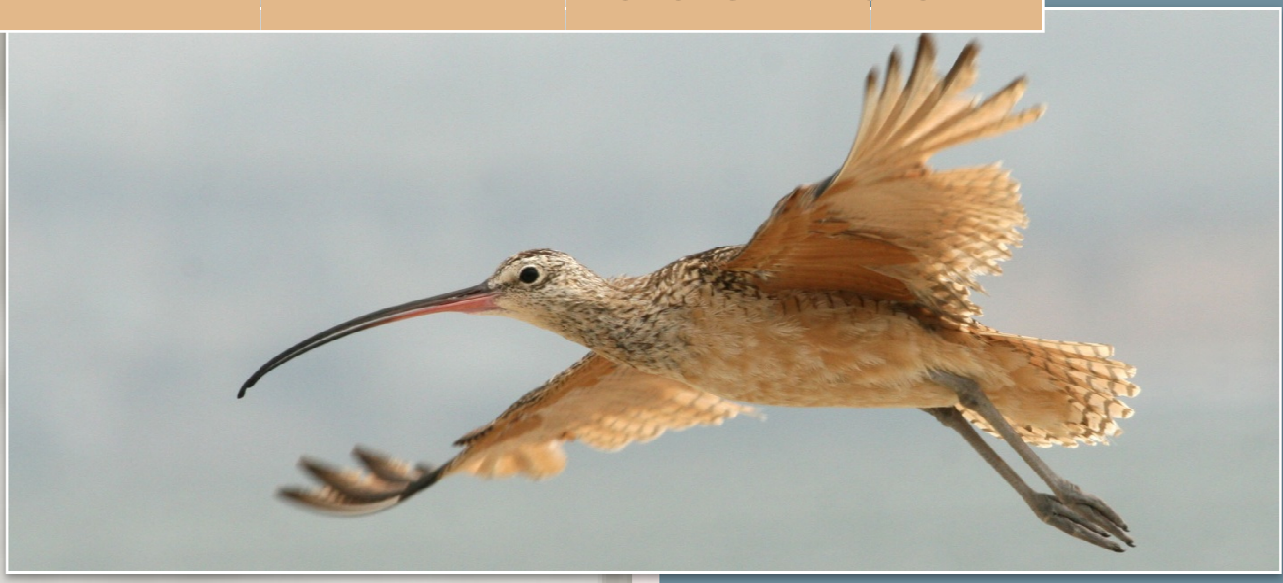
San Diego Bay Avian Species Surveys 2006-2007



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Cover photo courtesy of Matt Sadowski.

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The birding skills of these field observers improved the quality of the survey results: ***Philip Unitt, Joe Barth, Robert Patton, John Lovio, SuEllen Lynn, Julie Lambert, Brian Foster, Thomas Meyer, Lea Squires, Thomas Sabol, Bryan Munson, Mark Billings, Tim Burr, Matt Sadowski*** *(also photography)****, and Zach Smith.***

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Erica Cunningham of Tierra Data Inc. *was the lead author and conscientious data cruncher of this report. Her skill on the water as boat pilot and field protocol coordinator added insight to the methods that would not have otherwise been possible.*

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Executive Summary

This report details results from the San Diego Bay avian surveys conducted between March 2006 and February 2007, partially in support of the San Diego Bay Integrated Natural Resources Management Plan (INRMP) revision and in concert with the 2000 San Diego Bay INRMP. This work was jointly funded by the Port of San Diego (Port), and the U.S. Navy, specifically Commander Navy Region Southwest, represented by Naval Facilities Engineering Command Southwest, in San Diego, California.

The vision of the Port and Navy was to conduct the first comprehensive survey of avian species in a single year that covered the entire bay, using focused methods to detect multiple classes of birds, i.e. shorebirds, waterbirds, and seabirds. The methods used in this survey were intended to form a basis for future long-term monitoring which could also be integrated with long term monitoring of other species groups, such as fish. For this reason, the sampling protocol was developed through a collaborative process among ornithologists and biologists with expertise on local avian fauna and with the U.S. Fish and Wildlife Service (USFWS) Ecological Services. The survey protocol was also developed and used collaboratively with USFWS Refuges, a landowner in south San Diego Bay. Refuge personnel surveyed the salt ponds, using this protocol, concurrently with the Navy and Port sponsored bay-wide surveys.

The goal of this project was:

Establish a scientifically defensible baseline for a long-term trend monitoring program to census water-dependent birds (shorebirds, waterfowl, gulls, terns, and others) of San Diego Bay.

The primary objectives were to:

1. Capture the relative abundance and distribution of avian species among bay subregions and among census locations throughout the year.
2. Detect a 20% change over a five-year period, based on point counts and survey routes, of the avian species identified in the INRMP as indicator species, or for which San Diego Bay can make the most difference in region-wide population viability.

Shorebird surveys took place monthly (excluding May and July) between March 2006 and February 2007; conducted in the four hours before low tide. These falling tide surveys were designed to capture bird use of foraging habitats as mudflats and other substrates became exposed by the receding water. Quarterly peaking tide surveys were also conducted, over the crest of the tide, four times during the year. These surveys were designed to observe high tide refugia, or areas that contained high bird use which would be missed during falling tide surveys. All surveys were intended to be completed over the course of three days.

The bay and ocean shoreline were surveyed on foot or by boat, depending upon the most advantageous view and access. Observers were assigned and transited an established route recording species and number of birds observed, including substrate where the bird was first sighted.

In addition to the shoreline survey of grid cells (which are used for other general and focus species surveys in the bay), focused observation points were created and surveyed along the transect routes. These points were chosen for several different reasons including coordination with other monitoring efforts, as sites of special management concern to the Navy or Port, or as known bird congregation areas. Concentric rings (50, 100, and 500 m radius) were developed around these points and an "instantaneous" count of each species within the rings was taken.

Surveys to detect the presence of waterbirds took place once monthly between November 2006 and February 2007, when maximum migratory waterbird presence was expected. To complete the survey within a morning window two boats were employed. One started at the mouth of the bay and the other

at the south end of the bay near the salt ponds, following established routes, and meeting in the bay's center.

A total of 541,374 birds were observed during these surveys, including 188 distinct species. Just over 500,000 were sighted during the shorebird portion of the survey; 121,807 of which were counted during the peaking tide surveys. Birds observed during the point count of the shorebird surveys total 84,606; a subset of those seen during shorebird transects. The waterbird surveys totaled 31,812 birds, including 43 different species. Abundance, density, richness, and diversity are discussed by month, eco-region, and by bay grid cell for each survey type.

The number of birds observed per month varied considerably with a low of 15,014 in June to a high of 58,087 in December. During shorebird surveys, birds were generally denser along extensive mudflats in the south bay as well as around the bait barge in north bay. The salt ponds in south San Diego Bay also show a very high density of birds.

Bird density during the falling and peaking tide survey was notably different at several bay locations. The bait barge and several mudflat areas in the south bay included additional birds during the falling tide survey. During the peaking tide survey, birds were generally denser along the ocean shoreline, notably across the strand from Delta Beach North, adjacent to the bait barge, and near the Navy Enhancement Island (also known as Homeport Island). Birds were also denser in the salt ponds during peaking tides.

Species richness per cell during the shoreline survey was higher along the ocean shoreline, along the western shore of the central bay, and in the salt ponds. When compared by eco-region, the south bay and salt ponds contained the highest species richness. In a similar trend with number of birds observed, species richness was greatest in November through March and lowest in June and August.

Species diversity during shoreline surveys was greatest along the western shore of the bay and along the ocean shoreline, as well as in the salt ponds. The index of diversity used in this analysis, Shannon-Wiener, can be very dependent on species richness, especially when there is a large difference in richness between samples. The grid cells do vary greatly in number of species recorded, and in this survey there is a degree of correlation between richness and diversity.

A greater number and more types of birds were observed in the shoreline transects compared to the point count stations. The density calculated for the point count stations is less than that observed during the transect survey and is likely an underestimate because at no station could the entire buffer be observed. At many sites, obstructions such as buildings and landscape irregularities prevented surveyors from viewing inland. The types of birds were also similar during shore transect and point count surveys.

During waterbird surveys more birds were observed per hectare in the south-central and south eco-region than in other bay regions. The number of birds observed per month was greatest in January and lowest in November. Species richness per cell was highest in the south bay as well as in isolated cells elsewhere in the bay. Although it was the month with the lowest abundance of birds, November had the highest number of observed species.

Species diversity during the waterbird survey was greatest in the north bay. Although number of species observed in south bay was greater, evenness in abundance between species types was greater in north bay, causing higher diversity. By month, species diversity was highest in November.

It is recommended that future comprehensive surveys such as this should be conducted every three to five years. The Navy supports routine fish sampling every three years; conducting coinciding avian surveys might increase bay resources managers' abilities to interpret the data for management implications. In interim years, the point count stations and a boat-based transect should take place at

least once, as budget allows, during peak months. In this way, the abbreviated annual sampling can allow for better discernment of weather-related versus anthropogenic fluctuations in abundance and diversity. Shorebird surveys targeted for November allow for coordination with other major efforts in San Francisco Bay and elsewhere, whereas waterbird surveys should be targeted for December/January to obtain maximum numbers. Comparison with annual California least tern and western snowy plover monitoring is also possible on the shared survey grid system. Recommendations for the future as well as a summary of issues encountered during this survey are discussed more fully in Section 4 of this document.

Data sets are stored and delivered in three separate Microsoft Excel files, one each for the shorebird, point count, and waterbird survey data. The first tab in the file contains the data; the second tab a Pivot Table, which can be used to manipulate and display the data without harming the integrity of that stored in the first tab.

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1 Introduction

This report details results from the San Diego Bay avian surveys conducted between March 2006 and February 2007, partially in support of the San Diego Bay Integrated Natural Resources Management Plan (INRMP) revision and in concert with the 2000 San Diego Bay INRMP. This work was jointly funded by the Port of San Diego (Port), and the U.S. Navy, represented by Naval Facilities Engineering Command (NAVFAC) Southwest, in San Diego, California.

The vision of the Port and Navy was to conduct the first comprehensive survey of avian species in a single year that covered the entire bay, and contained focused methods to detect multiple classes of birds, i.e. shorebirds, waterbirds, and seabirds. The methods used in this survey were intended to form the basis for future long-term monitoring of birds as well as for comparing these results to those of other major survey efforts. For this reason, the sampling protocol was developed through a collaborative process among biologists with expertise on local avian fauna. Finally, the survey protocol was developed collaboratively with the U.S. Fish and Wildlife Service Refuges, a landowner in south San Diego Bay. Refuge personnel surveyed the salt ponds, using this protocol, concurrently with the Navy and Port sponsored bay-wide surveys.

Project Goals and Objectives

The goal of this project was:

Establish a scientifically defensible baseline for a long-term trend monitoring program to census water-dependent birds (shorebirds, waterfowl, gulls, terns, and others) of San Diego Bay.

The primary objectives were to:

1. Capture the relative abundance and distribution of avian species among bay subregions and among census locations throughout the year.
2. Detect a 20% change over a five-year period, based on point counts and survey routes, of the avian species identified in the INRMP as indicator species, or for which San Diego Bay can make the most difference in region-wide population viability.

Literature Review

Regional Setting

San Diego Bay is part of the Pacific Ocean's Southern California Bight (SCB or Bight), a curve in the southwestern California coastline that extends from Point Conception to just south of the Mexican border. This ecological region is very productive and diverse for several reasons. The Bight is the landfall terminus of the very complex Pacific Ocean underwater topography, especially when compared to the long, flat shelf extending seaward from the south Atlantic coast. The SCB contains both cool and warm water due to ocean currents mixing from subarctic and equatorial regions. Sea temperatures fluctuate regularly due to the currents' changing strengths (Dailey et al. 1993). These changes are reflected most by plankton and to a varying degree are transferred up the food chain. Finally, the Bight's embayments, including San Diego Bay, contain intertidal habitat required by a number of species, and which is naturally scarce in southern California (compared to the east and gulf coasts). These ecological edges are even more limited today due to commercial development in other harbors, ports, marinas, and estuaries of the Bight (Navy and Port 2000).

The bay is a part of the Pacific Flyway used by millions of birds traveling between northern breeding grounds and southern wintering sites. It is one of a dwindling number of stopover sites used by migrants

to replenish their energy during this long journey. It supports large populations of over-wintering birds depending on bay resources for food, shelter, resting, and staging before migration. San Diego Bay provides the largest expanse of protected bay waters in southern California to migrants on the Flyway. The bay also serves as the northern range for tropical species, including several that breed and nest locally. Fully one-third of birds dependent on San Diego Bay have been identified as sensitive or declining by the federal or state governments or by the Audubon Society (Navy and Port 2000).

More than 300 bird species have been documented to use the bay, of which 136 directly depend upon it (Navy and Port 2000). These species, their local status and distribution, both historically and during this survey, are described in Appendix B: Species Profiles. The majorities of these species, representing 30 families, are migratory and may only stop to rest and feed, while others spend the winter or breed. Several are terrestrial birds of special concern or influence found around the bay even though not directly dependent upon it. Resident birds live and breed in the area year-round. Migrants not usually found in the area, disoriented in their travel, on the edges of their range, or simply looking for suitable habitat are regarded as vagrants. Although vagrants are not ordinarily regarded as dependent on the bay, a considerable number pass through and visit each year.

San Diego Bay contributes more protected, shallow, bay habitats to Pacific Flyway waterbird populations than any other bay or estuary situated along the 180-mile coastal region of southern California. Central and south bay make up approximately 65% (7,130 acres) of the entire open water bay habitat.

When compared to midwinter populations of the SCB, the bay provided habitat for more than half of the entire midwinter duck population (U.S. Fish and Wildlife Service [USFWS] 1995a). A comparison to the 1994 winter waterbird population estimate of the Pacific Flyway and the State of California (Bartonek 1994), showed the bay also supporting a substantial proportion of midwinter seabird and waterbird populations.

San Diego Bay provides breeding, wintering, and/or stopover habitat for most shorebirds identified in the U.S. Shorebird Plan as retaining primary importance within the region. Of the ten species for which coastal habitats in the Southern Pacific Region are especially important, the black-bellied plover (*Pluvialis squatarola*), western snowy plover (*Charadrius alexandrinus nivosus*), semipalmated plover (*Charadrius semipalmatus*), willet (*Tringa semipalmata*), marbled godwit (*Limosa fedoa*), black turnstone (*Arenaria melanocephala*), short-billed dowitcher (*Limnodromus griseus*), and red-necked phalarope (*Phalaropus lobatus*) are supported by San Diego Bay.

Habitat Partitioning

Habitat and foraging dependencies specific to San Diego Bay are, in general, known only in a broad sense and extrapolated from other locations. Figure 1-1 is a simplified view of foraging habitat partitioning by birds. Whether birds actually use an available site is much more complicated. Factors such as habitat fragmentation, parcel size and connectivity, juxtaposition of other habitats, predator-prey relations, competition, disturbance, and species behavior patterns will affect a site's value and carrying capacity for birds. Although not used often, certain habitats could be of importance for use by a species within a much larger area and array of habitats. An example is the availability of roosting structures with relatively low human disturbance near foraging areas. Ogden (1995) and USFWS (1995b) documented a use of various artificial structures around the bay for roosts, and use of dikes at the Salt Works (USFWS 1994a). Baird (1997) documented high use of man-made structures for California least tern (*Sternula antillarum browni*) roosting. Merkel and Associates (2002) documented no clear difference in tern foraging between pier and open water habitats. Ogden (1994, 1995) showed a significant preference by many waterbirds and seabirds for shallow, nearshore areas compared to deeper water.

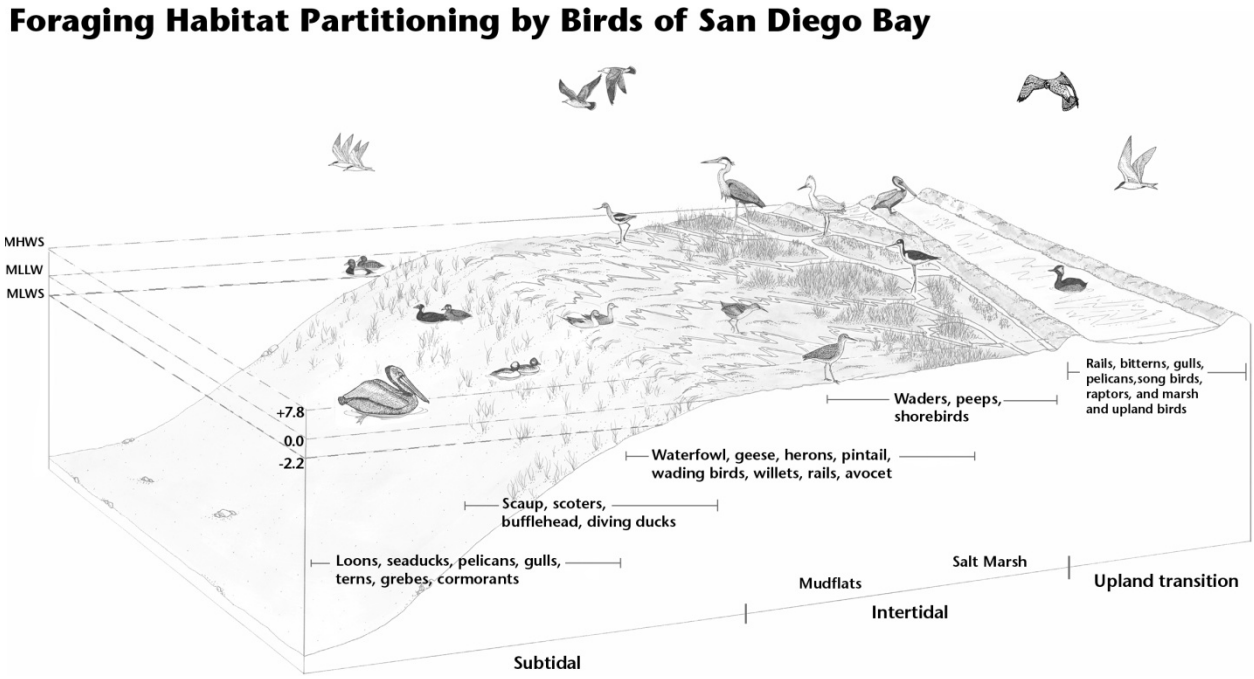

Figure 1-1: Foraging habitat partitioning by birds of San Diego Bay. Dabbling ducks forage in brackish water, unrelated to tidal elevation.

Important bird movement areas, such as crossover points between the bay and ocean at Emory Cove and Delta Beach, have been identified (Copper 1998). US Fish and Wildlife Service (Manning 1998) observed that brant geese established a movement corridor between beds of eelgrass in south bay. There is substantial movement between the Tijuana Estuary and the bay, and between the agricultural fields of the Tijuana River Valley and the bay by shorebirds.

Previous Survey Efforts

Table 1-1 compares methods and levels of effort of previous avian surveys performed in the bay. The first, sponsored by the Navy and conducted by Ogden Environmental and Energy Services (Ogden 1994, 1995), covered waterbirds of north and central bay over the course of two years, 1993 and 1994. The second, conducted by the US Fish and Wildlife Service (1995a), surveyed waterbirds of south and central bay. The third, also conducted by US Fish and Wildlife Service (1994a), covered birds of the Salt Works.

Table 1-1: Comparison of three surveys of bay avian fauna conducted in 1993 and one 1994 survey of central bay.

Survey	Location and Area Surveyed	Survey Period	Total Observations	Methods Summary
Ogden 1994	North and central bay (3,937 acres [1,593 ha] in north bay)	Jan. 1, 1993-Dec. 31, 1993	208,564 birds 70 waterbird species	Performed 48 surveys for north bay approximately once/week. Central bay surveyed approximately once/month. Made observations during boat transects traveling 5 to 15 mph with stops. The bay was stratified by grids into 1,000 ft (305 m) lengths across from shore to shore, then divided into depth categories (shallow, intermediate, deep), then further divided into marina, pier, and other shoreline categories. Did not identify most gulls and shorebirds to species.
US Fish and Wildlife Service 1995a	Central and south bay, excluding Coronado Yacht Club, 7th St. Channel, Coronado Cays, and diked ponds of Salt Works	April 15, 1993-April 14, 1994	149,553 total birds (52,853 waterbirds in central bay) 52 species	Performed 46 surveys approximately once/week totaling 350 field hours. Made observations from boat traveling 5 to 20 mph with 5 minute stops. Survey routes were 1,000 ft (305 m) widths. Staggered time of start at each location throughout the season. Observations recorded within a 500 ft (152 m) radius of the boat (18 acre [7 ha] circle). Did not record shorebirds, herons, egrets. Missed most ducks. Combined most gulls, terns, scaup, and western and Clark's grebe.
US Fish and Wildlife Service 1994a	Salt Works, Emory Cove, Marine Biological Study Area (1,730 acres [700ha])	Feb. 17, 1993-Feb. 2, 1994	522,553 birds 94 species	Performed 52 surveys once/week. Biologists on foot covered four survey routes. Recorded tidal conditions at time of observation.
Ogden 1995	Central bay (4,298 acres [1,739 ha] of water and shoreline habitat)	Jan. 1, 1994-Dec. 31, 1994	181,488 total birds (126,008 waterbirds) 70 waterbird species	Performed 47 surveys approximately once/week totaling 290 field hours. Same methods as for Ogden 1994.

The surveys of north (Ogden 1994), central (Ogden 1994, 1995; USFWS 1995a), and south (USFWS 1995a) bay did not account for use by shorebirds; dabbling ducks were under-represented in south bay and not all terns and gulls were identified to species. The biggest discrepancy between the Ogden and USFWS surveys in areas where they overlapped in central bay was in scoter and scaup counts (scoters 78,309 vs. 32,929; scaup 13,976 vs. 1,035 for Ogden and USFWS, respectively). The counts occurred in different years (US Fish and Wildlife Service 1993; Ogden 1994), which seemed to affect the scoter results. Otherwise, the differences may be at least partly due to survey coverage and methods. Ogden surveyed both shore and open water areas, whereas USFWS primarily surveyed in open water and did

not survey Glorietta Bay and Seventh Street Channel, known scaup concentration areas. Scaup preferred shoreline areas according to Ogden's 1993 surveys. The USFWS expended less of a survey effort in central bay alone, instead combining central and south bay for a total of 350 hours, while Ogden spent 290 hours targeting only central bay.

Ogden did not limit the survey time for collecting data (typical survey time: six hours), whereas USFWS limited survey time to approximately four hours per survey. US Fish and Wildlife Service counts at each point location (18 acre [7 ha] circle) were restricted to five minutes to minimize errors from bird movement. Ogden counted all individuals with no time restriction.

These separate surveys of avifauna of San Diego Bay in 1993–1994 resulted in an estimate of over seven million bird-use days per year, or an average of over 19,000 birds per day (with substantial peaks and lows) based on the average number of sightings during survey days (USFWS 1994b; Ogden 1995; USFWS 1995a). In the SCB as a whole, bird numbers and biomass are highest in the winter, when high-latitude nesters stop in the area. Northern migrants dominate in the winter. In spring and summer, a very different assemblage of waterbirds occurs on the bay.

The three surveys all reported an abundance peak about December (November through February for central bay by Ogden 1995), but in the Salt Works there was another peak in August due to the arrival of many red-necked phalaropes. Abundance peaks at the Salt Works in December were attributable to a great number of western sandpipers. All surveyors found a survey abundance low point around June.

In contrast to the December abundance peak, censuses conducted at the Tijuana Estuary (Kus and Ashfield 1989) and throughout the Pacific Flyway (Warnock et al. 1989; Page et al. 1990) documented that the number of migratory waterbirds peaks in the fall season and is of an order of magnitude greater than the number present in spring, by which time most birds depart for breeding grounds.

Abundance data for these surveys by species group are summarized in the San Diego Bay INRMP and are discussed where appropriate in this report, as well as in the Species Profiles appendix.

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2 Methods

Methods for this avian survey were developed considering previous San Diego Bay ornithological survey methods, which are summarized in the Port Environmental Services Department's San Diego Bay Bird Survey Protocol (Port 2005), and the San Diego Bay Integrated Natural Resources Management Plan (INRMP) (Navy and Port 2000). Protocol was developed collaboratively with respected San Diego Bay area birders and the US Fish and Wildlife Service Ecological Services and Refuges.

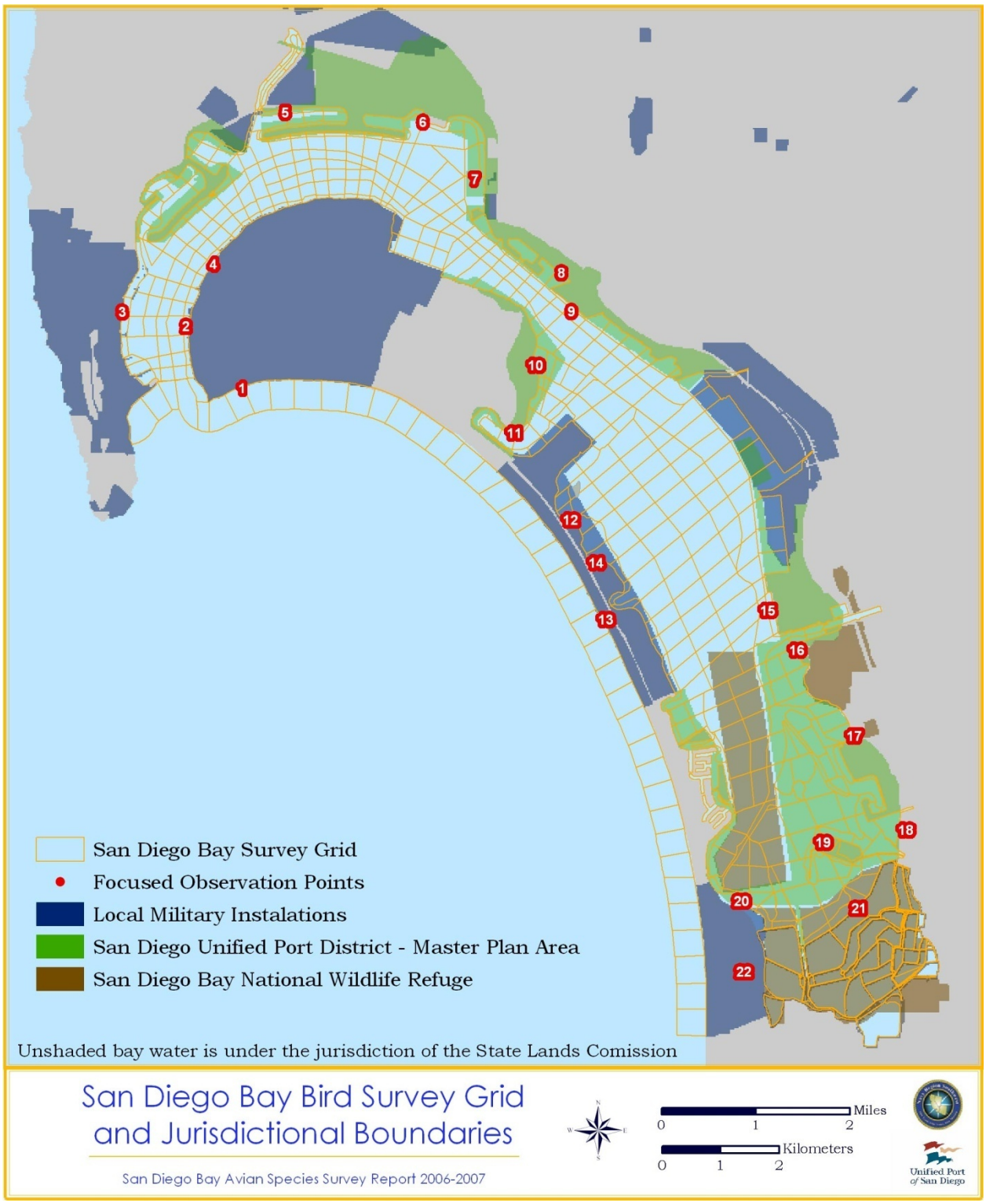
Criteria for Selection of Methods

To achieve project objectives, certain criteria were decided upon from earlier methods:

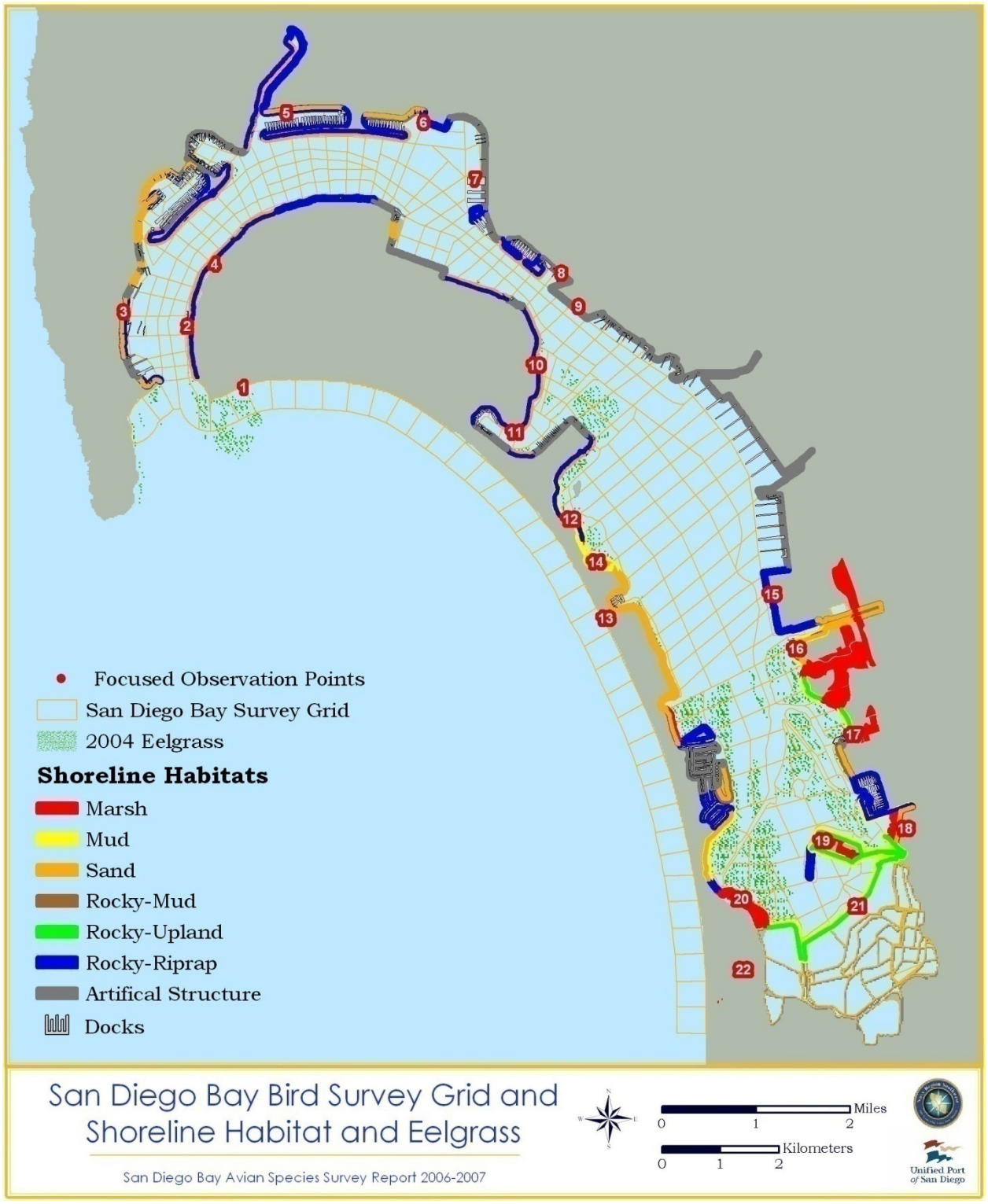
- Methods should lead toward a long-term monitoring program, including annual monitoring employing a subset of methods, census locations, or focus species.
- Methods should provide natural resources managers with information valuable to making effective conservation and management decisions.
- Methods should help to improve the predictive and interpretive power of project-level surveys and analyses of impacts. This includes development projects, restoration projects, surface use (boat wakes, flushing by boats, etc.), surface coverage (piers, marinas with boats parked, etc.), shoreline substrate changes such as armoring, oil spill response, and cumulative effects.
- Methods should address data gaps and inconsistencies in previous surveys, while making use of past data whenever possible.
- Methods should build on the investment in San Diego Bay bird surveys by integrating both published and unpublished data sets into the results of the project whenever possible.
- Where possible, methods should be used to support national and regional monitoring priorities, as well as other survey information collected locally by federal and state agencies, to enable a comparison of trends within San Diego Bay to other sites.
- Finally, the methods should be based on the assumption that it is more important to establish a reliable baseline and consistent methodology for assessing long-term trends, than to be comprehensive.

Project Area

The project area includes the entire bay footprint (with the salt ponds of the South San Diego Bay National Wildlife Refuge covered mostly by USFWS Refuges) and the shoreline on the ocean side, which is functionally connected to the bay and contains known bird concentrations. A grid system based water depth and habitat was used for this project (Map 2-1). Each grid cell was surveyed during the shore and/or waterbird survey. Map 2-2 displays the same survey grid in relation to shoreline habitat type and eelgrass. Close-up maps of the survey area are included in Section 7 Oversize Figures and Maps.



Map 2-1: Survey area and management jurisdictions for the San Diego Bay bird surveys.



Map 2-2: Avian survey grid in relation to San Diego Bay shoreline habitat and eelgrass.

In addition to surveys in grid cells, focused observation points were established at known bird concentration areas or to highlight areas of special management concern; these are indicated on Map 2-1.

The Salt Works of south San Diego Bay, which is part of the San Diego Bay National Wildlife Refuge, is included in the study area; however, data collection and analysis for the Refuge property were not funded by this project. Data for all salt ponds were collected and analyzed with internal U.S. Fish and Wildlife Service Refuges funding.

Habitat and Species Focus

The survey focus included open water areas, shorelines, and fresh- to brackish-bay wetlands and waters within the Project Area. It generally excluded marshes. The primary focus of this survey was on aquatic birds such as shorebirds, waterfowl, gulls and terns. Marsh birds such as rails, passerines, herons, and egrets were not specifically targeted, and would have required different methods; however, these species, and upland birds were recorded when observed.

Project Participants

Table 2-1 lists observers who participated in species identification during this project. Many other individuals participated in capacities such as vessel pilots, data recorders, data entry, error checking, and analysis. The number of observers required for this effort is a reflection of the fact that surveys were tied to tidal level and conducted over the whole bay simultaneously.

Table 2-1: Individuals who participated in identifying birds for the San Diego Bay bird survey.

Observers	
Brian Foster	Philip Unitt
Joe Barth	Robert Patton
John Lovio	SueEllen Lynn
Julie Lambert	Thomas Meyer
Lea Squires (Norton)	Thomas Sabol
Mark Billings	Tim Burr
Matt Sadowski	Zach Smith
Brian Collins	

Frequency, Timing, and Location of Shorebird Surveys

Shorebird surveys took place monthly (excluding May and July, which were removed due to funding concerns after the first survey month) between March 2006 and February 2007 (Table 2-2). Surveys were conducted within four hours before low tide in what is entitled a falling tide survey. Falling tide surveys were designed to capture bird use of foraging habitats as mudflats and other substrates were exposed by receding water.

Quarterly peaking tide surveys were also conducted, over the crest of the tide, four times throughout the year. These surveys were designed to observe high tide refugia, or areas that contain high numbers of birds during a peaking tide, which would be missed during falling tide surveys. It was the intention to complete all surveys over the course of three days; however, at times adverse weather conditions delayed survey teams.

Table 2-2: Survey dates and tides for the San Diego Bay shorebird surveys.

Survey Date	(month, days)	Tidal Cycle
March 2006	27, 28, 30	falling
April	24-27	peaking and falling
June	19-21	falling
August	7, 9-12	peaking and falling
September	6-8	falling
October	4-6	falling
November	6-9	peaking and falling
December	4-7	falling
January 2007	2-6, 8	falling
February	Jan. 31- Feb. 4	peaking and falling

The bay and ocean shoreline were surveyed either on foot or by boat, depending upon the most advantageous view and access (Photo 2-1 and Photo 2-2). Map 2-3 indicates areas surveyed by boat; the remainder were surveyed on foot. Many land and water locations consisted of Navy security zones. Private areas, such as the NASSCO shipyard, hires individual security patrols. A security form was forwarded to the appropriate Points of Contact one week prior to survey work. Appendix A: Example Security Form and Protocol contains an example of the form, as well as the protocol followed on the day of the survey.

Observers were assigned an area and transited an established route recording species, number of birds observed, and substrate where the bird was first sighted. Substrate classifications were initially (in March through October) defined as:

- **Air**: a bird flying
- **Water**: a bird anywhere below the high water line, and
- **Upland**: a bird anywhere above the high water line

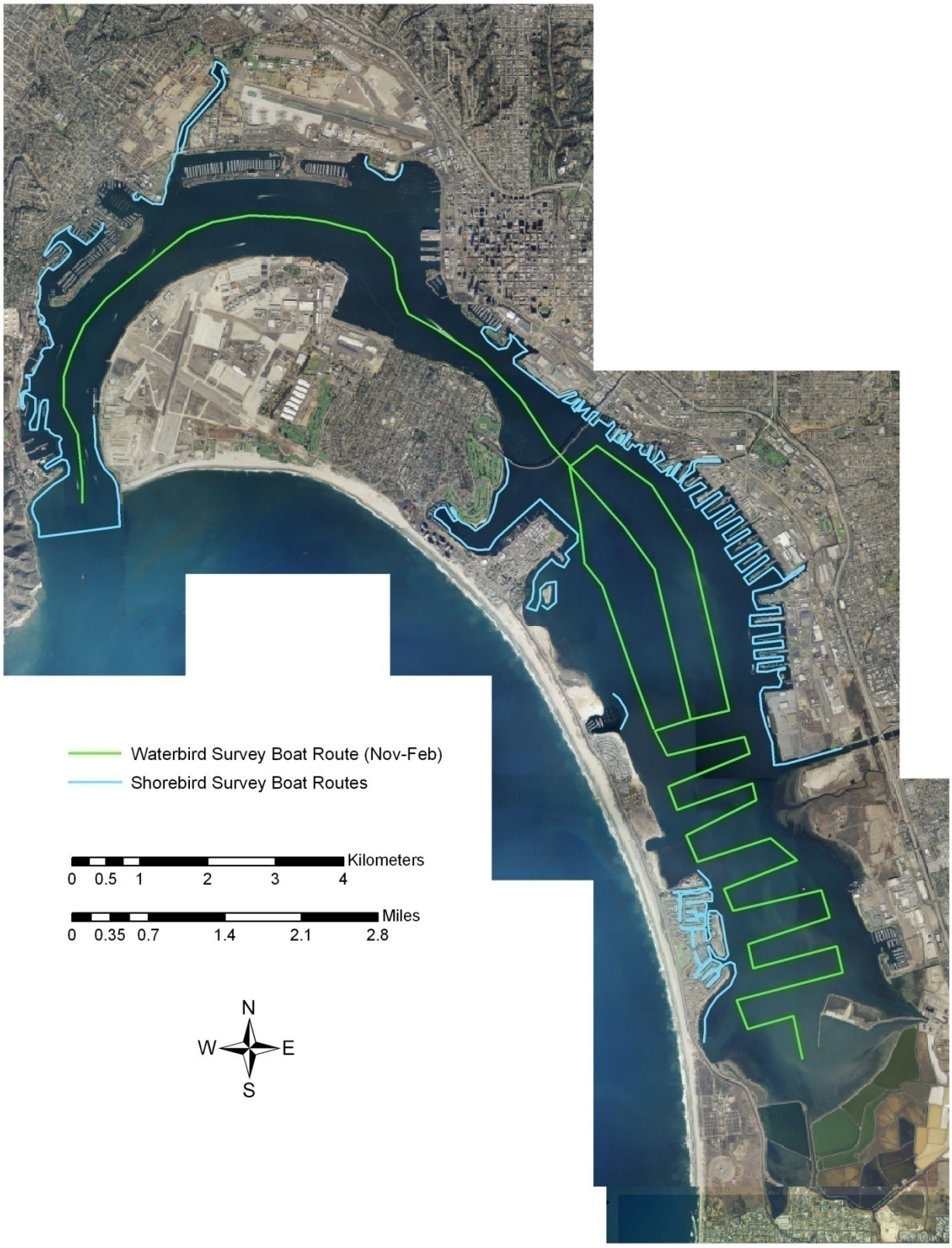
Further refinements to the system were established in November to include classifications for:

- **Dock**: a bird perched on anchored, floating, or other substrate over the water to include: docks, boats, bridges, wave attenuators, in water fences, and other like structures
- **Water-riprap**: a bird perched on riprap, jetty, or any broken up concrete or rock used for artificial shoreline stabilization below the high tide line, and
- **Upland-riprap**: riprap or jetty above the high tide line

To enable a more fine-scale analysis of the use of riprap habitat the additional categories were added at the request of the project sponsors. In addition to species and substrate information, data were collected on time of day, air temperature, wind, cloud cover, visibility, and precipitation. Additional anecdotal comments such as bird behavior, other survey conditions, notes, and or difficulties were also included.

Photo 2-1: Example of shoreline survey crew. Pictured are Bryan Munson (left) and Thomas Sabol.

Photo 2-2: One of the vessels used during on the water surveys.



Map 2-3: San Diego Bay bird waterbird and shorebird survey boat routes. All other shoreline locations were surveyed by land.

Point Count Surveys

In addition to the shoreline survey of grid cells, focused observation points were established and surveyed along the transect routes. Chosen for several reasons, these points are indicated on Map 2-1. Points are Natural Resource Damage Assessment (NRDA) sites (points 1, 2, 3, 12, 13, 16, 18, 19, and 20), long-term fish sampling locations (points 4, 10, 14, and 19) established by Allen (1999), sites of special management concern to the Navy or Port (points 1, 6, 7, 8, 9, 15, 16, 17, 21, 22), or known bird congregation areas (points 1, 4, 5, 10, 11, 12, 13, 16, 20, 21). Concentric rings (50, 100, and 500 m radius) were developed around these points and an "instantaneous" count of each species within the rings was taken. A time limit of ten minutes was initially established. Observers surveyed for ten minutes and noted the time when all birds initially present had been recorded. If less than half of the ten minutes passed, observers were instructed to make a replicate count in the remaining minutes. At some high density locations it was not possible to complete the count within ten minutes. Observers at these locations were instructed to continue counting until finished, including only birds present at the start of the point count.

Waterbird Surveys

Surveys to detect the presence of waterbirds were conducted once monthly between November 2006 and February 2007, when maximum migratory waterbird presence was expected (Table 2-3). For maximal detection, surveys began within an hour of sunrise. During November fog limited visibility in the south bay and the route was not started until visibility was 1,000 feet, approximately two and one-half hours after sunrise. Nevertheless, surveys were completed by noon.

The early morning survey schedule was designed for several reasons. Weather conditions are generally more calm and consistent during mornings than afternoons, when winds can pick up, creating chop in the bay. Chop makes it difficult to detect rafting waterbirds. Waterbirds also tend to migrate offshore towards mid-morning and disperse as a result of greater mid-day boat traffic.

Table 2-3: Survey days and times for waterbirds in San Diego Bay.

Survey Date (month, day)		Time (24 hour clock, US Pacific Time)
November 2006	15	07:20-11:27
December 2006	12	07:25-10:08
January 2007	17	07:32-10:38
February 2006	13	07:40-10:45

To complete the survey within the morning window, it was necessary to use two boats. One vessel started at the mouth of the bay and the other at the south end of the bay near the salt ponds. Radio contact between the two was maintained ensuring start times and survey pace. The boats traveled between 5 and 20 miles per hour, stopping very briefly to count rafting birds if necessary. A pre-determined survey route ran through the middle of the bay (Map 2-3). A 250 meter buffer was applied to the route and any grid cell touching the buffer was searched. This method covered all open water cells in the bay as well as a few cells touching the shoreline. Observers tracked their position in the bay using a hand-held GPS (global positioning system) unit displaying the bay grid and a location beacon. Instructions were to survey for waterbirds. Shorebirds were recorded if observed; however, efforts were concentrated on the open water.

The boat surveying the north half of the bay stayed on route (depicted in Figure 1 in the Work Plan), while the boat in the south bay did not. Once on site in the south bay, it became apparent that the planned route, which consisted of three long legs through this wide part of the bay, would not permit an

accurate count of the large number of rafting birds. The boat pilot instead adopted a zigzag pattern along the bay's east-west axis, allowing the observer to make a determination as to which birds had, or had not, been counted. This route was recorded on a GPS unit during the November survey and was subsequently followed.

Data Analysis

Database Creation and Error Checking

Field data collection forms were provided to surveyors; however, most participants had been birding for many years, and preferred using forms of their own preparation. Regardless of how data was collected, all data was entered and delivered in a pre-formatted Microsoft Excel file. Use of this standard electronic form eased the process of inputting the data to a Microsoft Access database. Not all data was delivered in this format, requiring considerable reformatting effort. Some field data taken by non-TDI personnel was entered into Excel by TDI from the original data collection forms; however, the data collector was always available to answer questions as to unique field notations.

When referring to data in this report, a **record** is an observation of a bird species in a single cell. **Fields** are types of information collected for each record, such as Grid Cell, Time, Observer, Abundance, Substrate, Comments, etc. Each record may contain multiple observations of a single species, or only one, depending on what was seen in each cell. The **grid** is a pattern of lines overlain on an orthophoto of the bay that creates multiple **cells**, which determine the spatial location of each record.

Error checking consisted of checking the four letter bird code field against the species field to ensure a match. Records were also compared against a master bird code list to identify any typing errors. The grid cell field was also checked against the master list of grid cells created for this project. Cells that did not match the list were identified and corrected. Because changes to the bay shoreline occurred since the orthophoto used to design the grid was taken, it was necessary to develop special cells for those entered that did not match established cells. Special cells were also created, primarily in the South Bay Salt Works, based on discussions with birders about that bay area. Certain channels and pools were divided into separate parts, or merged, to reflect the actual configuration of the Salt Works, which is sometimes not apparent from an orthophoto. Other cells that did not match the official list were sometimes specific areas within an established cell; the more specific information was moved to the comments field and the cell changed to match the rest. There are other established names for areas of the bay used by the birders participating in this project; those conversions were made as necessary.

The surveys in March 2006 were the first to be conducted and so were viewed as somewhat of a trial. Data for this month was collected to test two different grid types. One grid (the one chosen for this project) was modified from Ogden (1994) and based primarily on water depth, bathymetry and habitat, while the other was a simple 500 by 500 meter square grid overlaid on the bay and nearshore ocean waters. Project participants were instructed to use one of the two provided grids, with data to be converted later to the grid that would be used in the remaining months. The cells of the two different grids did not exactly overlap, so birds sometimes had to be split between adjoining cells to make the conversion. Once the split was determined, all of the observations to be dispersed were grouped and split, as whole birds, as evenly as possible. If single observations of a species occurred, the bird was placed into only one cell. We do not believe that this process skewed the results, since the cells of the grid that was eventually selected are on average smaller than those of the square grid (86,828 meters^2 average cell area for the habitat-based grid vs. 250,000 meters^2 exact cell area for the square grid). The observations are therefore located primarily within the original cell recorded and were never "moved" more than 500 meters from their original observation area.

An overview of the species and counts recorded each month was performed. Records were sorted by month, time, and cell to ensure that cells were not double counted, that all routes were covered each month, and that cells were not mis-entered (which become apparent when cell entries are compared to time and other matching entries). When suspect records were discovered that could not be corrected by searching the original data sheets or talking with data recorders, these records were flagged and not used in the analysis. These flagged records account for approximately 1% of the total records and birds observed. An additional 4% of the collected data was not used in the analysis because of overlapping survey routes causing duplicate cell counts.

Calculations and Mapping

Initial calculations and mapping consisted of simple species lists with abundance data for both the shore and waterbird surveys. Species richness (the number of species per cell) and diversity were calculated using Microsoft Excel. The Shannon-Wiener Index of Diversity was used to compare diversity among grid cells, eco-regions, and months. The following equation defines the Shannon-Wiener Index (H) where p_i is the proportion of the number observed of a single species over the total number of all individuals observed in a sample. These proportions are summed for each species observed in the sample, and the negative taken.

$$H = -\sum_{i=1}^{S\,obs} pi \ \ln p$$

Figures displaying abundance, richness, and diversity were created in ArcMap8 and are displayed in the Results section.

3 Results

A total of 541,374 birds were observed during these San Diego Bay avian species surveys, focused on shorebirds and waterbirds. Birds observed during the point count portion of the shorebird surveys total 84,606; these are a subset of those observed during the transiting shorebird surveys. Table 6-1 presents a combined species list for all surveys. Table 6-2 and Table 6-28 list species and number of birds observed per month separated by shore and waterbird survey, respectively. Because methods for each survey type were different, results are presented separately below.

