).

Coincident with the development of the wintering area in the Gulf of California in the early 1960s was that of an overland spring migration route northward over the Salton Sink (Patten et al. 2003) and mountain passes of eastern San Diego County (Unitt 2004). Although most Brant using this route apparently fly nonstop to the Pacific coast, some are grounded by storms, strong headwinds, or other factors. Flocks of up to 500 such birds occur annually at the Salton Sea (Patten et al. 2003), and numbers have ranged up to 754 at Lake Henshaw in eastern San Diego County (Unitt 2004).

Recent abundance patterns at major wintering and staging sites are complex and described below.

Humboldt Bay. This site still supports the majority of Brant in the state, although it is more important for spring staging than for wintering. In fact, Humboldt Bay is the fourth most utilized staging area in the Pacific Flyway (Moore et al. 2004). Peak counts of spring-staging birds totaled 20,000 to 40,000 from 1950 to 1977, declined to 10,000 to 15,000 in the 1980s, then increased to 20,000 to 25,000 in the late 1990s (Pacific Flyway Council 2002). Moore and Black (2006) attributed a 1953–1983 decline in spring Brant use directly to hunting disturbance. The pattern of numbers on the Centerville Beach CBC, which includes South Bay, supports this (Harris 2005). Numbers averaged 36 birds from 1980 to 1989, but after the spring hunting season was eliminated numbers averaged 697 from 1990 to 1999 and 1830 from 2000 to 2003 (5322 in 2003).

Because of its isolation from other staging sites, Humboldt Bay supports higher Brant numbers than would be predicted by Eel-grass abundance alone (Moore et al. 2004). Another measure of the importance of Humboldt Bay is its number of Brant "use-days," which is a mean estimate of the number of Brant per day times the number of days for which they occurred per season. Although such data are a useful metric, they are available only for Humboldt Bay (1,277,000 Brant-use days per year from Jan to Jun, n = 11 years post-1975) and Morro Bay (see below; Moore et al. 2004). At Humboldt, South Bay, with its more extensive Eel-grass beds, supports more Brant use (81%) than Arcata Bay (Moore et al. 2004).

Bodega Bay. Winter numbers at Bodega Bay have increased appreciably since the mid-1990s, as reflected in the results of the Western Sonoma County CBC, which is conducted in late December. Brant numbers rose from a mean of 9 and a high of 47 from 1976 to 1991, to a mean of 640 and a high of 1574 from 1995 to 1999 (Bolander and Parmeter 2000).

Tomales Bay/Drakes Estero. Mean winter numbers on Tomales Bay have also increased substantially, from about 200 birds in the 1980s, to 1194 in the 1990s, to 1453 from 2000 to 2005 (Kelly and Tappen 1998, J. Kelly unpubl. data). Brant on Tomales Bay in December and January 1989–1996 were estimated to represent 30.8% of the statewide population, numbers comparable to those on Humboldt Bay (Kelly and Tappen 1998). Single-day, winter (Dec–Jan) counts on Drakes Estero averaged 264 from 2001 to 2004, with a high of 541 (R. Hug unpubl. data).

Morro Bay. Brant use Morro Bay primarily in winter, with peak numbers from late November to early February (J. Roser unpubl. data). Recent increases at other sites were not apparent at Morro Bay, where numbers are thought to have been relatively stable since the 1980s (J. Roser in litt.). Mid-February counts declined from a mean of about 6000 and a high of 11,800 from 1950 to 1966 to a mean of 2600 and a high of 4651 from 1998 to 2005 (J. Roser unpubl. data). J. Roser (unpubl. data) calculated a mean of 354,488 Brant use-days per year (Nov–Apr) on Morro Bay from 1998 to 2005.