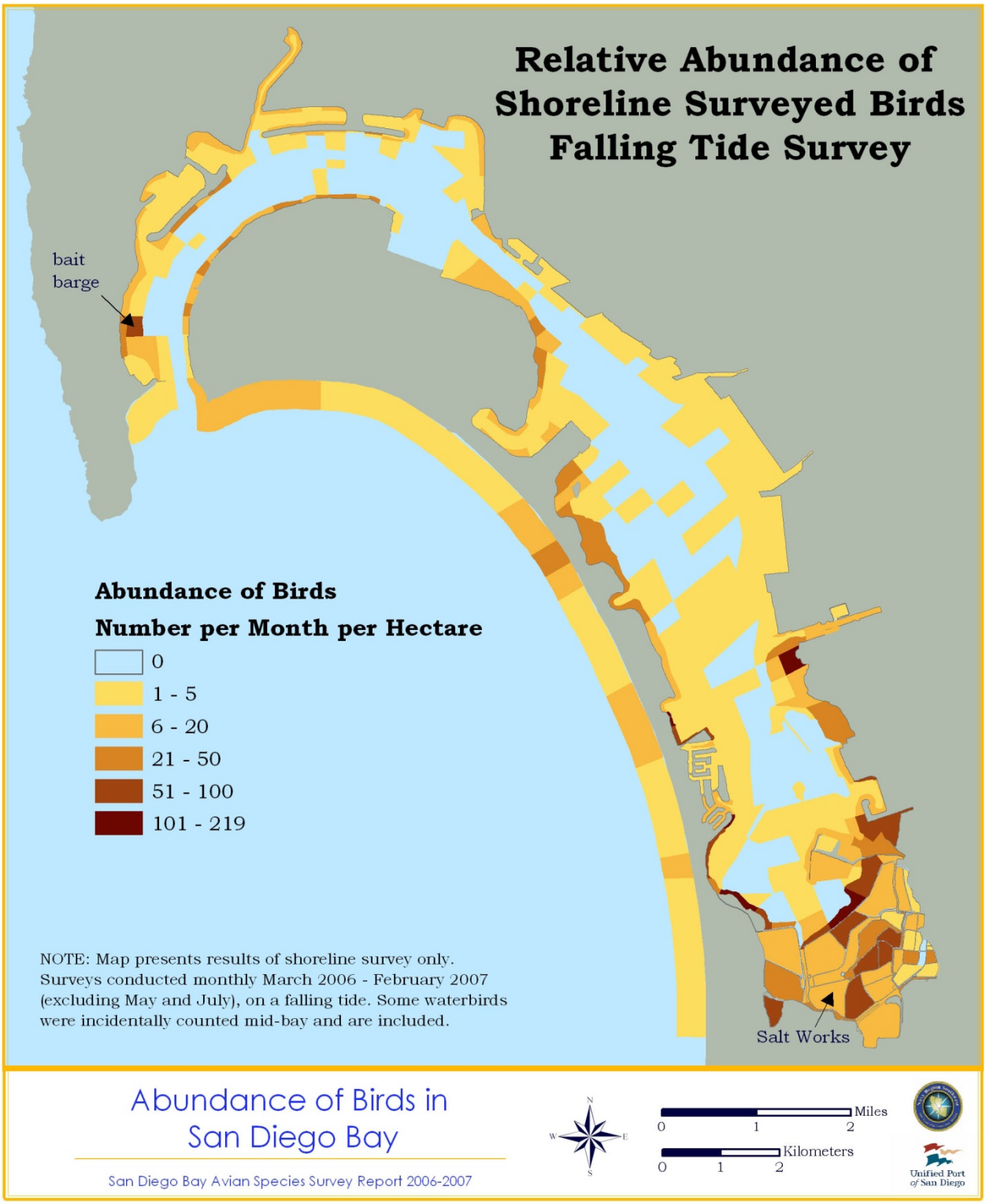
Shorebird Surveys

Abundance and Density

A total of 509,562 observations were made during the shoreline portion of this survey effort. Of these, 121,807 birds were observed during the April, August, and November 2006, and February 2007 peaking tide surveys; the remainder being observed during the monthly falling tide surveys. Map 3-1 displays the abundance of falling tide surveyed birds, normalized by the area of each cell. Birds are generally denser along extensive mudflat areas in the south bay, in some salt ponds, and around the bait barge in north bay. The salt pond area has, by far, the greatest density of observed birds. Table 3-1 compares the density of observed birds between eco-regions in the bay as well as the Pacific shoreline and salt ponds.

Table 3-1: Number of birds observed per hectare in each of the bay eco-regions, including falling and peaking tide data.

Eco-Region	Number Observed per Hectare
Ocean	80.5
North	79.0
North-Central	52.7
South-Central	40.3
South	186.2
Salt Ponds	377.6



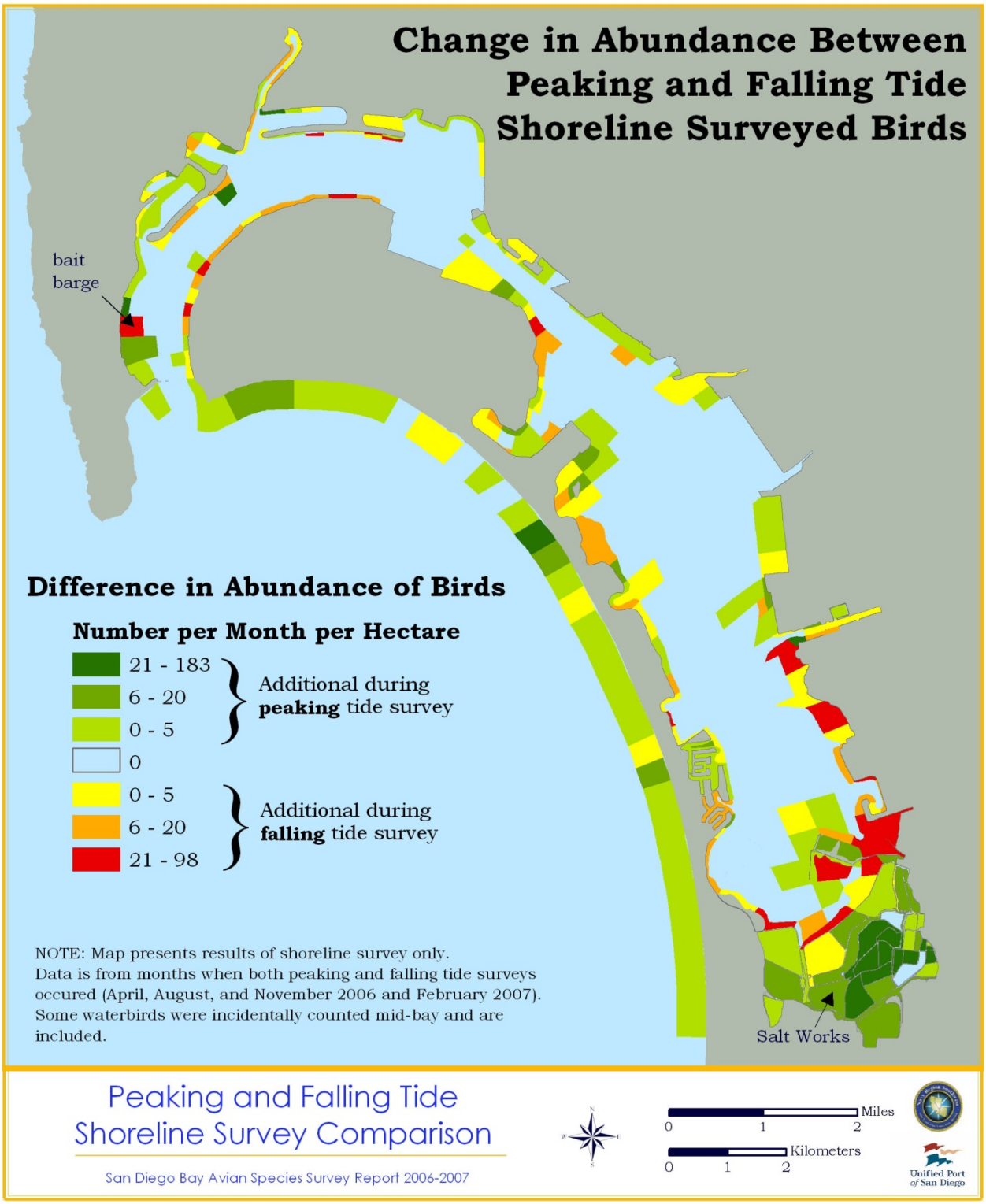
Map 3-1: Density of shoreline surveyed birds during the San Diego Bay bird surveys.

Bird density during the falling and peaking tide survey was notably different at several locations in the bay (Map 3-2). The bait barge as well as several mudflat areas in the south bay had additional birds during the falling tide survey. During the peaking tide survey, birds were generally denser along the ocean shoreline, notably across the strand from Delta Beach North, adjacent to the bait barge, and near the Navy Enhancement Island (also known as Homeport Island). Birds were also denser in the salt ponds during peaking tides.

The number of birds observed per month varied considerably with a low of 15,014 in June and high of 58,087 in December (Table 3-2).

Table 3-2: Number of birds observed each month during the falling tide shoreline survey.

Month	Number of Birds Observed
2006	
March	44,340
April	16,904
June	15,014
August	28,560
September	55,143
October	42,761
November	42,093
December	58,087
2007	
January	48,651
February	36,202



Map 3-2: Comparison between peaking and falling densities of shoreline surveyed birds.

Richness and Diversity

During the bay bird surveys 188 distinct species were observed. Species richness per cell (the number of species observed) during the shoreline survey was higher in the salt ponds, along the ocean shoreline, as well as along the western shore of the central bay (Map 3-3). When compared by eco-region, the south bay and salt ponds had the highest species richness (Table 3-3).

Table 3-3: Number of distinct species observed by eco-region during the bay shoreline survey.

Eco-Region	Species Observed
Ocean	108
North	106
North-Central	90
South-Central	102
South	141
Salt Ponds	141

In a similar trend with the number of birds observed, species richness was greatest in November through March and lowest in June and August (Table 3-4; Figure 3-1).

Table 3-4: Species richness by month during the bay falling tide shoreline survey.

Month	Species Observed
2006	
March	116
April	95
June	89
August	82
September	98
October	110
November	113
December	124
2007	
January	121
February	107

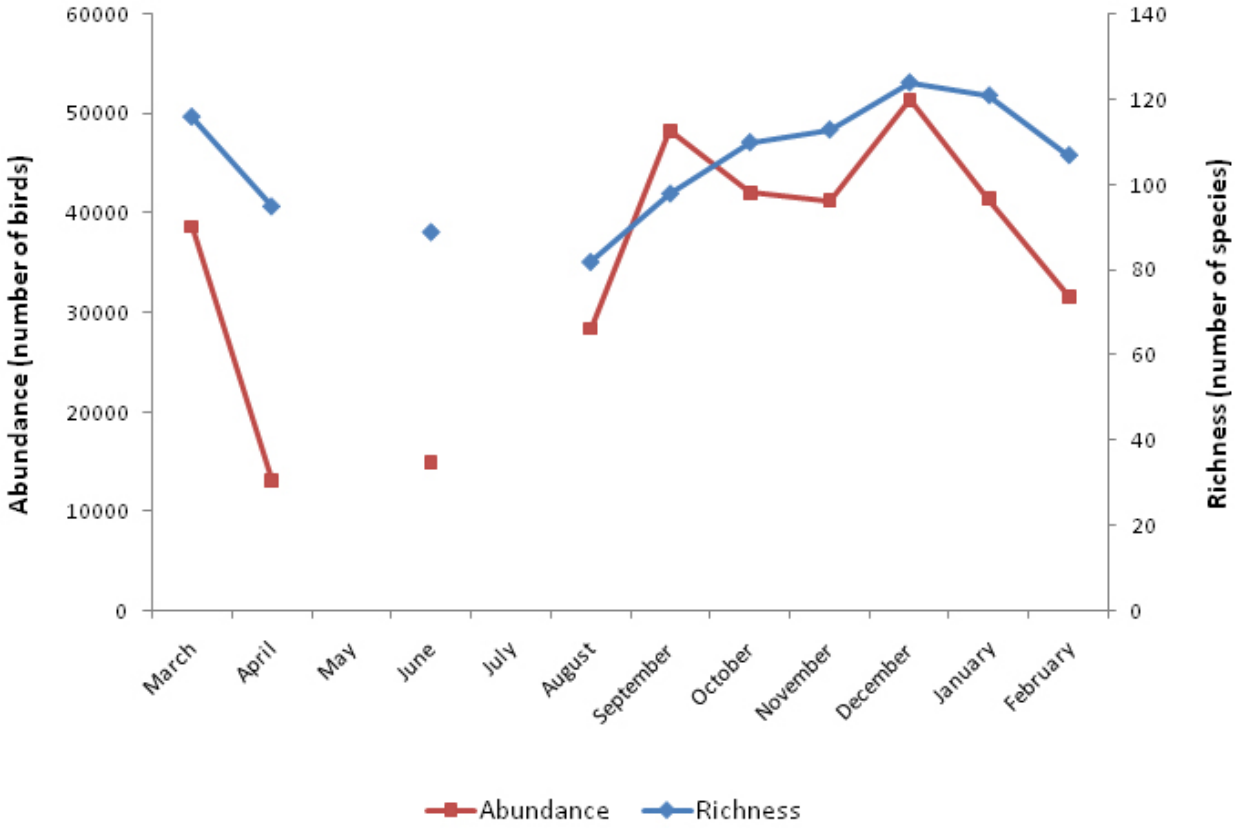
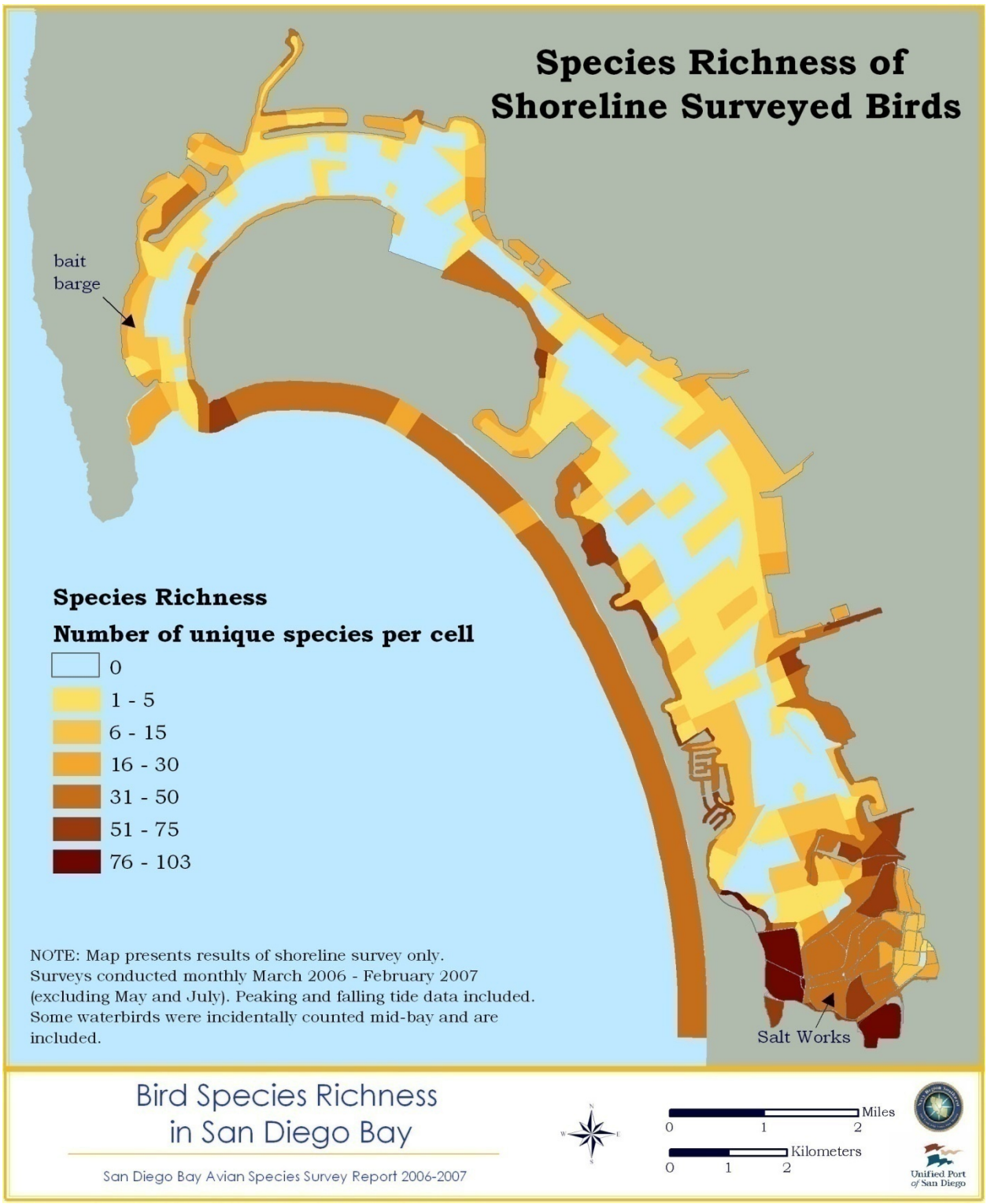


Figure 3-1: Bird abundance and species richness compared across months of the bay avian survey. Data is included for falling tide surveys only. Surveys did not take place in May or July.



Map 3-3: Species richness observed during the shoreline bay bird surveys.

Species diversity during the shoreline surveys was greatest along the western shore of the bay and along the ocean shoreline, as well as in the salt ponds (Map 3-4). The index of diversity used in this analysis, Shannon-Wiener, can be dependent on species richness, especially when there is a large difference in richness between samples. The grid cells do vary greatly in number of species recorded, and there is a degree of correlation between richness and diversity in this survey (Figure 3-2).

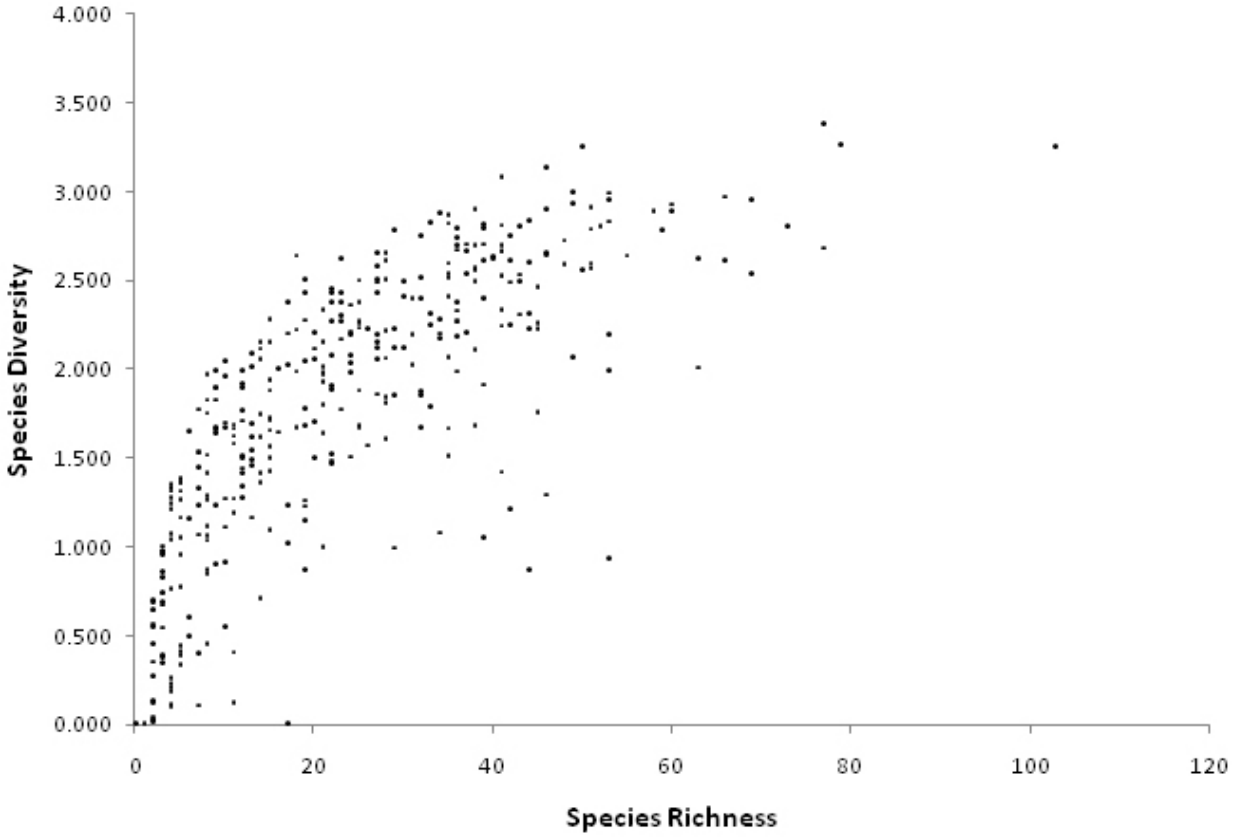
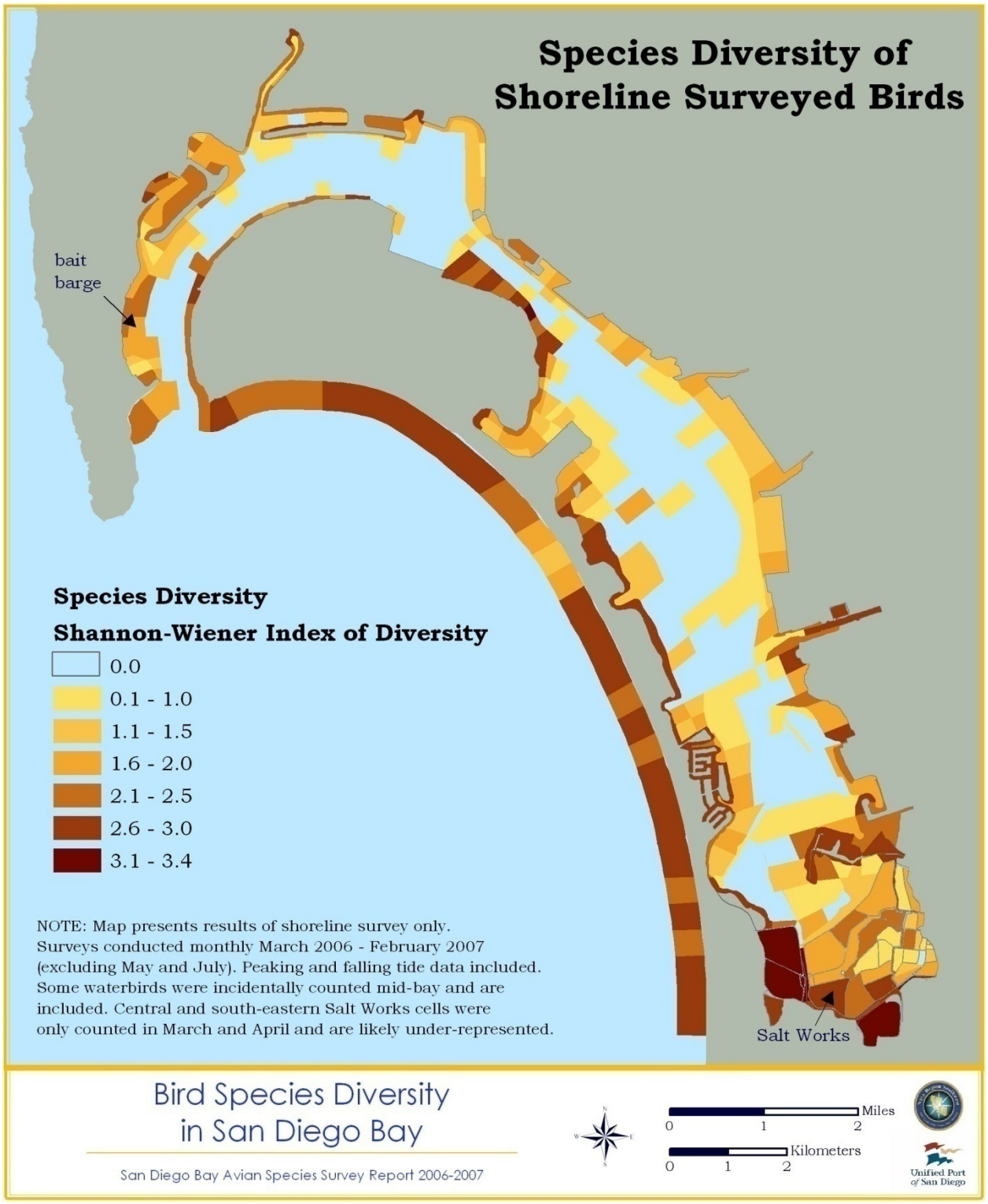


Figure 3-2: Graph of species richness versus diversity for grid cells during the bay shorebird surveys.



Map 3-4: Species diversity of shoreline surveyed birds.

Species diversity, when compared by eco-region is somewhat similar for all areas with the ocean, south-central, and salt pond areas having somewhat higher diversity (Table 3-5). Since the south and salt pond regions of the bay have equal levels of richness (141 species), the higher level of diversity in the salt ponds indicates more evenness in the number of individuals among species.

Table 3-5: Species diversity compared by eco-region during the bay shoreline survey.

Eco-Region	Species Diversity
Ocean	3.04
North	2.89
North-Central	2.91
South-Central	3.06
South	2.85
Salt Ponds	3.07

By month, species diversity was highest in December and January and lowest in October (Table 3-6).

Table 3-6: Species diversity compared by month during the bay shoreline survey.

Month	Species Diversity
2006	
March	3.05
April	3.07
June	3.21
August	2.95
September	2.94
October	2.90
November	3.08
December	3.33
2007	
January	3.32
February	3.17

Point Count Surveys

A total of 84,606 birds were observed during the point count surveys; 13,094 of these were observed during the peaking tide surveys in April, August, November, and February, the remaining being observed during the monthly falling tide surveys.

Although point count data collection in relation to tide was to mirror data collection during the shorebird transects, some point count data were collected at inopportune tides despite best efforts in the field. Where this occurred, data were left in the dataset when the alternative was no data for that month. Where duplicate data were collected for months when only one tidal survey was to be performed, these data were removed from the analysis. Some points were skipped altogether in certain months, while a count for Station 22 was never performed. The majority of monitoring irregularities were encountered in the early months of the effort before the receipt of data sheets allowed for detecting problems, and are summarized in Section 6 before Table 6-4 in which raw point count data is presented.

Even though the point count data were not always collected according to tidal cycle, it was still collected at the same time as the shorebird transects. Irregularities in point count observation time are mirrored in the shoreline transects; it was not possible to be at every location at an optimal tide. It is for this reason that the data between point and transect surveys can be compared.

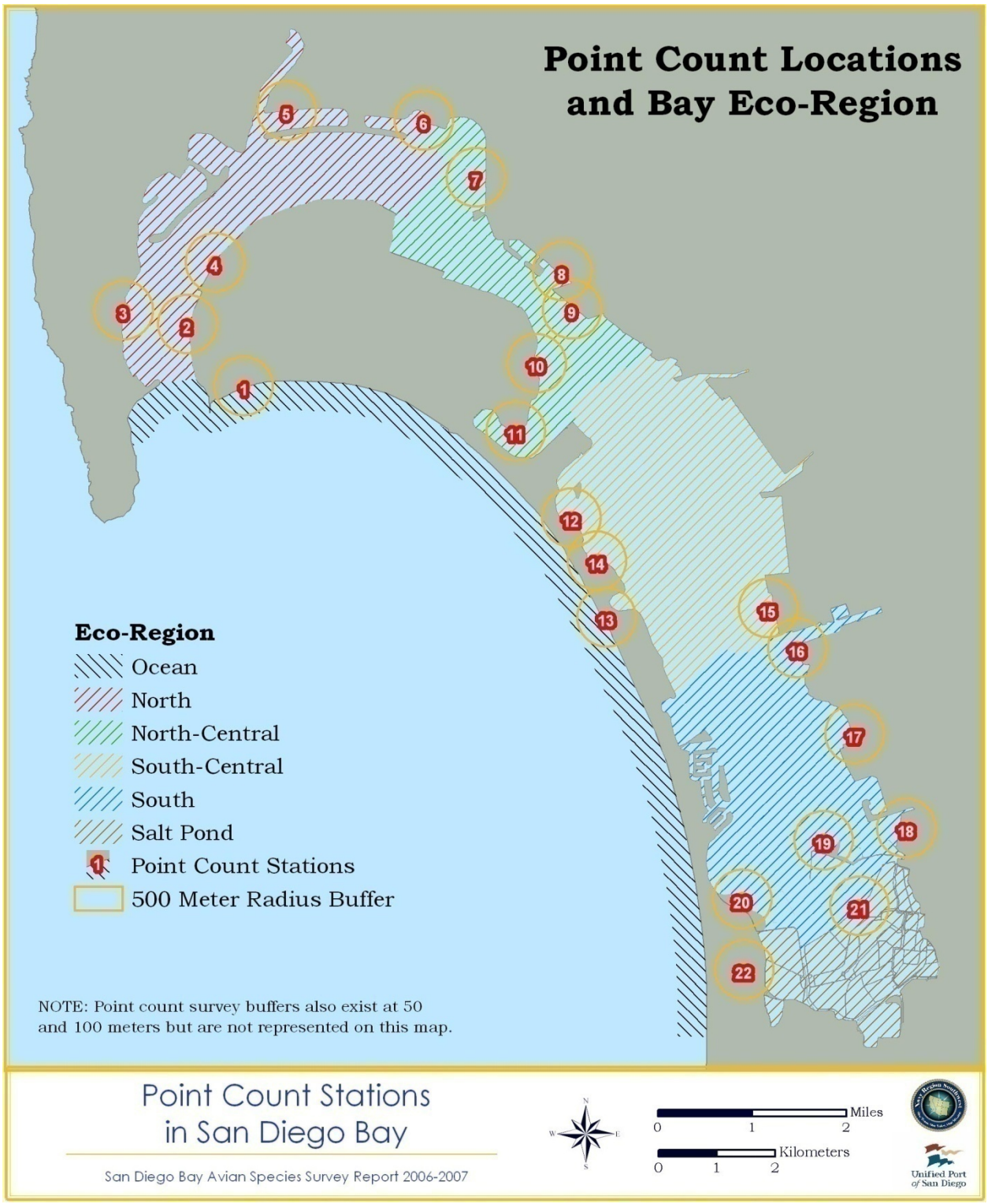
Whole Bay Numbers

Point count stations observed during this effort are depicted on Map 3-5. There are two stations on the ocean shoreline, five in the north eco-region, five in north-central, three in south-central, five in the south, and one that straddles the south eco-region and salt ponds. Since the stations were not equally distributed between eco-regions, comparison between data summarized by eco-region for the point counts and shoreline survey is not possible. A summary of the data collected for the whole bay between the shoreline and point count survey is presented in Table 3-7.

Table 3-7: Comparison of survey values between whole shoreline and point count bird surveys. Data is included from both peaking and falling tide surveys.

Value	Whole Shoreline	Point Count
Abundance	509,562	84,606
Species Count	188	120
Density (birds/HA)	122.6	51.3
Diversity (Shannon-Wiener)	3.46	3.30

It is not surprising that a greater number and more types of birds were observed in the shoreline vs. the point count survey because far more area was surveyed during the shoreline survey. Density was calculated by dividing the number of birds observed by the area of the 500 meter radius buffer, 18.5 hectares (HA), which was to mark the maximum extent of each point count. The density calculated for the point count stations is likely an underestimate because at no station could the entire buffer be observed. Obstructions such as buildings and landscape irregularities prevented observers from seeing inland at many of the sites. Diversity was similar between surveys.



Map 3-5: Point count station locations and bay eco-regions

The types of birds observed during the shore transect and point count surveys were also similar. Western sandpipers were the most common by far, numbering more than double the next most common bird observed in each survey, the marbled godwit. Surf scoters, willets, and wigeons also had very high numbers of observations in each survey type. Sanderlings, grebes, rock pigeons and cormorants are among the birds observed relatively more often during the shorebird transects. In contrast, peeps and brant were observed relatively more often during the point counts.

The number and type of birds observed during point counts as compared to the whole bay transects are different because of the amount of area surveyed, as well as because of habitat characteristics where the stations were located. The points were chosen based on sensitive habitat types, coordination with other monitoring locations such as long-term fish data collection or NRDA sites, known bird congregation areas, and also areas of particular management interest to the Navy and Port. They do not necessarily equally represent the types of habitat around the bay, although all shoreline subtypes were represented in each eco-region: sandy/muddy, riprap, docks, etc.

Waterbird Surveys

Abundance and Density

A total of 31,812 birds were observed during the waterbird portion of this survey effort. Map 3-6 displays the density of waterbirds observed per grid cell. More birds were observed per hectare in the south-central and south eco-region (Table 3-8).

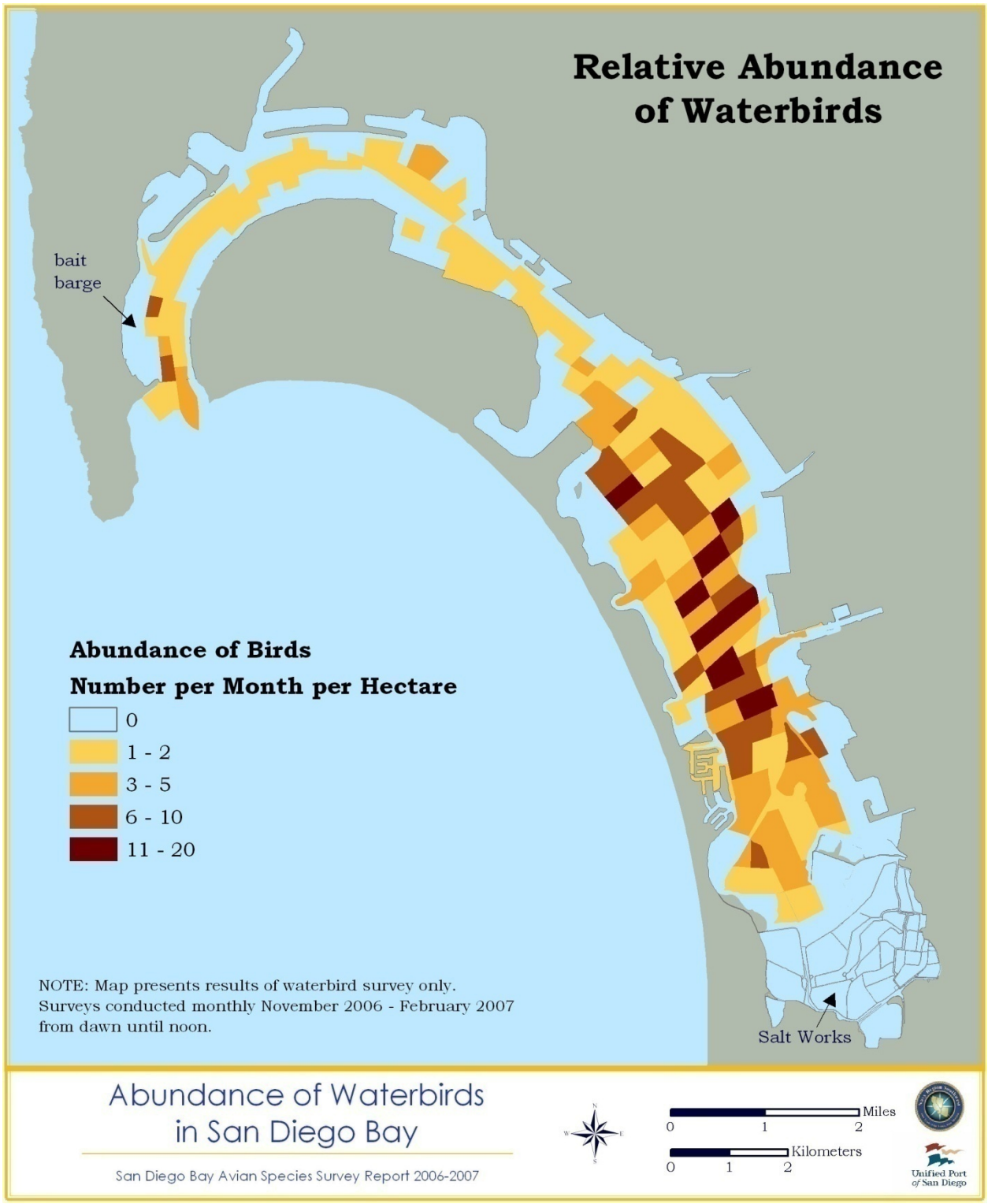
Table 3-8: Number of birds observed per hectare in each of the bay eco-regions during the bay waterbird survey.

Eco-Region	Number Observed per Hectare
Ocean	6.4
North	2.4
North-Central	0.9
South-Central	19.1
South	12.8

The number of birds observed per month was greatest in January and lowest in November (Table 3-9).

Table 3-9: Number of birds observed per month during the bay waterbird surveys.

Month	Number of Birds Observed
2006 - 2007	
November	4207
December	8777
January	11663
February	7165



Map 3-6: Density of waterbirds in San Diego Bay.

Richness and Diversity

A total of 43 species were observed during the bay waterbird surveys. Species richness per cell was highest in the south bay as well as in isolated cells elsewhere in the bay (Map 3-7; Table 3-10).

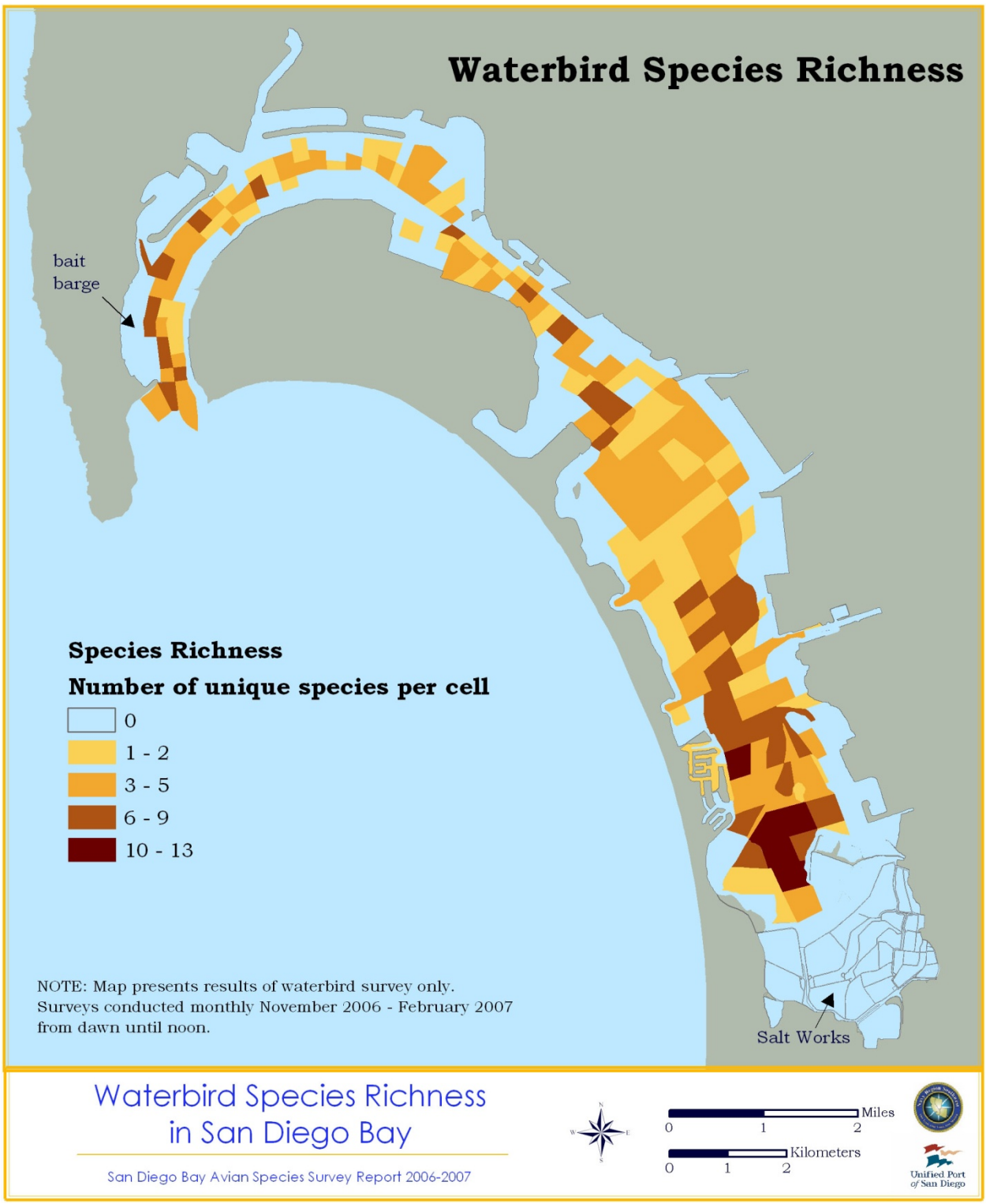
Table 3-10: Species richness by eco-region during the waterbird surveys.

Eco-Region	Species Observed
Ocean	10
North	21
North-Central	17
South-Central	28
South	33

Even though it was the month with the lowest abundance of birds, November had the highest number of observed species (Table 3-11).

Table 3-11: Species richness by month during the waterbird surveys.

Month	Species Observed
2006 - 2007	
November	38
December	25
January	28
February	21



Map 3-7: Species richness observed during the bay waterbird surveys.

Species diversity during the waterbird survey was greatest in the north bay (Map 3-8; Table 3-12). Even though the number of species observed in the south bay was greater, evenness in abundance between species types was greater in north bay. The very high number of surf scoter (17,583 in the south-central and 9,490 in the south eco-region) compared to other species observed (never higher than 600) led to a low measure of diversity for these regions.

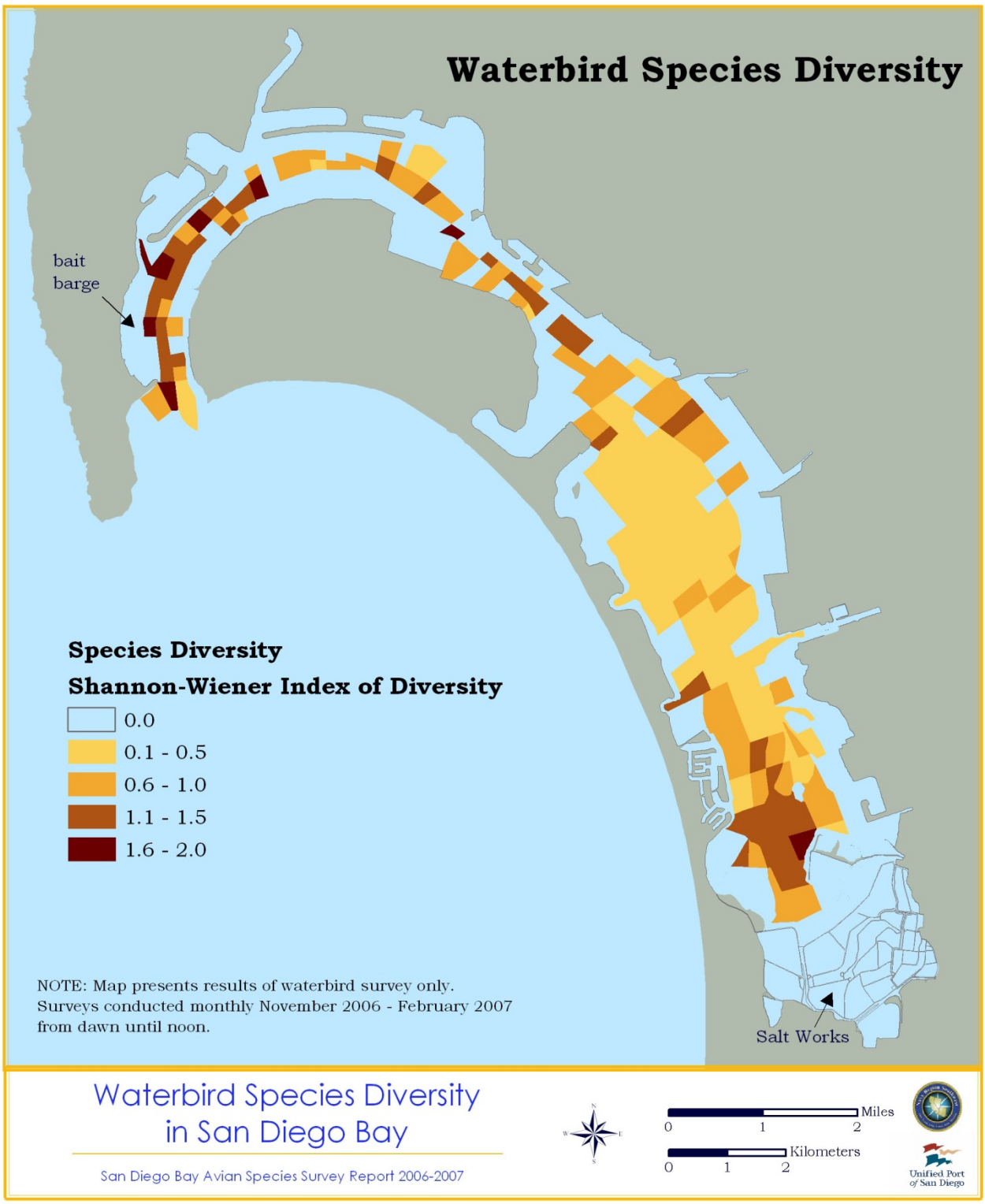
Table 3-12: Species diversity by eco-region during the waterbird surveys.

Eco-Region	Species Diversity
Ocean	0.92
North	1.75
North-Central	1.63
South-Central	0.26
South	0.78

Species diversity was highest in November, in part because this was the month with the lowest surf scoter count. This low scoter count and also the high number of different species observed in November led to a high measure of diversity.

Table 3-13: Species diversity by month during the bay waterbird surveys.

Month	Species Diversity
2006 - 2007	
November	1.16
December	0.46
January	0.64
February	0.74



Map 3-8: Species diversity of grid cells observed during the bay waterbird surveys.

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4 Discussion and Recommendations

Shorebird and Waterbird Surveys

When compared to previously conducted avian surveys in San Diego Bay, these surveys find similar results. Results for the three previous surveys, as described in Table 1-1, are summarized in the Bay INRMP and compared below in Table 4-1.

Table 4-1: Comparison of rankings for most abundant birds observed during previously conducted and these avian surveys, including shorebird and waterbird data.

	Previous Surveys	2006-07 Surveys
Waterfowl	surf scoter	surf scoter
	eared grebe	grebe (western and Clark's)
	scaup (lesser and greater)	eared grebe
Shorebirds	western sandpiper	western sandpiper
	red-necked phalarope	peep
	peep	marbled godwit
Seabirds	brown pelican	western gull
	elegant tern	elegant tern
	Heermann's gull	double-crested cormorant
Marsh Birds	great blue heron	snowy egret
	snowy egret	Belding's Savannah sparrow
	great egret	great blue heron

Where differences in rankings of the most abundant birds occur, they can be explained by the field methods employed by the various surveys. Western and Clark's grebes, which had placed sixth in previous efforts, were very common in this survey effort. Eared grebes were uncommon in this survey effort until complete salt pond data was added to the database, elevating their ranking. An interesting difference in the types of shorebirds observed was the red-necked phalarope. Before complete salt pond data was available, the phalarope placed 14th, elevating to fourth place once complete data was included. A reason for this difference can be explained by the phalarope's distribution in the bay, as it concentrates mostly at the south bay salt ponds. These examples illustrate the importance of the salt ponds for birds in the bay.

The most striking difference among seabird observations is in western gulls, which were observed in greatest number during these surveys, placing seventh in previous efforts. This common gull was likely undercounted in previous surveys as most observations were made at the salt ponds, and other wider-ranging efforts did not distinguish gulls to species. For marsh birds, neither the 1993 or these surveys were designed to detect these often secretive species. They are often concealed in vegetation and require different techniques for detection (such as calling). Easier to spot species, such as herons, were recorded in greatest abundance while smaller species were likely missed.

The type of birds observed also varied in different parts of the bay; this was presumably due to differences in habitat availability and human disturbance which create different species assemblages. A comparison of abundance of species groups by eco-region is presented in Figure 4-1.

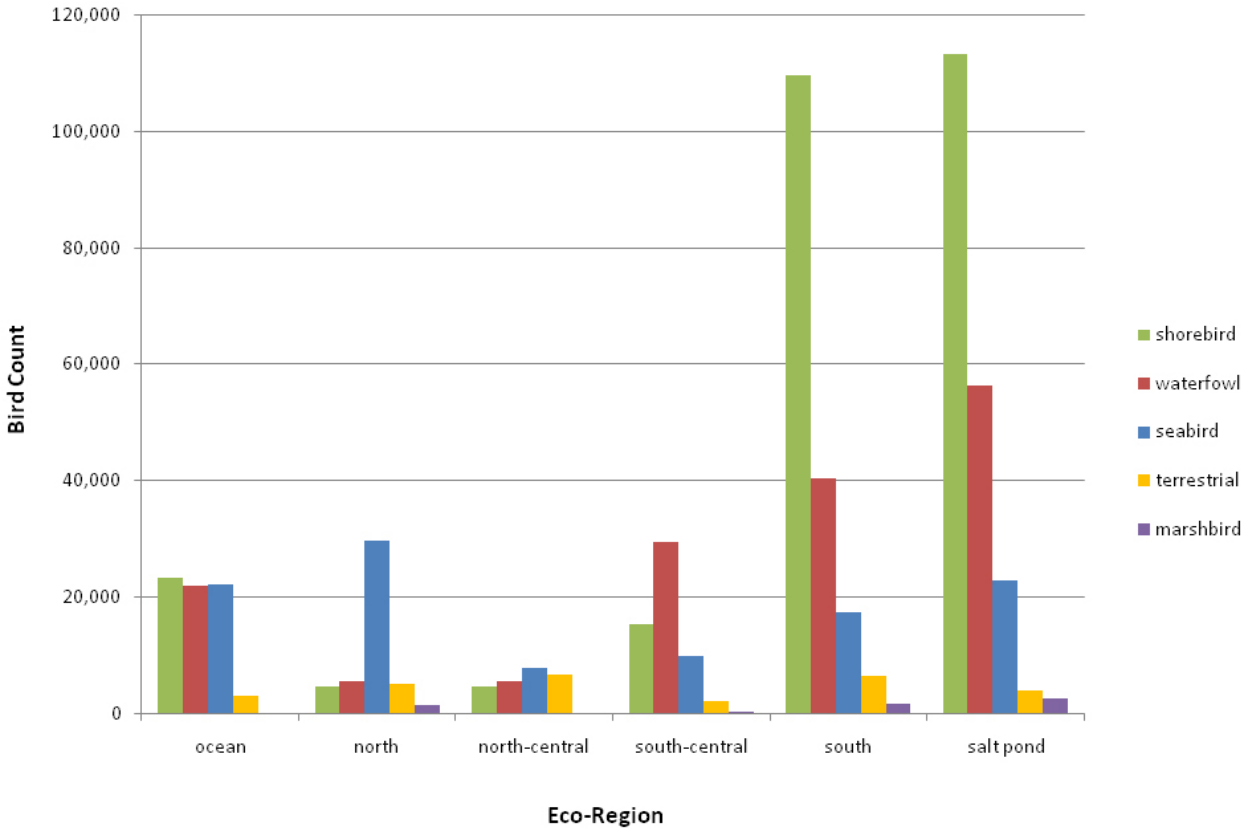


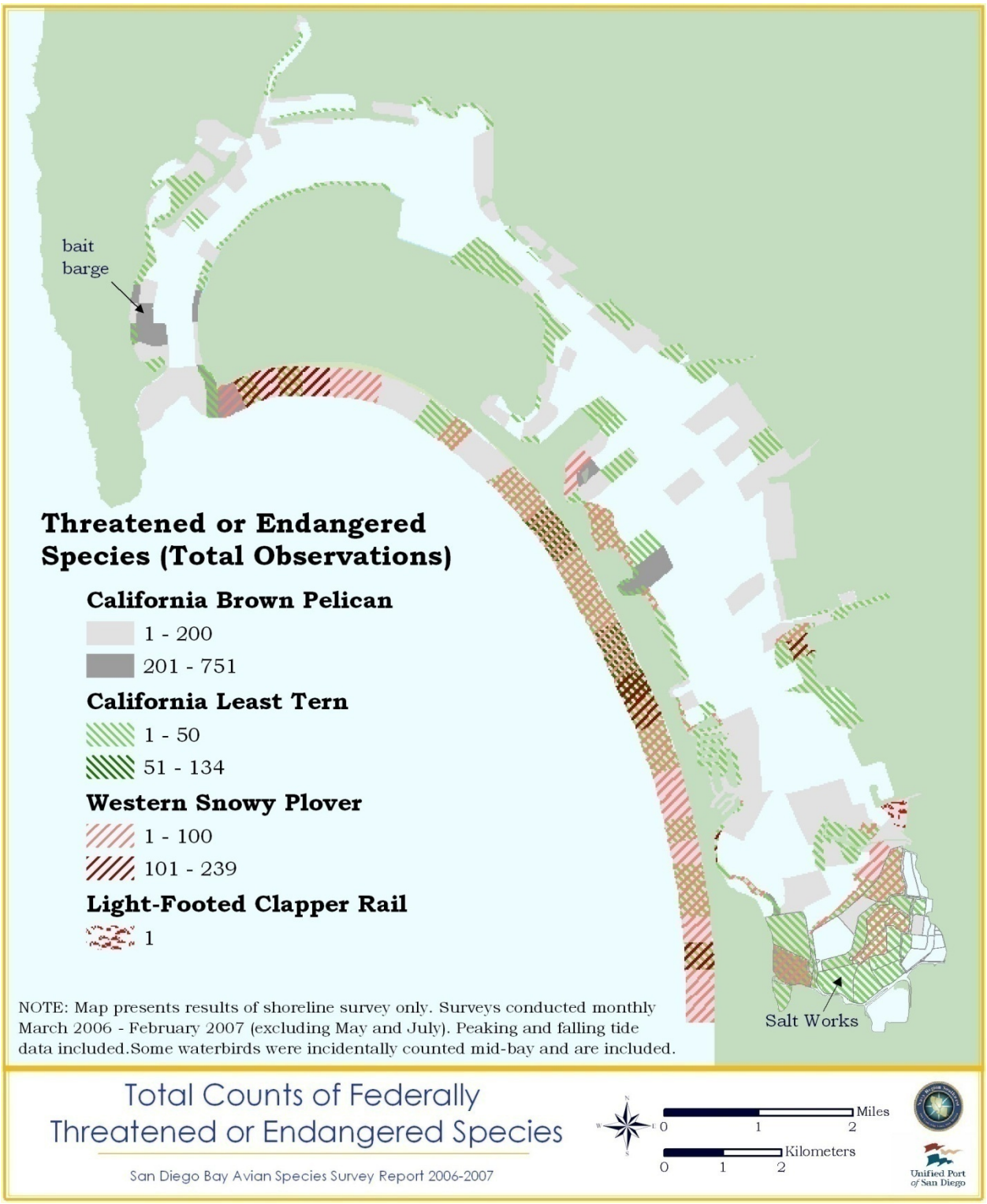
Figure 4-1: Bird type and abundance recorded per eco-region during shore and water bird surveys 2006-2007.

Shorebirds were by far the most abundant type of bird observed in the bay, with 271,020 in total. The next most abundant was waterfowl, with 159,025 observations. Differences in the distribution of species type are apparent in Figure 4-1. Shorebirds are far more abundant than any other species group in the south bay and salt ponds; the salt ponds also contained the most waterfowl. Large flocks of, for example, over 4,000 western sandpipers at one count, occurred in the salt ponds. Waterfowl recorded in the salt ponds were primarily eared grebe, American wigeon, and scaup.

The second highest count of waterfowl occurred in the south bay. Surf scoters were the most common, by an order of magnitude over the next most common species, the American wigeon and brant. Surf scoters were however most common in the south-central bay over other bay eco-regions, with 25,902 observed over the course of the year.

North bay is noteworthy for its low numbers of all bird types except for the highest number of seabirds of any region. Most of these seabirds were western gulls (9,910 total) and cormorants (Brandt's and double-crested; 10,448 total). The ocean region had similar numbers of shorebirds, waterfowl, and seabirds while having very few terrestrial or marsh birds.

The distribution of federally listed species also differs per bay region; Map 4-1 displays the location and abundance of these protected species.



Map 4-1: Location and of federally protected species observed during the bay avian surveys.

Of federally protected species, brown pelicans were both observed in the highest numbers and were the most widespread; they were also the fourth most abundant seabird observed. They were observed in concentrations along the Fiddler's Cove wave attenuators, on Homeport Island, around the bait barge, and near Zuniga Jetty. Western snowy plovers were the next most numerous observed, but only because they are present year round. During the breeding season for the California least tern and western snowy plover the least tern is far more numerous. Only one light-footed clapper rail was observed, but the methods employed by this survey were not designed to detect this species.

Point Count Surveys

The types of birds observed and diversity were similar between the shorebird and point count surveys, as demonstrated in Table 3-7. The bird density comparison could likely be improved by decreasing the radius of the circle of observable area at each point, only extending it over the water and nearshore habitat. This would more closely approximate the actually observable area at each point count station.

To be able to compare eco-regions in the bay through the years using point counts would necessitate additional stations in certain parts of the bay, in order to ensure even coverage. Stations could be added at high value habitat areas identified during the shoreline survey, or they could be added to represent the majority types of habitat present in each eco-region, if an estimate of whole bay usage rather than points of interest is desired. Modification to the placement or number of stations depends on the results desired and types of comparisons to be made.

Recommendations for the Future

Data Acquisition

Data set continuity and accuracy would benefit from complete standardization of data sheets and bird codes. Data recorders submitting their data in Excel sheets or recording it on PDA-style devices could also further automate the data collection process. This would increase data accuracy and speed up database creation. This quicker data transfer would decrease the time between data collection and analysis, facilitating early detection of problems and permitting more likely resolution of questions about data outliers.

The database manager recommended certain improvement in data collection:

- More room to enter information on hard copy field data forms would make numbers and letters more readable.
- All original data sheets should remain available for emerging questions about interpretation of the data as entered.
- Data entries need to be reviewed and flagged immediately as questions arise. Questions about these flagged entries can be more reliably answered closer to the data collection date.
- If data are submitted in a spreadsheet the formatting for date, time, text, and number should be consistent. Codes used for species should be taken from the standardized sheet and scientific names provided should have consistent spelling and capitalization.
- Data collectors should be clear about which tide they are surveying; when the survey time is mid-tide, recorders should indicate high or low tide depending on when the paired reading was taken. If there is only one reading and no tide indication, the data manager may have no indication about whether the readings were meant to be peaking or falling tide.

- Point count location survey areas should be clearly defined and reflect what is possible to observe from a fixed position on the bay. This would allow for a more accurate calculation of bird density information.
- Data sheets with null values should be submitted; otherwise it is unclear if no birds were seen or if no survey was conducted for a given cell.

Data Analysis and Viewing

Many combinations of factors (time, bird, tide, location, eco-region, substrate, etc.) can be analyzed with the current data set. Particular aspects of the data that are not appropriate for a general report may be of great interest to project proponents in certain jurisdictions of the bay. A tool that would allow managers to access and interpret the data could prove very useful. A product could be designed for the Internet with interactive mapping aspects, data table production, and printing.

In order to more easily compare this data to that which might be gathered from other major survey efforts in the bay or from future versions of this survey, a database should be developed to consolidate all the data for future use.

Future Surveys

Future comprehensive surveys such as this one should be conducted every three to five years, and during the same years that periodic fish surveys take place. In this way, the ability to interpret trends and management implications can be maximized. A repeat of this survey effort is occurring in 2009-10.

In interim years, the point count stations and a boat-based transect should take place at least once, as budget allows, during peak months. In this way, the abbreviated annual sampling can allow for discernment of weather-related versus anthropogenic fluctuations in abundance and diversity. Shorebird surveys targeted for November would allow for coordination with other major bird survey efforts, such as the shorebird census in the San Francisco Bay area conducted by the Point Reyes Bird Observatory. Coordination with these other efforts could enable a comparison of species observed regionally during the same time and tide. Waterbird surveys should be targeted for December/January for maximum numbers.

Accessing Navy secure areas required much coordination and cooperation among different Navy entities. Having a Navy Point of Contact for access and safety was essential to completing the surveys and should continue to be coordinated and improved for future efforts.

Data from future surveys should be collected and stored in such a way that trends can be assessed with previous data year(s). While improvements to standardization can and should be made, changes to the methods should be clearly weighed for tradeoffs in the context of how any change could help or hamper trend assessment.

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6 Tables

This section contains tables that were too large to include in the text of this document.

Table 6-1: All species observed during the San Diego Bay avian surveys and their Federal and State of California listing status if any.

Common Name	Scientific Name	Status[1]
American avocet	*Recurvirostra americana*	
American coot	*Fulica americana americana*	
American crow	*Corvus brachyrhynchos hesperis*	
American goldfinch	*Carduelis tristis salicamans*	
American kestrel	*Falco sparverius sparverius*	
American oystercatcher	*Haematopus palliatus*	
American pipit	*Anthus rubescens pacificus*	
American redstart	*Setophaga ruticilla*	
American white pelican	*Pelecanus erythrorhynchos*	SSC
American wigeon	*Anas americana*	
Anna's hummingbird	*Calypte anna*	
ash-throated flycatcher	*Myiarchus cinerascens cinerascens*	
Baird's sandpiper	*Calidris bairdii*	
bank swallow	*Riparia riparia riparia*	ST
barn swallow	*Hirundo rustica erythrogaster*	
Belding's Savannah sparrow	*Passerculus sandwichensis beldingi*	SE
belted kingfisher	*Ceryls alcyon*	
black oystercatcher	*Haematopus bachmani*	
black phoebe	*Sayornis nigricans semiatra*	
black scoter	*Melanitta nigra americana*	
black skimmer	*Rynchops niger niger*	SSC
black tern	*Chlidonias niger surinamensis*	SSC
black turnstone	*Arenaria melanocephala*	
black-bellied plover	*Pluvialis squatarola*	
black-crowned night-heron	*Nycticorax nycticorax hoactli*	
black-headed grosbeak	*Pheucticus melanocephalus maculatus*	
black-necked stilt	*Himantopus mexicanus mexicanus*	
black-throated gray warbler	*Dendroica nigrescens*	
black-vented shearwater	*Puffinus opisthomelas*	
blue grosbeak	*Passerina caerulea*	
blue-winged teal	*Anas discors*	
Bonaparte's gull	*Larus philadelphia*	
Brandt's cormorant	*Phalacrocorax penicillatus*	
brant	*Branta bernicla*	SSC
Brewer's blackbird	*Euphagus cyanocephalus*	
brown-headed cowbird	*Molothrus ater*	
brown pelican	*Pelecanus occidentalis californicus*	FE, SE
bufflehead	*Bucephala albeola*	

burrowing owl	*Athene cunicularia*	SSC
bushtit	*Psaltriparus minimus melanurus*	
California gnatcatcher	*Polioptila californica californica*	FT
California gull	*Larus californicus californicus*	
California least tern	*Sternula antillarum browni*	FE, SE
California towhee	*Pipilo crissalis*	
Canada goose	*Branta canadensis*	
Caspian tern	*Hydroprogne caspia*	
Cassin's auklet	*Ptychoramphus aleuticus*	SSC
Cassin's kingbird	*Tyrannus vociferans vociferans*	
cattle egret	*Bubulcus ibis*	
cinnamon teal	*Anas cyanoptera septentrionalium*	
Clark's grebe	*Aechmophorus clarkii transitionalis*	
cliff swallow	*Petrochelidon pyrrhonota tachina*	
common goldeneye	*Bucephala clangula*	
common loon	*Gavia immer*	SSC
common merganser	*Mergus merganser*	
common moorhen	*Gallinula chloropus*	
common raven	*Corvus corax clarionensis*	
common tern	*Sterna hirundo hirundo*	
common yellowthroat	*Geothlypis trichas*	
Cooper's hawk	*Accipiter cooperii*	
dark-eyed junco	*Junco hyemalis*	
domestic duck	multiple species	
double-crested cormorant	*Phalacrocorax auritus*	
dunlin	*Calidris alpinia pacifica*	
eared grebe	*Podiceps nigricollis californicus*	
elegant tern	*Sterna elegans*	
Eurasian collared dove	*Streptopelia decaocto*	
Eurasion wigeon	*Anas penelope*	
European starling	*Sturnus vulgaris vulgaris*	
Forster's tern	*Sterna forsteri*	
fox sparrow	*Passerella iliaca*	
gadwall	*Anas strepera strepera*	
glaucous gull	*Larus hyperboreus*	
glaucous-winged gull	*Larus glaucescens*	
great blue heron	*Ardea herodias wardi*	
great egret	*Ardea alba egretta*	
great-tailed grackle	*Quiscalus mexicanus*	
greater scaup	*Aythya marila nearctica*	
greater yellowlegs	*Tringa melanoleuca*	
green heron	*Butorides virescens anthonyi*	
green-winged teal	*Anas crecca carolinensis*	
gull-billed tern	*Gelochelidon nilotica vanrossemi*	SSC

Heermann's gull	*Larus heermanni*	
herring gull	*Larus argentatus smithsonianus*	
hooded merganser	*Lophodytes cucullatus*	
hooded oriole	*Icterus cucullatus nelsoni*	
horned grebe	*Podiceps auritus cornutus*	
horned lark	*Eremophila alpestris*	
house finch	*Carpodacus mexicanus frontalis*	
house sparrow	*Passer domesticus domesticus*	
house wren	*Troglodytes aedon parkmanii*	
killdeer	*Charadrius vociferus vociferus*	
large-billed Savannah sparrow	*Passerculus sandwichensis rostratus*	SSC
Lazuli bunting	*Passerina amoena*	
least sandpiper	*Calidris minutilla*	
lesser goldfinch	*Carduelis psaltria*	
lesser scaup	*Aythya affinis*	
lesser yellowlegs	*Tringa flavipes*	
light-footed clapper rail	*Rallus longirostris levipes*	FE, SE
Lincoln's sparrow	*Melospiza lincolnii*	
little blue heron	*Egretta caerulea*	
loggerhead shrike	*Lanius ludovicianus*	SSC
long-billed curlew	*Numenius americanus*	
long-billed dowitcher	*Limnodromus scolopaceus*	
long-tailed duck	*Clangula hyemalis*	
mallard	*Anas platyrhynchos platyrhynchos*	
marbled godwit	*Limosa fedoa fedoa*	
marsh wren	*Cistothorus palustris*	
merlin	*Falco columbarius columbarius*	
mew gull	*Larus canus brachyrhynchus*	
mourning dove	*Zenaida macroura marginella*	
Nashville warbler	*Vermivora ruficapilla ridgwayi*	
northern flicker	*Colaptes auratus*	
northern harrier	*Circus cyaneus hudsonius*	SSC
northern mockingbird	*Mimus polyglottos polyglottos*	
northern pintail	*Anas acuta*	
northern rough-winged swallow	*Stelgidopteryx serripennis*	
northern shoveler	*Anas clypeata*	
olympic gull	hybrid between glaucous-winged and western gulls	
orange-crowned warbler	*Vermivora celata*	
osprey	*Pandion haliaetus carolinensis*	
Pacific golden-plover	*Pluvialis fulva*	
Pacific Loon	*Gavia pacifica*	
parasitic jaeger	*Stercorarius parasiticus*	
peregrine falcon	*Falco peregrinus anatum*	SE
pied-billed grebe	*Podilymbus podiceps podiceps*	

red knot	*Calidris canutus roselaari*	
red phalarope	*Phalaropus fuclicarius*	
red-breasted merganser	*Mergus serrator*	
red-crowned parrot	*Amazona viridigenalis*	
reddish egret	*Egretta rufescens dickeyi*	
redhead	*Aythya americana*	SSC
red-necked phalarope	*Phalaropus lobatus*	
red-shouldered hawk	*Buteo lineatus elegans*	
red-tailed hawk	*Buteo jamaicensis*	
red-throated loon	*Gavia stellata*	
red-winged blackbird	*Agelaius phoeniceus*	
ring-billed gull	*Larus delawarensis*	
rock pigeon	*Columba livia*	
rock wren	*Salpinctes obsoletus*	
Ross's goose	*Chen rossii*	
royal tern	*Thalasseus maximus*	
ruby-crowned kinglet	*Regulus calendula calendula*	
ruddy duck	*Oxyura jamaicensis rubida*	
ruddy turnstone	*Arenaria interpres*	
San Diego song sparrow	*Melospiza melodia cooperi*	
sanderling	*Calidris alba*	
Savannah sparrow	*Passerculus sandwichensis*	
Say's phoebe	*Sayornis saya saya*	
semipalmated plover	*Charadrius semipalmatus*	
semipalmated sandpiper	*Calidris pusilla*	
sharp-shinned hawk	*Accipiter striatus velox*	
short-billed dowitcher	*Limnodromus griseus caurinus*	
short-eared owl	*Asio flammeus flammeus*	SSC
snow goose	*Chen hyperborea*	
snowy egret	*Egretta thula thula*	
song sparrow	*Melospiza melodia*	SSC
spotted sandpiper	*Actitis macularius*	
spotted towhee	*Pipilo maculatus*	
stilt sandpiper	*Calidris himantopus*	
surf scoter	*Melanitta perspicillata*	
surfbird	*Aphriza virgata*	
Thayer’s gull	*Larus thayeri*	
Townsend's warbler	*Dendroica townsendi*	
tree swallow	*Tachycineta bicolor*	
turkey vulture	*Cathartes aura meridionalis*	
Vaux's swift	*Chaetura vauxi vauxi*	SSC
violet-green swallow	*Tachycineta thalassina thalassina*	
wandering tattler	*Tringa incanus*	
western grebe	*Aechmophorus occidentalis occidentalis*	

western gull	*Larus occidentalis wymani*	
western kingbird	*Tyrannus verticalis*	
western meadowlark	*Sturnella neglecta*	
western sandpiper	*Calidris mauri*	
western scrub-jay	*Aphelocoma californica*	
western snowy plover	*Charadrius alexandrinus nivosus*	FT, SSC
whimbrel	*Numenius phaeopus hudsonicus*	
white tailed kite	*Elanus leucurus*	
white-crowned sparrow	*Zonotrichia leucophrys*	
white-faced ibis	*Plegadis chihi*	
white-throated swift	*Aeronautes saxatalis*	
white-winged scoter	*Melanitta fuscai deglandi*	
willet	*Tringa semipalmata inornatus*	
Wilson's phalarope	*Phalaropus tricolor*	
Wilson's warbler	*Wilsonia pusilla*	
wrentit	*Chamaea fasciata henshawi*	
yellow warbler	*Dendroica petechia*	SSC
yellow-rumped warbler	*Dendroica coronata ssp.*	

Total number of unique species: 188

[1] FE: Federally Endangered; FT: Federally Threatened; SE: CA State Endangered, ST: CA State Threatened; SSC: CA State Species of Special Concern

Table 6-2: Species and number of birds observed per month during the San Diego Bay shorebird surveys. In April, August, November, and February, peaking and falling tide surveys were performed; these data are presented separately in the table. Species are organized from greatest to least number; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western sandpiper	91445	7889	2866	4573	731	6165	1068	11610	**13033**	10839	1982	9396	8802	6385	6106
peep sp.	30826	4737	721	1643	0	97	1444	**5759**	699	183	4553	5238	3753	1760	239
marbled godwit	29324	**3730**	1515	1116	1148	1744	1901	2808	2287	2722	1900	3512	2132	2056	753
western gull	26176	1010	1031	712	1392	2233	2195	**2887**	2372	2675	1762	2756	2121	1631	1399
willet	22353	**2998**	892	858	806	1431	1664	3085	1761	1936	1395	2362	1521	1186	458
surf scoter	21956	**5089**	194	185	32	2	8	7	9	144	1491	4699	3225	3200	3671
red-necked phalarope	20137	0	0	375	10	4005	5787	**6340**	3579	0	1	40	0	0	0
eared grebe	16272	1181	81	1049	51	19	20	606	1570	3395	**3581**	2315	1093	407	904
sanderling	13819	1035	904	718	105	1472	1397	1199	2160	722	679	969	**1498**	434	527
western/Clark's grebe	13349	0	2978	2979	61	2	0	2	59	535	**3792**	885	1971	65	20
dowitcher sp.	12078	1469	247	915	48	452	487	776	1262	1412	637	**2412**	777	972	212
elegant tern	11725	1348	810	421	2477	928	1167	**4094**	443	21	12	0	0	3	1
American wigeon	11174	230	20	14	0	0	0	0	292	1802	412	**2793**	2636	1942	1033
black-bellied plover	11168	351	116	78	169	753	767	988	1500	**1553**	462	1366	1265	1002	798
rock pigeon	10463	331	324	393	446	828	718	911	975	974	817	908	**1051**	893	894
double-crested cormorant	10358	255	202	296	533	589	876	963	801	416	758	652	641	1346	**2030**
brown pelican	10186	52	520	1306	448	864	929	**1910**	620	740	970	710	556	244	317
Heermann's gull	8631	0	4	3	7	**1524**	990	791	1013	852	705	1016	978	387	361
semipalmated plover	7052	**850**	190	515	166	284	467	699	537	687	796	615	540	132	574
scaup sp.	7011	21	0	0	0	0	0	0	0	1	22	278	993	2762	**2934**
California gull	6825	216	171	131	90	32	55	90	120	892	139	446	1345	**1564**	1534
brant	6765	**2152**	22	40	0	0	0	0	2	338	141	936	571	1147	1416
Brandt's cormorant	6304	8	120	68	46	198	377	1065	1002	**1153**	534	743	711	260	19
ring-billed gull	6125	335	39	30	2	25	22	44	21	200	504	1558	**1577**	1154	614
dunlin	6122	**1486**	489	511	2	0	0	16	226	1059	215	745	726	215	432
red knot	5654	605	265	552	21	202	171	474	**1029**	655	417	565	406	181	111
black skimmer	4895	122	181	161	967	974	**1029**	798	367	111	50	14	58	63	0
western grebe	4581	472	48	65	3	0	0	0	19	720	246	571	417	388	**1632**
least sandpiper	4276	491	78	101	0	177	234	526	**618**	519	128	513	428	102	361

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
black-necked stilt	3844	497	13	278	287	186	304	330	**540**	426	302	110	235	132	204
bufflehead	3829	518	25	26	0	0	0	0	0	119	84	**1022**	674	628	733
Forster's tern	3814	80	228	444	521	140	193	273	305	239	278	**575**	294	102	142
house finch	3377	175	75	200	**533**	273	487	321	129	96	255	293	161	80	299
European starling	3044	89	46	99	133	70	260	294	188	494	290	**548**	315	56	162
lesser scaup	2641	351	1	6	0	0	0	0	0	169	132	**1134**	356	79	413
mallard	2593	89	87	68	122	175	144	209	201	341	188	266	**298**	228	177
snowy plover	2401	223	53	86	58	154	193	**389**	193	153	218	235	309	22	115
northern shoveler	2288	266	83	151	0	0	5	75	253	205	213	**435**	172	171	259
snowy egret	1965	136	111	93	171	142	133	189	**222**	132	124	184	173	86	69
American coot	1878	185	4	5	2	0	0	0	15	152	95	412	292	**425**	291
horned lark	1779	97	61	91	101	106	134	90	83	**227**	163	224	150	34	218
royal tern	1645	37	19	2	37	183	242	118	**261**	146	104	95	81	158	162
caspian tern	1580	51	92	270	**774**	137	201	30	13	1	2	2	3	4	0
killdeer	1497	38	37	36	44	86	69	33	30	163	303	**331**	183	74	70
barn swallow	1456	50	52	156	156	100	143	397	**400**	0	2	0	0	0	0
Savannah sparrow	1414	49	45	102	48	112	**186**	74	123	32	143	184	145	14	157
sandpiper sp.	1411	**865**	3	0	0	0	0	513	0	0	0	0	0	30	0
northern pintail	1393	9	9	0	0	0	0	18	125	60	**449**	188	195	174	166
house sparrow	1369	42	33	123	**241**	112	107	174	62	90	139	45	102	17	82
least tern	1238	0	18	135	**826**	110	113	36	0	0	0	0	0	0	0
gull sp.	1183	74	24	111	13	1	6	11	0	107	54	236	**510**	10	26
short-billed dowitcher	1148	**441**	1	0	60	370	2	155	18	0	1	6	0	94	0
Belding's savannah sparrow	1053	160	25	99	99	12	23	**166**	11	46	151	93	31	71	66
American avocet	1030	96	7	35	79	71	75	74	81	75	53	93	80	102	**109**
great blue heron	929	44	47	44	71	52	67	91	46	94	84	**111**	61	56	61
long-billed dowitcher	874	1	1	30	33	202	51	**367**	0	60	1	3	35	90	0
great egret	841	47	15	26	50	31	44	61	66	95	109	**146**	73	33	45
ruddy duck	823	42	7	24	0	1	0	0	20	107	50	**257**	121	79	115
cormorant sp.	805	0	0	0	4	40	0	0	0	0	**750**	0	10	0	1
cliff swallow	784	20	53	79	216	114	**277**	24	1	0	0	0	0	0	0
Wilson's phalarope	767	0	0	4	0	112	132	199	**320**	0	0	0	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
greater scaup	746	3	0	1	0	0	0	0	0	0	8	30	0	**476**	228
long-billed curlew	732	67	10	8	48	52	57	65	50	69	67	81	58	**82**	18
gadwall	697	69	13	25	49	34	11	20	63	20	4	65	**135**	86	103
white-crowned sparrow	678	50	23	3	0	0	0	0	7	51	97	88	**230**	15	114
ruddy turnstone	676	61	25	22	9	63	62	75	35	77	62	**86**	50	32	17
horned grebe	671	1	2	3	0	0	0	0	0	3	27	118	57	120	**340**
pied-billed grebe	648	11	5	0	3	11	21	17	41	35	**249**	100	90	35	30
black turnstone	606	27	23	4	11	49	59	52	32	66	52	**103**	81	21	26
mourning dove	568	32	32	**112**	72	27	27	44	9	1	57	19	101	0	35
Heerman's gull or herring gull	527	9	0	0	0	0	0	**483**	0	0	0	29	6	0	0
shearwater sp.	510	0	0	0	0	0	0	**510**	0	0	0	0	0	0	0
American crow	435	45	29	32	39	11	6	17	**68**	54	29	21	34	16	34
red-breasted merganser	380	13	5	4	0	0	0	0	0	16	20	**168**	87	39	28
Brewer's blackbird	372	10	4	2	31	11	23	**85**	6	54	45	26	50	4	21
American pipit	370	2	0	0	3	0	0	0	0	78	**147**	19	54	21	46
osprey	364	24	23	21	17	13	9	14	32	29	36	**49**	39	16	42
gull-billed tern	346	37	90	**115**	102	0	2	0	0	0	0	0	0	0	0
greater yellowlegs	320	12	3	1	14	15	26	**62**	42	23	10	70	21	12	9
green-winged teal	311	18	2	0	1	0	0	0	0	16	17	**105**	75	31	46
common tern	305	0	0	0	0	0	108	**195**	2	0	0	0	0	0	0
surfbird	290	**123**	12	15	0	15	22	16	15	6	14	18	22	6	6
whimbrel	280	**166**	35	7	4	4	12	7	5	8	7	10	7	5	3
black phoebe	271	16	9	6	15	6	6	23	10	20	48	30	**52**	14	16
spotted sandpiper	268	14	19	30	0	11	11	**29**	19	28	33	27	23	11	13
redhead	254	0	0	0	0	0	0	0	1	78	**102**	17	34	9	13
tern sp.	220	0	0	67	0	31	0	**121**	0	0	0	0	0	0	1
Audubon's warbler (yellow-rumped)	205	13	0	2	0	0	0	0	0	25	39	**72**	29	7	18
Anna's hummingbird	188	18	7	25	9	5	13	10	6	7	**36**	11	17	6	18
western meadowlark	159	8	9	5	1	0	0	1	0	1	26	2	3	1	**102**
belted kingfisher	157	9	0	0	0	1	2	12	19	11	**27**	24	16	11	25
Say's phoebe	148	3	0	1	3	0	0	2	4	9	26	**34**	30	7	29
herring gull	146	12	0	0	0	0	0	0	1	3	6	29	35	**39**	21

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
American white pelican	135	0	26	8	20	25	**28**	7	0	0	0	21	0	0	0
common raven	126	**48**	14	13	6	0	2	0	2	5	4	9	12	6	5
common loon	123	5	2	2	0	0	0	0	2	**31**	17	30	20	8	6
shorebird sp.	120	0	**120**	0	0	0	0	0	0	0	0	0	0	0	0
yellow warbler	107	0	0	1	0	0	0	0	0	21	**61**	0	24	0	0
song sparrow	105	24	7	7	**28**	1	0	5	2	1	3	6	9	0	12
cinnamon teal	99	16	0	0	0	0	8	5	21	2	0	0	14	**30**	3
American kestrel	98	8	4	0	3	6	8	16	5	8	**17**	7	7	2	7
yellowlegs sp.	97	0	2	0	0	16	0	0	0	5	7	**66**	0	1	0
northern harrier	89	7	5	2	2	1	2	7	6	5	13	9	**15**	5	10
blue-winged teal	87	20	0	0	0	0	0	0	**26**	9	0	14	7	10	1
bushtit	84	0	0	0	11	23	1	3	10	0	**28**	0	8	0	0
common goldeneye	83	4	2	4	0	0	0	0	0	0	0	11	24	2	**36**
common yellowthroat	82	4	3	6	8	0	2	5	2	5	13	7	**16**	1	10
northern mockingbird	81	4	5	17	**22**	6	2	4	1	1	9	4	1	2	3
red-tailed hawk	76	2	3	2	3	4	0	6	3	6	9	8	**12**	6	**12**
Bonaparte's gull	70	0	0	0	0	0	0	0	0	0	0	21	**28**	11	10
black-crowned night heron	70	0	0	4	8	3	1	0	2	7	14	8	**20**	1	2
little blue heron	63	5	3	3	4	2	1	1	**13**	7	6	10	3	4	1
peregrine falcon	63	3	4	3	2	3	4	2	3	9	9	2	6	6	7
large-billed savannah sparrow	62	0	0	0	0	0	**40**	6	0	2	5	3	3	2	1
tree swallow	55	6	0	2	1	0	0	1	1	16	0	**20**	5	3	0
red-throated loon	54	8	0	0	0	0	0	0	1	0	0	**21**	16	7	1
green heron	53	2	1	1	7	3	**10**	4	3	4	2	4	**10**	0	2
pacific loon	46	2	0	0	0	0	3	0	1	2	7	**19**	4	2	6
marsh wren	45	3	0	0	1	0	0	0	2	2	9	**18**	7	1	2
Clark's grebe	44	3	0	3	0	0	0	0	0	3	**16**	5	4	8	2
Cassin's kingbird	42	2	2	0	2	0	4	4	0	1	2	**17**	6	0	2
glaucous-winged gull	39	1	0	1	0	3	0	0	2	0	1	3	4	**12**	**12**
duck sp.	38	0	0	0	0	0	0	0	0	**35**	0	0	3	0	0
reddish egret	37	2	0	1	0	2	4	6	**8**	3	3	3	3	2	0
mew gull	33	0	0	0	0	0	0	0	0	0	0	2	**29**	2	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
white-faced ibis	31	0	0	0	0	0	0	0	**31**	0	0	0	0	0	0
northern rough-winged swallow	30	8	3	**14**	3	1	0	0	1	0	0	0	0	0	0
Vaux's swift	28	0	9	**18**	0	0	0	0	1	0	0	0	0	0	0
lesser yellowlegs	27	5	0	0	0	1	1	**6**	3	4	3	2	1	1	0
domestic duck	25	0	2	0	0	0	0	0	**12**	4	0	1	0	6	0
orange-crowned warbler	23	2	1	1	0	0	0	0	0	2	**10**	2	2	1	2
Eurasian collared dove	23	0	0	4	0	0	9	0	1	0	2	2	**5**	0	0
black oystercatcher	22	2	0	0	0	0	2	2	0	1	**8**	0	0	0	7
loggerhead shrike	21	0	0	1	2	1	3	**4**	1	0	3	0	2	1	3
wandering tattler	20	0	1	**4**	0	1	**4**	**4**	0	3	0	3	0	0	0
Lincoln's sparrow	20	2	0	0	0	0	0	0	0	1	5	**6**	5	0	1
Cooper's hawk	19	1	0	2	0	**3**	2	**3**	**3**	1	**3**	0	1	0	0
black tern	15	0	0	0	0	3	3	**9**	0	0	0	0	0	0	0
parasitic jaeger	13	0	0	0	0	0	0	3	**5**	1	2	1	1	0	0
Baird's sandpiper	13	0	0	0	0	0	0	2	**11**	0	0	0	0	0	0
cattle egret	13	0	0	0	0	0	0	0	**13**	0	0	0	0	0	0
western kingbird	12	**10**	0	2	0	0	0	0	0	0	0	0	0	0	0
merlin	11	1	0	3	0	1	0	1	0	0	1	1	**2**	1	0
snow goose	8	0	0	0	0	0	0	0	0	**2**	**2**	1	1	**2**	0
violet-green swallow	8	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0
short-eared owl	8	0	0	0	0	0	0	0	0	3	1	**4**	0	0	0
California gnatcatcher	8	0	0	0	0	0	0	0	0	0	**3**	0	2	0	**3**
hooded oriole	7	0	0	**4**	2	0	1	0	0	0	0	0	0	0	0
semipalmated sandpiper	7	0	0	0	0	0	0	1	**6**	0	0	0	0	0	0
red-shouldered hawk	7	0	0	0	0	0	0	0	1	0	1	**2**	**2**	0	1
glaucous gull	6	0	0	0	0	0	0	0	0	0	1	0	1	0	**4**
white-tailed kite	6	0	0	0	0	0	0	0	**2**	1	0	1	**2**	0	0
California towhee	6	1	0	0	1	0	0	1	1	0	0	0	0	0	**2**
stilt sandpiper	6	0	0	0	0	0	**5**	0	0	1	0	0	0	0	0
crow sp.	6	0	0	0	0	0	0	0	0	0	0	0	**5**	1	0
jaeger sp.	6	0	0	0	0	0	0	**3**	1	0	2	0	0	0	0
hummingbird sp.	5	0	0	0	0	0	0	0	1	0	0	0	1	0	**3**

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
pacific golden-plover	5	1	0	0	0	0	0	0	1	0	1	**2**	0	0	0
ruby-crowned kinglet	5	0	0	0	0	0	0	0	0	1	**2**	**2**	0	0	0
common merganser	5	0	0	0	0	0	0	0	0	0	0	0	**3**	2	0
teal sp.	5	0	0	0	0	0	0	0	0	0	0	**5**	0	0	0
white-throated swift	4	0	0	0	0	0	0	0	0	0	0	**4**	0	0	0
Ross' goose	4	0	0	0	0	0	0	0	0	0	1	**2**	0	1	0
red-crowned parrot	4	0	0	**4**	0	0	0	0	0	0	0	0	0	0	0
wrentit	3	0	0	0	**3**	0	0	0	0	0	0	0	0	0	0
black scoter	3	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0
house wren	3	0	0	0	0	0	0	**1**	0	**1**	0	**1**	0	0	0
Eurasion wigeon	3	0	0	0	0	0	0	0	0	0	0	0	**2**	0	1
American oystercatcher	3	0	0	0	0	0	0	0	0	0	**2**	0	0	0	1
bank swallow	3	0	0	**2**	0	0	0	0	1	0	0	0	0	0	0
loon sp.	3	**2**	0	0	0	0	0	0	0	0	0	0	1	0	0
Canada goose	3	0	0	0	0	0	0	0	0	**3**	0	0	0	0	0
Townsend's warbler	3	**1**	0	**1**	0	0	0	0	0	0	0	**1**	0	0	0
brown-headed cowbird	2	0	0	0	0	0	**2**	0	0	0	0	0	0	0	0
Wilson's warbler	2	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0	0
rock wren	2	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0
Thayer's gull	2	**1**	0	0	0	0	0	0	0	0	0	0	**1**	0	0
dark-eyed junco	2	0	0	0	0	0	0	0	0	0	**2**	0	0	0	0
burrowing owl	2	0	0	0	0	0	0	0	0	0	0	0	**2**	0	0
grebe sp.	2	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
hooded merganser	2	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
common moorhen	2	0	0	0	0	0	0	0	0	0	0	**2**	0	0	0
American goldfinch	2	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0	0
Ash-throated flycatcher	2	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0
lesser goldfinch	2	0	0	0	0	0	**2**	0	0	0	0	0	0	0	0
black-throated gray warbler	2	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0
accipiter sp.	1	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
white-winged scoter	1	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
northern flicker	1	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
American redstart	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
olympic gull (hybrid between glaucous-winged and western gulls)	1	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0
San Diego song sparrow	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
egret sp.	1	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
spotted towhee	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
blue grosbeak	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
Nashville warbler	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
red phalarope	1	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
scrub jay	1	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
Lazuli bunting	1	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0
red-winged blackbird	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
fox sparrow	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
great-tailed grackle	1	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
clapper rail	1	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0
sharp-shinned hawk	1	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0
turkey vulture	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
black-headed grosbeak	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
Grand Total	509562	44340	16904	23291	15014	28560	27996	55143	42761	42093	35443	**58087**	48651	36202	35077

Table 6-3: Species and number of birds observed per month during the San Diego Bay shorebird surveys. In April, August, November, and February, peaking and falling tide surveys were performed; these data are presented separately in the table. Species are organized alphabetically; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
accipiter sp.	1	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
American avocet	1030	96	7	35	79	71	75	74	81	75	53	93	80	102	**109**
American coot	1878	185	4	5	2	0	0	0	15	152	95	412	292	**425**	291
American crow	435	45	29	32	39	11	6	17	**68**	54	29	21	34	16	34
American goldfinch	2	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0	0
American kestrel	98	8	4	0	3	6	8	16	5	8	**17**	7	7	2	7
American oystercatcher	3	0	0	0	0	0	0	0	0	0	**2**	0	0	0	1
American pipit	370	2	0	0	3	0	0	0	0	78	**147**	19	54	21	46
American redstart	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
American white pelican	135	0	26	8	20	25	**28**	7	0	0	0	21	0	0	0
American wigeon	11174	230	20	14	0	0	0	0	292	1802	412	**2793**	2636	1942	1033
Anna's hummingbird	188	18	7	25	9	5	13	10	6	7	**36**	11	17	6	18
Ash-throated flycatcher	2	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0
Audubon's warbler (yellow-rumped)	205	13	0	2	0	0	0	0	0	25	39	**72**	29	7	18
Baird's sandpiper	13	0	0	0	0	0	0	2	**11**	0	0	0	0	0	0
bank swallow	3	0	0	**2**	0	0	0	0	1	0	0	0	0	0	0
barn swallow	1456	50	52	156	156	100	143	397	**400**	0	2	0	0	0	0
Belding's savannah sparrow	1053	160	25	99	99	12	23	**166**	11	46	151	93	31	71	66
belted kingfisher	157	9	0	0	0	1	2	12	19	11	**27**	24	16	11	25
black oystercatcher	22	2	0	0	0	0	2	2	0	1	**8**	0	0	0	7
black phoebe	271	16	9	6	15	6	6	23	10	20	48	30	**52**	14	16
black scoter	3	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0
black skimmer	4895	122	181	161	967	974	**1029**	798	367	111	50	14	58	63	0
black tern	15	0	0	0	0	3	3	**9**	0	0	0	0	0	0	0
black turnstone	606	27	23	4	11	49	59	52	32	66	52	**103**	81	21	26
black-bellied plover	11168	351	116	78	169	753	767	988	1500	**1553**	462	1366	1265	1002	798
black-crowned night heron	70	0	0	4	8	3	1	0	2	7	14	8	**20**	1	2
black-headed grosbeak	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
black-necked stilt	3844	497	13	278	287	186	304	330	**540**	426	302	110	235	132	204
black-throated gray warbler	2	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
blue grosbeak	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
blue-winged teal	87	20	0	0	0	0	0	0	**26**	9	0	14	7	10	1
Bonaparte's gull	70	0	0	0	0	0	0	0	0	0	0	21	**28**	11	10
Brandt's cormorant	6304	8	120	68	46	198	377	1065	1002	**1153**	534	743	711	260	19
brant	6765	**2152**	22	40	0	0	0	0	2	338	141	936	571	1147	1416
Brewer's blackbird	372	10	4	2	31	11	23	**85**	6	54	45	26	50	4	21
brown pelican	10186	52	520	1306	448	864	929	**1910**	620	740	970	710	556	244	317
brown-headed cowbird	2	0	0	0	0	0	**2**	0	0	0	0	0	0	0	0
bufflehead	3829	518	25	26	0	0	0	0	0	119	84	**1022**	674	628	733
burrowing owl	2	0	0	0	0	0	0	0	0	0	0	0	**2**	0	0
bushtit	84	0	0	0	11	23	1	3	10	0	**28**	0	8	0	0
California gnatcatcher	8	0	0	0	0	0	0	0	0	0	**3**	0	2	0	**3**
California gull	6825	216	171	131	90	32	55	90	120	892	139	446	1345	**1564**	1534
California towhee	6	1	0	0	1	0	0	1	1	0	0	0	0	0	**2**
Canada goose	3	0	0	0	0	0	0	0	0	**3**	0	0	0	0	0
caspian tern	1580	51	92	270	**774**	137	201	30	13	1	2	2	3	4	0
Cassin's kingbird	42	2	2	0	2	0	4	4	0	1	2	**17**	6	0	2
cattle egret	13	0	0	0	0	0	0	0	**13**	0	0	0	0	0	0
cinnamon teal	99	16	0	0	0	0	8	5	21	2	0	0	14	**30**	3
clapper rail	1	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0
Clark's grebe	44	3	0	3	0	0	0	0	0	3	**16**	5	4	8	2
cliff swallow	784	20	53	79	216	114	**277**	24	1	0	0	0	0	0	0
common goldeneye	83	4	2	4	0	0	0	0	0	0	0	11	24	2	**36**
common loon	123	5	2	2	0	0	0	0	2	**31**	17	30	20	8	6
common merganser	5	0	0	0	0	0	0	0	0	0	0	0	**3**	2	0
common moorhen	2	0	0	0	0	0	0	0	0	0	0	**2**	0	0	0
common raven	126	**48**	14	13	6	0	2	0	2	5	4	9	12	6	5
common tern	305	0	0	0	0	0	108	**195**	2	0	0	0	0	0	0
common yellowthroat	82	4	3	6	8	0	2	5	2	5	13	7	**16**	1	10
Cooper's hawk	19	1	0	2	0	**3**	2	**3**	**3**	1	**3**	0	1	0	0
cormorant sp.	805	0	0	0	4	40	0	0	0	0	750	0	10	0	1
crow sp.	6	0	0	0	0	0	0	0	0	0	0	0	**5**	1	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
dark-eyed junco	2	0	0	0	0	0	0	0	0	0	**2**	0	0	0	0
domestic duck	25	0	2	0	0	0	0	0	**12**	4	0	1	0	6	0
double-crested cormorant	10358	255	202	296	533	589	876	963	801	416	758	652	641	1346	**2030**
dowitcher sp.	12078	1469	247	915	48	452	487	776	1262	1412	637	**2412**	777	972	212
duck sp.	38	0	0	0	0	0	0	0	0	**35**	0	0	3	0	0
dunlin	6122	**1486**	489	511	2	0	0	16	226	1059	215	745	726	215	432
eared grebe	16272	1181	81	1049	51	19	20	606	1570	3395	**3581**	2315	1093	407	904
egret sp.	1	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
elegant tern	11725	1348	810	421	2477	928	1167	**4094**	443	21	12	0	0	3	1
Eurasian collared dove	23	0	0	4	0	0	**9**	0	1	0	2	2	5	0	0
Eurasion wigeon	3	0	0	0	0	0	0	0	0	0	0	0	**2**	0	1
European starling	3044	89	46	99	133	70	260	294	188	494	290	**548**	315	56	162
Forster's tern	3814	80	228	444	521	140	193	273	305	239	278	**575**	294	102	142
fox sparrow	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
gadwall	697	69	13	25	49	34	11	20	63	20	4	65	**135**	86	103
glaucous gull	6	0	0	0	0	0	0	0	0	0	1	0	1	0	**4**
glaucous-winged gull	39	1	0	1	0	3	0	0	2	0	1	3	4	**12**	**12**
great blue heron	929	44	47	44	71	52	67	91	46	94	84	**111**	61	56	61
great egret	841	47	15	26	50	31	44	61	66	95	109	**146**	73	33	45
greater scaup	746	3	0	1	0	0	0	0	0	0	8	30	0	**476**	228
greater yellowlegs	320	12	3	1	14	15	26	**62**	42	23	10	70	21	12	9
great-tailed grackle	1	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
grebe sp.	2	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
green heron	53	2	1	1	7	3	**10**	4	3	4	2	4	**10**	0	2
green-winged teal	311	18	2	0	1	0	0	0	0	16	17	**105**	75	31	46
gull sp.	1183	74	24	111	13	1	6	11	0	107	54	236	**510**	10	26
gull-billed tern	346	37	90	**115**	102	0	2	0	0	0	0	0	0	0	0
Heermann's gull	8631	0	4	3	7	**1524**	990	791	1013	852	705	1016	978	387	361
Heerman's gull or herring gull	527	9	0	0	0	0	0	**483**	0	0	0	29	6	0	0
herring gull	146	12	0	0	0	0	0	0	1	3	6	29	35	**39**	21
hooded merganser	2	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**
hooded oriole	7	0	0	**4**	2	0	1	0	0	0	0	0	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
horned grebe	671	1	2	3	0	0	0	0	0	3	27	118	57	120	**340**
horned lark	1779	97	61	91	101	106	134	90	83	**227**	163	224	150	34	218
house finch	3377	175	75	200	**533**	273	487	321	129	96	255	293	161	80	299
house sparrow	1369	42	33	123	**241**	112	107	174	62	90	139	45	102	17	82
house wren	3	0	0	0	0	0	0	**1**	0	**1**	0	**1**	0	0	0
hummingbird sp.	5	0	0	0	0	0	0	0	1	0	0	0	1	0	**3**
jaeger sp.	6	0	0	0	0	0	0	**3**	1	0	2	0	0	0	0
killdeer	1497	38	37	36	44	86	69	33	30	163	303	**331**	183	74	70
large-billed savannah sparrow	62	0	0	0	0	0	**40**	6	0	2	5	3	3	2	1
Lazuli bunting	1	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0
least sandpiper	4276	491	78	101	0	177	234	526	**618**	519	128	513	428	102	361
least tern	1238	0	18	135	**826**	110	113	36	0	0	0	0	0	0	0
lesser goldfinch	2	0	0	0	0	0	**2**	0	0	0	0	0	0	0	0
lesser scaup	2641	351	1	6	0	0	0	0	0	169	132	**1134**	356	79	413
lesser yellowlegs	27	5	0	0	0	1	1	**6**	3	4	3	2	1	1	0
Lincoln's sparrow	20	2	0	0	0	0	0	0	0	1	5	**6**	5	0	1
little blue heron	63	5	3	3	4	2	1	1	**13**	7	6	10	3	4	1
loggerhead shrike	21	0	0	1	2	1	3	**4**	1	0	3	0	2	1	3
long-billed curlew	732	67	10	8	48	52	57	65	50	69	67	81	58	**82**	18
long-billed dowitcher	874	1	1	30	33	202	51	**367**	0	60	1	3	35	90	0
loon sp.	3	**2**	0	0	0	0	0	0	0	0	0	0	1	0	0
mallard	2593	89	87	68	122	175	144	209	201	**341**	188	266	298	228	177
marbled godwit	29324	**3730**	1515	1116	1148	1744	1901	2808	2287	2722	1900	3512	2132	2056	753
marsh wren	45	3	0	0	1	0	0	0	2	2	9	**18**	7	1	2
merlin	11	1	0	**3**	0	1	0	1	0	0	1	1	2	1	0
mew gull	33	0	0	0	0	0	0	0	0	0	0	2	**29**	2	0
mourning dove	568	32	32	**112**	72	27	27	44	9	1	57	19	101	0	35
Nashville warbler	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
northern flicker	1	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
northern harrier	89	7	5	2	2	1	2	7	6	5	13	9	**15**	5	10
northern mockingbird	81	4	5	17	**22**	6	2	4	1	1	9	4	1	2	3
northern pintail	1393	9	9	0	0	0	0	18	125	60	**449**	188	195	174	166

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
northern rough-winged swallow	30	8	3	**14**	3	1	0	0	1	0	0	0	0	0	0
northern shoveler	2288	266	83	151	0	0	5	75	253	205	213	**435**	172	171	259
olympic gull (hybrid between glaucous-winged and western gulls)	1	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0
orange-crowned warbler	23	2	1	1	0	0	0	0	0	2	**10**	2	2	1	2
osprey	364	24	23	21	17	13	9	14	32	29	36	**49**	39	16	42
pacific golden-plover	5	1	0	0	0	0	0	0	1	0	1	**2**	0	0	0
pacific loon	46	2	0	0	0	0	3	0	1	2	7	**19**	4	2	6
parasitic jaeger	13	0	0	0	0	0	0	3	**5**	1	2	1	1	0	0
peep sp.	30826	4737	721	1643	0	97	1444	**5759**	699	183	4553	5238	3753	1760	239
peregrine falcon	63	3	4	3	2	3	4	2	3	9	**9**	2	6	6	7
pied-billed grebe	648	11	5	0	3	11	21	17	41	35	**249**	100	90	35	30
red knot	5654	605	265	552	21	202	171	474	**1029**	655	417	565	406	181	111
red phalarope	1	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
red-breasted merganser	380	13	5	4	0	0	0	0	0	16	20	**168**	87	39	28
red-crowned parrot	4	0	0	**4**	0	0	0	0	0	0	0	0	0	0	0
reddish egret	37	2	0	1	0	2	4	6	**8**	3	3	3	3	2	0
redhead	254	0	0	0	0	0	0	0	1	78	**102**	17	34	9	13
red-necked phalarope	20137	0	0	375	10	4005	**5787**	6340	3579	0	1	40	0	0	0
red-shouldered hawk	7	0	0	0	0	0	0	0	1	0	1	**2**	**2**	0	1
red-tailed hawk	76	2	3	2	3	4	0	6	3	6	9	8	**12**	6	**12**
red-throated loon	54	8	0	0	0	0	0	0	1	0	0	**21**	16	7	1
red-winged blackbird	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
ring-billed gull	6125	335	39	30	2	25	22	44	21	200	504	1558	**1577**	1154	614
rock pigeon	10463	331	324	393	446	828	718	911	975	974	817	908	**1051**	893	894
rock wren	2	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0
Ross' goose	4	0	0	0	0	0	0	0	0	0	1	**2**	0	1	0
royal tern	1645	37	19	2	37	183	242	118	**261**	146	104	95	81	158	162
ruby-crowned kinglet	5	0	0	0	0	0	0	0	0	1	**2**	**2**	0	0	0
ruddy duck	823	42	7	24	0	1	0	0	20	107	50	**257**	121	79	115
ruddy turnstone	676	61	25	22	9	63	62	75	35	77	62	**86**	50	32	17
San Diego song sparrow	1	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
sanderling	13819	1035	904	718	105	1472	1397	1199	**2160**	722	679	969	1498	434	527
sandpiper sp.	1411	**865**	3	0	0	0	0	513	0	0	0	0	0	30	0
Savannah sparrow	1414	49	45	102	48	112	**186**	74	123	32	143	184	145	14	157
Say's phoebe	148	3	0	1	3	0	0	2	4	9	26	**34**	30	7	29
scaup sp.	7011	21	0	0	0	0	0	0	0	1	22	278	993	2762	**2934**
scrub jay	1	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
semipalmated plover	7052	**850**	190	515	166	284	467	699	537	687	796	615	540	132	574
semipalmated sandpiper	7	0	0	0	0	0	0	1	**6**	0	0	0	0	0	0
sharp-shinned hawk	1	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0
shearwater sp.	510	0	0	0	0	0	0	**510**	0	0	0	0	0	0	0
shorebird sp.	120	0	**120**	0	0	0	0	0	0	0	0	0	0	0	0
short-billed dowitcher	1148	**441**	1	0	60	370	2	155	18	0	1	6	0	94	0
short-eared owl	8	0	0	0	0	0	0	0	0	3	1	**4**	0	0	0
snow goose	8	0	0	0	0	0	0	0	0	**2**	**2**	1	1	**2**	0
snowy egret	1965	136	111	93	171	142	133	189	**222**	132	124	184	173	86	69
snowy plover	2401	223	53	86	58	154	193	**389**	193	153	218	235	309	22	115
song sparrow	105	**24**	7	7	28	1	0	5	2	1	3	6	9	0	12
spotted sandpiper	268	14	19	30	0	11	11	29	19	28	**33**	27	23	11	13
spotted towhee	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
stilt sandpiper	6	0	0	0	0	0	**5**	0	0	1	0	0	0	0	0
surf scoter	21956	**5089**	194	185	32	2	8	7	9	144	1491	4699	3225	3200	3671
surfbird	290	**123**	12	15	0	15	22	16	15	6	14	18	22	6	6
teal sp.	5	0	0	0	0	0	0	0	0	0	0	**5**	0	0	0
tern sp.	220	0	0	67	0	31	0	**121**	0	0	0	0	0	0	1
Thayer's gull	2	**1**	0	0	0	0	0	0	0	0	0	0	**1**	0	0
Townsend's warbler	3	**1**	0	**1**	0	0	0	0	0	0	0	**1**	0	0	0
tree swallow	55	6	0	2	1	0	0	1	1	16	0	**20**	5	3	0
turkey vulture	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Vaux's swift	28	0	9	**18**	0	0	0	0	1	0	0	0	0	0	0
violet-green swallow	8	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0
wandering tattler	20	0	1	**4**	0	1	**4**	**4**	0	3	0	3	0	0	0
western grebe	4581	472	48	65	3	0	0	0	19	720	246	571	417	388	**1632**

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
western gull	26176	1010	1031	712	1392	2233	2195	**2887**	2372	2675	1762	2756	2121	1631	1399
western kingbird	12	**10**	0	2	0	0	0	0	0	0	0	0	0	0	0
western meadowlark	159	8	9	5	1	0	0	1	0	1	26	2	3	1	**102**
western sandpiper	91445	7889	2866	4573	731	6165	1068	11610	**13033**	10839	1982	9396	8802	6385	6106
western/Clark's grebe	13349	0	2978	2979	61	2	0	2	59	535	**3792**	885	1971	65	20
whimbrel	280	**166**	35	7	4	4	12	7	5	8	7	10	7	5	3
white-crowned sparrow	678	50	23	3	0	0	0	0	7	51	97	88	**230**	15	114
white-faced ibis	31	0	0	0	0	0	0	0	**31**	0	0	0	0	0	0
white-tailed kite	6	0	0	0	0	0	0	0	**2**	1	0	1	2	0	0
white-throated swift	4	0	0	0	0	0	0	0	0	0	0	**4**	0	0	0
white-winged scoter	1	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
willet	22353	2998	892	858	806	1431	1664	**3085**	1761	1936	1395	2362	1521	1186	458
Wilson's phalarope	767	0	0	4	0	112	132	199	**320**	0	0	0	0	0	0
Wilson's warbler	2	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0	0
wrentit	3	0	0	0	**3**	0	0	0	0	0	0	0	0	0	0
yellow warbler	107	0	0	1	0	0	0	0	0	21	**61**	0	24	0	0
yellowlegs sp.	97	0	2	0	0	16	0	0	0	5	7	**66**	0	1	0
Grand Total	397191	44340	16904	23291	15014	28560	27996	55143	42761	42093	35443	**58087**	48651	36202	35077

Data collection problems occurring during the point count surveys are presented in the following list. Problems with data collection occurred for several reasons. In order to complete the shoreline survey for the entire bay over the course of three days, surveyors designed long routes that took advantage of the entire falling tide. This at times necessitated taking a point count observation near the beginning or end of a survey transect, placing it at a non-optimal tide level. Confusion about when to perform both a high and low tide survey also occurred. This most likely occurred because the survey schedule was changed in the middle of the project year and the need to communicate with many field observers. Budget constraints necessitated removing two survey months (months expected to be of low bird abundance), so the high tide surveys were re-distributed to keep them equidistant throughout the survey season. Early high tide survey months for the point counts may have been skipped because observers did not understand that the point counts as well as the shoreline survey were to be conducted twice. Delays in data submission, entry, and analysis meant that these problems were not noticed in sufficient time to rectify them until some survey events had already passed.