San Diego Bay/Mission Bay/San Diego River flood-control channel. Because of its proximity to a major urban center, this site has been more altered, primarily by dredging and development, than other wintering and staging areas in the state. Nonetheless, winter Brant numbers have increased

in the San Diego area from counts of zero in the 1970s to annual highs of 750–1500 by the late 1990s (Unitt 2004). Slow regrowth of Eel-grass beds is thought to be partially responsible for the recent increases in Brant use. The largest numbers (up to 1300) occur on South San Diego Bay, along the Chula Vista bay front, and in Emory Cove, sites with the largest Eel-grass beds. Smaller numbers (100–200) are now regular on Mission Bay as well as the San Diego River flood-control channel (50–200), which has supported Brant for decades and was the species' only consistent wintering site during the low point in the 1970s (Unitt 2004).

Ecological Requirements

During the nonbreeding season, Brant require well-protected, shallow marine waters with intertidal Eel-grass beds, primarily within bays and estuaries. Their extensive use of natural habitats contrasts with that of most other geese of the Northern Hemisphere, which now primarily use agricultural land throughout winter (Reed et al. 1998).

The Brant is a food specialist during the nonbreeding season, relying principally on a single native plant, Eel-grass. Winter and spring distributions of Brant, therefore, are closely tied to that of Eel-grass, and changes in the abundance and availability of this plant have dramatic effects on Brant populations (Moore et al. 2004). At times of poor Eel-grass production, Brant will consume intertidal vegetation, such as surf-grasses (*Phyllospadix* spp.) and green algae (*Ulva* spp. and *Enteromorpha* spp.); salt marsh vegetation, such as arrow-grasses (*Triglochin* spp.) and pickleweeds (*Salicornia* spp.); and upland vegetation, such as cultivated grasses, clover, and grain (Reed et al. 1998, Moore et al. 2004). Brant at the Salton Sea, however, are always faced with a short supply of marginal foods. They may rely primarily on bulrush (*Scirpus* spp.; Nowak and Monson 1965), though they will eat almost anything along the shore that is green (G. McCaskie in litt.). Because Brant do not dive, they can usually access Eel-grass only at low tides. Still, they tend to feed in the deepest possible areas permitted by tides and close to large tidal channels and other areas where Eel-grass biomass and protein content are higher (J. E. Moore and J. M. Black unpubl. data).

Brant often feed in areas close to gritting sites (J. E. Moore and J. M. Black unpubl. data), which are intertidal mudflats, sandbars, or spits, where the birds ingest grit necessary for food digestion. Brant select gritting sites based primarily upon calcium content and secondarily upon distribution of substrate particle size (Lee et al. 2004). Birds repeatedly congregate at discrete sites during low to mid tide, using preferred sites faithfully for years (Lee et al. 2004) and even decades (J. Roser in litt.).

At high tide, Brant need sheltered open water or protected beaches for loafing.

Threats

The reliance of Brant on Eel-grass makes them highly vulnerable to fluctuations in the quality of this habitat. Human activities that negatively affect Eel-grass habitat include petroleum storage and transport; dredging and filling; salt production; mariculture (especially oyster operations); coastal development; siltation from logging, grazing, and upstream development; pollution; and introduction of exotic organisms (Pacific Flyway Council 2002, Ward et al. 2005).

Even where healthy Eel-grass habitats are available, Brant may be displaced or excluded by human disturbance, including boats, jet skis, sailboards, kayaks, canoes, aircraft, dogs, recreational and commercial shellfish harvests, hunting, fishing, birding, and commercial and residential development (Pacific Flyway Council 2002). Brant are susceptible to many of the same disturbances while loafing and ingesting grit. At Humboldt Bay, the frequency of nonhunting human disturbance events that caused Brant to take flight was 0.6 per hour for five time periods between November and May (Henry 1980); 39% of the disturbances were by people (mostly clammers), 29% by aircraft, 18% by boats, 9% by loud noises, and 4% by vehicle traffic. Disturbance levels at Morro Bay are thought to be much higher (J. Roser pers. comm.).