Station	Data Problems
1	Missing April and February falling tide data; March, June, September, and December collected on peaking tide
2	Missing April and February falling tide data; no October or March data collected.
3	Missing August falling and April peaking tide data
4	Missing April and February peaking tide data
5	Missing April peaking tide data
6	No problems
7	No problems
8	Missing April falling tide data
9	Missing April falling tide data
10	Missing April peaking tide data
11	Missing April peaking tide data; March data collected on a peaking tide
12	Missing September data
13	March, September, and October data collected on a peaking tide
14	Missing September data
15	Missing April peaking tide data; June data collected at a peaking tide
16	Missing April peaking tide data; no October data collected
17	Missing April and November peaking tide data
18	Missing April peaking tide data
19	Missing April peaking tide data
20	Missing March and October data
21	Missing April peaking tide data; no June data collected
22	No data collected

Table 6-4: Species and number observed during the San Diego Bay avian point count surveys at Stations 1 through 7 during peaking and falling tides. The total column indicates totals for all 21 point count stations summed for this and Tables 6-4 and 6-5. Species are organized from greatest to least number.

		Station and Tide													
		1		2		3		4		5		6		7	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
western sandpiper	19586	8	19	0	0	0	0	0	0	0	0	1	0	0	0
marbled godwit	6224	91	725	29	0	0	0	112	0	6	26	126	16	0	0
peep sp.	4974	0	0	0	0	0	0	0	0	0	0	0	0	0	0
surf scoter	4167	0	4	0	0	69	4	0	0	2	0	9	0	18	0
American wigeon	4127	0	0	0	0	0	0	0	0	0	0	0	0	0	0
willet	3654	11	237	8	0	3	0	9	2	3	12	44	0	0	0
western gull	3538	94	153	177	39	91	68	169	29	126	17	102	70	119	29
black-bellied plover	3095	96	314	15	0	4	0	24	4	1	0	16	5	0	0
brant	3031	0	0	41	0	0	0	22	0	0	0	0	0	0	0
unidentified small sandpiper	2560	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dowitcher sp.	2163	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California gull	1495	16	7	0	1	1	0	2	0	1	0	0	0	3	0
ring-billed gull	1467	8	7	5	0	4	3	2	0	21	9	4	0	1	0
sanderling	1458	225	524	8	0	0	0	66	0	0	0	2	0	0	0
red-necked phalarope	1398	0	0	0	0	0	0	0	0	0	0	0	0	0	0
elegant tern	1223	4	2	21	2	6	6	5	8	2	0	0	0	0	0
brown pelican	1142	2	103	305	150	67	63	18	7	1	0	4	0	6	1
semipalmated plover	1070	4	33	14	0	0	0	12	0	0	0	15	0	0	0
red knot	1064	1	23	0	0	0	0	0	0	0	0	0	0	0	0
lesser scaup	1052	0	0	0	0	0	0	0	0	4	0	16	0	0	0
scaup sp.	1048	0	0	0	0	0	0	0	0	0	0	4	7	0	0
Clark's or western grebe	1029	0	0	2	6	0	0	0	0	0	0	0	0	0	0
dunlin	908	0	0	0	0	0	0	0	0	0	0	0	0	0	0
short-billed dowitcher	869	0	0	0	0	0	0	0	0	0	0	0	0	0	0
rock pigeon	858	0	0	14	9	8	2	87	0	27	20	0	0	151	19
Brandt's cormorant	825	0	0	0	0	385	435	0	0	0	0	0	0	0	0
eared grebe	736	0	5	0	0	14	3	0	0	8	10	11	8	0	0
western grebe	728	0	1	12	0	356	106	0	0	3	21	36	1	0	0
Heermann's gull	662	13	21	206	62	3	3	159	1	23	0	0	0	57	18
double-crested cormorant	628	1	22	23	8	193	71	17	4	5	1	19	11	1	1

		Station and Tide													
		1		2		3		4		5		6		7	
Species	**Total**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**
Forster's tern	581	2	21	3	7	0	0	5	9	4	1	3	0	0	0
northern shoveler	504	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bufflehead	412	0	0	1	0	18	4	3	0	22	29	32	13	0	0
royal tern	373	18	17	3	1	5	0	4	2	1	0	0	0	0	0
gull sp.	360	24	17	15	0	2	0	2	0	0	0	0	0	0	0
western snowy plover	347	58	165	0	0	0	0	0	0	0	0	0	0	0	0
great blue heron	321	0	1	85	23	61	23	29	8	4	1	8	1	0	0
long-billed dowitcher	280	0	0	0	0	0	0	0	0	0	0	0	0	0	0
least sandpiper	226	0	0	0	0	0	0	0	0	0	0	58	56	0	0
snowy egret	212	0	1	13	0	28	7	11	2	17	0	3	3	0	0
American coot	207	0	0	0	0	0	0	0	0	0	0	0	0	0	0
northern pintail	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0
European starling	191	0	1	5	0	0	0	4	0	4	0	3	0	0	0
knot or dowitcher sp.	190	0	0	0	0	0	0	0	0	0	0	0	0	0	0
black skimmer	189	0	0	2	0	2	0	0	0	0	0	0	0	0	0
Caspian tern	186	0	2	6	2	0	0	4	0	1	0	3	0	0	0
ruddy turnstone	185	10	12	2	0	0	0	4	0	0	0	5	0	0	0
greater scaup	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0
great egret	169	0	0	14	0	55	9	6	0	1	0	0	0	0	0
killdeer	146	0	2	37	5	0	0	8	0	0	0	4	1	0	0
California least tern	145	0	2	1	0	1	0	1	0	0	0	2	0	1	0
herring gull	142	0	0	0	0	12	39	0	0	14	0	1	0	47	10
long-billed curlew	136	0	0	3	0	0	0	5	0	0	0	2	0	0	0
herring gull or Heermann's gull	134	0	0	0	0	12	2	0	0	8	0	3	0	79	0
common tern	129	0	0	0	0	0	0	0	0	0	0	0	0	0	0
gadwall	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0
house finch	109	0	10	7	6	0	0	0	0	2	0	0	2	3	0
horned lark	108	0	33	7	0	0	0	3	0	0	0	0	0	0	0
mallard	77	0	0	0	0	0	0	3	0	8	0	8	4	0	0
Savannah sparrow	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
surfbird	76	0	7	0	0	0	0	0	0	0	0	17	0	0	0
green-winged teal	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		Station and Tide													
		1		2		3		4		5		6		7	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
barn swallow	68	4	8	12	8	0	0	1	0	7	0	0	0	1	0
greater yellowlegs	64	0	0	0	0	0	0	0	0	0	0	1	0	0	0
American avocet	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
house sparrow	62	0	0	0	0	0	0	0	0	2	0	0	0	0	0
horned grebe	55	0	0	0	0	0	0	0	0	3	0	1	0	0	0
Royal/Elegant Tern	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0
American crow	51	0	0	0	0	0	0	0	0	5	2	0	3	0	3
Belding's Savannah sparrow	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0
osprey	44	0	0	4	2	1	0	3	1	0	0	0	0	0	0
spotted sandpiper	40	0	0	3	1	1	2	12	3	1	0	6	4	0	0
gull-billed tern	35	0	2	0	0	0	0	2	0	0	0	0	0	0	0
ruddy duck	35	0	0	0	0	0	0	0	0	0	0	0	1	0	0
black turnstone	29	1	2	8	2	0	0	5	0	0	0	0	0	0	0
belted kingfisher	26	0	0	0	0	0	0	0	0	0	0	4	1	0	0
red-breasted merganser	26	0	0	1	1	13	0	0	0	0	1	0	0	0	0
whimbrel	26	0	0	0	0	0	0	1	0	0	0	0	0	0	0
black phoebe	25	0	2	4	1	6	0	2	0	1	0	1	0	1	0
blue-winged teal	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cliff swallow	22	0	0	0	0	0	0	3	0	0	0	0	0	0	0
mourning dove	20	0	0	0	0	0	0	0	1	1	0	0	2	0	0
cinnamon teal	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pied-billed grebe	15	0	0	0	0	0	0	0	0	0	0	2	2	0	0
glaucous-winged gull	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Say's phoebe	14	1	3	1	0	0	0	0	0	0	0	0	0	0	0
Bonaparte's gull	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
tern sp.	12	0	0	0	3	0	0	6	2	0	0	0	0	0	0
black-necked stilt	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
common loon	8	0	2	0	0	1	0	0	1	0	0	0	0	0	0
cormorant sp.	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anna's hummingbird	7	0	0	1	0	0	0	0	0	0	1	1	1	0	0
Brewer's blackbird	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
redhead	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		Station and Tide													
		1		2		3		4		5		6		7	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
reddish egret	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
American pipit	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0
large-billed Savannah sparrow	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vaux's swift	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Audubon's warbler	6	0	0	0	0	0	0	0	0	3	1	0	0	0	0
northern harrier	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red-throated loon	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0
white-crowned sparrow	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
western meadowlark	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clark's grebe	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0
common raven	4	0	0	1	0	0	0	2	0	0	0	1	0	0	0
red-tailed hawk	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Audubon's warbler (yellow-rumped)	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada goose	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snow goose	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
common yellowthroat	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
little blue heron	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
northern mockingbird	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0
parasitic jaeger	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
song sparrow	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
spotted towhee	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
yellowlegs sp.	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellow-rumped warbler	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
American kestrel	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ash-throated flycatcher	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
black-crowned night-heron	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
bushtit	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Cooper's hawk	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
lesser yellowlegs	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Lincoln's sparrow	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
marsh wren	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		Station and Tide													
		1		2		3		4		5		6		7	
Species	**Total**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**
mew gull	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
pacific golden-plover	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pacific loon	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
red-shouldered hawk	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thayer's gull	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
wandering tattler	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
warbling vireo	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hummingbird sp.	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Grand Total	84,606	693	2514	1121	340	1428	850	833	85	344	152	578	213	489	81

Table 6-5: Species and number observed during the San Diego Bay avian point count surveys at Stations 8 through 14 during peaking and falling tides. The total column indicates totals for all 21 point count stations summed for this and Tables 6-3 and 6-5. Species are organized from greatest to lowest abundance.

		Station and Tide													
		8		9		10		11		12		13		14	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
western sandpiper	19586	0	0	0	0	26	0	0	1	146	8	0	5	724	14
marbled godwit	6224	0	0	0	0	149	31	147	28	185	40	13	2	128	206
peep sp.	4974	0	0	0	0	0	0	0	0	0	0	0	0	0	0
surf scoter	4167	0	0	0	0	17	1	7	0	297	592	3	2	60	126
American wigeon	4127	0	0	0	0	0	0	0	0	75	0	0	0	0	0
willet	3654	0	0	0	0	55	9	47	31	49	79	6	8	37	82
western gull	3538	222	81	74	27	68	5	79	58	93	98	90	108	14	3
black-bellied plover	3095	0	0	0	0	6	0	0	0	30	56	5	3	578	2
brant	3031	0	0	0	0	0	0	0	0	45	5	13	8	207	20
unidentified small sandpiper	2560	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dowitcher sp.	2163	0	0	0	0	12	18	11	0	107	0	0	0	465	110
California gull	1495	6	0	22	0	5	0	0	0	0	1	5	0	1	1
ring-billed gull	1467	8	3	17	2	55	1	11	1	1	0	2	0	5	0
sanderling	1458	0	0	0	0	41	1	0	150	74	0	127	42	185	0
red-necked phalarope (northern)	1398	0	0	0	0	0	0	0	0	0	0	0	0	0	0
elegant tern	1223	0	0	0	0	1	0	0	0	2	10	6	100	214	85
brown pelican	1142	5	2	3	0	4	0	1	3	53	105	14	52	9	15
semipalmated plover	1070	0	0	0	0	0	0	0	0	4	0	1	1	358	3
red knot	1064	0	0	0	0	9	1	0	0	0	6	0	0	120	0
lesser scaup	1052	0	0	0	0	13	0	0	0	1	0	0	0	0	4
scaup sp.	1048	0	0	0	0	24	87	8	0	343	300	0	0	0	0
Clark's or western grebe	1029	0	0	0	0	1	0	0	0	14	4	457	480	0	0
dunlin	908	0	0	0	0	0	0	0	0	3	0	0	0	201	0
short-billed dowitcher	869	0	0	0	0	0	0	0	0	0	0	0	0	22	0
rock pigeon	858	12	9	30	18	116	24	0	0	0	0	0	0	0	0
Brandt's cormorant	825	0	0	0	0	0	0	0	0	0	0	0	3	0	0
eared grebe	736	1	1	0	0	17	4	11	2	25	10	1	1	5	9
western grebe	728	1	0	0	0	0	1	1	0	10	0	23	114	0	0
Heermann's gull	662	1	5	4	3	23	2	0	0	0	0	4	34	0	0
double-crested cormorant	628	11	1	0	1	3	0	2	9	12	22	11	27	2	0

		Station and Tide													
		8		9		10		11		12		13		14	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
Forster's tern	581	0	0	0	0	4	0	0	0	4	21	4	7	107	23
northern shoveler	504	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bufflehead	412	0	0	0	0	52	14	17	1	34	14	0	0	12	7
royal tern	373	0	0	0	0	3	0	0	0	3	6	5	3	91	35
gull sp.	360	160	0	138	0	0	0	0	0	0	0	0	0	0	0
western snowy plover	347	0	0	0	0	0	0	9	0	2	0	0	5	59	0
great blue heron	321	1	0	0	3	2	0	1	0	3	3	0	0	3	0
long-billed dowitcher	280	0	0	0	0	0	0	0	0	0	0	0	0	0	0
least sandpiper	226	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snowy egret	212	0	0	1	0	15	1	0	0	7	1	0	0	8	2
American coot	207	0	0	0	0	0	0	0	0	0	0	0	0	0	0
northern pintail	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0
European starling	191	0	2	0	0	118	45	0	0	3	0	1	4	0	0
knot or dowitcher sp.	190	0	0	0	0	0	0	0	0	0	0	0	0	0	0
black skimmer	189	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Caspian tern	186	0	0	0	0	0	0	0	0	0	2	1	3	4	3
ruddy turnstone	185	0	0	0	0	0	0	0	0	4	6	2	0	123	0
greater scaup	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0
great egret	169	0	0	0	0	0	0	0	0	5	0	0	0	3	0
killdeer	146	0	0	0	0	0	0	0	0	4	1	0	0	5	3
California least tern	145	0	0	0	0	0	0	2	0	19	9	11	2	9	4
herring gull	142	5	1	1	1	0	0	1	1	2	0	0	0	0	0
long-billed curlew	136	0	0	0	0	1	0	0	0	7	0	0	0	31	10
herring gull or Heermann's gull	134	18	0	9	0	0	0	0	0	0	0	0	0	1	1
common tern	129	0	0	0	0	0	0	0	0	0	2	0	0	1	8
gadwall	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0
house finch	109	2	2	0	0	1	0	0	0	10	0	1	41	7	0
horned lark	108	0	0	0	0	0	0	0	0	13	0	0	3	1	1
mallard	77	0	0	0	0	30	8	0	0	0	0	0	0	0	0
Savannah sparrow	77	0	0	0	0	0	0	0	0	0	2	0	0	9	17
surfbird	76	0	0	0	0	0	0	0	52	0	0	0	0	0	0
green-winged teal	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		Station and Tide													
		8		9		10		11		12		13		14	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
barn swallow	68	0	0	0	0	0	0	5	0	0	2	2	2	2	4
greater yellowlegs	64	0	0	0	0	1	0	0	0	4	0	0	0	16	0
American avocet	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
house sparrow	62	0	0	0	0	51	9	0	0	0	0	0	0	0	0
horned grebe	55	0	0	0	0	1	0	0	0	8	0	0	0	0	2
Royal/Elegant Tern	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0
American crow	51	1	2	0	0	8	2	17	2	0	0	0	1	0	0
Belding's Savannah sparrow	47	0	0	0	0	0	0	0	0	4	0	0	0	0	0
osprey	44	0	0	0	0	1	1	0	0	4	0	1	2	0	0
spotted sandpiper	40	0	0	0	0	2	0	0	0	0	2	0	0	0	0
gull-billed tern	35	0	0	0	0	0	0	0	0	0	0	2	7	9	7
ruddy duck	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
black turnstone	29	0	0	0	0	0	0	0	0	0	0	0	0	5	0
belted kingfisher	26	0	0	0	0	0	0	0	0	1	0	0	0	0	0
red-breasted merganser	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
whimbrel	26	0	0	0	0	0	0	0	0	1	2	1	0	1	0
black phoebe	25	0	0	0	0	1	1	0	1	1	0	0	0	0	0
blue-winged teal	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cliff swallow	22	0	0	0	0	0	0	2	1	0	0	1	0	0	1
mourning dove	20	0	0	1	2	0	0	0	0	0	0	0	0	0	4
cinnamon teal	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pied-billed grebe	15	0	0	0	0	0	0	0	0	1	0	0	0	0	0
glaucous-winged gull	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Say's phoebe	14	0	0	0	0	0	0	0	0	0	0	2	1	0	0
Bonaparte's gull	12	0	0	0	0	0	0	0	0	0	0	0	0	11	0
tern sp.	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
black-necked stilt	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
common loon	8	0	0	0	0	0	0	1	0	1	0	1	1	0	0
cormorant sp.	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anna's hummingbird	7	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Brewer's blackbird	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0
redhead	7	0	0	0	0	1	0	0	0	1	1	0	0	0	0

		Station and Tide													
		8		9		10		11		12		13		14	
Species	**Total**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**
reddish egret	7	0	0	0	0	0	0	0	0	0	0	0	0	1	1
American pipit	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0
large-billed Savannah sparrow	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vaux's swift	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Audubon's warbler	6	0	1	0	0	0	0	0	1	0	0	0	0	0	0
northern harrier	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0
red-throated loon	5	0	0	0	0	0	0	0	0	0	0	3	1	0	0
white-crowned sparrow	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
western meadowlark	5	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Clark's grebe	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
common raven	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red-tailed hawk	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Audubon's warbler (yellow-rumped)	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0
Canada goose	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snow goose	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unknown	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0
common yellowthroat	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
little blue heron	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0
northern mockingbird	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
parasitic jaeger	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0
song sparrow	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
spotted towhee	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellowlegs sp.	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0
yellow-rumped warbler	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0
American kestrel	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ash-throated flycatcher	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
black-crowned night-heron	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bushtit	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooper's hawk	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
lesser yellowlegs	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln's sparrow	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
marsh wren	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		Station and Tide													
		8		9		10		11		12		13		14	
Species	**Total**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**
mew gull	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pacific golden-plover	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pacific loon	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red-shouldered hawk	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Thayer's gull	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
wandering tattler	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
warbling vireo	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
hummingbird sp.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	84,606	461	111	300	57	940	267	385	343	1716	1412	820	1076	3856	818

Table 6-6: Species and number observed during the San Diego Bay avian point count surveys at Stations 15 through 21 during peaking and falling tides. The total column indicates totals for all 21 point count Stations summed for this and Tables 6-3 and 6-4. Species are sorted form greatest to lowest abundance.

		Station and Tide													
		15		16		17		18		19		20		21	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
western sandpiper	19586	0	0	250	2	1260	1	6486	0	23	0	3650	3	6958	1
marbled godwit	6224	0	0	838	661	551	172	681	20	50	0	754	62	375	0
peep sp.	4974	0	0	3121	0	3	0	500	0	0	0	0	0	1350	0
surf scoter	4167	809	213	416	409	130	30	15	0	566	302	64	2	0	0
American wigeon	4127	0	0	0	20	98	0	3167	520	2	0	84	6	155	0
willet	3654	0	0	647	266	299	30	325	70	30	2	986	42	221	4
western gull	3538	66	21	48	29	10	6	818	56	17	31	46	7	68	12
black-bellied plover	3095	0	0	183	4	43	0	69	0	15	0	675	33	914	0
brant	3031	0	0	36	57	236	100	125	220	16	4	1137	716	23	0
unidentified small sandpiper	2560	0	0	0	0	0	0	600	0	0	0	0	0	1960	0
dowitcher sp.	2163	0	0	73	85	242	90	250	0	4	0	596	45	55	0
California gull	1495	2	0	0	27	17	5	1114	210	4	2	32	2	5	3
ring-billed gull	1467	0	0	36	6	121	80	968	0	22	0	39	2	23	0
sanderling	1458	0	0	1	0	2	0	0	0	0	0	10	0	0	0
red-necked phalarope (northern)	1398	0	0	0	0	0	0	2	0	0	0	0	0	796	600
elegant tern	1223	0	0	0	0	0	0	0	0	5	0	716	26	2	0
brown pelican	1142	3	1	3	2	34	3	8	0	8	14	5	41	27	0
semipalmated plover	1070	0	0	18	0	62	1	16	0	1	0	234	1	292	0
red knot	1064	0	0	334	0	71	30	16	0	1	0	350	2	100	0
lesser scaup	1052	0	0	110	103	0	0	0	4	195	332	20	250	0	0
scaup sp.	1048	0	0	0	0	0	0	0	0	0	0	125	150	0	0
Clark's or western grebe	1029	0	0	0	0	0	0	0	0	1	0	46	18	0	0
dunlin	908	0	0	22	0	87	0	94	0	2	0	117	0	382	0
short-billed dowitcher	869	0	0	0	0	200	0	165	0	0	0	481	0	1	0
rock pigeon	858	2	2	0	0	300	8	0	0	0	0	0	0	0	0
Brandt's cormorant	825	1	1	0	0	0	0	0	0	0	0	0	0	0	0
eared grebe	736	1	0	3	3	0	0	2	2	1	4	9	8	360	197
western grebe	728	0	0	1	0	0	0	1	2	31	7	0	0	0	0
Heermann's gull	662	0	1	0	1	0	1	4	10	0	1	2	0	0	0
double-crested cormorant	628	0	1	0	0	39	14	1	2	61	3	10	9	1	9

		Station and Tide													
		15		16		17		18		19		20		21	
Species	**Total**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**
Forster's tern	581	0	0	8	1	8	0	17	0	49	6	230	8	19	10
northern shoveler	504	0	0	1	0	9	0	128	60	2	0	212	0	72	20
bufflehead	412	0	0	2	0	0	1	2	1	62	11	56	4	0	0
royal tern	373	1	0	0	0	0	0	2	0	0	0	92	6	25	50
gull sp.	360	0	0	0	0	0	0	0	0	0	2	0	0	0	0
western snowy plover	347	0	0	17	0	0	0	0	0	0	0	32	0	0	0
great blue heron	321	7	12	20	0	5	0	7	2	2	1	1	2	2	0
long-billed dowitcher	280	0	0	0	0	11	1	263	0	0	0	0	0	5	0
least sandpiper	226	0	0	11	0	0	0	18	0	79	0	3	0	0	1
snowy egret	212	0	0	11	1	5	0	20	6	9	0	21	1	18	0
American coot	207	0	0	0	0	0	0	157	50	0	0	0	0	0	0
northern pintail	203	0	0	0	0	32	0	12	8	1	0	125	16	4	5
European starling	191	0	1	0	0	0	0	0	0	0	0	0	0	0	0
knot or dowitcher sp.	190	0	0	190	0	0	0	0	0	0	0	0	0	0	0
black skimmer	189	0	0	2	0	4	1	99	0	3	0	45	0	24	5
Caspian tern	186	0	0	2	1	1	0	29	1	3	1	7	5	83	22
ruddy turnstone	185	0	0	0	0	4	1	0	0	0	0	10	2	0	0
greater scaup	170	0	0	0	0	2	6	62	0	0	0	0	100	0	0
great egret	169	0	0	5	1	4	0	8	4	2	2	10	3	37	0
killdeer	146	0	0	0	0	47	25	1	0	0	0	2	1	0	0
California least tern	145	0	0	71	0	4	0	0	0	0	1	4	0	1	0
herring gull	142	2	1	0	0	0	0	0	0	0	0	3	1	0	0
long-billed curlew	136	0	0	10	3	12	0	15	0	1	1	18	0	17	0
herring gull or Heermann's gull	134	0	0	0	0	0	0	0	0	0	0	1	0	0	0
common tern	129	0	0	0	0	0	0	0	0	0	0	118	0	0	0
gadwall	117	0	0	0	0	0	0	64	40	1	0	0	0	12	0
house finch	109	0	1	6	0	5	0	0	0	0	2	1	0	0	0
horned lark	108	0	0	40	5	0	0	0	0	1	0	1	0	0	0
mallard	77	0	0	0	0	0	0	7	0	0	0	0	9	0	0
Savannah sparrow	77	0	0	0	0	2	0	0	0	0	0	20	22	5	0
surfbird	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
green-winged teal	70	0	0	0	0	1	0	54	15	0	0	0	0	0	0

		Station and Tide													
		15		16		17		18		19		20		21	
Species	**Total**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**
barn swallow	68	0	0	0	1	0	0	3	0	2	0	1	2	1	0
greater yellowlegs	64	0	0	12	1	10	0	2	0	0	0	10	1	6	0
American avocet	62	0	0	0	0	2	0	54	0	0	0	0	0	2	4
house sparrow	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
horned grebe	55	0	0	0	0	0	0	0	0	19	13	4	3	0	1
Royal/Elegant Tern	54	0	0	0	0	0	0	54	0	0	0	0	0	0	0
American crow	51	0	0	0	0	0	0	5	0	0	0	0	0	0	0
Belding's Savannah sparrow	47	0	0	4	1	0	0	0	0	15	23	0	0	0	0
osprey	44	1	0	5	0	0	0	3	0	1	4	5	0	2	3
spotted sandpiper	40	0	0	0	0	1	0	2	0	0	0	0	0	0	0
gull-billed tern	35	0	0	0	0	0	0	0	0	1	0	3	0	2	0
ruddy duck	35	0	0	0	0	1	0	31	2	0	0	0	0	0	0
black turnstone	29	0	0	2	0	1	0	0	0	2	0	1	0	0	0
belted kingfisher	26	1	6	2	2	3	0	2	1	0	2	0	0	0	0
red-breasted merganser	26	0	0	0	0	0	0	0	0	10	0	0	0	0	0
whimbrel	26	0	0	8	0	4	0	3	0	2	0	2	0	1	0
black phoebe	25	0	0	1	1	0	0	0	0	0	0	0	1	0	0
blue-winged teal	25	0	0	0	0	0	0	25	0	0	0	0	0	0	0
cliff swallow	22	0	0	1	0	0	0	0	0	0	0	13	0	0	0
mourning dove	20	0	0	0	0	4	0	0	0	0	0	0	5	0	0
cinnamon teal	19	0	0	0	0	0	0	4	0	0	0	0	0	15	0
pied-billed grebe	15	0	0	0	0	2	0	2	0	0	0	5	1	0	0
glaucous-winged gull	14	0	0	0	0	0	0	6	6	0	0	0	1	0	1
Say's phoebe	14	0	0	1	0	0	0	0	0	0	0	2	3	0	0
Bonaparte's gull	12	0	0	0	0	0	0	0	0	0	0	1	0	0	0
tern sp.	12	0	0	0	0	0	0	0	0	0	0	0	0	1	0
black-necked stilt	9	0	0	0	0	0	0	0	0	0	0	0	0	9	0
common loon	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cormorant sp.	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0
Anna's hummingbird	7	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Brewer's blackbird	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
redhead	7	0	0	0	0	0	0	0	0	0	0	0	4	0	0

		Station and Tide													
		15		16		17		18		19		20		21	
Species	Total	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak	fall	peak
reddish egret	7	0	0	1	0	0	0	3	1	0	0	0	0	0	0
American pipit	6	0	0	0	3	0	0	0	0	0	0	0	0	0	0
large-billed Savannah sparrow	6	0	0	0	0	0	0	0	0	3	3	0	0	0	0
Vaux's swift	6	0	0	0	0	0	0	0	0	0	0	6	0	0	0
Audubon's warbler	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
northern harrier	5	0	0	1	0	1	0	0	0	0	0	1	0	0	1
red-throated loon	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
white-crowned sparrow	5	0	0	0	0	0	0	0	0	0	0	4	1	0	0
western meadowlark	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Clark's grebe	4	2	0	0	0	0	0	0	0	1	0	0	0	0	0
common raven	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red-tailed hawk	4	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Audubon's warbler (yellow-rumped)	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada goose	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0
snow goose	3	0	0	0	0	0	0	2	0	0	0	0	1	0	0
unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
common yellowthroat	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
little blue heron	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
northern mockingbird	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
parasitic jaeger	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
song sparrow	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
spotted towhee	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellowlegs sp.	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellow-rumped warbler	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0
American kestrel	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
ash-throated flycatcher	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
black-crowned night-heron	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bushtit	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooper's hawk	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
lesser yellowlegs	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln's sparrow	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
marsh wren	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0

		Station and Tide													
		15		16		17		18		19		20		21	
Species	**Total**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**	**fall**	**peak**
mew gull	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pacific golden-plover	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
pacific loon	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red-shouldered hawk	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thayer's gull	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
wandering tattler	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
warbling vireo	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hummingbird sp.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	84,606	899	261	6575	1700	4003	606	16593	1313	1326	774	11263	1629	14432	949

Table 6-7: Bird abundance at point count station 1 during each survey month. This station is located on the ocean shore of NASNI. This station is missing April and February falling tide data; data from March, June, September, and December were collected on a peaking tide. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
marbled godwit	816	**146**	-	48	64	54	79	126	0	10	119	97	27	-	46
sanderling	749	85	-	55	0	47	50	52	78	62	**190**	11	38	-	81
black-bellied plover	410	10	-	7	1	35	14	2	7	20	85	81	34	-	**114**
willet	248	**157**	-	65	0	11	0	7	0	0	6	1	0	-	1
western gull	247	2	-	3	16	3	44	58	5	**77**	24	4	9	-	2
snowy plover	223	4	-	6	0	4	10	19	6	3	**63**	23	45	-	40
brown pelican	105	0	-	**52**	38	0	0	8	2	0	5	0	0	-	0
gull sp.	41	0	-	7	0	5	0	0	0	0	10	0	**19**	-	0
semipalmated plover	37	0	-	4	0	0	0	6	2	2	1	6	0	-	**16**
royal tern	35	0	-	0	0	0	0	0	1	**12**	5	0	5	-	**12**
Heermann's gull	34	0	-	0	0	**13**	1	10	0	0	10	0	0	-	0
horned lark	33	0	-	0	5	0	0	**15**	0	0	0	13	0	-	0
western sandpiper	27	2	-	0	0	0	0	0	8	0	7	0	0	-	**10**
red knot	24	0	-	0	0	0	0	0	0	1	**19**	4	0	-	0
Forster's tern	23	3	-	2	3	0	0	**7**	0	2	1	3	0	-	2
double-crested cormorant	23	0	-	2	3	0	4	5	0	1	**8**	0	0	-	0
California gull	23	1	-	0	0	8	0	3	0	**6**	1	0	2	-	2
ruddy turnstone	22	0	-	0	0	0	0	0	2	7	2	**9**	1	-	1
ring-billed gull	15	0	-	2	0	0	0	0	0	1	0	1	**7**	-	4
barn swallow	12	2	-	2	3	0	1	0	**4**	0	0	0	0	-	0
house finch	10	0	-	0	0	0	0	0	0	0	0	0	0	-	**10**
surfbird	7	0	-	0	0	0	0	0	0	0	**5**	2	0	-	0
elegant tern	6	0	-	0	0	0	1	1	**4**	0	0	0	0	-	0
eared grebe	5	**5**	-	0	0	0	0	0	0	0	0	0	0	-	0
Say's phoebe	4	0	-	0	0	0	0	0	0	0	0	**2**	1	-	1
surf scoter	4	**2**	-	0	0	0	0	0	0	0	0	**2**	0	-	0
black turnstone	3	0	-	0	0	0	0	0	1	0	0	**2**	0	-	0
caspian tern	2	0	-	0	**2**	0	0	0	0	0	0	0	0	-	0
gull-billed tern	2	0	-	**2**	0	0	0	0	0	0	0	0	0	-	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
California least tern	2	0	-	**2**	0	0	0	0	0	0	0	0	0	-	0
black phoebe	2	0	-	**1**	0	0	0	0	0	0	0	**1**	0	-	0
common loon	2	**1**	-	0	0	0	0	0	0	0	**1**	0	0	-	0
American pipit	2	0	-	0	0	0	0	0	0	0	**1**	**1**	0	-	0
killdeer	2	0	-	0	0	0	0	0	0	0	0	0	0	-	**2**
western grebe	1	**1**	-	0	0	0	0	0	0	0	0	0	0	-	0
snowy egret	1	0	-	0	0	0	0	**1**	0	0	0	0	0	-	0
European starling	1	0	-	0	0	0	0	0	0	0	0	0	0	-	**1**
red-throated loon	1	0	-	0	0	0	0	0	0	0	0	**1**	0	-	0
mew gull	1	0	-	0	0	0	0	0	0	0	0	**1**	0	-	0
parasitic jaeger	1	0	-	0	0	0	0	0	0	**1**	0	0	0	-	0
great blue heron	1	0	-	**1**	0	0	0	0	0	0	0	0	0	-	0
Grand Total	3207	421	-	261	135	180	204	320	120	205	**563**	265	188	-	345

Table 6-8: Bird abundance at point count station 2 during each survey month. This station is located on the bay shore of NASNI, near the weapons pier. This station is missing April and February falling tide data; data from March and October was not collected. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
brown pelican	455	-	-	0	3	89	73	**177**	-	24	77	3	8	-	1
Heermann's gull	268	-	-	0	0	**130**	48	70	-	6	14	0	0	-	0
western gull	216	-	-	**73**	28	13	7	14	-	10	32	10	13	-	16
great blue heron	108	-	-	2	7	16	14	11	-	17	9	**20**	11	-	1
killdeer	42	-	-	6	1	0	2	6	-	**24**	3	0	0	-	0
brant	41	-	-	0	0	0	0	0	-	0	0	0	0	-	**41**
double-crested cormorant	31	-	-	3	3	1	5	1	-	0	3	0	**10**	-	5
marbled godwit	29	-	-	3	0	3	0	0	-	0	0	**11**	8	-	4
rock pigeon	23	-	-	1	**6**	2	5	1	-	0	4	0	4	-	0
elegant tern	23	-	-	**12**	0	2	2	7	-	0	0	0	0	-	0
barn swallow	20	-	-	2	6	2	**8**	2	-	0	0	0	0	-	0
black-bellied plover	15	-	-	0	0	0	0	0	-	3	0	**5**	3	-	4
gull sp.	15	-	-	0	0	0	0	**15**	-	0	0	0	0	-	0
semipalmated plover	14	-	-	3	0	0	0	**10**	-	0	0	0	0	-	1
great egret	14	-	-	0	0	0	0	1	-	3	0	**5**	4	-	1
snowy egret	13	-	-	0	1	2	0	0	-	0	0	3	**6**	-	1
house finch	13	-	-	**3**	0	**3**	**3**	0	-	0	**3**	1	0	-	0
western grebe	12	-	-	0	0	0	0	0	-	**12**	0	0	0	-	0
black turnstone	10	-	-	1	0	0	0	**6**	-	0	2	0	1	-	0
Forster's tern	10	-	-	0	0	0	0	0	-	0	**7**	3	0	-	0
western/Clark's grebe	8	-	-	0	0	0	0	0	-	0	**6**	2	0	-	0
willet	8	-	-	0	1	**2**	0	**2**	-	0	0	1	1	-	1
caspian tern	8	-	-	**3**	**3**	0	2	0	-	0	0	0	0	-	0
sanderling	8	-	-	0	0	0	0	0	-	0	0	0	**5**	-	3
horned lark	7	-	-	0	0	**5**	0	0	-	2	0	0	0	-	0
osprey	6	-	-	0	0	0	0	0	-	1	**2**	**2**	1	-	0
ring-billed gull	5	-	-	0	0	0	0	0	-	0	0	1	0	-	**4**
European starling	5	-	-	0	0	0	0	0	-	0	0	0	**5**	-	0
black phoebe	5	-	-	**1**	0	0	0	0	-	**1**	**1**	**1**	**1**	-	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
spotted sandpiper	4	-	-	0	0	0	0	0	-	**2**	1	0	1	-	0
royal tern	4	-	-	0	0	0	0	0	-	**2**	1	0	1	-	0
tern sp.	3	-	-	0	0	0	**3**	0	-	0	0	0	0	-	0
long-billed curlew	3	-	-	0	**1**	**1**	0	**1**	-	0	0	0	0	-	0
red-tailed hawk	2	-	-	0	**1**	0	0	0	-	0	0	0	**1**	-	0
ruddy turnstone	2	-	-	0	0	0	0	0	-	0	0	0	0	-	**2**
black skimmer	2	-	-	0	**2**	0	0	0	-	0	0	0	0	-	0
red-breasted merganser	2	-	-	0	0	0	0	0	-	**1**	**1**	0	0	-	0
Anna's hummingbird	1	-	-	**1**	0	0	0	0	-	0	0	0	0	-	0
California least tern	1	-	-	0	**1**	0	0	0	-	0	0	0	0	-	0
bufflehead	1	-	-	0	0	0	0	0	-	0	0	0	**1**	-	0
California gull	1	-	-	0	0	0	**1**	0	-	0	0	0	0	-	0
wandering tattler	1	-	-	0	0	0	**1**	0	-	0	0	0	0	-	0
common raven	1	-	-	**1**	0	0	0	0	-	0	0	0	0	-	0
Say's phoebe	1	-	-	0	0	0	0	0	-	0	0	0	**1**	-	0
Grand Total	1461	-	-	115	64	271	174	**324**	-	108	166	68	86	-	85

Table 6-9: Bird abundance at point count station 3 during each survey month. This station is located on the bay side of the Point Loma shoreline. This station is missing August falling and April peaking tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
Brandt's cormorant	820	4	30	-	0	-	0	275	9	35	**435**	30	2	0	0
western grebe	462	81	22	-	0	-	0	0	0	78	60	**120**	0	55	46
double-crested cormorant	264	8	**95**	-	2	-	68	0	40	13	2	0	0	35	1
western gull	159	13	13	-	35	-	24	9	2	3	**40**	5	5	6	4
brown pelican	130	1	0	-	**45**	-	26	5	3	8	30	2	2	1	7
great blue heron	84	6	1	-	6	-	10	10	4	**12**	6	8	7	7	7
surf scoter	73	7	8	-	0	-	0	0	0	2	1	12	**26**	14	3
great egret	64	4	0	-	6	-	0	**16**	8	12	2	1	3	5	7
herring gull	51	0	0	-	0	-	0	10	2	0	**39**	0	0	0	0
snowy egret	35	4	0	-	4	-	1	**18**	1	0	6	1	0	0	0
bufflehead	22	**6**	0	-	0	-	0	0	0	0	0	4	3	5	4
eared grebe	17	1	**8**	-	0	-	0	0	1	0	1	2	0	2	2
herring gull or Heermann's gull	14	2	0	-	0	-	2	0	0	**7**	0	1	2	0	0
red-breasted merganser	13	5	0	-	0	-	0	0	0	0	0	**8**	0	0	0
elegant tern	12	0	0	-	0	-	0	4	0	2	**6**	0	0	0	0
rock pigeon	10	1	0	-	**5**	-	0	2	0	0	0	0	0	0	2
ring-billed gull	7	0	0	-	0	-	0	0	0	0	**3**	**3**	0	1	0
black phoebe	6	1	0	-	1	-	0	0	0	0	0	**3**	1	0	0
Heermann's gull	6	0	0	-	0	-	0	0	0	0	0	0	0	**3**	**3**
royal tern	5	0	0	-	0	-	0	0	**5**	0	0	0	0	0	0
black-bellied plover	4	0	0	-	0	-	0	0	**4**	0	0	0	0	0	0
spotted sandpiper	3	0	0	-	0	-	0	0	0	0	**2**	1	0	0	0
willet	3	0	0	-	0	-	0	**1**	**1**	0	0	0	**1**	0	0
spotted towhee	2	0	0	-	**2**	-	0	0	0	0	0	0	0	0	0
black skimmer	2	0	0	-	**2**	-	0	0	0	0	0	0	0	0	0
gull sp.	2	**2**	0	-	0	-	0	0	0	0	0	0	0	0	0
hummingbird sp.	1	0	0	-	0	-	0	0	0	0	0	0	**1**	0	0
common yellowthroat	1	0	0	-	**1**	-	0	0	0	0	0	0	0	0	0
California least tern	1	0	0	-	**1**	-	0	0	0	0	0	0	0	0	0
osprey	1	0	0	-	0	-	0	0	0	0	0	**1**	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
common loon	1	**1**	0	-	0	-	0	0	0	0	0	0	0	0	0
bushtit	1	0	0	-	**1**	-	0	0	0	0	0	0	0	0	0
Clark's grebe	1	0	0	-	0	-	0	0	0	**1**	0	0	0	0	0
California gull	1	**1**	0	-	0	-	0	0	0	0	0	0	0	0	0
Grand Total	2278	148	177	-	111	-	131	350	80	173	**633**	202	53	134	86

Table 6-10: Bird abundance at point count station 4 during each survey month. This station is located on the NASNI bay shoreline. This station is missing April and February peaking tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western gull	198	3	21	-	13	16	14	**64**	5	11	15	17	10	9	-
Heermann's gull	160	0	0	-	0	51	0	**101**	6	0	1	0	0	1	-
marbled godwit	112	**34**	18	-	0	2	0	8	6	4	0	12	10	18	-
rock pigeon	87	9	2	-	0	0	0	0	0	**76**	0	0	0	0	-
sanderling	66	7	**38**	-	0	0	0	0	8	0	0	1	12	0	-
great blue heron	37	1	1	-	7	3	5	3	1	2	3	1	2	**8**	-
black-bellied plover	28	2	2	-	0	**4**	0	3	1	3	**4**	**4**	3	2	-
brown pelican	25	1	0	-	3	**6**	2	2	1	3	5	1	0	1	-
brant	22	0	0	-	0	0	0	0	0	0	0	0	**22**	0	-
double-crested cormorant	21	1	0	-	1	1	2	4	0	1	2	0	**8**	1	-
spotted sandpiper	15	**4**	0	-	0	1	2	1	1	2	1	0	2	1	-
Forster's tern	14	2	0	-	0	0	0	0	0	1	**9**	0	2	0	-
snowy egret	13	0	1	-	1	1	2	1	0	**6**	0	0	1	0	-
elegant tern	13	0	0	-	0	3	**8**	2	0	0	0	0	0	0	-
semipalmated plover	12	0	**5**	-	0	0	0	1	0	2	0	3	1	0	-
willet	11	0	0	-	0	**3**	0	1	**3**	0	2	2	0	0	-
killdeer	8	0	0	-	0	0	0	0	0	2	0	0	0	**6**	-
tern sp.	8	0	**4**	-	0	0	2	2	0	0	0	0	0	0	-
royal tern	6	0	0	-	0	0	0	0	1	1	**2**	1	1	0	-
great egret	6	0	0	-	0	0	0	0	0	**3**	0	1	1	1	-
black turnstone	5	0	**5**	-	0	0	0	0	0	0	0	0	0	0	-
long-billed curlew	5	**2**	0	-	0	1	0	0	1	1	0	0	0	0	-
ruddy turnstone	4	**2**	0	-	0	0	0	**2**	0	0	0	0	0	0	-
caspian tern	4	0	1	-	**3**	0	0	0	0	0	0	0	0	0	-
osprey	4	0	0	-	0	0	0	0	0	**1**	**1**	**1**	0	**1**	-
European starling	4	**2**	0	-	0	0	0	0	0	0	0	0	0	**2**	-
cliff swallow	3	0	0	-	**3**	0	0	0	0	0	0	0	0	0	-
horned lark	3	0	**2**	-	1	0	0	0	0	0	0	0	0	0	-
bufflehead	3	0	0	-	0	0	0	0	0	0	0	**2**	1	0	-
mallard	3	**3**	0	-	0	0	0	0	0	0	0	0	0	0	-

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
common raven	2	0	**1**	-	0	0	0	0	0	0	0	0	0	**1**	-
ring-billed gull	2	0	0	-	0	0	0	0	**1**	0	0	0	**1**	0	-
black phoebe	2	0	0	-	0	0	0	0	0	0	0	0	**1**	**1**	-
California gull	2	0	0	-	0	0	0	0	0	0	0	0	0	**2**	-
gull sp.	2	0	0	-	0	**2**	0	0	0	0	0	0	0	0	-
gull-billed tern	2	0	**2**	-	0	0	0	0	0	0	0	0	0	0	-
pacific loon	1	0	0	-	0	0	0	0	0	0	**1**	0	0	0	-
common loon	1	0	0	-	0	0	0	0	0	0	**1**	0	0	0	-
whimbrel	1	0	0	-	0	0	0	**1**	0	0	0	0	0	0	-
mourning dove	1	0	0	-	0	0	**1**	0	0	0	0	0	0	0	-
barn swallow	1	0	**1**	-	0	0	0	0	0	0	0	0	0	0	-
California least tern	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	-
Grand Total	918	73	104	-	33	94	38	**196**	35	119	47	46	78	55	-

Table 6-11: Bird abundance at point count station 5 during each survey month. This station is located on shore north of Harbor Island, near the Old San Diego River Mouth. This station is missing April peaking tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western gull	143	2	7	-	5	14	11	18	15	18	5	**19**	16	12	1
bufflehead	51	11	0	-	0	0	0	0	0	0	**18**	3	7	1	11
rock pigeon	47	0	3	-	9	1	0	12	0	0	**20**	2	0	0	0
marbled godwit	32	2	1	-	0	0	0	0	0	0	8	0	0	3	**18**
ring-billed gull	30	2	0	-	0	0	0	0	2	0	**9**	**9**	3	5	0
western grebe	24	1	0	-	0	0	0	0	0	0	0	0	2	0	**21**
Heermann's gull	23	0	0	-	0	**21**	0	0	0	0	0	0	0	2	0
eared grebe	18	3	0	-	0	0	0	0	0	1	1	3	0	1	**9**
snowy egret	17	**4**	0	-	1	0	0	0	1	0	0	**4**	**4**	3	0
willet	15	1	1	-	0	0	0	0	0	1	2	0	0	0	**10**
herring gull	14	0	0	-	0	0	0	0	**10**	4	0	0	0	0	0
herring gull or Heermann's gull	8	0	0	-	0	0	0	0	0	0	0	**5**	3	0	0
mallard	8	0	1	-	0	0	0	0	0	0	0	**5**	0	2	0
American crow	7	0	0	-	**5**	0	0	0	0	0	2	0	0	0	0
barn swallow	7	0	**4**	-	2	1	0	0	0	0	0	0	0	0	0
double-crested cormorant	6	0	0	-	**1**	0	0	0	**1**	**1**	**1**	**1**	**1**	0	0
Forster's tern	5	0	0	-	0	0	0	0	0	0	0	0	**4**	0	1
great blue heron	5	1	**2**	-	0	0	0	0	0	0	1	0	1	0	0
lesser scaup	4	**4**	0	-	0	0	0	0	0	0	0	0	0	0	0
Audubon's warbler	4	0	0	-	0	0	0	0	0	**1**	**1**	**1**	**1**	0	0
European starling	4	0	1	-	**3**	0	0	0	0	0	0	0	0	0	0
horned grebe	3	0	0	-	0	0	0	0	0	0	0	**2**	1	0	0
elegant tern	2	0	0	-	0	0	0	0	0	**1**	0	0	0	**1**	0
house sparrow	2	0	**2**	-	0	0	0	0	0	0	0	0	0	0	0
house finch	2	0	0	-	**2**	0	0	0	0	0	0	0	0	0	0
surf scoter	2	0	0	-	0	0	0	**1**	**1**	0	0	0	0	0	0
Anna's hummingbird	1	0	0	-	0	0	0	0	0	0	**1**	0	0	0	0
royal tern	1	0	0	-	0	**1**	0	0	0	0	0	0	0	0	0
black-crowned night heron	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
spotted sandpiper	1	0	0	-	0	0	0	0	0	0	0	**1**	0	0	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
brown pelican	1	0	0	-	0	0	0	0	0	0	0	0	0	**1**	0
red-breasted merganser	1	0	0	-	0	0	0	0	0	0	**1**	0	0	0	0
black-bellied plover	1	0	0	-	0	0	0	0	0	0	0	**1**	0	0	0
great egret	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
California gull	1	0	0	-	0	0	0	0	0	**1**	0	0	0	0	0
caspian tern	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
mourning dove	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
black phoebe	1	0	0	-	0	0	0	0	0	0	0	0	**1**	0	0
lesser yellowlegs	1	0	0	-	0	0	0	0	0	0	0	0	0	**1**	0
Grand Total	496	31	22	-	32	38	11	31	30	28	70	56	44	32	71

Table 6-12: Bird abundance at point count station 6 during each survey month. This station is located near the Coast Guard Station in the north-east corner of the bay, near Convair Lagoon. This station is missing no data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western gull	172	11	2	3	2	8	6	5	8	28	**50**	2	23	13	11
marbled godwit	142	**36**	5	0	0	14	16	25	14	0	0	12	11	9	0
least sandpiper	114	11	2	0	0	7	**56**	11	0	0	0	2	25	0	0
bufflehead	45	3	0	0	0	0	0	0	0	0	3	**22**	2	5	10
willet	44	6	0	0	0	1	0	14	**16**	0	0	1	4	2	0
western grebe	37	0	0	0	0	0	0	0	0	7	1	**23**	0	6	0
double-crested cormorant	30	**4**	0	0	0	3	3	0	2	3	**4**	3	0	**4**	**4**
black-bellied plover	21	2	1	4	0	1	1	2	3	0	0	2	**5**	0	0
eared grebe	19	3	0	0	0	0	0	0	0	3	0	0	3	2	**8**
surfbird	17	**17**	0	0	0	0	0	0	0	0	0	0	0	0	0
lesser scaup	16	7	0	0	0	0	0	0	0	0	0	0	**9**	0	0
semipalmated plover	15	0	0	0	0	0	0	0	0	0	0	0	0	**15**	0
mallard	12	0	0	4	0	0	0	0	0	0	0	0	**8**	0	0
scaup sp.	11	0	0	0	0	0	0	0	0	0	0	0	0	4	**7**
spotted sandpiper	10	1	2	0	0	1	1	0	0	1	**3**	0	1	0	0
great blue heron	9	1	0	0	0	0	0	**3**	1	1	1	1	1	0	0
surf scoter	9	1	0	0	0	0	0	0	0	0	0	0	**5**	3	0
snowy egret	6	**2**	0	0	0	0	0	0	0	1	**2**	0	0	0	1
killdeer	5	0	**2**	0	1	1	1	0	0	0	0	0	0	0	0
ruddy turnstone	5	2	0	0	0	0	0	0	0	0	0	0	**3**	0	0
belted kingfisher	5	0	0	0	0	0	0	0	0	1	1	**3**	0	0	0
brown pelican	4	1	0	0	0	0	0	0	0	**2**	0	0	1	0	0
ring-billed gull	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**	0
pied-billed grebe	4	0	0	0	0	0	0	0	0	0	0	0	**2**	0	**2**
American crow	3	0	0	0	0	0	0	0	0	0	**3**	0	0	0	0
Forster's tern	3	0	0	0	0	1	0	**2**	0	0	0	0	0	0	0
caspian tern	3	**2**	0	0	1	0	0	0	0	0	0	0	0	0	0
herring gull or Heermann's gull	3	0	0	0	0	0	0	0	0	0	0	0	**3**	0	0
long-billed curlew	2	0	0	0	0	0	0	0	0	0	0	**2**	0	0	0
mourning dove	2	0	0	0	0	0	**2**	0	0	0	0	0	0	0	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
California least tern	2	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0
Anna's hummingbird	2	0	0	0	0	0	0	0	0	**1**	0	0	0	0	**1**
house finch	2	0	0	0	0	0	**2**	0	0	0	0	0	0	0	0
sanderling	2	0	0	0	0	0	0	0	0	0	0	0	**2**	0	0
European starling	2	0	0	0	0	0	0	**2**	0	0	0	0	0	0	0
black phoebe	1	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
common raven	1	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0
horned grebe	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0
European starling	1	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
western sandpiper	1	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
greater yellowlegs	1	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
northern mockingbird	1	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0
ruddy duck	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
herring gull	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Grand Total	791	**112**	15	11	5	37	89	64	45	49	68	74	109	68	45

Table 6-13: Bird abundance at point count station 7 during each survey month. This station is located on the cruise ship terminal pier. This station is missing no data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
rock pigeon	170	1	0	2	**60**	40	6	1	8	6	5	4	25	6	6
western gull	148	7	7	0	**43**	23	13	4	11	5	6	12	4	3	10
herring gull or Heermann's gull	79	0	0	0	0	0	0	0	0	0	0	22	**57**	0	0
Heermann's gull	75	0	0	0	0	**32**	7	0	0	0	0	0	0	25	11
herring gull	57	0	0	0	0	0	0	**30**	10	7	10	0	0	0	0
surf scoter	18	**18**	0	0	0	0	0	0	0	0	0	0	0	0	0
brown pelican	7	0	0	0	1	**2**	0	0	0	0	0	0	**2**	1	1
American crow	3	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
California gull	3	0	0	0	0	0	0	0	0	0	0	0	**3**	0	0
house finch	3	0	0	0	**3**	0	0	0	0	0	0	0	0	0	0
double-crested cormorant	2	0	0	0	0	0	0	0	0	**1**	0	0	0	0	**1**
California least tern	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
black phoebe	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
ring-billed gull	1	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
northern mockingbird	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
barn swallow	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
Grand Total	570	26	7	2	**111**	97	26	35	29	19	21	38	92	35	32

Table 6-14: Bird abundance at point count station 8 during each survey month. This station is located just offshore of the Convention Center south the Embarcadero Marina Park South and is missing April falling tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western gull	303	9	-	7	7	38	22	**43**	29	36	34	30	24	6	18
gull sp.	160	0	-	0	0	0	0	0	0	0	0	60	**100**	0	0
rock pigeon	21	2	-	**8**	0	2	0	1	2	0	1	0	3	2	0
herring gull or Heermann's gull	18	0	-	0	0	0	0	0	0	0	0	**9**	**9**	0	0
double-crested cormorant	12	2	-	0	1	1	1	**4**	0	1	0	1	1	0	0
ring-billed gull	11	0	-	0	0	0	0	0	0	0	0	**4**	1	3	3
Brewer's blackbird	7	0	-	0	0	0	0	**7**	0	0	0	0	0	0	0
brown pelican	7	0	-	0	0	0	1	0	0	1	1	0	**4**	0	0
Heermann's gull	6	0	-	0	0	1	1	0	0	0	0	0	0	0	**4**
California gull	6	1	-	0	0	0	0	0	0	0	0	**2**	**2**	1	0
herring gull	6	0	-	0	0	0	0	1	**3**	1	1	0	0	0	0
house finch	4	**2**	-	**2**	0	0	0	0	0	0	0	0	0	0	0
American crow	3	0	-	0	0	0	0	0	0	1	**2**	0	0	0	0
eared grebe	2	**1**	-	**1**	0	0	0	0	0	0	0	0	0	0	0
European starling	2	0	-	**2**	0	0	0	0	0	0	0	0	0	0	0
Audubon's warbler	1	0	-	0	0	0	0	0	0	0	**1**	0	0	0	0
belted kingfisher	1	0	-	0	0	0	0	0	0	0	0	0	0	0	**1**
western grebe	1	0	-	0	0	0	0	0	0	**1**	0	0	0	0	0
great blue heron	1	0	-	0	**1**	0	0	0	0	0	0	0	0	0	0
Grand Total	572	17	-	20	9	42	25	56	34	41	40	106	**144**	12	26

Table 6-15: Bird abundance at point count station 9 during each survey month. This station is located in the center of the bay front of the 10th Avenue Marine Terminal and is missing April falling tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
gull sp.	138	3	-	0	0	0	0	0	0	0	0	20	**115**	0	0
western gull	101	6	-	4	8	13	13	1	7	6	2	**27**	6	0	8
rock pigeon	48	0	-	1	1	**11**	**11**	0	2	0	0	10	1	5	6
California gull	22	0	-	0	0	0	0	0	0	0	0	2	**17**	3	0
ring-billed gull	19	0	-	0	0	0	0	0	0	2	0	0	3	**12**	2
herring gull or Heermann's gull	9	0	-	0	0	0	0	0	0	0	0	**5**	4	0	0
Heermann's gull	7	0	-	0	0	0	0	0	0	0	0	0	0	**4**	3
great blue heron	3	0	-	0	0	0	0	0	0	0	0	0	0	0	**3**
mourning dove	3	0	-	**1**	0	0	0	**1**	0	0	**1**	0	0	0	0
brown pelican	3	0	-	0	**3**	0	0	0	0	0	0	0	0	0	0
herring gull	2	0	-	0	0	0	0	0	0	**1**	**1**	0	0	0	0
snowy egret	1	0	-	0	0	0	0	0	0	0	0	0	0	**1**	0
double-crested cormorant	1	0	-	0	0	0	0	0	0	0	**1**	0	0	0	0
Grand Total	357	9	-	6	12	24	24	2	9	9	5	64	**146**	25	22

Table 6-16: Bird abundance at point count station 10 during each survey month. This station is located at the base of the Coronado Bridge on Coronado and is missing April peaking tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
marbled godwit	180	3	**38**	-	36	9	0	4	5	21	0	6	10	17	31
European starling	163	0	0	-	0	0	45	**100**	18	0	0	0	0	0	0
rock pigeon	140	3	21	-	0	0	2	18	**50**	8	22	6	10	0	0
scaup sp.	111	0	0	-	0	0	0	0	0	0	0	0	0	24	**87**
western gull	73	10	2	-	6	**25**	2	8	4	3	2	3	2	5	1
bufflehead	66	**18**	0	-	0	0	0	0	0	0	3	15	6	13	11
willet	64	5	1	-	5	8	0	**22**	3	2	0	2	2	5	9
house sparrow	60	0	0	-	1	10	4	**23**	12	3	5	0	2	0	0
ring-billed gull	56	7	0	-	0	0	0	0	0	0	0	2	13	**33**	1
sanderling	42	0	0	-	0	0	0	0	0	0	0	0	12	**29**	1
mallard	38	4	0	-	5	5	0	0	0	**8**	0	5	0	3	**8**
dowitcher sp.	30	0	0	-	0	0	0	0	0	0	0	0	4	8	**18**
western sandpiper	26	0	0	-	0	0	0	0	0	0	0	0	1	**25**	0
Heermann's gull	25	0	0	-	0	1	0	4	3	3	2	**5**	4	3	0
eared grebe	21	**4**	1	-	0	0	0	0	0	3	2	3	2	**4**	2
surf scoter	18	5	0	-	0	0	0	0	0	0	0	0	5	**7**	1
snowy egret	16	2	**5**	-	1	3	0	1	0	1	0	2	0	0	1
lesser scaup	13	**8**	0	-	0	0	0	0	0	0	0	0	5	0	0
red knot	10	0	0	-	0	0	0	0	0	0	0	0	1	**8**	1
American crow	10	0	0	-	**5**	2	1	1	0	0	1	0	0	0	0
black-bellied plover	6	0	0	-	0	0	0	0	0	1	0	1	**2**	**2**	0
California gull	5	0	0	-	0	0	0	0	0	0	0	0	0	**5**	0
brown pelican	4	0	**1**	-	**1**	0	0	0	0	**1**	0	**1**	0	0	0
Forster's tern	4	0	0	-	1	0	0	1	0	0	0	0	0	**2**	0
double-crested cormorant	3	**2**	0	-	1	0	0	0	0	0	0	0	0	0	0
royal tern	3	0	0	-	0	0	0	**1**	0	0	0	0	**1**	**1**	0
great blue heron	2	0	0	-	**1**	0	0	0	0	0	0	**1**	0	0	0
osprey	2	0	0	-	0	0	**1**	0	0	0	0	0	**1**	0	0
black phoebe	2	**1**	0	-	0	0	0	0	0	0	0	0	0	0	**1**
spotted sandpiper	2	0	0	-	0	0	0	0	0	0	0	0	**1**	**1**	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
greater yellowlegs	1	0	0	-	0	0	0	0	0	0	0	**1**	0	0	0
yellow-rumped warbler	1	0	0	-	0	0	0	0	0	0	0	0	0	0	0
western/Clark's grebe	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
long-billed curlew	1	0	0	-	0	0	0	0	0	0	0	0	0	**1**	0
western grebe	1	0	0	-	0	0	0	0	0	0	0	0	0	0	0
ash-throated flycatcher	1	0	**1**	-	0	0	0	0	0	0	0	0	0	0	0
Anna's hummingbird	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
redhead	1	0	0	-	0	0	0	0	0	0	0	0	0	**1**	0
horned grebe	1	0	0	-	0	0	0	0	0	0	0	**1**	0	0	0
house finch	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
elegant tern	1	0	0	-	0	0	0	**1**	0	0	0	0	0	0	0
warbling vireo	1	0	**1**	-	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1207	72	71	-	66	63	55	184	95	54	39	54	84	197	173

Table 6-17: Bird abundance at point count station 11 during each survey month. This station is located in Glorietta Bay on a small sandy shore of the Coronado Golf Course. This station is missing April peaking tide data; March data was collected on a peaking tide. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
marbled godwit	175	28	**60**	-	0	0	0	33	48	6	0	0	0	0	0
sanderling	150	**150**	0	-	0	0	0	0	0	0	0	0	0	0	0
western gull	137	4	13	-	8	27	**39**	2	3	3	5	20	2	1	10
willet	78	**31**	2	-	1	0	0	10	28	5	0	0	1	0	0
surfbird	52	**52**	0	-	0	0	0	0	0	0	0	0	0	0	0
American crow	19	0	**5**	-	2	1	0	0	**5**	2	0	0	2	0	2
bufflehead	18	0	0	-	0	0	0	0	0	0	0	7	**10**	0	1
eared grebe	13	0	**5**	-	0	0	0	0	0	0	1	4	0	2	1
ring-billed gull	12	0	0	-	0	0	0	0	0	1	0	**10**	0	0	1
double-crested cormorant	11	0	0	-	1	0	0	0	0	0	0	1	0	0	**9**
dowitcher sp.	11	0	0	-	0	0	0	2	**9**	0	0	0	0	0	0
snowy plover	9	0	**9**	-	0	0	0	0	0	0	0	0	0	0	0
scaup sp.	8	0	0	-	0	0	0	0	0	0	0	**8**	0	0	0
surf scoter	7	0	0	-	0	0	0	0	0	0	0	**7**	0	0	0
barn swallow	5	0	0	-	2	**3**	0	0	0	0	0	0	0	0	0
brown pelican	4	0	1	-	0	0	0	0	0	0	0	0	0	0	**3**
Audubon's warbler (yellow-rumped)	4	0	0	-	0	0	0	0	0	0	0	**4**	0	0	0
cliff swallow	3	0	0	-	**2**	0	1	0	0	0	0	0	0	0	0
California least tern	2	0	0	-	**2**	0	0	0	0	0	0	0	0	0	0
herring gull	2	0	0	-	0	0	0	**1**	0	0	**1**	0	0	0	0
Audubon's warbler	1	0	0	-	0	0	0	0	0	0	**1**	0	0	0	0
common loon	1	0	0	-	0	0	0	0	0	0	0	0	**1**	0	0
western grebe	1	0	0	-	0	0	0	0	0	0	0	0	**1**	0	0
red-shouldered hawk	1	0	0	-	0	0	0	0	0	0	**1**	0	0	0	0
western sandpiper	1	0	0	-	0	0	0	0	0	0	**1**	0	0	0	0
little blue heron	1	0	0	-	0	0	0	0	0	**1**	0	0	0	0	0
black phoebe	1	0	0	-	0	0	0	0	0	0	0	0	0	0	**1**
great blue heron	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
Grand Total	728	**265**	95	-	19	31	40	48	93	18	10	61	17	3	28

Table 6-18: Bird abundance at point count station 12 during each survey month. This station is located on Delta Beach North and is missing September data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
surf scoter	889	2	10	1	0	0	0	-	0	0	230	29	156	100	**361**
scaup sp.	643	0	0	0	0	0	0	-	0	0	0	0	20	323	**300**
marbled godwit	225	6	23	40	0	40	0	-	1	25	0	**80**	0	10	0
western gull	191	26	22	**48**	0	21	10	-	20	2	35	1	0	1	5
brown pelican	158	0	18	**72**	0	25	20	-	10	0	13	0	0	0	0
western sandpiper	154	16	0	8	0	9	0	-	0	1	0	25	36	**59**	0
willet	128	5	26	**75**	2	6	4	-	1	1	0	6	1	1	0
dowitcher sp.	107	0	0	0	7	2	0	-	0	2	0	35	1	**60**	0
black-bellied plover	86	1	13	**40**	3	1	0	-	2	1	16	4	3	2	0
American wigeon	75	0	0	0	0	0	0	-	0	0	0	0	0	**75**	0
sanderling	74	13	**30**	0	0	0	0	-	0	0	0	4	23	4	0
brant	50	0	0	0	0	0	0	-	0	0	0	0	0	**45**	5
bufflehead	48	7	3	0	0	0	0	-	0	0	6	**16**	7	1	8
eared grebe	35	3	3	3	0	0	0	-	0	0	0	**13**	2	4	7
double-crested cormorant	34	0	1	1	0	1	4	-	10	0	5	0	0	0	**12**
California least tern	28	0	0	9	**19**	0	0	-	0	0	0	0	0	0	0
Forster's tern	25	0	0	5	0	1	**16**	-	0	0	0	0	1	2	0
western/Clark's grebe	18	0	**13**	2	0	0	0	-	0	0	0	0	1	0	2
horned lark	13	**10**	0	0	1	2	0	-	0	0	0	0	0	0	0
elegant tern	12	2	0	0	0	0	**10**	-	0	0	0	0	0	0	0
ruddy turnstone	10	0	0	**6**	0	1	0	-	0	1	0	0	2	0	0
western grebe	10	**10**	0	0	0	0	0	-	0	0	0	0	0	0	0
house finch	10	0	0	0	4	**6**	0	-	0	0	0	0	0	0	0
royal tern	9	0	0	0	0	1	**6**	-	1	1	0	0	0	0	0
snowy egret	8	1	1	1	0	0	0	-	0	**2**	0	1	1	1	0
horned grebe	8	0	1	0	0	0	0	-	0	1	0	**3**	0	**3**	0
long-billed curlew	7	1	0	0	0	0	0	-	1	**2**	0	1	0	**2**	0
great blue heron	6	0	0	**2**	0	0	0	-	0	**2**	0	1	0	0	1
red knot	6	0	0	**6**	0	0	0	-	0	0	0	0	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
great egret	5	0	1	0	0	0	0	-	0	**2**	0	0	1	1	0
killdeer	5	0	0	0	0	1	1	-	0	0	0	**3**	0	0	0
semipalmated plover	4	0	0	0	0	0	0	-	0	0	0	**4**	0	0	0
osprey	4	0	1	0	0	0	0	-	0	0	0	0	**2**	1	0
Belding's savannah sparrow	4	**4**	0	0	0	0	0	-	0	0	0	0	0	0	0
greater yellowlegs	4	1	0	0	0	0	0	-	0	0	0	1	0	**2**	0
whimbrel	3	0	0	**2**	0	0	0	-	0	1	0	0	0	0	0
European starling	3	**3**	0	0	0	0	0	-	0	0	0	0	0	0	0
dunlin	3	1	0	0	0	0	0	-	0	0	0	0	**2**	0	0
barn swallow	2	0	0	**2**	0	0	0	-	0	0	0	0	0	0	0
spotted sandpiper	2	0	0	0	0	0	0	-	0	0	0	0	0	0	**2**
snowy plover	2	0	0	0	0	0	0	-	0	0	0	**2**	0	0	0
savannah sparrow	2	0	0	**2**	0	0	0	-	0	0	0	0	0	0	0
redhead	2	0	0	0	0	0	0	-	0	0	0	0	0	**1**	**1**
herring gull	2	**1**	0	0	0	0	0	-	0	0	0	0	0	**1**	0
common tern	2	0	0	0	0	0	**2**	-	0	0	0	0	0	0	0
caspian tern	2	0	0	**2**	0	0	0	-	0	0	0	0	0	0	0
little blue heron	1	0	0	0	0	0	0	-	0	0	0	0	0	**1**	0
common loon	1	0	0	0	0	0	0	-	0	0	0	0	**1**	0	0
belted kingfisher	1	0	0	0	0	0	0	-	0	0	0	**1**	0	0	0
black phoebe	1	0	0	0	0	0	0	-	0	0	0	**1**	0	0	0
lesser scaup	1	**1**	0	0	0	0	0	-	0	0	0	0	0	0	0
California gull	1	0	0	**1**	0	0	0	-	0	0	0	0	0	0	0
pied-billed grebe	1	0	0	0	0	0	0	-	0	0	0	**1**	0	0	0
ring-billed gull	1	0	0	0	0	0	0	-	0	0	0	0	**1**	0	0
Grand Total	3126	114	166	328	36	117	73	-	46	44	305	232	261	700	**704**

Table 6-19: Bird abundance at point count station 13 during each survey month. This station is located on the Silver Strand Oceanside beach across from Fiddler's Cove. March, September, and October data for this station were collected on a peaking tide. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western/Clark's grebe	937	0	400	**450**	0	0	0	0	0	50	30	7	0	0	0
western gull	198	4	4	5	19	11	34	13	**40**	31	6	6	15	4	6
sanderling	169	6	12	2	0	**76**	6	6	10	33	5	6	0	0	7
western grebe	137	4	0	0	0	0	0	0	0	0	0	0	23	0	**110**
elegant tern	106	3	0	0	1	5	11	**70**	16	0	0	0	0	0	0
brown pelican	66	3	7	14	0	1	7	3	7	2	**18**	2	1	1	0
house finch	42	1	1	2	0	0	1	4	**33**	0	0	0	0	0	0
Heermann's gull	38	0	0	0	0	0	0	5	**26**	2	3	0	2	0	0
double-crested cormorant	38	2	0	5	6	4	**12**	3	1	1	3	0	0	0	1
brant	21	0	0	0	0	0	0	0	0	0	0	0	0	**13**	8
marbled godwit	15	0	0	0	0	**13**	1	0	1	0	0	0	0	0	0
willet	14	0	0	0	2	3	**7**	1	0	0	0	1	0	0	0
California least tern	13	0	0	2	**11**	0	0	0	0	0	0	0	0	0	0
Forster's tern	11	0	1	**5**	1	1	0	0	1	0	1	1	0	0	0
gull-billed tern	9	2	2	**5**	0	0	0	0	0	0	0	0	0	0	0
black-bellied plover	8	0	0	0	1	**3**	1	1	1	1	0	0	0	0	0
royal tern	8	0	0	0	0	**2**	**2**	0	0	1	1	0	1	1	0
California gull	5	0	0	0	0	0	0	0	0	**5**	0	0	0	0	0
surf scoter	5	0	0	0	0	0	0	0	0	0	1	**3**	0	0	1
western sandpiper	5	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**
snowy plover	5	0	0	**3**	0	0	0	1	1	0	0	0	0	0	0
European starling	5	0	0	**4**	1	0	0	0	0	0	0	0	0	0	0
red-throated loon	4	1	0	0	0	0	0	0	0	0	0	**2**	0	1	0
barn swallow	4	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	0
caspian tern	4	0	0	**2**	1	0	1	0	0	0	0	0	0	0	0
osprey	3	0	0	0	1	0	**2**	0	0	0	0	0	0	0	0
Brandt's cormorant	3	0	0	0	0	0	0	0	**3**	0	0	0	0	0	0
Say's phoebe	3	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	**1**
horned lark	3	**2**	0	1	0	0	0	0	0	0	0	0	0	0	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
common loon	2	0	0	0	0	0	0	0	**1**	0	0	0	0	**1**	0
eared grebe	2	0	0	0	0	0	0	0	0	0	0	**1**	0	0	**1**
ring-billed gull	2	0	0	0	0	**1**	0	0	0	0	0	0	0	**1**	0
semipalmated plover	2	0	0	0	0	0	0	**1**	0	0	0	**1**	0	0	0
ruddy turnstone	2	0	0	0	**2**	0	0	0	0	0	0	0	0	0	0
black skimmer	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
whimbrel	1	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
cliff swallow	1	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
American crow	1	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
American pipit	1	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
parasitic jaeger	1	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0
northern harrier	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Grand Total	1896	29	427	**502**	50	120	85	108	142	126	69	31	43	23	141

Table 6-20: Bird abundance at point count station 14 during each survey month. This station is located on the north end of Delta Beach South and is missing September data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western sandpiper	738	**175**	100	0	122	65	14	-	80	46	0	25	49	62	0
black-bellied plover	580	32	20	0	27	121	2	-	36	28	0	47	130	**137**	0
dowitcher sp.	575	0	12	0	4	40	110	-	0	47	0	125	105	**132**	0
semipalmated plover	361	85	52	0	19	47	3	-	**100**	7	0	1	47	0	0
marbled godwit	334	8	1	2	4	60	**200**	-	4	1	4	1	10	39	0
elegant tern	299	12	30	0	3	84	**85**	-	**85**	0	0	0	0	0	0
brant	227	34	0	0	0	0	0	-	0	0	0	40	**90**	43	20
dunlin	201	**65**	31	0	0	0	0	-	4	24	0	6	21	50	0
surf scoter	186	5	0	1	0	0	0	-	0	0	**120**	1	4	50	5
sanderling	185	25	13	0	**72**	30	0	-	0	3	0	8	9	25	0
Forster's tern	130	6	**56**	2	1	0	21	-	3	0	0	28	10	3	0
royal tern	126	5	0	0	0	**50**	35	-	18	0	0	1	13	4	0
ruddy turnstone	123	23	12	0	0	0	0	-	0	1	0	0	4	**83**	0
red knot	120	13	27	0	1	2	0	-	0	1	0	10	**36**	30	0
willet	119	0	0	0	2	20	**75**	-	1	5	5	8	0	1	2
snowy plover	59	**18**	7	0	0	10	0	-	10	7	0	5	0	2	0
long-billed curlew	41	1	2	2	7	6	8	-	3	0	0	0	3	**9**	0
savannah sparrow	26	0	2	6	2	0	**8**	-	0	0	3	0	5	0	0
brown pelican	24	0	8	**12**	0	0	0	-	0	1	1	0	0	0	2
short-billed dowitcher	22	5	0	0	0	0	0	-	**17**	0	0	0	0	0	0
bufflehead	19	0	0	0	0	0	0	-	0	0	0	**7**	3	2	**7**
western gull	17	0	0	1	3	2	1	-	0	1	1	**5**	0	3	0
greater yellowlegs	16	0	0	0	1	2	0	-	**6**	3	0	3	1	0	0
gull-billed tern	16	2	7	**7**	0	0	0	-	0	0	0	0	0	0	0
eared grebe	14	0	0	2	0	0	0	-	0	0	**5**	3	0	2	2
California least tern	13	0	2	3	**7**	0	1	-	0	0	0	0	0	0	0
Bonaparte's gull	11	0	**11**	0	0	0	0	-	0	0	0	0	0	0	0
snowy egret	10	1	0	1	1	**3**	0	-	2	1	1	0	0	0	0
common tern	9	0	0	0	0	0	**8**	-	1	0	0	0	0	0	0
killdeer	8	0	1	0	0	2	**3**	-	1	1	0	0	0	0	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
house finch	7	0	0	0	**7**	0	0	-	0	0	0	0	0	0	0
caspian tern	7	0	**4**	3	0	0	0	-	0	0	0	0	0	0	0
barn swallow	6	0	0	0	0	2	**4**	-	0	0	0	0	0	0	0
ring-billed gull	5	**3**	0	0	0	0	0	-	0	1	0	1	0	0	0
black turnstone	5	0	0	0	0	0	0	-	0	0	0	**4**	1	0	0
western meadowlark	4	0	0	0	0	0	0	-	0	0	0	0	0	0	**4**
lesser scaup	4	0	0	**4**	0	0	0	-	0	0	0	0	0	0	0
mourning dove	4	0	0	0	0	0	**4**	-	0	0	0	0	0	0	0
great egret	3	0	0	0	**1**	0	0	-	0	0	0	**2**	0	0	0
great blue heron	3	0	0	0	0	**3**	0	-	0	0	0	0	0	0	0
yellowlegs sp.	2	0	0	0	0	0	0	-	0	**1**	0	0	**1**	0	0
herring gull or Heerman's gull	2	0	0	0	0	0	0	-	0	0	**1**	**1**	0	0	0
horned grebe	2	0	0	0	0	0	0	-	0	0	0	0	0	0	**2**
California gull	2	0	0	0	0	0	0	-	0	0	0	**1**	0	0	**1**
double-crested cormorant	2	0	**1**	0	0	0	0	-	**1**	0	0	0	0	0	0
reddish egret	2	0	0	0	0	0	0	-	**1**	0	**1**	0	0	0	0
horned lark	2	0	0	0	**1**	0	0	-	0	0	**1**	0	0	0	0
black skimmer	1	0	0	0	0	0	**1**	-	0	0	0	0	0	0	0
whimbrel	1	**1**	0	0	0	0	0	-	0	0	0	0	0	0	0
cliff swallow	1	0	0	0	0	0	**1**	-	0	0	0	0	0	0	0
Grand Total	4674	519	399	46	285	549	**584**	-	373	179	143	333	542	677	45

Table 6-21: Bird abundance at point count station 15 during each survey month. This station is located off the dock front of the National City Marine Terminal and is missing April peaking tide data. June data was also collected on a peaking tide. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
surf scoter	1022	75	0	-	0	0	0	0	0	0	4	257	**300**	177	209
western gull	87	2	1	-	3	3	13	2	**23**	5	1	2	6	22	4
great blue heron	19	0	0	-	0	0	0	0	0	0	**8**	6	1	0	4
belted kingfisher	7	0	0	-	0	0	0	0	0	0	1	1	0	0	**5**
brown pelican	4	0	0	-	0	0	1	0	1	0	0	0	**2**	0	0
rock pigeon	4	0	0	-	**2**	**2**	0	0	0	0	0	0	0	0	0
herring gull	3	0	0	-	0	0	0	**1**	0	0	**1**	0	**1**	0	0
Clark's grebe	2	0	0	-	0	0	0	0	0	0	0	**2**	0	0	0
California gull	2	**2**	0	-	0	0	0	0	0	0	0	0	0	0	0
Brandt's cormorant	2	0	0	-	**1**	0	0	0	0	0	0	**1**	0	0	0
osprey	1	0	0	-	0	0	0	0	0	0	0	0	0	**1**	0
house finch	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
Heerman's gull	1	0	0	-	0	0	0	0	0	0	0	0	0	0	**1**
double-crested cormorant	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
royal tern	1	0	0	-	0	0	0	0	0	0	0	0	**1**	0	0
eared grebe	1	0	0	-	0	0	0	0	0	0	0	**1**	0	0	0
Anna's hummingbird	1	**1**	0	-	0	0	0	0	0	0	0	0	0	0	0
European starling	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
Grand Total	1160	80	1	-	9	5	14	3	24	5	15	270	**311**	200	223

Table 6-22: Bird abundance at point count station 16 during each survey month. This station is located on the shore of D Street Fill and is missing April peaking tide data. October data was not collected. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
peep sp.	3121	0	119	-	0	1	0	99	-	230	0	1080	12	**1580**	0
marbled godwit	1499	0	44	-	75	50	**660**	74	-	267	0	36	28	264	1
willet	913	2	0	-	12	40	**265**	119	-	171	1	53	14	236	0
surf scoter	825	48	0	-	0	0	0	0	-	0	0	182	0	186	**409**
red knot	334	0	50	-	0	0	0	141	-	**143**	0	0	0	0	0
western sandpiper	252	**119**	7	-	20	0	0	0	-	104	2	0	0	0	0
lesser scaup	213	0	0	-	0	0	0	0	-	0	0	0	0	**110**	103
knot / dowitcher	190	0	0	-	0	0	0	0	-	0	0	0	0	**190**	0
black-bellied plover	187	0	5	-	1	9	3	4	-	**122**	0	0	0	42	1
dowitcher sp.	158	0	15	-	0	14	**85**	41	-	3	0	0	0	0	0
brant	93	0	2	-	0	0	0	0	-	30	3	4	0	0	**54**
western gull	77	0	2	-	**24**	0	1	3	-	4	4	7	1	7	**24**
California least tern	71	0	0	-	**71**	0	0	0	-	0	0	0	0	0	0
horned lark	45	0	0	-	3	**29**	0	0	-	8	3	0	0	0	2
ring-billed gull	42	0	0	-	0	0	0	0	-	1	0	**14**	11	10	6
California gull	27	0	0	-	0	0	0	0	-	0	1	0	0	0	**26**
dunlin	22	**14**	0	-	0	0	0	0	-	8	0	0	0	0	0
great blue heron	20	0	0	-	3	0	0	0	-	**14**	0	1	0	2	0
American wigeon	20	0	0	-	0	0	0	0	-	0	0	0	0	0	**20**
semipalmated plover	18	0	**8**	-	1	2	0	0	-	5	0	0	0	2	0
snowy plover	17	0	0	-	0	0	0	0	-	0	0	0	0	**17**	0
long-billed curlew	13	2	0	-	1	**3**	**3**	0	-	1	0	0	1	2	0
greater yellowlegs	13	1	0	-	1	2	1	0	-	**7**	0	0	0	1	0
snowy egret	12	0	3	-	1	1	1	1	-	1	0	**3**	1	0	0
least sandpiper	11	0	0	-	0	1	0	0	-	**10**	0	0	0	0	0
Forster's tern	9	0	**4**	-	2	1	0	1	-	0	1	0	0	0	0
whimbrel	8	**8**	0	-	0	0	0	0	-	0	0	0	0	0	0
great egret	6	0	0	-	1	0	1	0	-	1	0	**2**	1	0	0
eared grebe	6	0	0	-	0	0	0	0	-	1	**2**	**2**	0	0	1
house finch	6	0	0	-	0	2	0	0	-	0	0	**4**	0	0	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
osprey	5	**3**	0	-	0	0	0	0	-	1	0	1	0	0	0
Belding's savannah sparrow	5	0	0	-	**2**	0	0	0	-	0	0	**2**	0	0	1
brown pelican	5	0	0	-	0	0	0	0	-	0	**2**	**2**	1	0	0
belted kingfisher	4	0	0	-	0	0	0	0	-	0	0	1	0	1	**2**
American pipit	3	0	0	-	0	0	0	0	-	0	**2**	0	0	0	1
caspian tern	3	0	**1**	-	**1**	0	**1**	0	-	0	0	0	0	0	0
Canada goose	3	0	0	-	0	0	0	0	-	0	**3**	0	0	0	0
black turnstone	2	0	0	-	0	0	0	0	-	**2**	0	0	0	0	0
black phoebe	2	0	0	-	0	0	0	0	-	**1**	**1**	0	0	0	0
bufflehead	2	**1**	0	-	0	0	0	0	-	0	0	0	**1**	0	0
black skimmer	2	0	0	-	**1**	**1**	0	0	-	0	0	0	0	0	0
western meadowlark	1	0	0	-	**1**	0	0	0	-	0	0	0	0	0	0
western grebe	1	0	0	-	0	0	0	0	-	0	0	**1**	0	0	0
cliff swallow	1	0	0	-	**1**	0	0	0	-	0	0	0	0	0	0
northern shoveler	1	0	0	-	0	0	0	0	-	0	0	**1**	0	0	0
northern harrier	1	0	0	-	0	0	0	0	-	0	0	0	**1**	0	0
Heermann's gull	1	0	0	-	0	0	0	0	-	0	**1**	0	0	0	0
barn swallow	1	0	0	-	0	0	**1**	0	-	0	0	0	0	0	0
reddish egret	1	0	0	-	0	0	0	**1**	-	0	0	0	0	0	0
Say's phoebe	1	0	0	-	0	0	0	0	-	0	0	**1**	0	0	0
red-tailed hawk	1	0	0	-	0	0	0	0	-	0	**1**	0	0	0	0
sanderling	1	0	0	-	0	0	0	0	-	**1**	0	0	0	0	0
Grand Total	8275	198	260	-	222	156	1022	484	-	1136	27	1397	72	**2650**	651

Table 6-23: Bird abundance at point count station 17 during each survey month. This station is located north of the Chula Vista Marina and is missing April and November peaking tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western sandpiper	1261	60	90	-	0	0	1	10	**300**	200	-	250	50	**300**	0
marbled godwit	723	60	2	-	5	30	22	60	30	40	-	40	**272**	12	150
brant	336	14	0	-	0	0	0	0	0	0	-	5	**200**	17	100
dowitcher sp.	332	0	0	-	0	0	0	80	30	80	-	50	2	0	**90**
willet	329	3	3	-	0	20	20	7	100	30	-	30	**101**	5	10
rock pigeon	308	0	0	-	0	10	8	0	0	**150**	-	100	0	40	0
ring-billed gull	201	17	17	-	0	0	0	0	0	2	-	10	40	35	**80**
short-billed dowitcher	200	**200**	0	-	0	0	0	0	0	0	-	0	0	0	0
surf scoter	160	0	0	-	0	0	0	0	0	0	-	**100**	0	30	30
red knot	101	1	0	-	0	0	0	0	0	**40**	-	0	30	0	30
American wigeon	98	0	0	-	0	0	0	0	0	10	-	25	3	**60**	0
dunlin	87	0	2	-	0	0	0	0	0	**80**	-	5	0	0	0
killdeer	72	0	0	-	6	**30**	25	0	6	0	-	5	0	0	0
semipalmated plover	63	0	2	-	0	10	1	6	10	**30**	-	1	2	1	0
double-crested cormorant	53	0	0	-	0	4	2	5	4	5	-	3	0	**18**	12
black-bellied plover	43	4	0	-	0	0	0	6	5	3	-	**15**	5	5	0
brown pelican	37	0	0	-	0	0	0	2	0	3	-	4	**23**	2	3
northern pintail	32	0	0	-	0	0	0	0	0	1	-	**30**	1	0	0
California gull	22	2	0	-	0	0	0	0	0	0	-	0	**10**	5	5
western gull	16	0	0	-	1	0	0	0	1	0	-	2	0	**6**	**6**
long-billed curlew	12	0	0	-	**2**	1	0	1	**2**	1	-	1	**2**	**2**	0
long-billed dowitcher	12	0	0	-	0	**10**	1	0	0	0	-	0	1	0	0
greater yellowlegs	10	1	0	-	1	0	0	1	**4**	0	-	2	0	1	0
northern shoveler	9	0	0	-	0	0	0	0	0	3	-	0	**5**	1	0
cormorant sp.	8	0	0	-	0	0	0	0	0	0	-	0	**8**	0	0
greater scaup	8	0	0	-	0	0	0	0	0	0	-	0	0	2	**6**
Forster's tern	8	1	**5**	-	1	0	0	0	0	0	-	1	0	0	0
ruddy turnstone	5	**2**	0	-	0	**2**	0	0	0	0	-	0	0	0	1
snowy egret	5	0	0	-	**1**	0	0	**1**	0	**1**	-	0	**1**	**1**	0
great blue heron	5	**1**	0	-	**1**	0	0	0	**1**	**1**	-	0	0	**1**	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
house finch	5	0	**5**	-	0	0	0	0	0	0	-	0	0	0	0
black skimmer	5	0	0	-	**2**	**2**	1	0	0	0	-	0	0	0	0
great egret	4	0	0	-	0	1	0	1	**2**	0	-	0	0	0	0
California least tern	4	0	0	-	**4**	0	0	0	0	0	-	0	0	0	0
whimbrel	4	0	0	-	**2**	0	0	0	1	0	-	0	1	0	0
mourning dove	4	0	**4**	-	0	0	0	0	0	0	-	0	0	0	0
belted kingfisher	3	0	**1**	-	0	0	0	0	0	**1**	-	**1**	0	0	0
peep sp.	3	0	0	-	0	**3**	0	0	0	0	-	0	0	0	0
song sparrow	2	0	**2**	-	0	0	0	0	0	0	-	0	0	0	0
American avocet	2	0	0	-	0	0	0	0	0	0	-	0	**2**	0	0
pied-billed grebe	2	0	0	-	0	0	0	0	0	0	-	0	0	**2**	0
sanderling	2	**2**	0	-	0	0	0	0	0	0	-	0	0	0	0
savannah sparrow	2	0	**1**	-	0	0	0	**1**	0	0	-	0	0	0	0
Lincoln's sparrow	1	0	0	-	0	0	0	0	0	0	-	0	**1**	0	0
spotted sandpiper	1	0	0	-	0	0	0	0	**1**	0	-	0	0	0	0
black turnstone	1	**1**	0	-	0	0	0	0	0	0	-	0	0	0	0
Heerman's gull	1	0	0	-	0	0	**1**	0	0	0	-	0	0	0	0
bufflehead	1	0	0	-	0	0	0	0	0	0	-	0	0	0	**1**
Anna's hummingbird	1	0	0	-	0	0	0	0	0	0	-	0	**1**	0	0
common yellowthroat	1	**1**	0	-	0	0	0	0	0	0	-	0	0	0	0
ruddy duck	1	0	**1**	-	0	0	0	0	0	0	-	0	0	0	0
green-winged teal	1	0	0	-	0	0	0	0	0	0	-	0	**1**	0	0
caspian tern	1	0	0	-	0	0	0	0	**1**	0	-	0	0	0	0
northern harrier	1	0	0	-	0	0	0	0	0	0	-	0	**1**	0	0
Grand Total	4609	370	135	-	26	123	82	181	498	681	-	680	763	546	524

Table 6-24: Bird abundance at point count station 18 during each survey month. This station is located just north of the South Bay Power Plant and is missing April peaking tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western sandpiper	6486	300	970	-	0	310	0	606	1000	**1500**	0	500	800	500	0
American wigeon	3687	7	0	-	0	0	0	0	0	**850**	100	800	710	800	420
California gull	1324	0	4	-	0	0	0	0	10	300	50	0	300	**500**	160
peep sp.	1100	500	**600**	-	0	0	0	0	0	0	0	0	0	0	0
ring-billed gull	968	7	61	-	0	0	0	0	0	0	0	300	**400**	200	0
western gull	874	12	1	-	135	80	16	50	110	100	20	**200**	80	50	20
marbled godwit	701	**201**	70	-	16	11	0	53	150	20	0	50	40	70	20
willet	395	72	10	-	3	1	0	55	**80**	1	30	61	20	22	40
brant	345	122	0	-	0	0	0	0	0	3	0	0	0	0	**220**
long-billed dowitcher	263	0	0	-	30	13	0	0	**120**	20	0	0	0	80	0
dowitcher sp.	250	0	8	-	0	0	0	90	0	0	0	**102**	50	0	0
American coot	207	11	1	-	0	0	0	0	2	10	0	20	33	**80**	50
northern shoveler	188	6	2	-	0	0	0	0	0	20	20	**100**	0	0	40
short-billed dowitcher	165	**150**	15	-	0	0	0	0	0	0	0	0	0	0	0
gadwall	104	0	0	-	4	0	0	0	0	0	0	10	20	30	**40**
black skimmer	99	0	0	-	27	**70**	0	2	0	0	0	0	0	0	0
dunlin	94	25	25	-	0	0	0	0	3	1	0	**30**	0	10	0
green-winged teal	69	2	0	-	0	0	0	0	0	0	0	5	**30**	17	15
black-bellied plover	69	2	0	-	10	**11**	0	10	6	10	0	10	10	0	0
greater scaup	62	**62**	0	-	0	0	0	0	0	0	0	0	0	0	0
Royal/Elegant Tern	54	0	**54**	-	0	0	0	0	0	0	0	0	0	0	0
American avocet	54	1	**21**	-	0	0	0	0	0	11	0	0	1	20	0
ruddy duck	33	**25**	0	-	0	0	0	0	0	0	0	4	0	2	2
caspian tern	30	2	**12**	-	10	5	1	0	0	0	0	0	0	0	0
snowy egret	26	0	2	-	0	0	6	4	**12**	1	0	0	0	1	0
blue-winged teal	25	6	2	-	0	0	0	0	0	0	0	5	**8**	4	0
northern pintail	20	0	0	-	0	0	0	0	0	0	2	0	**10**	2	6
least sandpiper	18	0	0	-	0	0	0	0	6	2	0	**10**	0	0	0
Forster's tern	17	0	**10**	-	7	0	0	0	0	0	0	0	0	0	0
semipalmated plover	16	0	0	-	0	0	0	1	0	5	0	**10**	0	0	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
red knot	16	0	0	-	0	0	0	**12**	4	0	0	0	0	0	0
long-billed curlew	15	2	0	-	2	1	0	**3**	**3**	1	0	0	1	2	0
surf scoter	15	**15**	0	-	0	0	0	0	0	0	0	0	0	0	0
Heermann's gull	14	0	0	-	0	0	0	0	0	0	0	0	0	4	**10**
glaucous-winged gull	12	0	0	-	0	0	0	0	0	0	0	0	0	**6**	**6**
great egret	12	1	2	-	0	2	**4**	1	1	0	0	1	0	0	0
great blue heron	9	1	0	-	0	1	1	1	0	**2**	0	0	1	1	1
brown pelican	8	0	**7**	-	0	1	0	0	0	0	0	0	0	0	0
mallard	7	0	0	-	2	0	0	0	**3**	0	0	0	0	2	0
American crow	5	0	0	-	0	0	0	0	**5**	0	0	0	0	0	0
cinnamon teal	4	0	**2**	-	0	0	0	0	0	0	0	0	1	1	0
lesser scaup	4	0	0	-	0	0	0	0	0	0	0	0	0	0	**4**
reddish egret	4	0	0	-	0	**2**	1	1	0	0	0	0	0	0	0
eared grebe	4	**2**	0	-	0	0	0	0	0	0	0	0	0	0	**2**
bufflehead	3	**2**	0	-	0	0	0	0	0	0	0	0	0	0	1
western grebe	3	0	0	-	0	0	0	0	0	**1**	**1**	0	0	0	**1**
belted kingfisher	3	0	0	-	0	0	**1**	**1**	**1**	0	0	0	0	0	0
barn swallow	3	0	0	-	**2**	1	0	0	0	0	0	0	0	0	0
whimbrel	3	**2**	1	-	0	0	0	0	0	0	0	0	0	0	0
double-crested cormorant	3	0	0	-	0	0	0	0	0	0	**2**	0	0	1	0
osprey	3	0	0	-	**1**	0	0	0	**1**	**1**	0	0	0	0	0
spotted sandpiper	2	0	0	-	0	0	0	0	0	**1**	0	**1**	0	0	0
pied-billed grebe	2	**2**	0	-	0	0	0	0	0	0	0	0	0	0	0
red-necked phalarope	2	0	0	-	0	**2**	0	0	0	0	0	0	0	0	0
snow goose	2	0	0	-	0	0	0	0	0	**2**	0	0	0	0	0
greater yellowlegs	2	**1**	0	-	0	0	0	0	0	**1**	0	0	0	0	0
royal tern	2	0	0	-	0	0	0	**2**	0	0	0	0	0	0	0
killdeer	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
Grand Total	17906	1541	1880	-	250	511	30	892	1517	2863	225	2219	2515	2405	1058