Although Brant are sensitive to hunting disturbance, hunting itself is not currently a major threat in California or elsewhere (Pacific Flyway Council 2002). With changes in the open season (from winter to fall and 40 to 30 days) and bag limit (from four to two per day), the statewide Brant harvest decreased from an annual average of 3700 birds in the 1970s to about 500 since 1983 (Pacific Flyway Council 2002). Area-specific closures were also established in Humboldt and Morro bays. Hunting activity, however, does frequently exclude birds from foraging, loafing, and gritting sites, flushing them to the open ocean, where they may remain until just after dusk (Roser 2003).

Disturbance during winter and staging is of particular concern because it can negatively affect

the ability of Brant to build energy reserves for migration and breeding and thus lower reproductive success (Henry 1980, Derksen and Ward 1993, Ward et al. 2005). Even without disturbances that exclude Brant from foraging areas at low tide, Brant may have to consume floating Eel-grass leaves at high tide to meet their daily energy requirements (J. E. Moore unpubl. data).

Management and Research Recommendations

The management plan for eastern Pacific Brant populations in Pacific Flyway Council (2002) includes many of the following management and research recommendations:

- Maintain quantity and quality of Eel-grass habitats. Ensure that they are defended against sedimentation, eutrophication, exotic organisms, contaminants, and other threats.
- Protect traditional gritting sites from excessive human disturbance and degradation from development and other causes.
- Pursue mitigation for impacts to critical habitats, including loss or degradation of Eel-grass beds and gritting and loafing sites, disturbance of wintering and staging flocks, and exclusion of Brant from traditional use areas.
- Develop and strengthen coordinated management activities with other states and countries (especially Mexico).
- Evaluate the need to set aside high-tide loafing areas to ensure that Brant have suitable resting areas as recreational pressure increases.
- Assess wintering and staging sites for Eel-grass habitat restoration potential and restore habitat where appropriate.
- Determine the historic and current extent and quality of Eel-grass habitats at all major staging and wintering areas.
- Determine the driving forces behind changes in Eel-grass distribution, abundance, and quality by comparing bed locations and acreage with rainfall, water temperature, light, bathymetry, sediment, salinity, turbidity, dissolved oxygen, and nutrients.
- Determine the extent to which watershed management issues such as logging, grazing, development, dredging, and management of water resources and dams influence Eel-grass presence and persistence.
- Determine the carrying capacity of primary wintering and staging sites. Use data obtained to evaluate winter population distribution goals.
- Quantify the effects of human activity on wintering and staging Brant, including impacts associated with development, mariculture, hunting, boats, aircraft, and other forms of anthropogenic disturbance. Determine the extent to which disturbance might reduce Brant survival or the suitability of critical wintering and staging areas, and ensure that such pressures on the population remain tolerable.

Monitoring Needs

The aerial midwinter surveys conducted by the U.S. Fish and Wildlife Service and California Department of Fish and Game should be continued. The midwinter survey is the primary management index for Brant, providing important population and habitat information. But because most Brant occur in California during spring migration, monitoring of major use areas should be instituted at that season as well. Although timing of Brant use varies from site to site, optimal statewide survey dates timed to sample peak numbers are mid-December (winter) and mid-March (spring) at coastal bays and estuaries and late March to mid-April at coastal promontories (spring).

Resighting efforts of marked birds should continue on a three- or five-year schedule to determine the proportions of birds at wintering and staging areas from specific nesting and molting sites.

Harvest levels should continue to be monitored through hunter surveys to determine if they are sustainable. The derivation of harvest from breeding stocks, as determined from banding and marking, should be assessed.

Eel-grass beds at major wintering and staging areas should be surveyed periodically to quantitatively assess distribution, abundance, and quality over time. Some beds, for example, those at Morro Bay (see Berman 2003), are currently being monitored. Monitoring should include an assessment of threats from sedimentation, eutrophication, disease, dredging, exotic organisms, and other factors.

Anthropogenic disturbances to Brant, especially from vessel and aircraft traffic that may displace birds from traditional foraging, loafing, and gritting sites, should be monitored at all major wintering and staging areas.

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