Table 6-25: Bird abundance at point count station 19 during each survey month. This station is located on the Chula Vista Wildlife Refuge and is missing April peaking tide data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
surf scoter	868	162	10	-	1	0	0	0	0	0	0	65	32	296	**302**
lesser scaup	527	3	0	-	0	0	0	0	0	0	0	0	0	192	**332**
least sandpiper	79	0	0	-	0	9	0	6	4	7	0	16	**37**	0	0
bufflehead	73	**42**	0	-	0	0	0	0	0	0	0	19	1	0	11
double-crested cormorant	64	0	1	-	0	2	0	1	0	0	0	0	0	**57**	3
Forster's tern	55	3	1	-	**43**	1	0	0	0	0	0	1	0	0	6
marbled godwit	50	**27**	11	-	0	1	0	0	0	3	0	0	1	7	0
western gull	48	3	1	-	2	0	1	1	0	2	1	2	0	6	**29**
Belding's savannah sparrow	38	0	1	-	3	3	4	3	2	1	**15**	1	0	1	4
western grebe	38	3	0	-	0	0	0	0	0	0	0	1	0	**27**	7
horned grebe	32	0	0	-	0	0	0	0	0	0	0	1	0	**18**	13
willet	32	1	2	-	0	**12**	0	4	3	2	1	1	2	3	1
western sandpiper	23	7	0	-	0	0	0	1	2	1	0	2	**10**	0	0
brown pelican	22	0	0	-	0	0	0	0	0	0	1	0	0	8	**13**
ring-billed gull	22	0	0	-	0	0	0	0	0	0	0	7	0	**15**	0
brant	20	0	0	-	0	0	0	0	0	**16**	0	0	0	0	4
black-bellied plover	15	0	0	-	0	1	0	0	1	2	0	3	2	**6**	0
red-breasted merganser	10	2	0	-	0	0	0	0	0	0	0	0	0	**8**	0
snowy egret	9	**3**	1	-	1	0	0	1	0	2	0	1	0	0	0
large-billed savannah sparrow	6	0	0	-	0	0	0	0	0	0	**3**	0	**3**	0	0
California gull	6	1	0	-	0	0	0	0	0	0	0	0	0	**3**	2
osprey	5	0	0	-	0	0	0	0	1	0	**2**	0	0	0	**2**
eared grebe	5	0	0	-	0	0	0	0	0	0	0	0	0	1	**4**
elegant tern	5	0	0	-	**4**	0	0	1	0	0	0	0	0	0	0
caspian tern	4	0	0	-	**2**	1	1	0	0	0	0	0	0	0	0
great egret	4	0	0	-	0	0	**1**	**1**	0	0	0	**1**	0	0	**1**
dowitcher sp.	4	0	0	-	0	0	0	1	0	0	0	0	**3**	0	0
great blue heron	3	0	0	-	**1**	0	0	**1**	0	0	**1**	0	0	0	0
black skimmer	3	0	0	-	0	**3**	0	0	0	0	0	0	0	0	0
American wigeon	2	0	0	-	0	0	0	0	0	0	0	0	0	**2**	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
whimbrel	2	0	**2**	-	0	0	0	0	0	0	0	0	0	0	0
dunlin	2	0	**1**	-	0	0	0	0	0	0	0	0	**1**	0	0
house finch	2	0	0	-	0	0	0	0	0	0	0	0	0	0	**2**
barn swallow	2	0	**1**	-	**1**	0	0	0	0	0	0	0	0	0	0
long-billed curlew	2	0	0	-	0	**1**	**1**	0	0	0	0	0	0	0	0
gull sp.	2	0	0	-	0	0	0	0	0	0	**2**	0	0	0	0
black turnstone	2	0	0	-	0	0	0	0	0	0	0	0	0	**2**	0
northern shoveler	2	0	0	-	0	0	0	0	0	0	0	0	0	**2**	0
belted kingfisher	2	0	0	-	0	0	0	0	0	0	**1**	0	0	0	**1**
western/Clark's grebe	1	0	0	-	0	0	0	0	0	0	0	0	**1**	0	0
red knot	1	0	0	-	0	0	0	0	0	0	0	0	0	**1**	0
gadwall	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
semipalmated plover	1	0	0	-	0	0	0	**1**	0	0	0	0	0	0	0
horned lark	1	0	0	-	**1**	0	0	0	0	0	0	0	0	0	0
northern pintail	1	0	0	-	0	0	0	0	0	0	0	0	**1**	0	0
Clark's grebe	1	0	0	-	0	0	0	0	0	0	0	0	**1**	0	0
California least tern	1	0	0	-	0	0	**1**	0	0	0	0	0	0	0	0
gull-billed tern	1	0	**1**	-	0	0	0	0	0	0	0	0	0	0	0
Heermann's gull	1	0	0	-	0	0	0	0	0	0	0	0	0	0	**1**
Grand Total	2100	257	33	-	60	34	9	22	13	36	27	121	95	655	**738**

Table 6-26: Bird abundance at point count station 20 during each survey month. This station is located at the Marine Biological Study Area south of Emory Cove and is missing March and October data. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006										2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western sandpiper	3653	-	300	1	28	360	2	400	-	500	0	587	555	**920**	0
brant	1853	-	0	0	0	0	0	0	-	0	66	447	2	**688**	650
willet	1028	-	**300**	25	19	26	6	223	-	150	9	91	75	102	2
marbled godwit	816	-	**250**	2	14	42	51	5	-	65	8	165	101	112	1
elegant tern	742	-	300	25	0	66	1	**350**	-	0	0	0	0	0	0
black-bellied plover	708	-	**160**	0	12	**160**	33	12	-	63	0	80	100	88	0
dowitcher sp.	641	-	150	0	0	0	45	0	-	160	0	116	**170**	0	0
short-billed dowitcher	481	-	0	0	0	**331**	0	150	-	0	0	0	0	0	0
red knot	352	-	**250**	0	0	14	2	3	-	8	0	45	30	0	0
scaup sp.	275	-	0	0	0	0	0	0	-	0	0	0	0	125	**150**
lesser scaup	270	-	0	0	0	0	0	0	-	0	0	0	20	0	**250**
Forster's tern	238	-	0	4	1	6	2	66	-	40	2	**110**	6	1	0
semipalmated plover	235	-	0	0	0	17	1	19	-	40	0	36	52	**70**	0
northern shoveler	212	-	0	0	0	0	0	0	-	3	0	**114**	75	20	0
northern pintail	141	-	0	0	0	0	0	0	-	2	16	3	**90**	30	0
common tern	118	-	0	0	0	0	0	**118**	-	0	0	0	0	0	0
dunlin	117	-	30	0	0	0	0	0	-	3	0	29	20	**35**	0
greater scaup	100	-	0	0	0	0	0	0	-	0	0	0	0	0	**100**
royal tern	98	-	1	0	0	8	1	2	-	15	5	7	13	**46**	0
American wigeon	90	-	0	0	0	0	0	0	-	15	6	16	23	**30**	0
surf scoter	66	-	0	0	0	0	0	0	-	0	2	0	12	**52**	0
western/Clark's grebe	64	-	6	0	0	0	0	0	-	0	6	0	**40**	0	12
bufflehead	60	-	0	0	0	0	0	0	-	0	0	12	20	**24**	4
western gull	53	-	3	0	1	8	0	1	-	5	3	10	3	**15**	4
brown pelican	46	-	0	**40**	0	0	0	4	-	0	0	1	0	0	1
black skimmer	45	-	**30**	0	0	6	0	2	-	3	0	4	0	0	0
savannah sparrow	42	-	6	8	2	0	1	8	-	0	**10**	0	4	0	3
ring-billed gull	41	-	1	2	0	0	0	0	-	0	0	9	**23**	6	0
California gull	34	-	1	0	0	0	0	0	-	1	2	10	**17**	3	0
snowy plover	32	-	2	0	0	0	0	0	-	**24**	0	3	0	3	0

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
snowy egret	22	-	1	0	1	2	0	1	-	**7**	0	3	6	0	1
double-crested cormorant	19	-	0	**5**	1	3	2	3	-	1	0	0	0	2	2
long-billed curlew	18	-	0	0	1	2	0	2	-	3	0	2	3	**5**	0
eared grebe	17	-	2	**4**	0	0	0	0	-	0	**4**	0	3	**4**	0
great egret	13	-	1	0	0	0	0	1	-	1	1	3	**4**	0	2
cliff swallow	13	-	1	0	**12**	0	0	0	-	0	0	0	0	0	0
ruddy turnstone	12	-	0	0	0	**8**	2	0	-	0	0	0	0	2	0
caspian tern	12	-	**6**	5	1	0	0	0	-	0	0	0	0	0	0
greater yellowlegs	11	-	0	0	1	**2**	0	1	-	1	0	**2**	**2**	1	1
sanderling	10	-	0	0	0	0	0	0	-	0	0	0	0	**10**	0
mallard	9	-	0	2	0	0	0	0	-	0	**7**	0	0	0	0
horned grebe	7	-	0	0	0	0	0	0	-	0	0	1	0	**3**	**3**
Vaux's swift	6	-	**6**	0	0	0	0	0	-	0	0	0	0	0	0
pied-billed grebe	6	-	0	0	0	0	0	0	-	0	0	**2**	1	**2**	1
osprey	5	-	0	0	0	0	0	1	-	0	0	1	**2**	1	0
white-crowned sparrow	5	-	0	0	0	0	0	0	-	0	1	0	**4**	0	0
Say's phoebe	5	-	0	0	0	0	0	0	-	1	**2**	1	0	0	1
mourning dove	5	-	0	**5**	0	0	0	0	-	0	0	0	0	0	0
redhead	4	-	0	0	0	0	0	0	-	0	0	0	0	0	**4**
California least tern	4	-	0	0	**2**	**2**	0	0	-	0	0	0	0	0	0
herring gull	4	-	0	0	0	0	0	0	-	0	0	0	1	**2**	1
great blue heron	3	-	0	**1**	0	0	0	**1**	-	0	0	0	0	0	**1**
gull-billed tern	3	-	1	0	**2**	0	0	0	-	0	0	0	0	0	0
killdeer	3	-	**1**	0	0	0	0	0	-	0	0	0	**1**	0	**1**
least sandpiper	3	-	0	0	0	**2**	0	1	-	0	0	0	0	0	0
barn swallow	3	-	0	**2**	1	0	0	0	-	0	0	0	0	0	0
Heermann's gull	2	-	0	0	0	0	0	0	-	0	0	0	0	**2**	0
whimbrel	2	-	0	0	0	0	0	0	-	0	0	0	0	**2**	0
Cooper's hawk	1	-	0	0	0	0	0	**1**	-	0	0	0	0	0	0
Thayer's gull	1	-	0	0	0	0	0	0	-	0	0	0	**1**	0	0
American kestrel	1	-	0	0	0	0	0	0	-	0	0	0	**1**	0	0
yellow-rumped warbler	1	-	0	0	0	0	0	0	-	0	**1**	0	0	0	0

		2006											2007	
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
northern harrier	1	-	0	0	0	0	0	0	-	0	0	0	0	**1**	0
glaucous-winged gull	1	-	0	0	0	0	0	0	-	0	0	0	0	0	**1**
horned lark	1	-	0	0	0	0	0	0	-	0	0	**1**	0	0	0
house finch	1	-	0	0	**1**	0	0	0	-	0	0	0	0	0	0
pacific golden-plover	1	-	0	0	0	0	0	0	-	0	0	**1**	0	0	0
marsh wren	1	-	0	0	0	0	0	0	-	0	0	**1**	0	0	0
Bonaparte's gull	1	-	0	0	0	0	0	0	-	0	0	**1**	0	0	0
black phoebe	1	-	0	0	0	0	0	0	-	0	**1**	0	0	0	0
herring gull or Heermann's gull	1	-	0	0	0	0	0	0	-	0	0	**1**	0	0	0
snow goose	1	-	0	0	0	0	0	0	-	0	**1**	0	0	0	0
black turnstone	1	-	0	0	0	0	0	0	-	0	0	**1**	0	0	0
Grand Total	12892	-	1809	131	100	1065	149	1375	-	1111	153	1916	1480	**2407**	1196

Table 6-27: Bird abundance at point count station 21 during each survey month. This station is located on the north shore of the salt ponds, between ponds 14 and 15. This station is missing April peaking tide data; no June data was collected. Species are organized from greatest to lowest abundance; peak abundance for each species is highlighted in bold.

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	Total		fall	peak		fall	peak			fall	peak			fall	peak
western sandpiper	6959	200	54	-	-	1000	1	1500	**2000**	600	0	504	600	500	0
peep sp.	3310	1350	**1960**	-	-	0	0	0	0	0	0	0	0	0	0
red-necked phalarope	1396	0	0	-	-	**630**	600	116	50	0	0	0	0	0	0
black-bellied plover	914	0	0	-	-	100	0	50	**300**	100	0	104	150	110	0
eared grebe	557	0	0	-	-	0	0	0	42	**192**	190	111	12	3	7
dunlin	382	65	**257**	-	-	0	0	0	30	0	0	30	0	0	0
marbled godwit	375	21	4	-	-	**100**	0	20	30	80	0	60	30	30	0
semipalmated plover	292	2	0	-	-	10	0	25	**80**	50	0	60	25	40	0
willet	225	10	0	-	-	**100**	0	21	30	20	1	30	10	0	3
American wigeon	155	0	0	-	-	0	0	0	0	0	0	20	65	**70**	0
caspian tern	105	12	13	-	-	**41**	22	17	0	0	0	0	0	0	0
red knot	100	0	0	-	-	0	0	0	**80**	0	0	20	0	0	0
northern shoveler	92	0	**68**	-	-	0	0	0	0	2	20	0	0	2	0
western gull	80	0	0	-	-	0	12	**44**	2	0	0	1	20	1	0
royal tern	75	0	1	-	-	2	**50**	22	0	0	0	0	0	0	0
dowitcher sp.	55	0	0	-	-	0	0	0	**40**	0	0	10	0	5	0
great egret	37	5	0	-	-	0	0	0	5	**12**	0	6	8	1	0
black skimmer	29	0	0	-	-	**12**	5	**12**	0	0	0	0	0	0	0
Forster's tern	29	0	3	-	-	0	3	0	0	2	2	**8**	6	0	5
brown pelican	27	0	**27**	-	-	0	0	0	0	0	0	0	0	0	0
brant	23	**23**	0	-	-	0	0	0	0	0	0	0	0	0	0
ring-billed gull	23	0	2	-	-	0	0	0	0	0	0	1	**20**	0	0
snowy egret	18	**8**	4	-	-	0	0	0	0	2	0	0	2	2	0
long-billed curlew	17	1	1	-	-	2	0	0	**4**	2	0	2	**4**	1	0
cinnamon teal	15	0	0	-	-	0	0	5	**10**	0	0	0	0	0	0
gadwall	12	0	0	-	-	0	0	0	0	0	0	2	0	**10**	0
double-crested cormorant	10	0	0	-	-	1	**9**	0	0	0	0	0	0	0	0
black-necked stilt	9	0	0	-	-	**8**	0	1	0	0	0	0	0	0	0
northern pintail	9	0	0	-	-	0	0	0	0	0	0	0	4	0	**5**

		2006											2007		
		Mar	Apr		Jun	Aug		Sep	Oct	Nov		Dec	Jan	Feb	
Species	**Total**		**fall**	**peak**		**fall**	**peak**			**fall**	**peak**			**fall**	**peak**
California gull	8	0	0	-	-	0	0	0	0	0	0	0	**5**	0	3
American avocet	6	0	2	-	-	0	1	0	0	0	**3**	0	0	0	0
greater yellowlegs	6	0	0	-	-	0	0	0	1	1	0	**2**	0	**2**	0
long-billed dowitcher	5	0	0	-	-	**5**	0	0	0	0	0	0	0	0	0
savannah sparrow	5	0	0	-	-	0	0	0	2	0	0	0	0	**3**	0
osprey	5	0	0	-	-	0	0	0	0	0	**2**	0	0	**2**	1
great blue heron	2	0	**1**	-	-	0	0	0	0	0	0	0	**1**	0	0
elegant tern	2	**2**	0	-	-	0	0	0	0	0	0	0	0	0	0
gull-billed tern	2	**2**	0	-	-	0	0	0	0	0	0	0	0	0	0
California least tern	1	0	0	-	-	**1**	0	0	0	0	0	0	0	0	0
red-tailed hawk	1	0	0	-	-	0	0	0	0	0	0	0	**1**	0	0
barn swallow	1	0	0	-	-	0	0	0	**1**	0	0	0	0	0	0
northern harrier	1	0	0	-	-	0	0	0	0	0	0	0	0	0	**1**
glaucous-winged gull	1	0	0	-	-	0	0	0	0	0	0	0	0	0	**1**
short-billed dowitcher	1	**1**	0	-	-	0	0	0	0	0	0	0	0	0	0
whimbrel	1	**1**	0	-	-	0	0	0	0	0	0	0	0	0	0
least sandpiper	1	0	0	-	-	0	0	0	0	0	0	0	0	0	**1**
tern sp.	1	**1**	0	-	-	0	0	0	0	0	0	0	0	0	0
horned grebe	1	0	0	-	-	0	0	0	0	0	0	0	0	0	**1**
Grand Total	15381	1704	2397	-	-	2012	703	1833	**2707**	1063	218	971	963	782	28

Table 6-28: Species and number observed during the waterbird portion of the San Diego Bay avian surveys. Species are organized from greatest to least number observed.

		Month			
Species	**Total Observed**	**Nov**	**Dec**	**Jan**	**Feb**
surf scoter	27357	3162	8071	10141	5983
Brandt's cormorant	1301	327	61	453	460
bufflehead	756	11	248	391	106
scaup sp.	482	15	106	291	70
western gull	457	178	66	89	124
brant	270	12	10	122	126
Heerman's gull	167	112	34	17	4
brown pelican	155	83	17	8	47
double-crested cormorant	142	23	8	1	110
Forster's tern	101	37	15	49	0
horned grebe	80	72	5	3	0
eared grebe	72	7	31	19	15
unknown	58	7	51	0	0
western grebe	53	19	8	9	17
ring-billed gull	43	8	6	22	7
California gull	37	13	14	2	8
royal tern	33	7	3	15	8
black-bellied plover	28	27	1	0	0
marbled godwit	23	22	0	1	0
snowy egret	23	21	0	1	1
lesser scaup	20	5	0	14	1
rock pigeon	11	3	5	3	0
American crow	9	1	0	0	8
gull sp.	9	2	7	0	0
red-breasted merganser	9	2	4	3	0
herring gull	7	7	0	0	0
least sandpiper	7	0	0	0	7
American wigeon	6	6	0	0	0
black scoter	4	1	2	1	0
willet	4	4	0	0	0
common loon	3	0	2	1	0
gadwall	3	3	0	0	0
osprey	3	1	0	2	0
elegant tern	2	2	0	0	0
glaucous-winged gull	2	0	0	1	1
great egret	2	0	0	2	0
long-tailed duck	2	0	0	1	1
sanderling	2	2	0	0	0
cormorant sp.	1	1	0	0	0
dunlin	1	1	0	0	0
great blue heron	1	1	0	0	0
long-billed curlew	1	0	0	0	1
mallard	1	0	1	0	0

		Month			
Species	**Total Observed**	**Nov**	**Dec**	**Jan**	**Feb**
northern harrier	1	1	0	0	0
pacific loon	1	0	1	0	0
western snowy plover	1	0	0	1	0
western sandpiper	1	1	0	0	0
Total	**31752**	**4207**	**8777**	**11663**	**7105**

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7 Oversize Figures and Maps

This section contains figures and maps that were too large to include in the text of the document.

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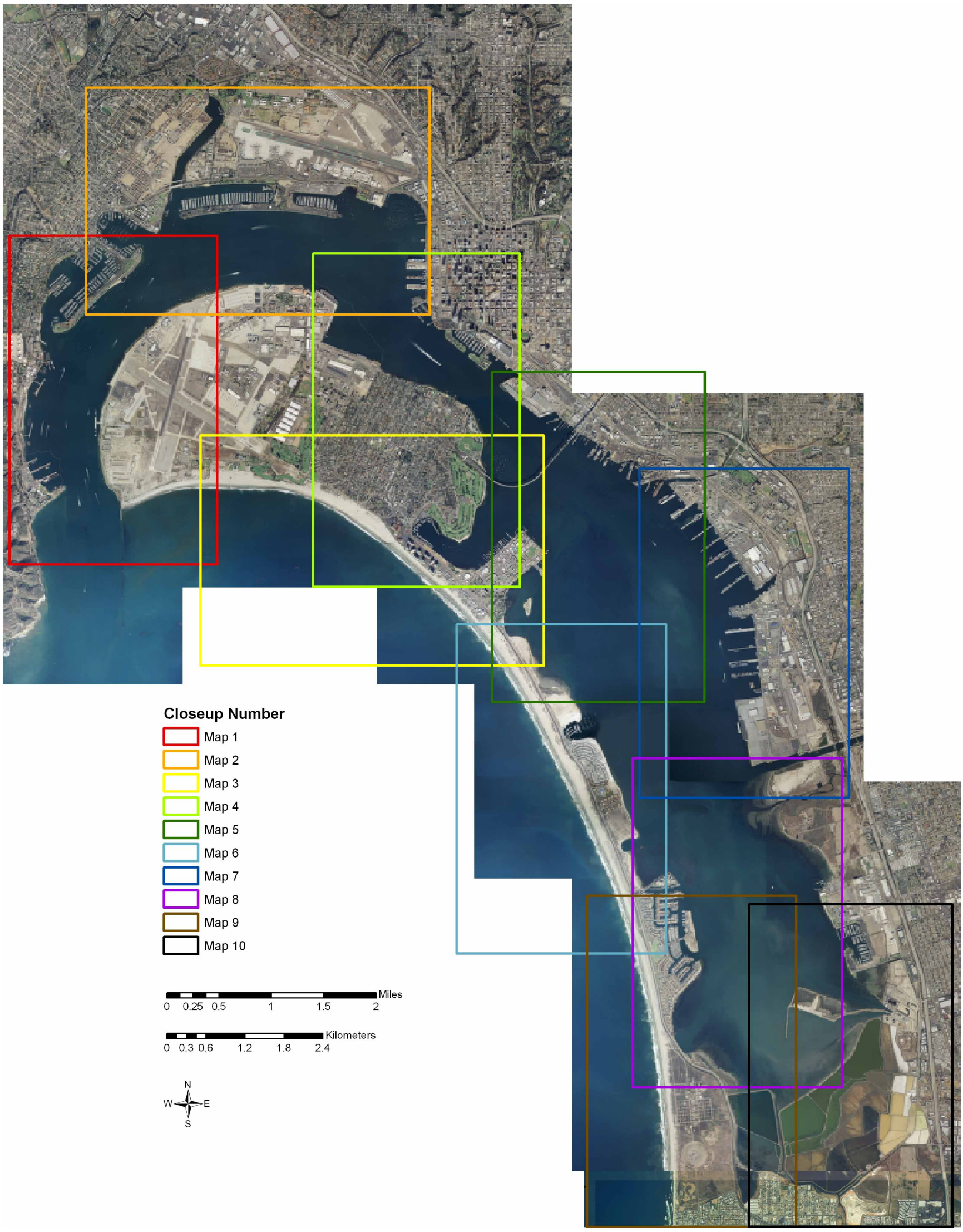

Map 7-1: Overview map of San Diego Bay indicating the location of the grid cell close-up maps.

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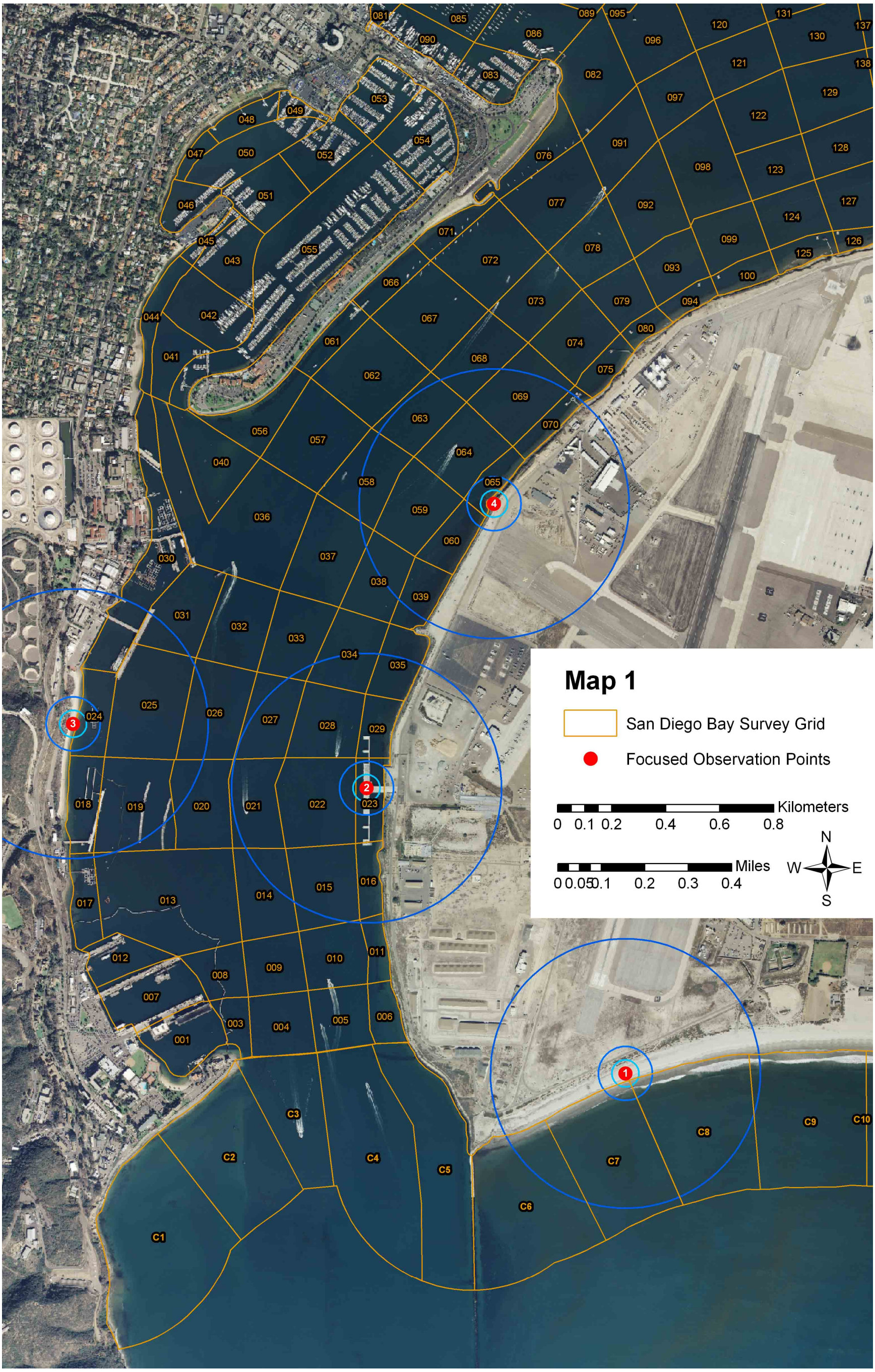

Map 7-2: Grid cell close-up Map 1.

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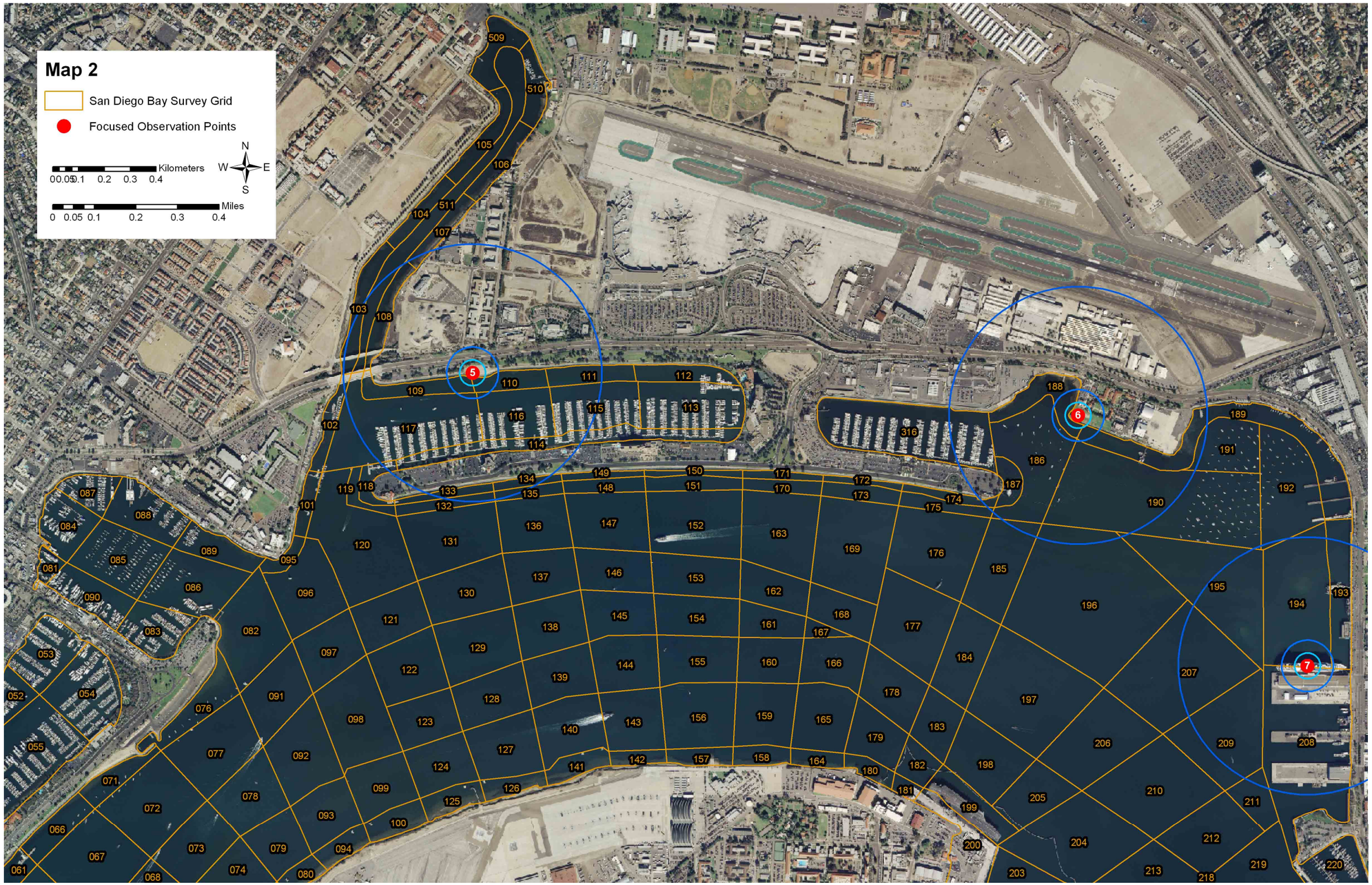

Map 7-3: Grid cell close-up Map 2.

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Map 7-4: Grid cell close-up Map 3.

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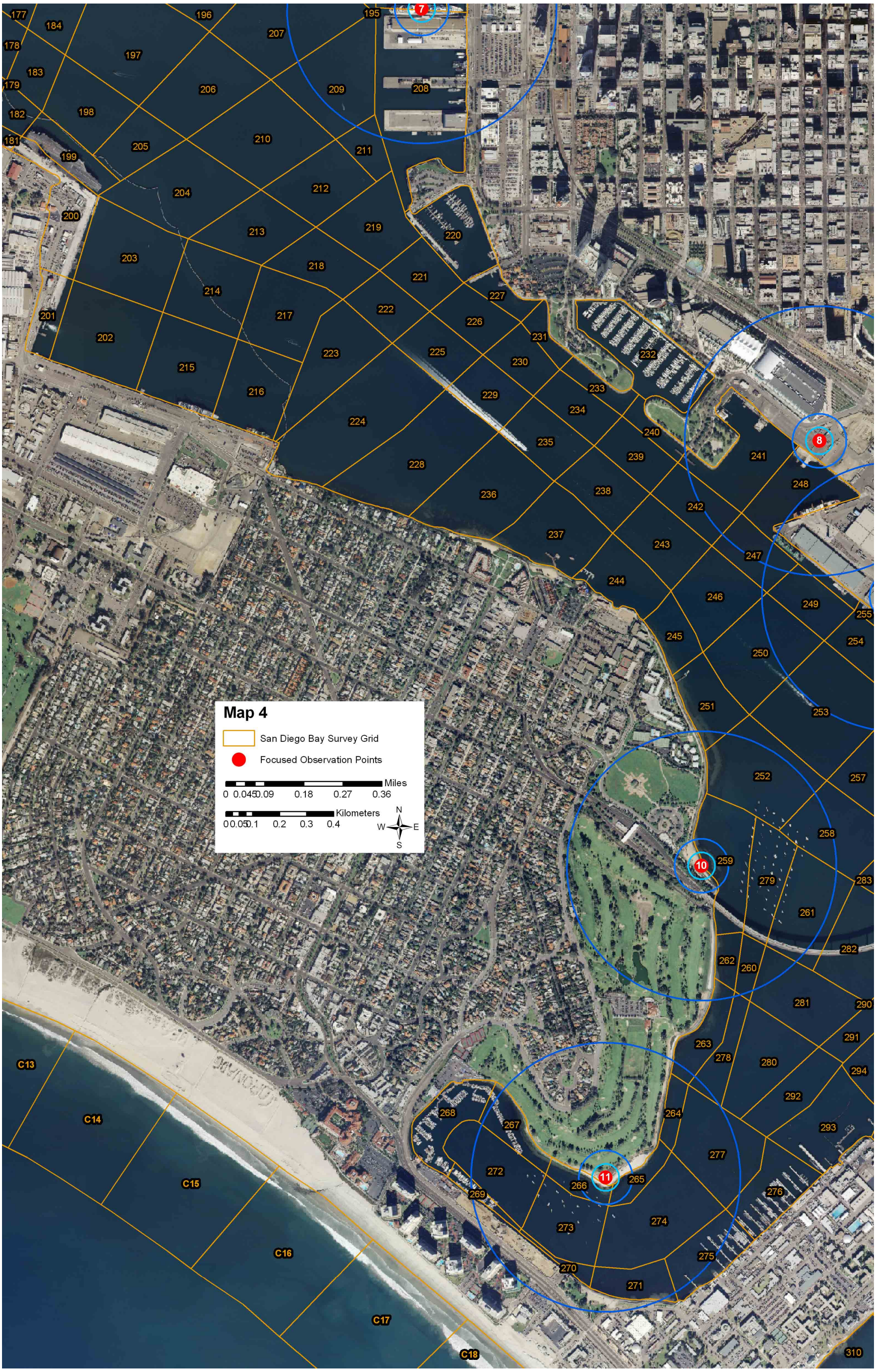

Map 7-5: Grid cell close-up Map 4.

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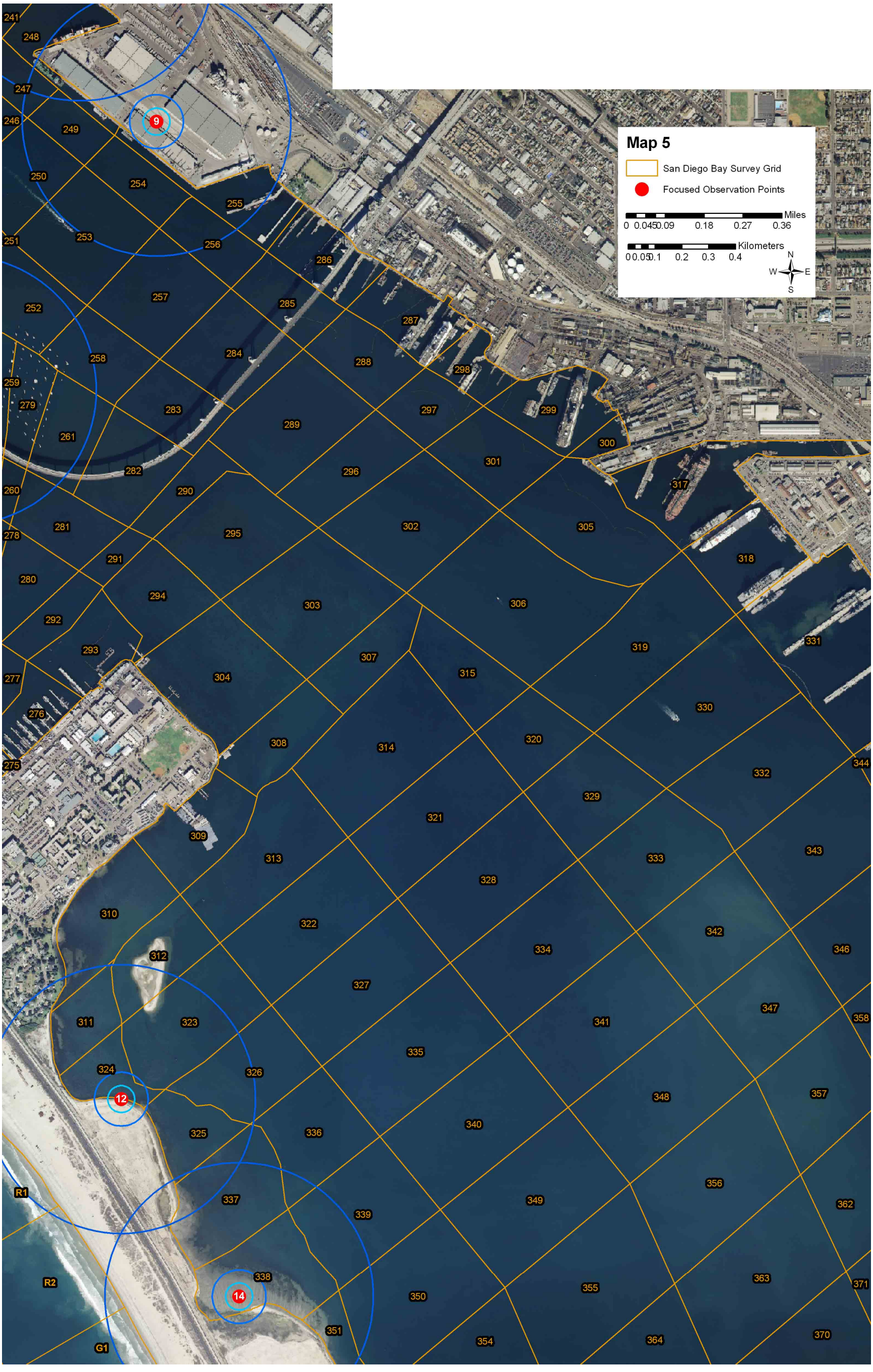

Map 7-6: Grid cell close-up Map 5.

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Map 7-7: Grid cell close-up Map 6.

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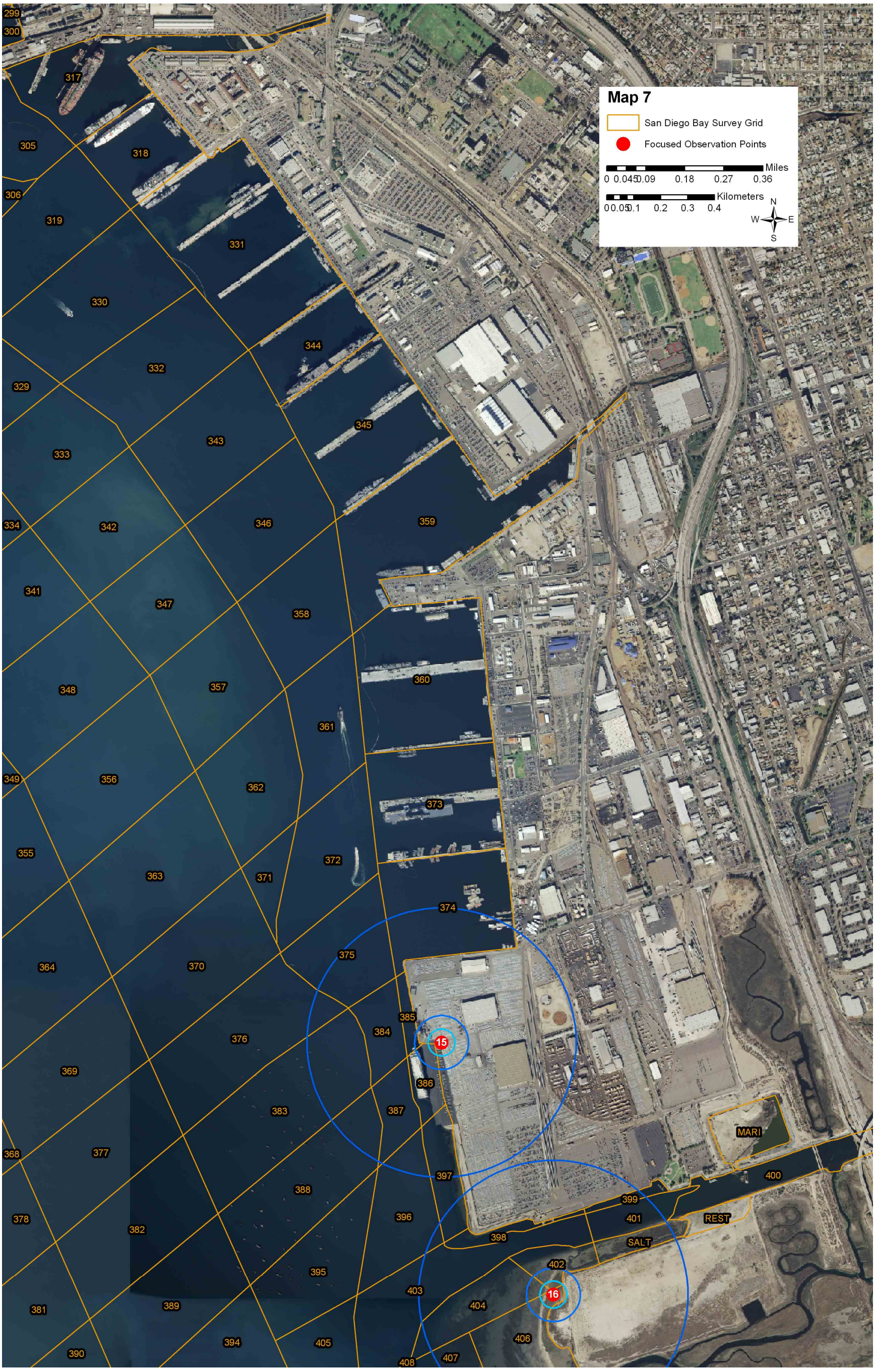

Map 7-8: Grid cell close-up Map 7.

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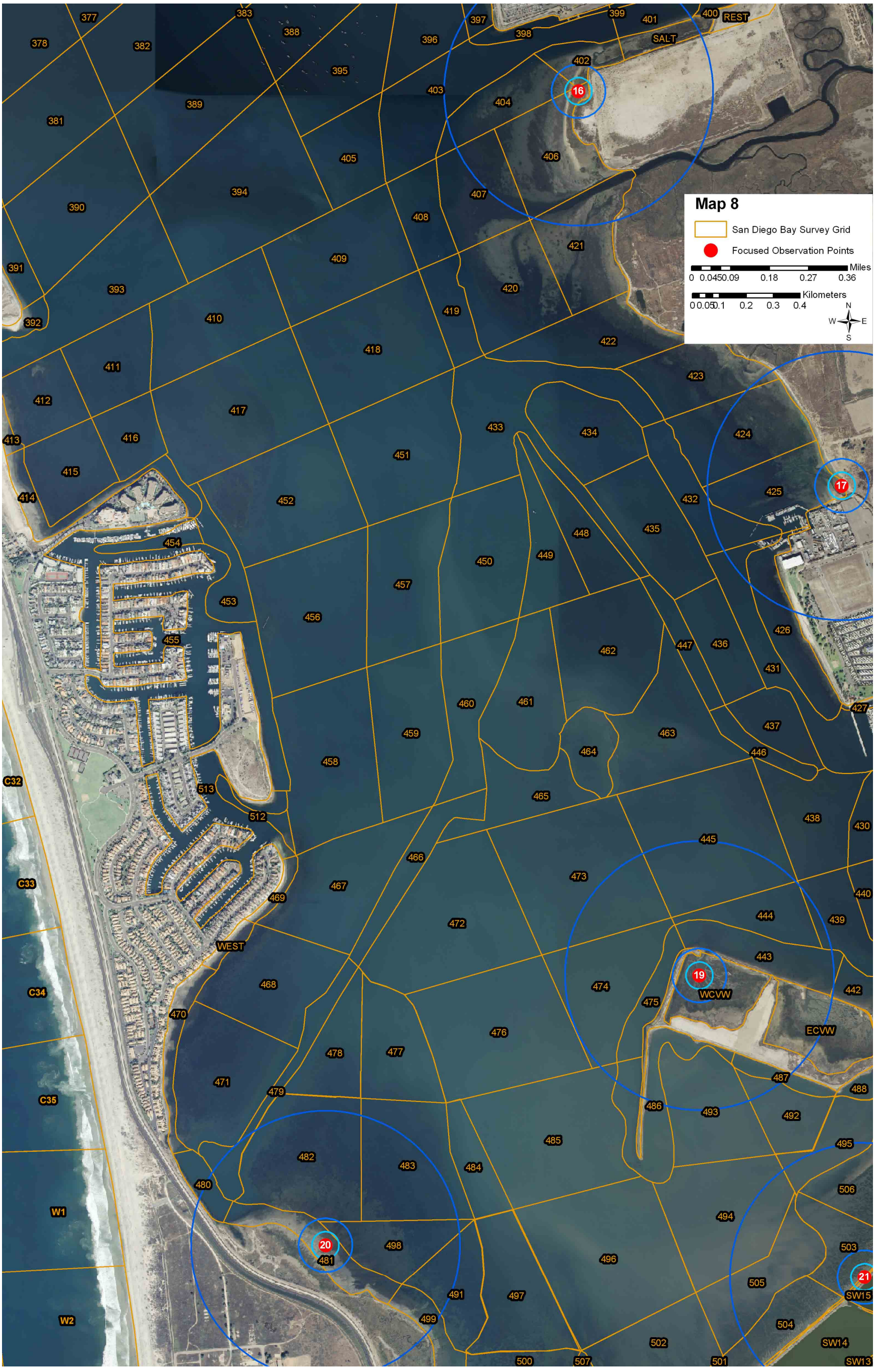

Map 7-9: Grid cell close-up Map 8.

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Map 7-10: Grid cell close-up Map 9.

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Map 7-11: Grid cell close-up Map 10.

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Appendix A: Example Security Form and Protocol

Natural Resource Survey Form	NAVFAC Naval Facilities Engineering Command

January 31 through February 2, 2007

Special Instructions:

Project Title		**Contract No**	
Survey Date(s)		**Duration of Survey**	
January 31-February 2, 2007			
Location	**Activity**	**Vehicle Type**	**Vehicle ID**
1:		Water ☒ Land ☐	
2:		Water ☒ Land ☐	
3:		Water ☒ Land ☐	
4:		Water ☐ Land ☒	
Operator Name		**Operator Contact Information**	
Jim Kellogg/Harry Smead		*Cell No.: 760-212-5158 / 760-212-5157 VHF: 14 & 16*	
Primary Contacts			
		Cell No.:	
		Cell No.:	
		Office No.:	
Other Participants			
		Cell No.:	
		Cell No.:	
		Cell No.:	
		Cell No.:	
		Cell No.:	
		Cell No.:	

	Cell No.:
	Cell No.:
Navy Contact Representatives	**Title**
Office Number: *Cell Number:*	
Office Number: *Cell Number:*	

Protocol consisted of sending in a completed security form (as shown above) to the Navy project manager one week prior to surveys; this form was forwarded to the appropriate parties in the Navy.

On the actual survey date the on-water survey crew telephoned Navy security dispatch with the time and location of the day's surveys. Surveyors reported to the Navy on the water radio frequencies, while the survey was in progress, and when the boat reached a Navy security zone, radioed on-water Navy security informing of entry into the zone.

Appendix B: Species Profiles

Species observed during the 2006-2007 San Diego Bay Bird Survey (shorebird and waterbird) are presented below, organized by Order then by Family. Naming convention (except for capitalization) follows the American Ornithologists' Union (AOU) Check-list of North American Birds (AOU 1998) supplemented by Unitt (2004) when subspecies not covered in the check-list, but important locally, are discussed. Species observed during this survey were cross referenced with the San Diego Bay Integrated Natural Resources Management Plan (INRMP; Navy 2000) species list. One additional species to the INRMP list was found, the black-vented shearwater. Species not observed are discussed under each Family's section. The San Diego Bay INRMP incorporated all major bird survey information prior to 2000 for the bay.

The 30 most abundant species observed during the survey are presented with a graph of their abundance over the survey months; only falling tide data is displayed in each chart as peaking tide data was not collected each month. Species descriptions contain a brief discussion of the location where the species was found and total number of birds observed, which at times may be greater than the graphical display because of (included) falling tide and waterbird survey data. When abundance is described by month in the text, only falling tide data is used. Small bay maps are presented for the ten most abundant birds depicting their location in the bay. The information presented is discussed in the context of historical observations, relying heavily on the Bay INRMP and Unitt's 2004 San Diego County Bird Atlas.

Anseriformes

Of the 35 Anseriformes listed on the San Diego Bay INRMP's species list, eight were not found during this survey effort: wood duck (*Aix sponsa*), ring-necked duck (*Aythya collaris*), tufted duck (*Aythya fuligula*), fulvous whistling-duck (*Dendrocygna bicolor*), harlequin duck (*Histrionicus histrionicus*), brant Atlantic subspecies (*Branta bernicla hrota*), canvasback (*Aythya valisineria*), and king eider (*Somateris spectabilis*.

Anatidae (Swans, Geese, and Ducks)

snow goose (Chen caerulescens)

The snow goose is a rare winter visitor in San Diego County, although there is an increasing wintering population at the Salton Sea; its distribution in the county follows that of the Canada goose. Snow geese typically occur in the county from November to February (Unitt 2004). During this effort, eight snow geese were observed from November through January. Almost all birds were seen in the south bay. One snow goose was seen flying over the salt ponds.

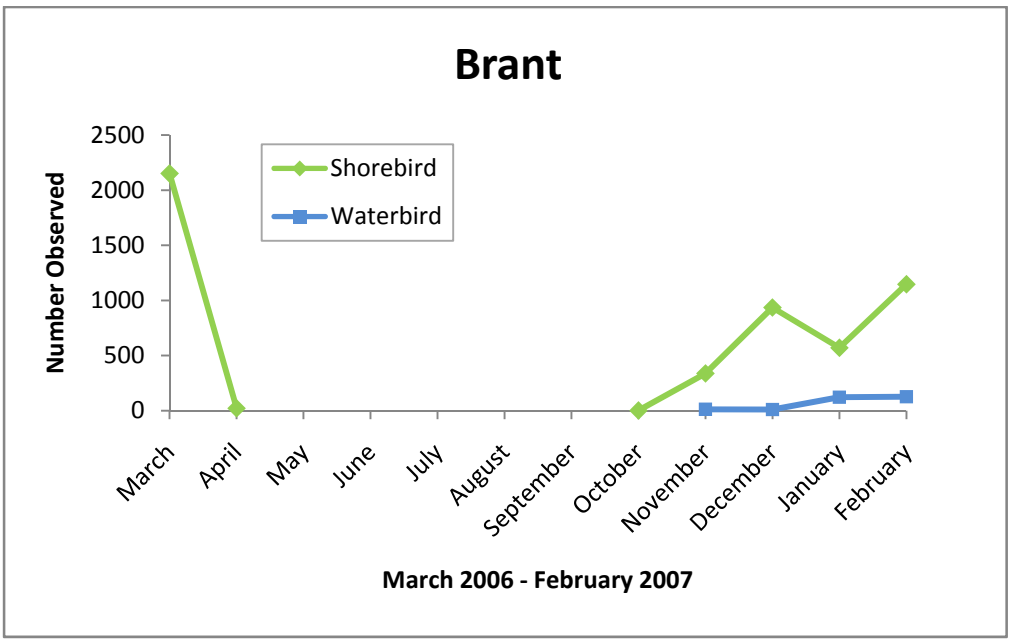
Ross's goose (Chen rossii)

The Ross's goose is an annual winter visitor in San Diego County. They are often found in association with snow goose flocks, but also frequent urban areas. They are typically present from November through March (Unitt 2004). Only four Ross's geese were seen during the surveys. One was flying over the salt ponds in November. Two were present in the salt ponds in December, and one in the southeast corner of south bay during the month of February.

brant (Branta bernicla)

Since the collapse of the brant population in San Diego Bay prior to 1970, the species has been increasing in the bay, likely feeding on eelgrass (Unitt 2004). Brants were seen in March and April, and again in October through February, 7,035 in total. The majority were in the south bay; however, some

were recorded in the north and south-central bay, as well as in the ocean grid. No birds were seen in the salt ponds. The black brant (*Branta bernicla nigricans*) is the brant subspecies regularly occurring in San Diego County because of its migration route along the Pacific coast (Unitt 2004). Several brants were recorded as this sub-species in December through February; all observations were from the south bay. These records were lumped with those recorded as brant in all data analyses.

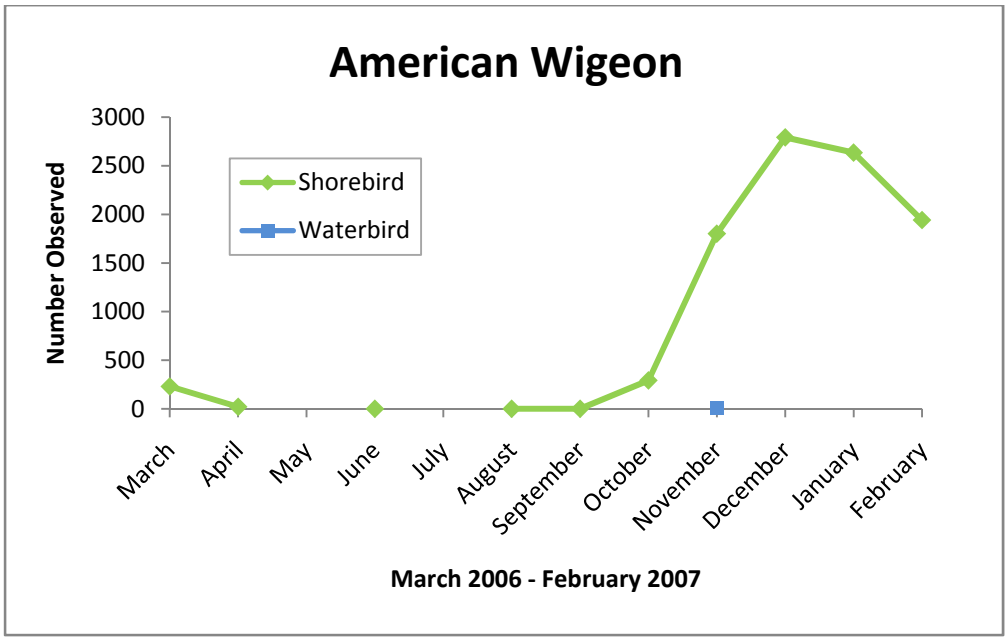


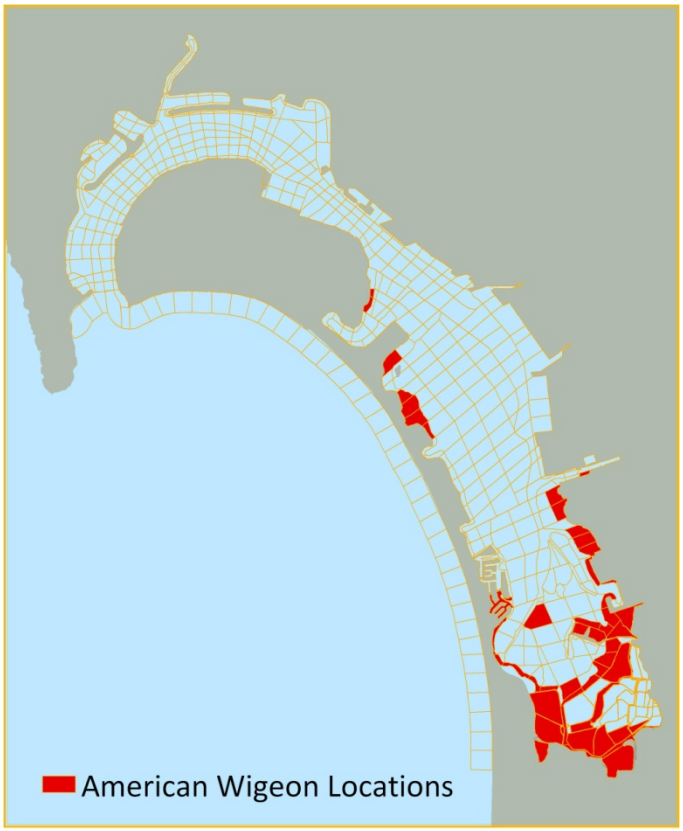
Canada goose (Branta canadensis)

Three Canada geese were observed during this effort. All three were found in November off of D Street Fill. Between 5,000 to 8,000 of these geese normally spend the winter in San Diego County, congregating in a few large flocks. They usually frequent fresh or brackish water and have not been historically seen in very high numbers around San Diego Bay (Unitt 2004).

American wigeon (Anas americana)

The American wigeon is a common winter visitor in San Diego County, second only to the mallard in distribution. Wigeons typically arrive in September and usually depart by April. This bird can be seen where other ducks are seldom found due to its habit of grazing on terrestrial vegetation. In San Diego Bay, eelgrass is a favorite food (Unitt 2004). During this effort, American wigeons were observed in March and April, and again from October through February, 11,180 in total. Most birds were observed in the south bay and salt ponds, some were observed in the south-central and north-central bay. All birds recorded in the north-central bay were observed in December and January along the Coronado Golf Course shoreline and along the south-east shoreline of NAB. None were observed in the north bay or ocean grid.





gadwall (Anas strepera strepera)

The gadwall is an abundant winter visitor to San Diego County and has extended its breeding range to include the county. Nesting birds can typically be found in the coastal lagoons of North County, which is also where higher numbers of wintering birds can be seen (Unitt 2004). During this effort, gadwalls were observed in all survey months, 700 in total. All sightings were in the south bay and in the salt ponds.

Eurasion wigeon (Anas penelope)
The Eurasian wigeon is a yearly winter visitor in San Diego County, usually found within groups of American wigeons. They are typically present from November through March (Unitt 2004). Two Eurasian wigeons were seen in January in the southwest corner of south bay and one bird was observed in February in the south bay next to the Chula Vista Wildlife Refuge.

mallard (Anas platyrhynchos platyrhynchos)
The mallard is a common, locally abundant, year-round resident, and the most widespread duck in San Diego County. The mallard has a widespread breeding distribution in the county and is known to nest in the bay's salt ponds and at the Chula Vista Wildlife Refuge (Unitt 2004). Mallards were observed in all regions of the bay during every survey month, 2,594 in total. No birds were observed in the ocean grid.

blue-winged teal (Anas discors)
The blue-winged teal is a regular, although in low numbers, migrant and winter visitor in San Diego County from October to April. Blue-winged teals can typically be found at the San Diego River flood-control channel and at Famosa Slough (Unitt 2004). Blue-winged teals were observed in March and again in October through February, 87 in total. All sightings were in the south bay and in the salt ponds.

cinnamon teal (Anas cyanoptera septentrionalium)
The cinnamon teal is a common migrant and winter visitor, and an uncommon summer breeding resident in San Diego County. Breeding birds are scattered in the coastal lagoons and lowlands, as well as inland (Unitt 2004). Cinnamon teals were observed in March, August through October, and in January and February, 99 in total. The birds were mostly in the south bay, but a few were seen in the salt ponds, as well as in the north and north-central bay.

northern shoveler (Anas clypeata)
The northern shoveler is a common winter visitor in San Diego County typically present from August to April (Unitt 2004). Northern shovelers were observed in March and April, and again in August through February, 2,288 in total. The majority were seen in the south bay and salt ponds. Two shovelers were found in the south-central bay in January, southwest of NAB.

northern pintail (Anas acuta)
The northern pintail is a locally common winter visitor in San Diego County. Occasionally, northern pintails have been recorded nesting in the county; none have been recorded since 1978. It frequents shallow water inland and along the coast (Unitt 2004). Northern pintails were observed in March and April, and again in September through February in the south bay and in the salt ponds, totaling 1,393 birds.

green-winged teal (Anas crecca carolinensis)
The green-winged teal is a rare winter visitor in San Diego County. It frequents the fresh and brackish waters on inland lakes and coastal wetlands. They are typically present from August through April (Unitt 2004). Green-winged teals were observed in March and again in December through February, 311 in total. All birds were observed in the south bay and in the salt ponds.

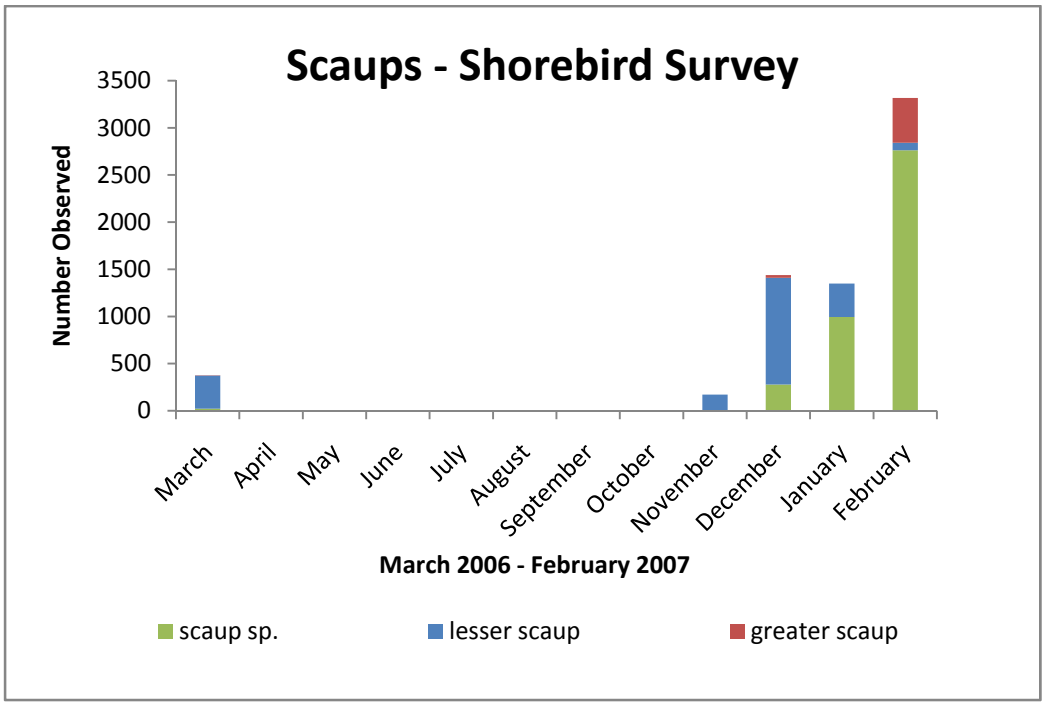
redhead (Aythya americana)
The redhead is mainly a winter visitor to San Diego County; however, it does breed along the county's northern coast, which is the south end of its breeding range on the Pacific Coast. It is quite common during the winter in Mission Bay, with inconsistent numbers at sites such as San Diego Bay, Buena Vista, and Bataquitos Lagoons (Unitt 2004). Redheads were observed October through February in all regions of the bay, although most sightings were from the salt ponds. A total of 254 birds were observed.

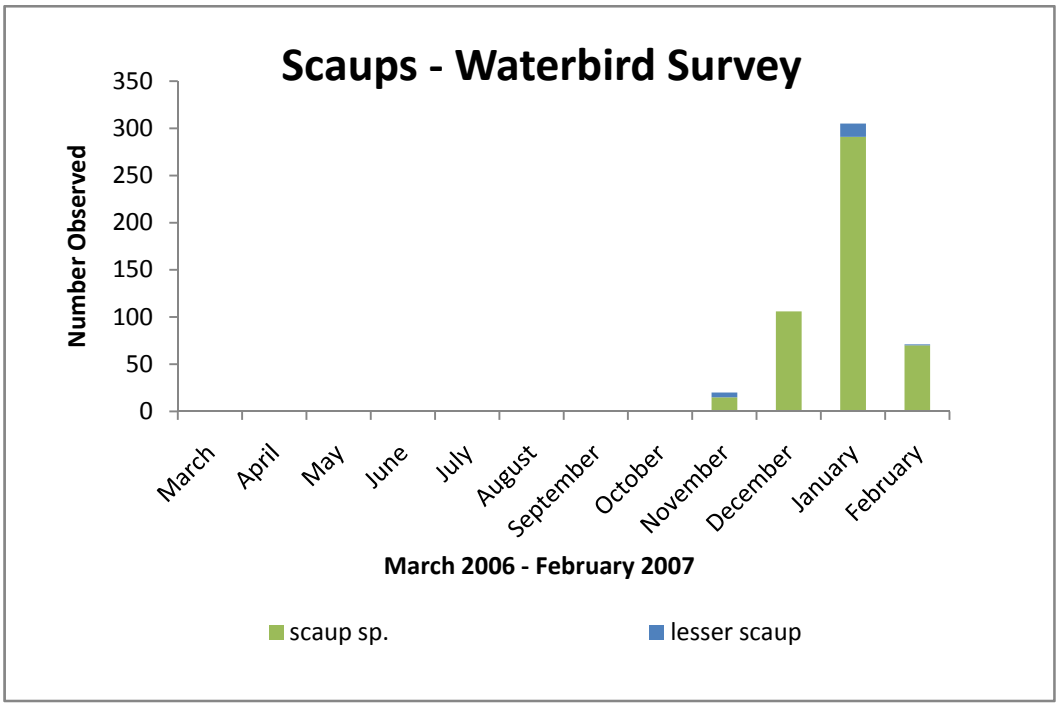
greater scaup (Aythya marila nearctica)

The greater scaup is an uncommon to rare winter visitor in San Diego County. It is usually found within flocks of lesser scaups. The two species are extremely similar, and thus the species' status in the county is poorly known. It is typically present from November through March. In San Diego County, it is most likely to be found in south San Diego Bay (Unitt 2004). Greater scaups were seen in March and April and again in November, December, and February. All birds were observed in the south bay and in the salt ponds, totaling 746 birds.

lesser scaup (Aythya affinis)

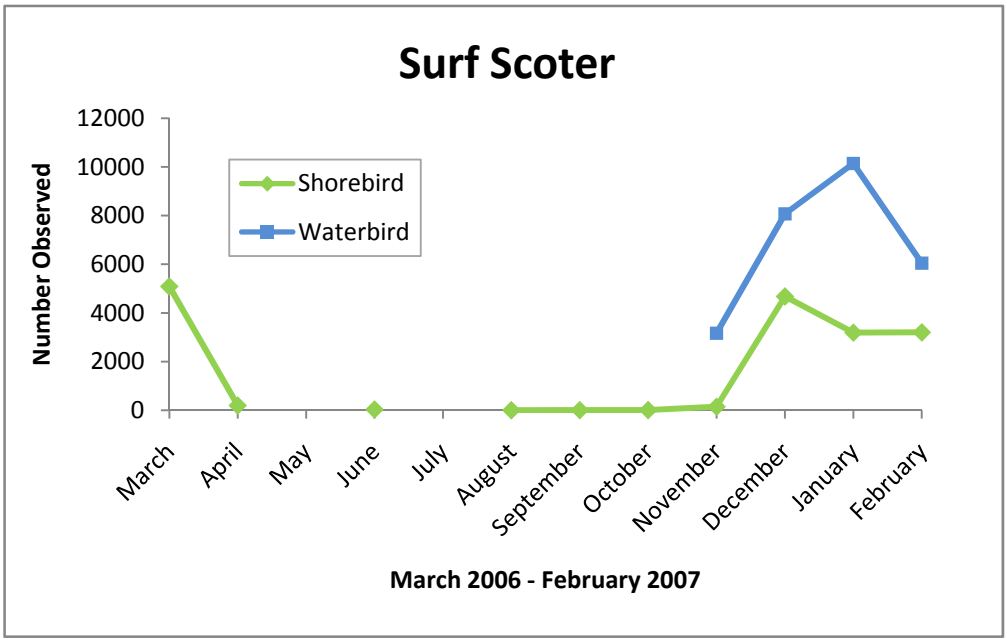
In southern California, wintering lesser scaups can be found in highest concentration on San Diego Bay. They are second only in abundance to the surf scoter in south bay (Unitt 2004). Lesser scaups were observed in March and April, and again in November through February in all regions of the bay, 2,661 in total. No birds were seen in the ocean grid. The charts that follow display scaup numbers as recorded by field observers during shorebird and waterbird surveys. Observers recorded greater, lesser, and scaup sp.; these data are lumped in the charts.





surf scoter (Melanitta perspicillata)

San Diego Bay is one of the surf scoter's key winter habitats, supporting the largest concentration of these birds in their winter range. Concentrated mainly in the south central and south bay, the scoter is the most abundant bird species on the bay (Unitt 2004) and the scoter was the second most abundant bird observed during this survey effort, after the western sandpiper. At total of 49,373 total birds were seen. Surf scoters were observed during every survey month in all regions of the bay and in the ocean grid; most common in the ocean, south, and south-central eco-regions.



white-winged scoter (Melanitta fuscai deglandi)

The white-winged scoter was previously a common winter visitor in San Diego County; however, since the 1970s it has almost disappeared from the area. It is believed that the wintering range of the white-winged scoter has shifted north, no longer including San Diego County (Unitt 2004). Only one white-winged scoter was observed during these surveys. In March, the individual was seen in ocean grid R1 across from Delta Beach North.

black scoter (Melanitta nigra americana)

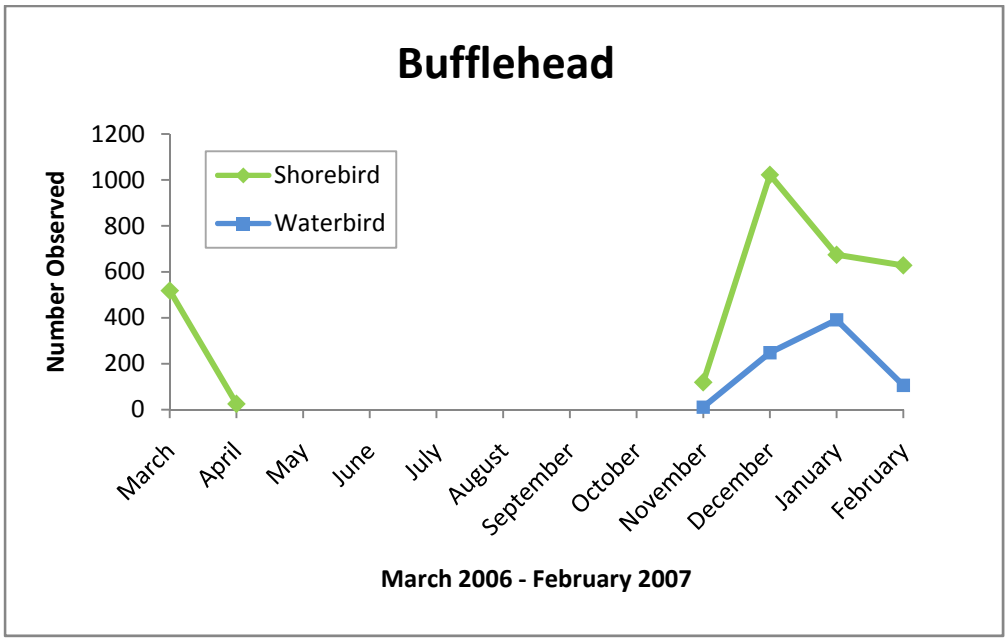
The black scoter is a rare winter visitor to San Diego County typically found in San Diego Bay or along the near-shore ocean (Unitt 2004). Only seven black scoters were detected during this effort. Sightings were in March, November, December and January: in the south and north-central bay.

long-tailed duck (Clangula hyemalis)

As San Diego Bay represents the southern tip of the long-tailed duck's winter range; it is a rare but almost annual occurrence in the bay (Unitt 2004). Two individuals were observed during the waterbird surveys, once in January and again in February, both occasions off the northeast corner of NAB, in grid cell 308.

bufflehead (Bucephala albeola)

The bufflehead is a common migrant and winter visitor in San Diego County. On San Diego Bay, it is the third most common diving duck behind the surf scoter and lesser scaup. Buffleheads are typically present from November to April (Unitt 2004). This bird was seen in March and April, and again in November through February in all portions of the bay. A few birds were also recorded in the ocean grid cells. In total 4,585 were observed.



common goldeneye (Bucephala clangula)

In San Diego County, the common goldeneye is an uncommon winter visitor in the San Diego Bay salt ponds and a rare winter visitor elsewhere (Unitt 2004). Eighty-three common goldeneyes were seen in March and April, and again in December and February. All sightings occured in the south bay with the exception of one bird observed in south-central bay grid cell 380.

hooded merganser (Lophodytes cucullatus)

The hooded merganser is an uncommon winter visitor in San Diego County. It is most frequently seen on small freshwater ponds rather than in coastal wetlands. They are typically present from November through March (Unitt 2004). Two hooded mergansers were seen in the southwest corner of the salt ponds; one in January, one in February.

common merganser (Mergus merganser)

The common merganser is a common winter visitor in San Diego County. It is more often seen on inland lakes than in coastal wetlands and is typically present from November through March (Unitt 2004). Only five common mergansers were depicted during this survey. Three were observed in the southwest bay salt ponds in January; two in the Chula Vista Wildlife Refuge in February.

red-breasted merganser (Mergus serrator)

The only San Diego County merganser with a preference for salt water, the red-breasted is common during the winter on San Diego Bay. Its numbers can vary considerably from year to year with no clear trend (Unitt 2004). Red-breasted mergansers were seen in March and April, and again in November through February in all regions of the bay and ocean grid, totaling 389 birds.

ruddy duck (Oxyura jamaicensis rubida)

The ruddy ducks is an abundant winter visitor and a locally common breeder in San Diego County. It frequents brackish lagoons and freshwater lakes and ponds. Wintering birds are typically present from

October to April (Unitt 2004). Ruddy ducks were regularly seen in March and April, and again in October through February, 823 in total. Most ruddy ducks were observed in the salt ponds and south bay. A few were seen in the north bay. One bird was seen in the Shelter Island area in August. Eleven ducks were seen in the ocean grid around NASNI in October and four were seen in the south-central bay grid cell 313 in November.

Galliformes

Neither of the birds in this Order listed in the species list found in the San Diego Bay INRMP was observed during this survey effort; this includes the California quail (*Callipepla californica californica*) and ring-necked pheasant (*Phasianus colchicus*). While the California quail is common year-round in San Diego County, and even on Point Loma, it rapidly disappears from developing urban areas and has limited available habitat where bay bird survey observations took place. Ring-necked pheasants are rarer in the county, but also have no potential habitat around San Diego Bay.

Gaviiformes

Gaviidae (Loons)

red-throated loon (Gavia stellata)

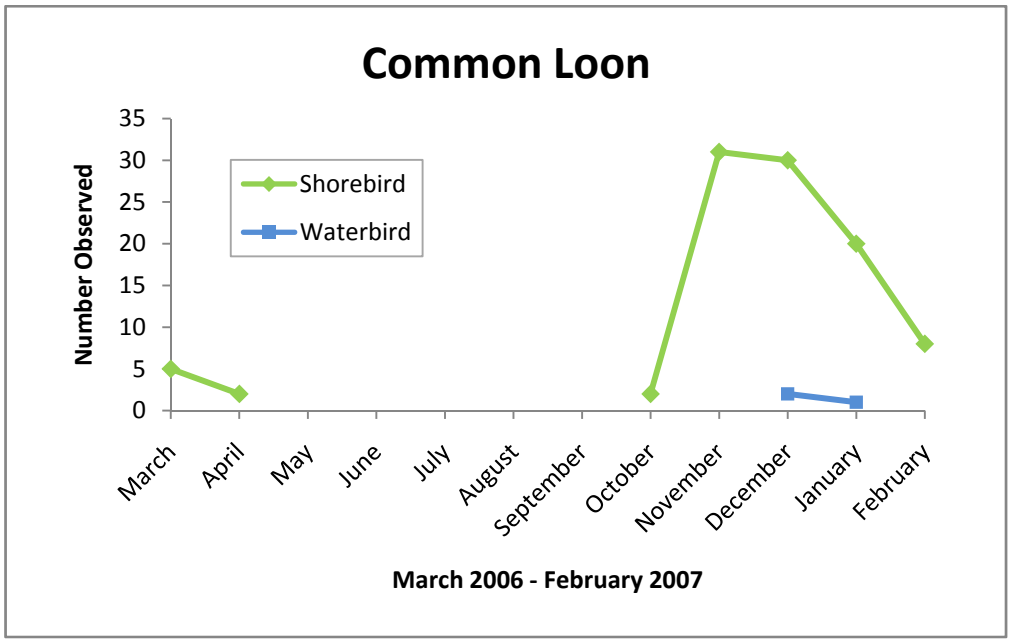
The red-throated loon is considered an uncommon winter visitor to the county. The birds arrive in October and are usually gone by April. Almost all records are coastal and only a few individuals venture inland (Unitt 2004). The vast majority of the red-throated loons observed were on the open ocean, all along the western side of North Island and the Silver Strand, with one being observed in the salt ponds in January. Red throated loons were seen in October and December through March, 54 in total.

Pacific loon (Gavia pacifica)

The Pacific loon is a common winter visitor to San Diego County's ocean, but is uncommon to rare in the county's bays and lagoons. Birds may arrive in October and usually depart March through June (Unitt 2004). Birds were detected in late March on the ocean near the Silver Strand State Beach. Three birds were seen in August on the ocean across from Delta Beach North. In the fall and winter, birds were seen from October through January, mostly on the open ocean; however, some birds were detected in the bay: one bird in the north bay in November, 2 birds in the north-central bay (one in December and one in February), six in the south bay (November and February), and six in the salt ponds (November through January). In total, 47 Pacific loons were observed.

common loon (Gavia immer)

The common loon is a fairly common winter visitor to the county along the shore, in bays and estuaries, and on occasion on inland lakes. Birds usually start to arrive in October and depart in late March and early April (Unitt 2004). Common loons were seen in all regions of the bay and in the open ocean in March and April and from October through February. The latest sightings in the spring consisted of four observations in late April on the ocean near the NASNI shoreline. The earliest sightings were two birds in early October on the ocean in the northern Silver Strand military training lanes. In total, 126 birds were observed.



Podicipediiformes

The red-necked grebe (*Podiceps grisegena*) is the only species in this Order listed on the San Diego Bay INRMP species list that was not observed during this survey. Listed as an accidental observation in the Bay INRMP, there are only three well supported records in San Diego County (Unitt 2004).

Podicipedidae (Grebes)

pied-billed grebe (Podilymbus podiceps podiceps)

The pied-billed grebe is a breeder and winter resident in San Diego County. Birds can also be seen in the county during migration, although it is uncertain if these sightings represent arrival and departure of migrants or movement of local birds. San Diego Bay is used as a wintering site for the pied-billed grebe, but this species has not been reported as breeding on the bay (Unitt 2004). The pied-billed grebe was recorded throughout the bay each month surveys were conducted (May and July were not included); 648 were observed in total. The highest numbers of birds were seen from October through February, with a peak of 99 birds observed in December.

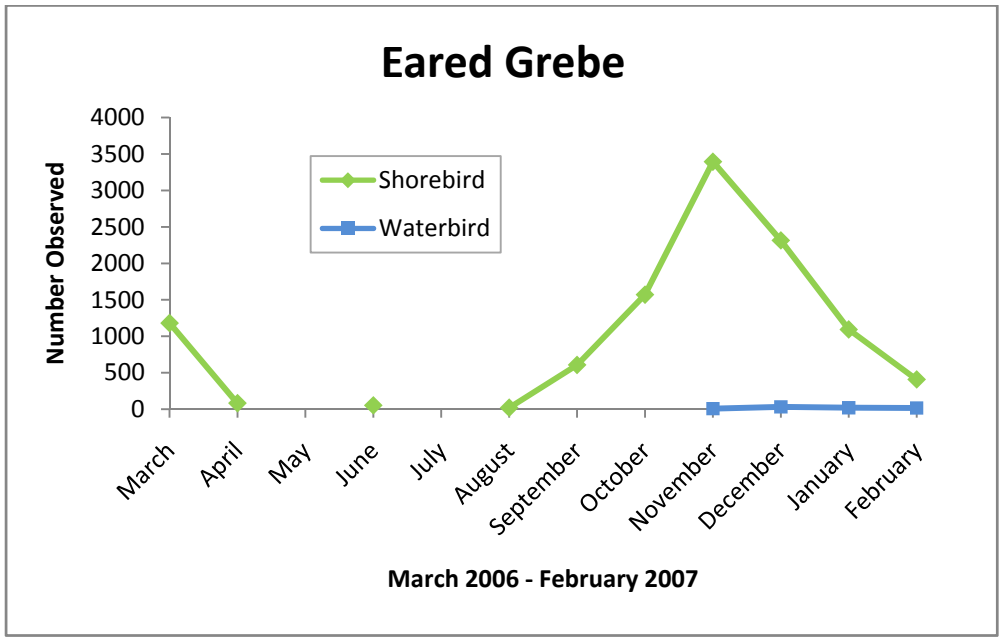
horned grebe (Podiceps auritus cornutus)

The horned grebe is a fairly common winter visitor in San Diego County, usually arriving in November and staying through March. San Diego Bay and Mission Bay support the highest number of birds in the county (Unitt 2004). The majority of the birds seen during this survey were observed November through February in all areas of the bay, 751 were observed in total. Only one bird was seen on the ocean; it was observed near NRRF. Only one horned grebe was seen in March in the south-central bay. Five birds were seen in April in the salt ponds and south-central bay.

eared grebe (Podiceps nigricollis californicus)

The eared grebe is a rare breeder and a common winter visitor in San Diego County. Breeding birds nest around fresh or brackish water and non-breeding birds use hypersaline waters. San Diego Bay, especially the south bay, supports thousands of wintering birds. Some non-breeding birds may also be seen on the bay during the summer months (Unitt 2004). The vast majority of birds during these surveys were seen

in March and from October through February, although a few birds were also detected in June, August and April. Four eared grebes were seen on the ocean across from NAB in early August. In total, 16,344 eared grebes were observed.

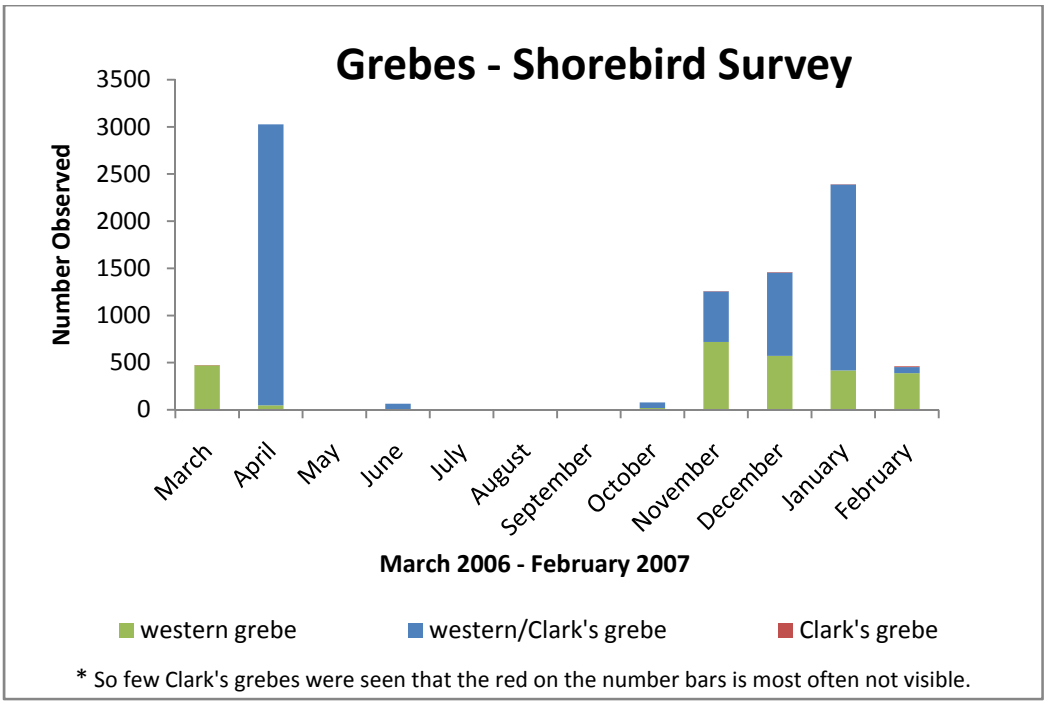


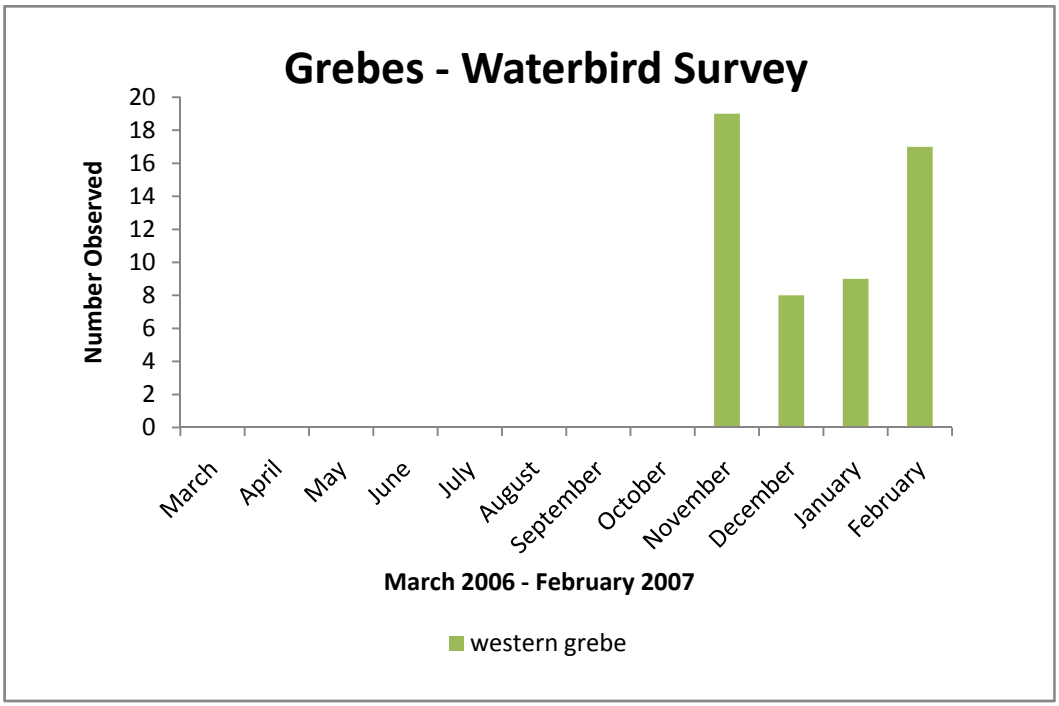
western grebe (Aechmophorus occidentalis occidentalis)

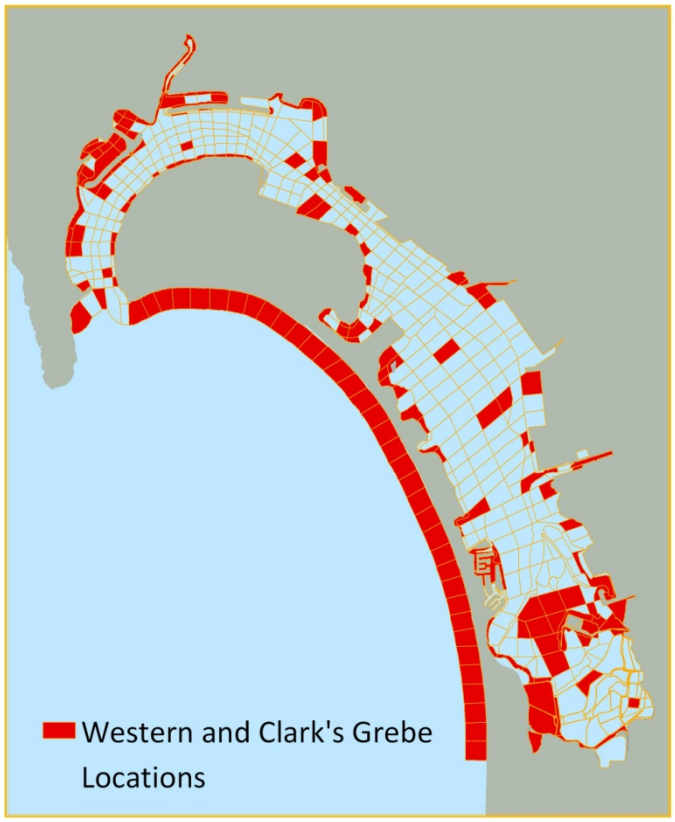
The western grebe is both a breeder and a winter visitor in San Diego County (Unitt 2004). It breeds on freshwater lakes and marshes but winters on salt or brackish water; hence, the birds seen on and around the bay would most likely be migrants. Western grebes were observed in March and April and again from October through February in all areas of the bay and on the open ocean; 4,634 were recorded in total.

Clark's grebe (Aechmophorus clarkii transitionalis)

The Clark's grebe is both a breeder and a winter visitor in San Diego County (Unitt 2004). It breeds on freshwater lakes and marshes but winters on salt or brackish water, hence the birds seen on and around the bay would most likely be migrants. Birds were seen in March and April in the north and north-central bay and from November through February in all areas of the bay. No birds were detected on the open ocean. A total of 44 Clark's grebes were recorded. The graphs that follow lump western grebes, Clark's grebes, and ambiguous observations of these species. Many more ambiguous observations (13,349) were recorded than that of either species; the western grebe is more common in the County.


Grebes - Shorebird Survey
Number Observed
3500
3000
2500
2000
1500
1000
500
0
March
April
May
June
July
August
September
October
November
December
January
February
March 2006 - February 2007
western grebe
western/Clark's grebe
Clark's grebe
* So few Clark's grebes were seen that the red on the number bars is most often not visible.


Grebes - Waterbird Survey
Number Observed
20
18
16
14
12
10
8
6
4
2
0
March
April
May
June
July
August
September
October
November
December
January
February
March 2006 - February 2007
western grebe



Procellariiformes

The only Procellariiform listed on the San Diego Bay INRMP species list is the black storm-petrel (*Oceanodroma melania*) of the Family Hydrobatidae; it is listed as an accidental observation. This bird nests on Los Coronados Islands and regularly occurs two to three miles offshore of San Diego County, but is rarely seen from land (Unitt 2004). It is therefore not a surprise that it went unobserved during this survey effort. Shearwaters, not listed on the San Diego Bay INRMP species list, were observed offshore during this effort.

Procellariidae

black-vented shearwater (Puffinus opisthomelas)

The black-vented shearwater winters in high numbers along the coast of San Diego County, concentrating within 15 miles of shore. It is most abundant September through December. They can be found in greatest number where squid and fish concentrate and have been observed in groups of tens of thousands of individuals (Unitt 2004). During this effort, 510 shearwaters were observed on and flying over the ocean offshore of Silver Strand State Beach in early September.

Pelecaniformes

Of the birds listed under this Order on the San Diego Bay INRMP species list, the magnificent frigatebird (*Fregata magnificens*), pelagic cormorant (*Phalacrocorax pelagicus*), and brown booby (*Sula leucogaster brewsteri*) were not observed during this effort.

Sulidae (Boobies)

The brown booby is listed as an accidental observation on the San Diego Bay INRMP species list and is an uncommon, but increasingly seen, species around the San Diego Bay/northern Baja California region of the eastern Pacific (Unitt 2004). It was not observed during this effort.

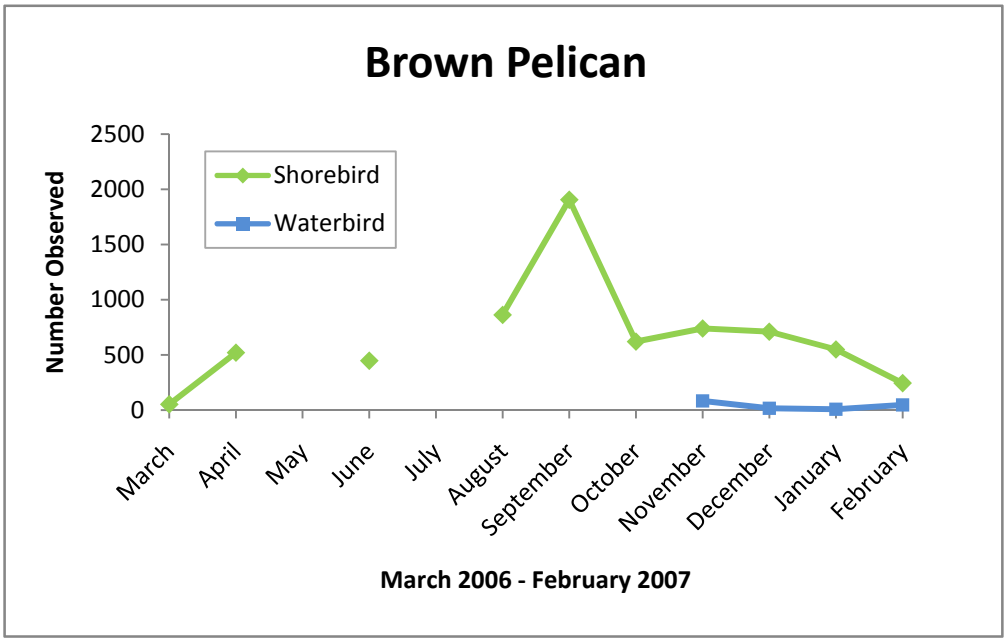
Pelecanidae (Pelicans)

American white pelican (Pelecanus erythrorhynchos)

American white pelicans winter in varying numbers in San Diego County, using coastal wetlands and inland lakes. On the coast, the Buena Vista lagoon and the southernmost basin of San Diego Bay are sites where pelicans can frequently be seen (Unitt 2004). American white pelicans were observed in April, June, August, September, and December, all in the salt ponds. In total, 135 were observed.

brown pelican (Pelecanus occidentalis californicus)

The brown pelican is a common winter visitor to San Diego County, but can be seen year round. It is most often found along the coast and offshore, although birds can regularly be seen on the Sweetwater Reservoir. In San Diego Bay, brown pelicans are usually found in the north and north-central portion of the bay and also roosting on the dikes of the south bay salt ponds (Unitt 2004). During this survey effort, brown pelicans were observed in all portions of the bay and on the open ocean during every month that surveys were conducted. They were most common in the Ocean and north eco-region. In total, 10,341 were observed.

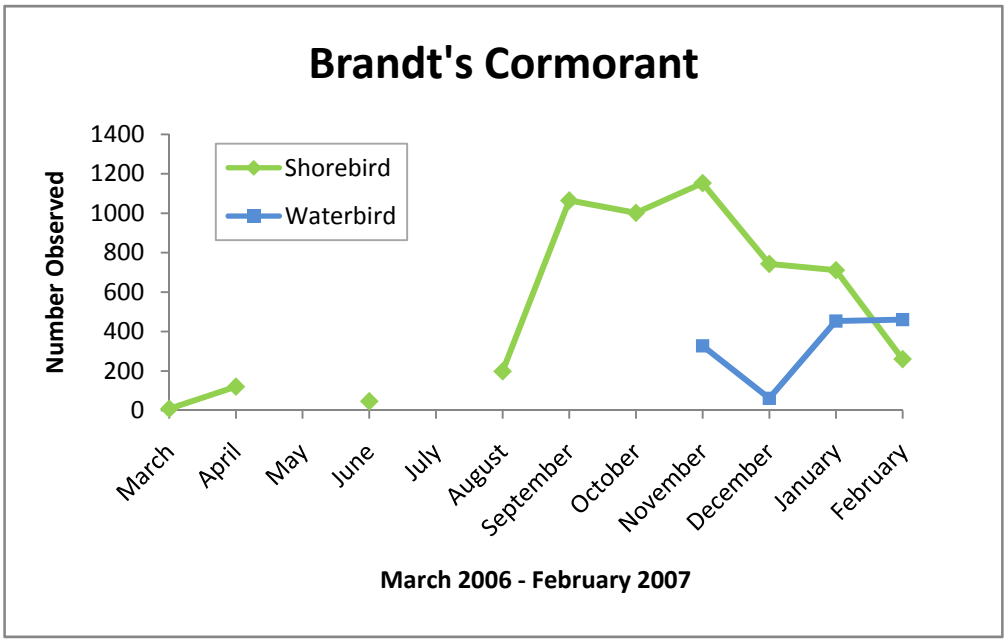


Phalacrocoracidae (Cormorants)

The pelagic cormorant is the least numerous of San Diego County's cormorants and can be easily overlooked among Brandt's cormorants, which are more common. It has been previously recorded in low numbers (6 to 10), with occasional high influxes (up to 127 in 1987), around the rocky shores of Pt. Loma (Unitt 2004). None were observed during this effort.

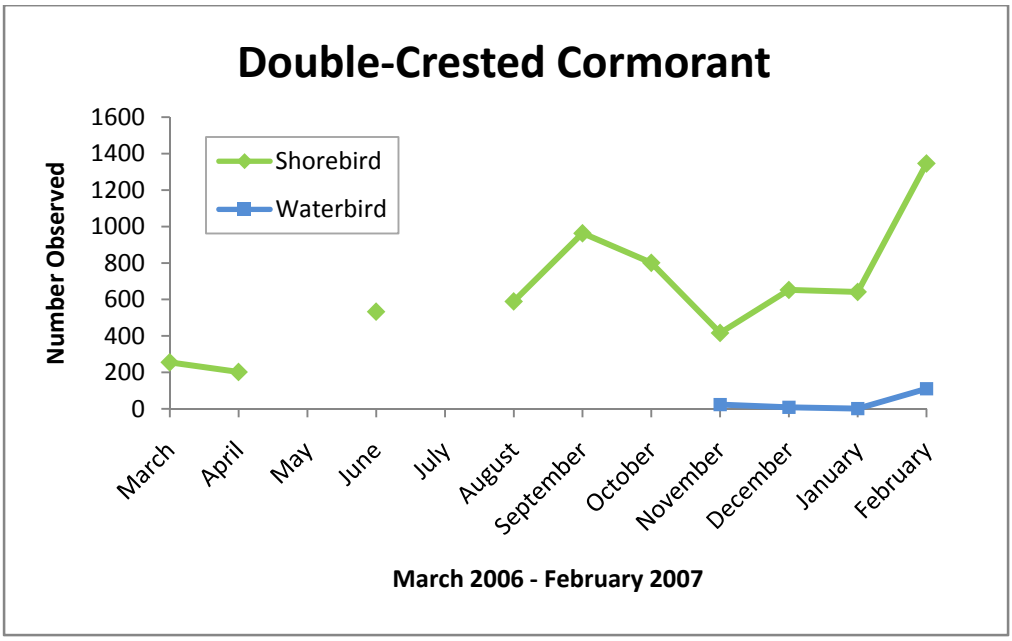
Brandt's cormorant (Phalacrocorax penicillatus)

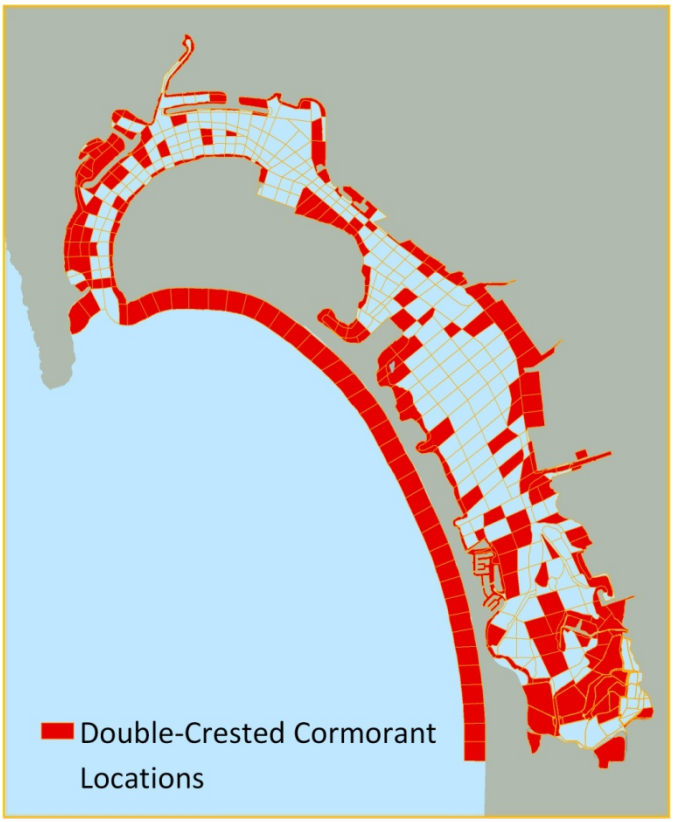
Brandt's cormorant is a common winter visitor to San Diego County, although a few birds will stay year-round and some birds have been observed nesting at La Jolla. Brandt's cormorants attempted nesting yearly from 1993 through 1995 on the degaussing pier of the Navy's submarine base on Point Loma. All three attempts failed: the first one from the disturbance of degaussing a minesweeper; no chicks hatched in the two following attempts (Unitt 2004). Brandt's cormorants were observed throughout the bay and on the open ocean during every month that surveys were conducted. A total of 7,605 were observed during all survey efforts.



double-crested cormorant (Phalacrocorax auritus)

The double-crested cormorant is a common non-breeding visitor to San Diego County. Since 1988, two breeding colonies have formed in the county: one at the Sweetwater Reservoir and one at the salt ponds of south San Diego Bay, where 77 nests were counted in 2005 (Unitt 2004; USFWS 2006). Double-crested cormorants were observed in all portions of the bay and on the open ocean during every month that surveys were conducted. Observations during shoreline and waterbird surveys totaled 10,500 birds.





Fregatidae (Frigatebirds)

The magnificent frigatebird is an increasingly uncommon visitor to San Diego County with rare visitors crossing from Mexico after fledging (Unitt 2004). It is listed as an accidental observation on the San Diego Bay INRMP species list and was not observed during this effort.

Ciconiiformes

The American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychusexilis hesperius*), tricolored heron (*Egretta tricolor ruficollis*), and yellow-crowned night heron (*Nyctansassa violaceus bancrofti*) are listed on the Bay INRMP species list but were not observed during this effort. The American and least bittern are somewhat uncommon in San Diego County and especially in the bay, where limited marsh habitat exists for them. The yellow-crowned night heron is the rarest of the herons that reach San Diego north from Mexico, and is listed as an accidental observation in San Diego Bay. One did, however, breed on Naval Air Station North Island in 2007 (Shepherd 2008). The tricolored heron is also a rare winter migrant in San Diego, but when sighted has been seen around San Diego Bay (Unitt 2004). The only Ciconiidae listed on the San Diego Bay INRMP species list, the wood stork (*Mycteria americana*), was not observed during this effort.

Ardeidae (Herons)

great blue heron (Ardea herodias wardi)

The great blue heron is common year-round in San Diego County. It is mostly a colonial breeder, although some birds might nest as isolated pairs. Breeding birds forage close to the colony and it appears that many wintering birds remain close to the breeding colonies. Some of the largest breeding colonies can be found at O'Neill Lake, Rancho Santa Fe, the Wild Animal Park, Sea World, Point Loma, and Naval Air Station North Island (Unitt 2004). During this effort, great blue herons were observed throughout the bay and on the ocean grid during all survey months; 930 were observed in total.

great egret (Ardea alba egretta)

The great egret is a common winter visitor to San Diego County and since 1988 has become a breeding species in the county with less than 100 pairs. The main breeding colony is at the Wild Animal Park. Other colony locations include Rancho Santa Fe, El Capitan Reservoir, Lindo Lake, the San Dieguito River estuary, the Point Loma naval research laboratory, Lake Wohlford, and Batiquitos Lagoon (Unitt 2004). During this effort, great egrets were seen during every survey month throughout the bay and in the ocean grid; they were most common during the winter, in November and December. In total, 843 great egrets were observed.

snowy egret (Egretta thula thula)

The snowy egret is a common fall and winter visitor to San Diego County, and since 1979, it is also a breeding bird in the county. The colony at Sea World and the one at the Wild Animal Park are two of the biggest colonies in the county (Unitt 2004). During this effort, snowy egrets, 1,988 in total, were observed during every survey month throughout the bay and in the ocean grid.

little blue heron (Egretta caerulea)

The little blue heron is a rare year-round resident in San Diego County since the 1980s. It forms breeding colonies in association with the snowy egret and has been seen nesting in the Sea World colony and in the heronry on NASNI. San Diego is the northwest corner of this species range (Unitt 2004). During this effort, although in low numbers, little blue herons were observed during every survey month, 63 in total. Birds were observed mainly in the north and south bay. A few birds were observed in the north-central portion of the bay; no birds were seen in the south-central eco-region or in the ocean grid cells.

reddish egret (Egretta rufescens dickey)

The reddish egret is a rare winter visitor to San Diego County. This species does not breed here, although some non-breeding individuals might be observed over the summer. San Diego County is the

northern limit of the species range (Unitt 2004). During this effort, reddish egrets were observed in low numbers during almost every survey month with no birds observed in June; 37 were observed in total. The vast majority of the birds were seen in the south and south-central portions of the bay with one bird observed in the southernmost ocean grid.

cattle egret (Bubulcus ibis)

In San Diego County, the cattle egret breeding population has fluctuated greatly over the years. From 1997 to 2002 the only important breeding colony in the county was that of the Wild Animal Park. Birds observed outside breeding colonies are presumed migrants or foraging birds dispersed from the colonies (Unitt 2004). During this effort, cattle egrets were only seen on one date in October. Five birds were observed in the north bay below the high water mark, on or near the NASNI shore. Eight birds were observed in the south bay salt ponds in cells SW10 and SW11.

green heron (Butorides virescens anthonyi)

The green heron can be found year-round in San Diego County. It is a bird of ponds, marshes, riparian woodlands, and channels (Unitt 2004). During this effort, although in low numbers (53 total), green herons were observed during every survey month throughout the bay and in the ocean. Most sightings were of single birds, although nine birds were seen together upland in grid cell 016 in August and six were seen together in cell 024 on a dock along Point Loma in January.

black-crowned night-heron (Nycticorax nycticorax hoactli)

The black-crowned night-heron is common year round in San Diego County. Breeding colonies exist at the Wild Animal Park, in Solana Beach, at Lindo Lake, at the Navy's submarine base on Point Loma, at Naval Air station North Island, and at the 32nd Street Naval Station. Isolated nesting birds have been observed in several locations throughout the county (Unitt 2004). Black-crowned night-herons were observed throughout San Diego Bay in April, June, August, and in October through January, 70 in total. Most birds were seen in the north and north-central portion of the bay, although a few birds were also detected in the south and south-central portion of the bay. No birds were seen in the ocean grid.

Threskiornithidae (Ibises)

white-faced ibis (Plegadis chihi)

The white-faced ibis is a winter visitor and breeder in San Diego County. During the Bird Atlas years (1997-2002), two active nesting colonies were identified: one at Guajome Lake and one in the San Luis Rey River valley (Unitt 2004). During this effort, white-faced ibis were only detected in October. One bird was observed in the south bay in grid 514 (Sweetwater National Wildlife Refuge) and 30 birds were seen in the ocean grid P2 (offshore of the Navy property NRRF).

Ciconiidae (Storks)

The wood stork is listed as an accidental observation in the Bay INRMP, one that does not regularly occur in San Diego Bay; it was not observed during this effort. This bird was formerly much more common in the county but has become exceedingly rare (Unitt 2004).

Falconiformes

Of the Falconiformes listed in the Bay INRMP the golden eagle (*Aquila chrysaetos canadensis*), rough-legged hawk (*Buteo lagopus sanctijohannis*), broad-winged hawk (*Buteo platypterus platypterus*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (Buteo swainsoni), California condor (*Gymnogyps californianus*), crested caracara (*Caracara plancus audubonii*), and prarie falcon (*Falco mexicanus*) were not observed during this survey effort.

Cathartidae (Vultures)

The California condor is listed as an accidental observation in the San Diego Bay INRMP and was not observed during this survey effort.

turkey vulture (Cathartes aura meridionalis)

Turkey vultures are not common along the San Diego County coastline, having retreated from its urbanization. They are present in the County year round; however, they are less numerous during fall migration and in the winter (Unitt 2004). Only one turkey vulture was seen during the surveys. The bird was observed flying over Silver Strand State Beach in the south bay in April.

Accipitridae (Hawks, Kites, and Eagles)

The golden eagle, rough-legged hawk, broad-winged hawk, ferruginous hawk, and Swainson's hawk are all listed as accidental observations in the San Diego Bay INRMP, and were not observed during this survey effort.

osprey (Pandion haliaetus carolinensis)

Ospreys are present year round in San Diego County, occurring in small numbers along the coast and near inland lakes and reservoirs. They began breeding in the County again, after a decline and resurgence, in 1997 (Unitt 2004). Ospreys were seen during every survey month, 367 in total. Birds were seen in all regions of the bay and in the ocean grid.

white-tailed kite (Elanus caeruleus)

White-tailed kites are present as a non-migratory species in the County year round, not differing much in their breeding and winter distributions. They tend to be less numerous in heavily urbanized habitats (Unitt 2004). Only six white-tailed kites were seen during the surveys. One was seen flying in the Shelter Island area in October and the rest were seen in the salt pond area October through January.

northern harrier (Circus cyaneus hudsonius)

In San Diego County the northern harrier is present year round; however, it is more widespread during the winter, utilizing marsh and grassland habitat (Unitt 2004). Northern harriers were seen during every survey month, 90 in total. Birds were seen in the ocean grid and in the bay from the south-central eco-region to the salt ponds.

sharp-shinned hawk (Accipiter striatus velox)

Sharp-shinned hawks are uncommon winter residents and migrants through San Diego County, using a wide variety of habitats (Unitt 2004). Only one sharp-shinned hawk was seen during the surveys. The bird was observed upland in the south bay near the D Street fill in November.

Cooper's hawk (Accipiter cooperi)

The Cooper's hawk is a covered species under San Diego's Multiple Species Conservation Plan. Since the 1980s, its number has increased as the population adapted to urban living (Unitt 2004). Cooper's hawks were seen in March and April, and again in August through November with the last sighting in January. Only 19 birds were observed, but the sightings were scattered in all regions of the bay and in the ocean grid. Almost all sightings were of birds in the air, with the exception of one bird seen upland on Point Loma in November and one bird seen upland on pond 20A in September.

red-shouldered hawk (Buteo lineatus elegans)

Red-shouldered hawks have adapted well to urbanization in San Diego County, taking advantage of exotic trees for nesting. They are present in the County year round, pairs remaining in their territories through the winter (Unitt 2004). Only seven red-shouldered hawks were seen during these surveys. One

was seen upland in the Coronado golf course area in November as well as one each seen flying near the Coronado golf course and the Coronado ocean shoreline in December. The remainder were sighted in the salt ponds in October and January.

red-tailed hawk (Buteo jamaicensis)

The red-tailed hawk is the bird of prey most widespread in San Diego County, using all of the County's terrestrial areas. They are present as both a breeding and winter species (Unitt 2004). Red-tailed hawks were seen during every survey month, 76 in total. Birds were seen in the ocean grid and in all regions of the bay except for the north-central portion.

Falconidae (Falcons)

The crested caracara is listed as an accidental observation in the San Diego Bay INRMP and was not observed during this survey effort. Prairie falcons breed in San Diego County, albeit in low numbers (20 to 30 pairs) and are an uncommon winter visitor to the county. During the breeding season, prairie falcons are distributed inland. They can be seen along the coast during the winter, although they are still more common inland and were not observed during this survey effort (Unitt 2004).

American kestrel (Falco sparverius sparverius)

American kestrels are present in San Diego County year-round, but are more common in the winter. They occupy a great variety of habitats are observed widely in the County (Unitt 2004). American kestrels were seen during every survey month, 98 in total. Birds were seen in all regions of the bay and in the ocean grid.

merlin (Falco columbarius columbarius)

Occuring occasionally in any habitat save dense woodland, the merlin is a rare winter visitor in San Diego County, seen mainly from October to March. Since they eat smaller birds they tend to occur where those species congregate, and can be seen annually along Point Loma during fall migration (Unitt 2004). Eleven merlins were observed during this effort in each survey month except June and October. They were found in each eco-region but the north-central and salt ponds.

peregrine falcon (Falco peregrinus anatum)

Peregrines were nearly extirpated from San Diego County in the middle of the 20th century due to effects from DDT. Since the ban of the chemical they have recovered and a small stable population exists in the County (Unitt 2004). Peregrine falcons were seen during every survey month, 63 in total. Birds were seen in all regions of the bay and in the ocean grid.

Gruiformes

Of the birds listed under this Order on the San Diego Bay INRMP species list, the sandhill crane (*Grus canadensis*), black rail (*Laterallus jamaicensis*), sora (*Porzana carolina*), and Virginia rail (*Rallus limicola*), were not observed during this effort.

Rallidae (Coot, gallinules, rails)

The following Rallidae were not observed during this effort: The black rail is listed as an accidental observation on the bay and is labeled as extirpated from the bay in the INRMP. The sora is an uncommon winter visitor in San Diego County. Soras are concentrated around the north county coastal lagoons and ponds, although some birds may use salt marshes (Unitt 2004). The Virginia rail is a resident and winter visitor in San Diego County. During the breeding season, they are concentrated around north county coastal lagoons and ponds. In winter, Virginia rails can also be seen in tidal salt marshes (Unitt 2004).

light-footed clapper rail (Rallus longirostris levipes)

Listed as federally endangered since 1970, the light-footed clapper rail was once common in the county's coastal salt marshes; the degradation of its habitat decimated its population (Unitt 2004). All rails typically stay hidden in marshes and are therefore difficult to detect, especially since this survey effort was not targeted at marsh habitat. One was seen however in marsh habitat in grid cell 514, which is just south of the Chula Vista Marina.

common moorhen (Gallinula chloropus)

The common moorhen generally avoids salt water, preferring fresh, but it can be sighted along the coast in slightly brackish conditions. The bird is present in the county year round as a non-migrant (Unitt 2004). Only two common moorhens were seen during these surveys. They were observed in grid cell 514 in the southeast corner of the south bay in December as well as in the Otay River channel in the salt ponds.

American coot (Fulica americana americana)

The American coot is common in San Diego County as both a winter visitor and breeding season species, both inland and near the coast (Unitt 2004). American coots were seen in March through June, and again from October through February, 1,878 in total. Birds were observed in all regions of the bay. No birds were seen in the ocean grid.

Gruidae (Cranes)

The sandhill crane is listed as an accidental observation on the Bay INRMP species list as one was seen flying over the south bay along the Silver Strand in 1999. In the early 20th century it was common in flocks migrating over the county, but its general decline has made recent sightings only very occasional individuals (Unitt 2004).

Charadriiformes

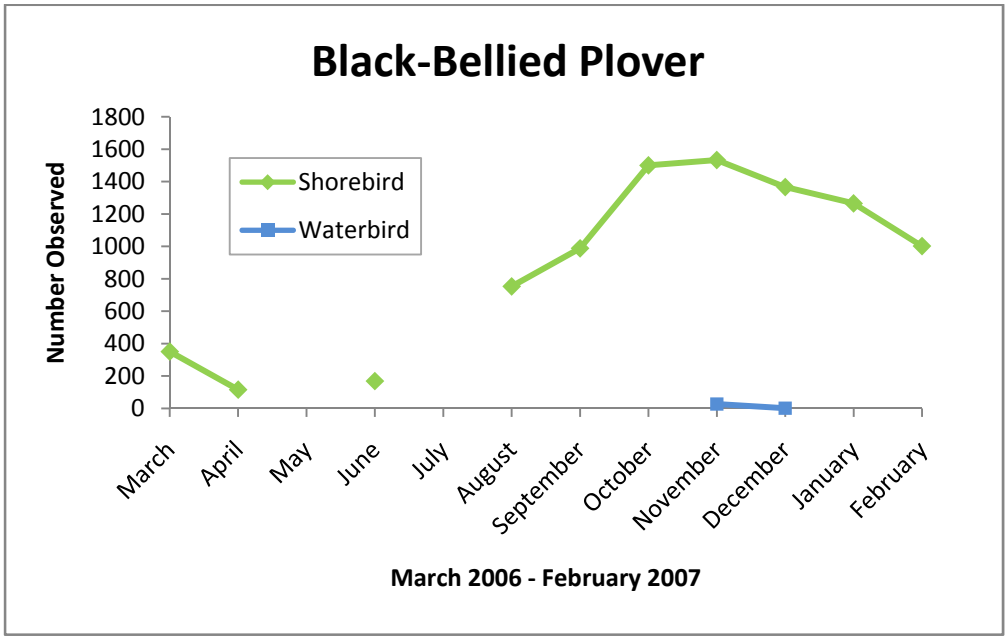
Of the birds listed under this Order on the San Diego Bay INRMP species list, the mountain plover (*Charadrius montanus*) and Wilson's plover (*Charadrius wilsonia*) in the Charadriidae family, the sooty tern (*Sterna fuscata*), sandwich tern (*Sterna sandvicensis*), laughing gull (*Larus atricilla*), Franklin's gull(*Larus pipixcan*), Sabine's gull (*Xema sabini*), black-legged kittiwake (*Rissa tridactyla*), and arctic tern (*Sterna paradisaea*) in the Laridae family, and the pectoral sandpiper (*Calidris melanotos*), Wilson's snipe (*Gallinago delicata)* (previously common snipe), bar-tailed godwit (*Limosa lapponica*), ruff (*Philomachus pugmax*), and solitary sandpiper (*Tringa solitaria)* in the Scolopacidae family were not observed during this effort.

Charadriidae (Plovers)

The following birds were not observed during this effort: Wilson's plover is listed as an accidental observation on the Bay INRMP species list; it is a rare vagrant on the Pacific coast north of the Mexican border. There are scattered records for San Diego Bay, in 1998 on the Delta Beaches, 2000 on North Island, and in 2008 on North Island (Unitt 2004; Copper 2008). The mountain plover is a wintering bird in southern California, but its population has been declining most likely due to habitat change in its breeding and wintering grounds. This species hasn't been wintering in San Diego County since 1991 (the only records in the San Diego Bay area come from birds sighted at the south end of the Silver Strand in 1938) and the only record of a migrant since was that of a single individual at Stuart Mesa on Camp Pendleton in October 1999 (Unitt 2004).

black-bellied plover (Pluvialis squatarola)

Black-bellied plovers were seen during every survey month, 11,196 in total. They were observed in all regions of the bay and in the ocean grid. They are known as one of the County's more common wintering shorebirds, present mostly along the coast (Unitt 2004).

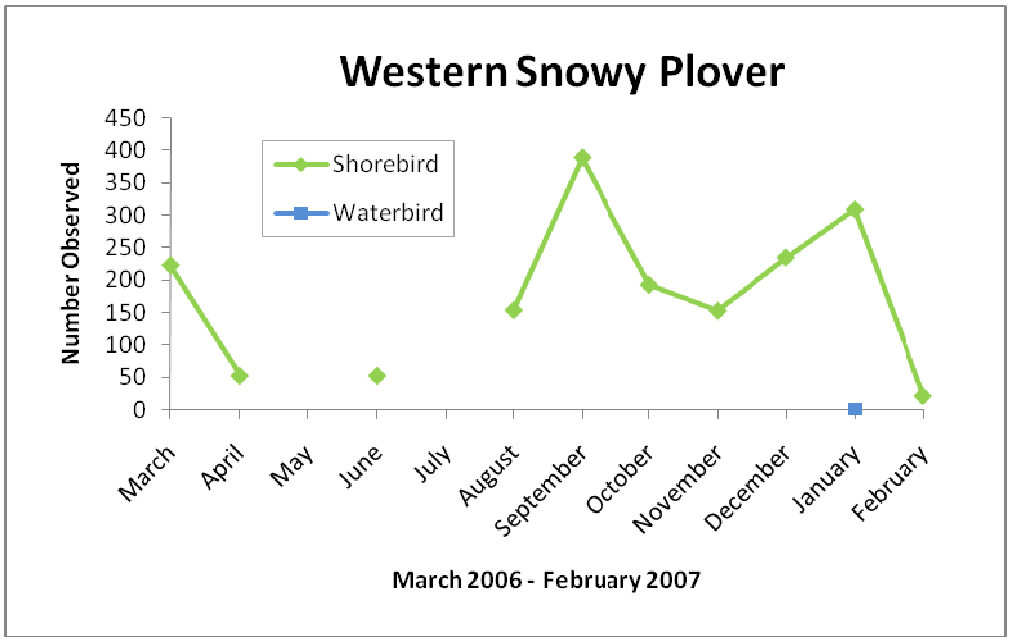


Pacific golden-plover (Pluvialis fulva)

A few Pacific golden-plovers reach coastal San Diego County each winter and migratory season. Similarities between the American golden-plover and the Pacific golden-plover make them difficult to distinguish with certitude. The field characteristics for distinguishing these two species have only been widely known for about a decade; hence, the status of the Pacific golden-plover is uncertain (Unitt 2004). Four Pacific golden-plovers were seen during these surveys. One was seen in March in the south bay, one was in the ocean grid just east of Zuniga Jetty in October, and two were in the south bay in December (one by the D Street fill and one in the South Bay Biological Station area).

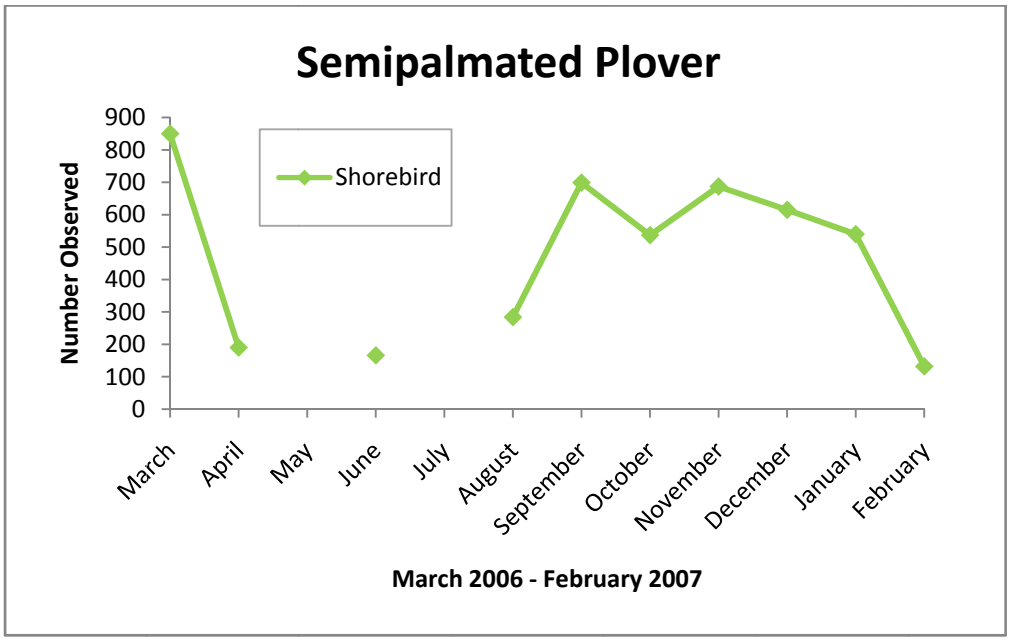
western snowy plover (Charadrius alexandrinus nivosus)

The western snowy plover is listed as threatened by the federal government and is one of the County's scarcest breeding birds. They breed in very limited areas on the coast and are somewhat more widespread during the winter, although not more numerous (Unitt 2004). More than 2,400 observations were made of western snowy plovers during this survey effort, with a maximum of 141 at one time along the northwestern shore of Emory Cove in September. Generally plovers were located along the NASNI and Silver Strand Ocean shoreline as well as on the Delta Beach mudflats as well as south of Emory Cove and at D-Street Fill.



semipalmated plover (Charadrius semipalmatus)

Semipalmated plovers are more common in coastal San Diego County than inland, preferring coastal mudflats. They are mainly winter visitors and migrants although some non-breeders remain year round (Unitt 2004). Semipalmated plovers were seen during every survey month, 7,052 in total. Birds were seen in the ocean grid and in all regions of the bay except for the north-central portion.



killdeer (Charadrius vociferus vociferous)

The killdeer is common in San Diego County during the winter and breeding seasons, and is the County's most widespread shorebird. They utilize bare ground and are common inland as well as near the coast (Unitt 2004). Killdeers were seen during every survey month, 1,497 in total. Birds were seen in all regions of the bay and in the ocean grid.

Haematopodidae (Oystercatchers)

American oystercatcher (Haematopus palliates)

American oystercatchers are rare in southern California; three were recorded during these surveys (Unitt 2004). Two were seen on the same day in November in adjacent cells on either side of Zuniga Jetty, and one was seen in the ocean cell just west of the Jetty in February. All birds were observed on riprap.

black oystercatcher (Haematopus bachmani)

The black oystercatcher is rare in San Diego County, showing no clear seasonal trend in its sightings. They prefer natural rocky habitats, although they were seen mainly along Zuniga Jetty during these surveys (Unitt 2004). Twenty-two black oystercatchers were observed; they were seen in March, August, September, November, and February. All the birds were observed in the ocean grid around Zuniga Jetty except for one bird seen in November on the Point Loma side of north bay near the boundary of the ocean grid.

Recurvirostridae (Stils, avocets)

black-necked stilt (Himantopus mexicanus mexicanus)

Black-necked stilts are common year round in the County, this survey found the highest concentration in the spring (Unitt 2004). A total of 3,844 black-necked stilts were seen during these surveys with a high count of 540 in October and a low count of 13 in April. Birds were observed mostly in the salt ponds, but a few birds were seen in the south bay in June, November, and February. This is consistent with their recorded distribution in the bay (Unitt 2004).

American avocet (Recurvirostra americana)

American avocets are present year round in San Diego County; in coastal south County they concentrate in the salt pond area of south San Diego Bay and in the Tijuana River estuary (Unitt 2004). A total of 1,030 American avocets were seen during the surveys with a high count 102 and February and a low count of 7 in April. Birds were seen during every survey month. All sightings were in the south and salt pond regions of the bay.

Scolopacidae (Sandpipers, phalaropes)

A total of 1,411 sandpiper sp. and 30,826 peeps were recorded during these surveys during every month but June. These were instances where field conditions did not permit identification to species, but that the birds were clearly small sandpipers.

The following birds were not observed during this survey effort:

The pectoral sandpiper is a yearly visitor, though in low numbers, to the county during migration. They are most common near fresh water, although a few individuals visit the coastal marshes (Unitt 2004). The Wilson's snipe (previously common snipe) is mainly a winter visitor to San Diego County, although a few individuals have been seen during the summer. It is mainly a bird of fresh or brackish water and is seldom seen along the seashore (Unitt 2004). The bar-tailed godwit is a casual migrant in California and San Diego County has two confirmed records (Unitt 2004). The ruff is a rare, but regular migrant and winter visitor in North America. One individual returned yearly to the San Diego Bay shore to winter between 1984 and 1991. Birds have also wintered at the salt ponds during the winter of 2002-2003 (Unitt 2004). The solitary sandpiper is a rare to uncommon fall migrant in San Diego County and is found around fresh and brackish water.

spotted sandpiper (Actitis macularius)

The spotted sandpiper can be found inland as well as along the coast in San Diego County. They are present in the winter but more common during migration; small numbers also nest in the County (Unitt 2004). A total of 268 spotted sandpipers were seen during the surveys. Birds were seen in all the survey months except in June with a high count of 61 in November and a low count of 11 in August.

wandering tattler (Tringa incanus)

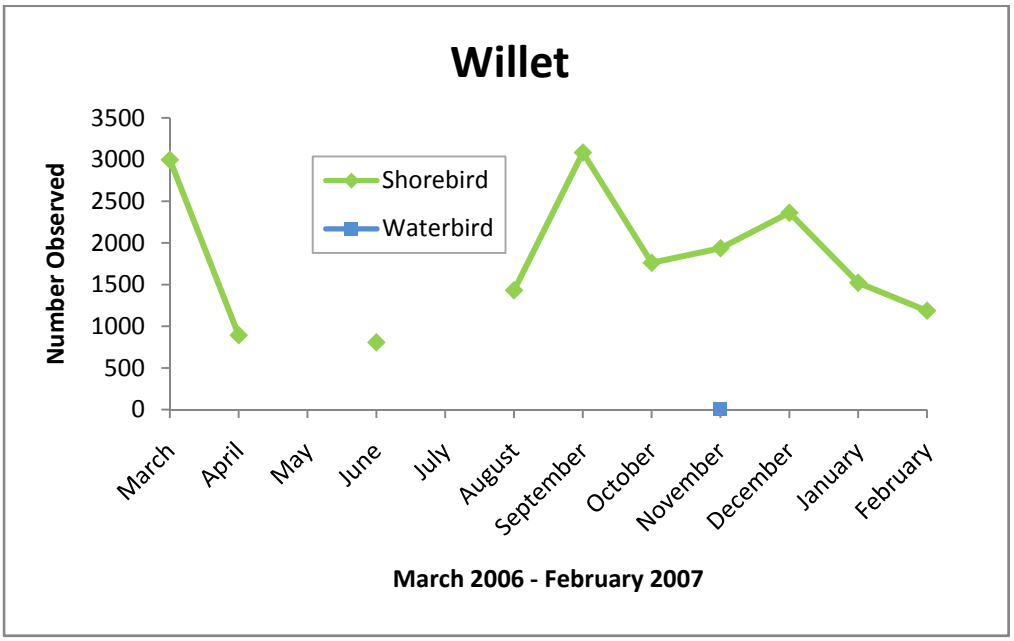
Wandering tattlers are primarily found in rocky habitats; in San Diego County they are present as winter visitors and migrants (Unitt 2004). A total of 20 wandering tattlers were seen during these surveys. The sightings were scattered in April, August, September, November, and December. Two birds were seen along the rocky western shore of NASNI in April; the remaining birds were seen in the ocean grid on either side of Zuniga jetty.

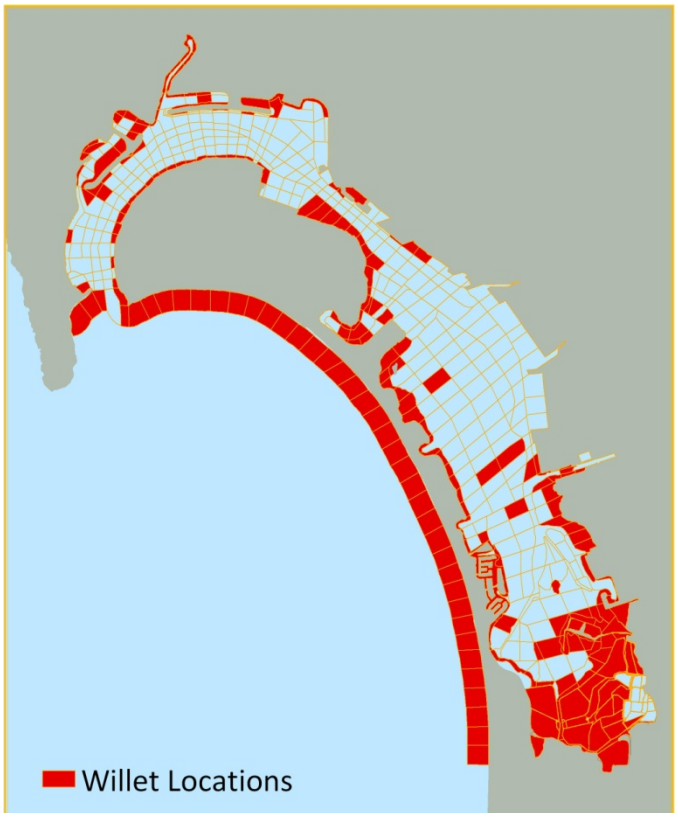
greater yellowlegs (Tringa melanoleuca)

Greater yellowlegs are found both inland and along the County's coast, seldom gathering in flocks (Unitt 2004). A total of 320 greater yellowlegs were seen during these surveys; 97 unidentified yellowlegs were also seen, mostly in the D Street Fill area. Birds were observed during every survey month with a high count of 70 in December and a low count of three in April. Although greater yellowlegs were seen in all regions of the bay and in the ocean grid, the majority of the birds were observed in the south and south-central regions of the bay. Three birds were seen in the north bay, two in the north-central bay just north of the Coronado bridge, two in the ocean grid along Breakers Beach, and 23 in the salt ponds.

willet (Tringa semipalmata inornatus)

Willets are very abundant along San Diego County's shoreline, especially in southern San Diego Bay. They can be seen year-round but are most common during fall migration (Unitt 2004). A total of 22,357 willets were seen during each survey month with a high count of 3,085 in September. Willets were detected in all regions of the bay and in the ocean grid.





lesser yellowlegs (Tringa flavipes)

The lesser yellowlegs is less common in the County than the greater yellowlegs. The lesser is common during migration but rare in the winter; California is just north of the species' main winter range (Unitt 2004). Twenty-seven lesser yellowlegs were seen during the surveys. Birds were seen in March, and again from September through February with a high count of six in September and a low count of one in August, January, and February. Ten birds were observed in the south bay, 13 in the salt ponds, one in the NAB/Homeport Island area, one in Glorietta Bay near the Coronado golf course, and two in the NTC boat channel.

whimbrel (Numenius phaeopus hudsonicus)

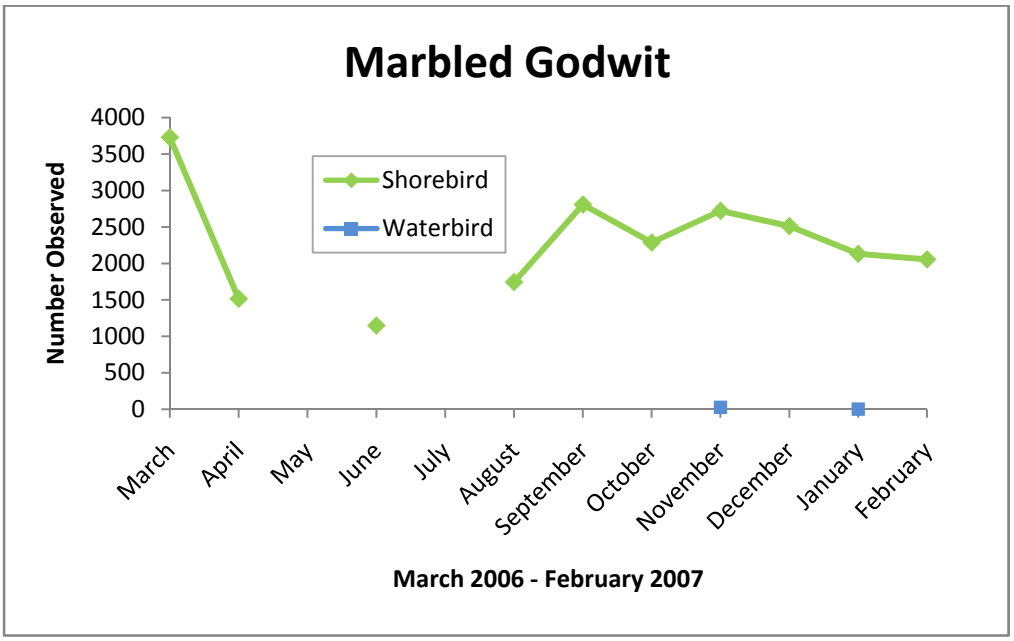
July through September, during the whimbrel's fall migration, is when this bird is normally most common along San Diego County's shoreline (Unitt 2004). In contrast to this, these surveys observed a peak in the spring. A total of 280 whimbrels were seen over the survey months with a high count of 166 in March and a low count of four in June and August. Two birds were seen flying in the Coronado golf course area in August, and two birds were seen in the salt ponds in March. The remaining birds were seen in the ocean grid and in the north, south-central, and south regions of the bay.

long-billed curlew Numenius americanus

The long-billed curlew inhabits mudflats and open grassland in San Diego County. They can be found year-round but are most common during the winter and migratory seasons (Unitt 2004). A total of 733 long-billed curlews were seen during each survey month, with a high count of 82 in February and a low count of 10 birds in April. The majority of the birds were found in the south bay. Several birds were also seen in the north, south-central, and salt pond regions of the bay. A few birds were seen in the north-central bay and in the ocean grid.

marbled godwit (Limosa fedoa fedoa)

The marbled godwit is very common along the County's coast, especially in the south County. Although it is mainly present as a winter visitor, several hundred normally remain through the summer (Unitt 2004). A total of 29,351 marbled godwits were seen during each survey month, with a high count of 3,730 in March and a low count of 1,148 in June. Marbled godwits were detected in all regions of the bay and in the ocean grid.



ruddy turnstone (Arenaria interpres)

Ruddy turnstones are common on mudflats and beaches in San Diego County where they can be observed year-round (Unitt 2004). A total of 676 ruddy turnstones were seen during every survey month, with a high count of 86 in December and a low count of 9 in June.

black turnstone Arenaria melanocephala

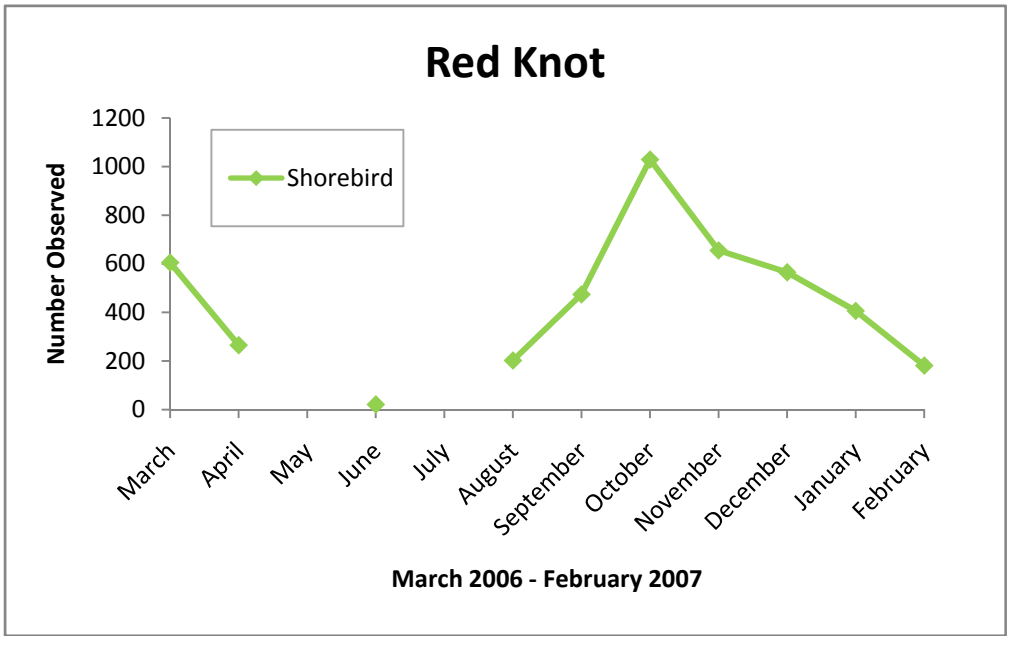
Black turnstones primarily utilize rocky shorelines, although they can also be found on tidal mudflats and beaches; they occur in the County year-round (Unitt 2004). A total of 606 black turnstones were seen in every survey month, with a high count of 103 in December and a low count of 11 in June.

surfbird (Aphriza virgata)

Surfbirds are most common on rocky shorelines, sometimes using sandy beaches during spring migration. They are common during the winter in San Diego County and most abundant during spring migration (Unitt 2004). A total of 290 surfbirds were seen with a high count of 123 in March and a low count of 12 in February. No surfbirds were seen in June. Most birds were seen in the ocean grid. Eighteen birds were seen in the Harbor Island area in March and in January, and six birds were seen along the Coronado shore in the north-central bay in March.

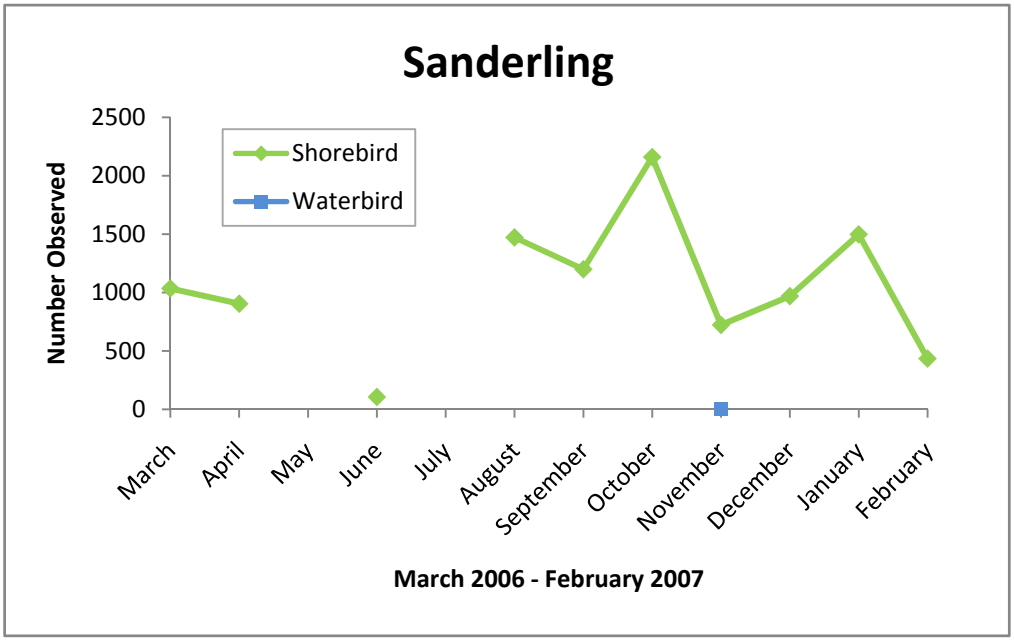
red knot (Calidris canutus roselaari)

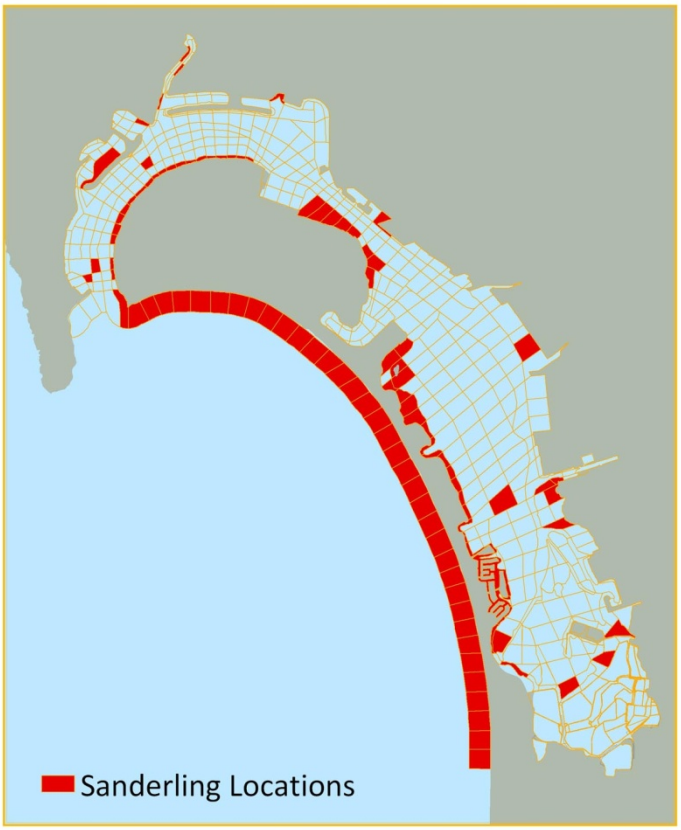
Red knots winter in San Diego Bay; they are present in greater numbers during migration, in groups of hundreds in the bay (Unitt 2004). A total of 5,654 red knots were seen over the survey months with a high count of 1,029 in October and a low count of 21 in June. The June observations were likely non-breeding birds. Knots were mainly seen in the south, south-central, and salt pond regions of the bay, and a few birds were seen in the north-central bay and in the ocean grid.



sanderling (Calidris alba)

Sanderlings winter along the County's beaches, utilizing other coastal habitats such as rocky shores and bays when their numbers increase during migration (Unitt 2004). A total of 13,821 sanderlings were seen over the survey months with a high count of 2,160 in October and a low count of 105 in June.



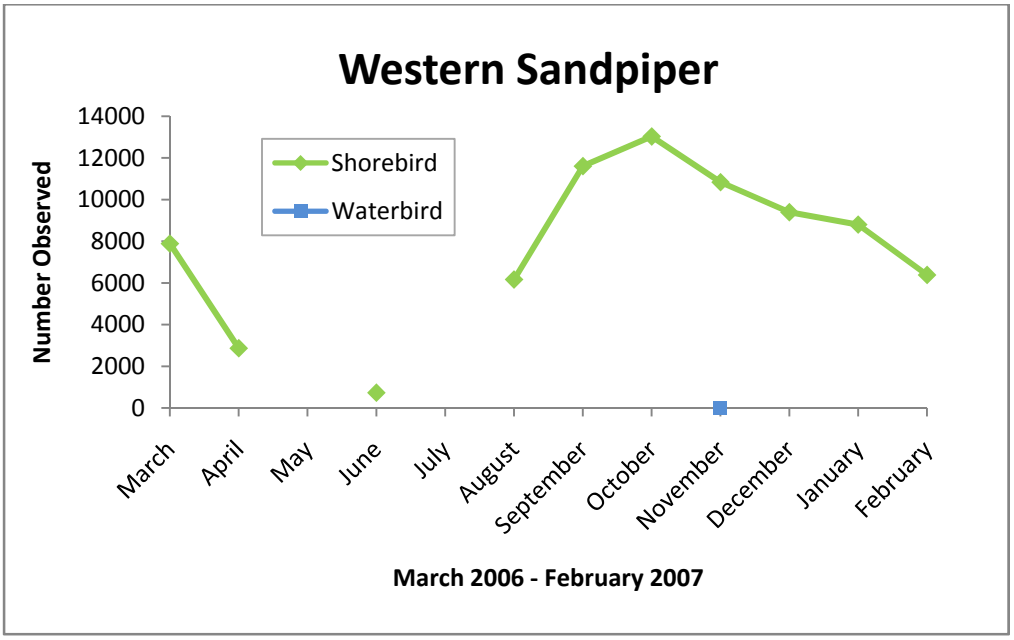


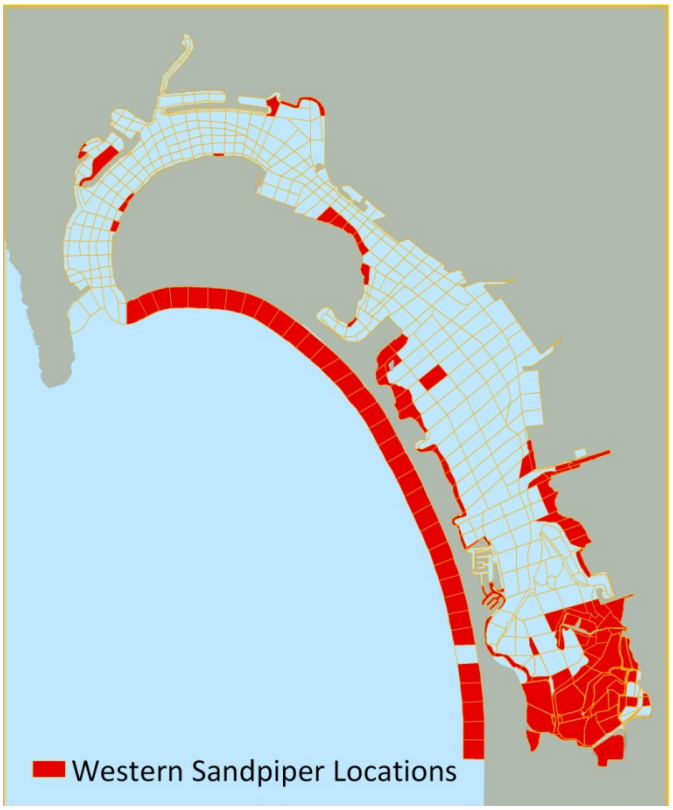
semipalmated sandpiper (Calidris pusilla)

Semipalmated sandpipers are rare in San Diego County, seen during fall migration. They concentrate in fresh and brackish water wetlands, avoiding the mudflats of San Diego Bay (Unitt 2004). Only seven semipalmated sandpipers were seen during these surveys. All individuals were seen along the southern shore of the Coronado Cays in October, with the exception of one individual seen in the salt ponds in September.

western sandpiper (Calidris mauri)

The western sandpiper is the most abundant bird on San Diego County's coastline. They are very common in the winter, with even larger numbers during migration (Unitt 2004). These birds were the most common species observed during the surveys; a total of 91,446 were seen over the survey months with a high count of 13,033 in October and a low count of 731 in June. Although a few birds were detected in the north bay and in the ocean grid, the majority were seen in the south, south-central, and salt pond regions of the bay.





least sandpiper (Calidris minutilla)

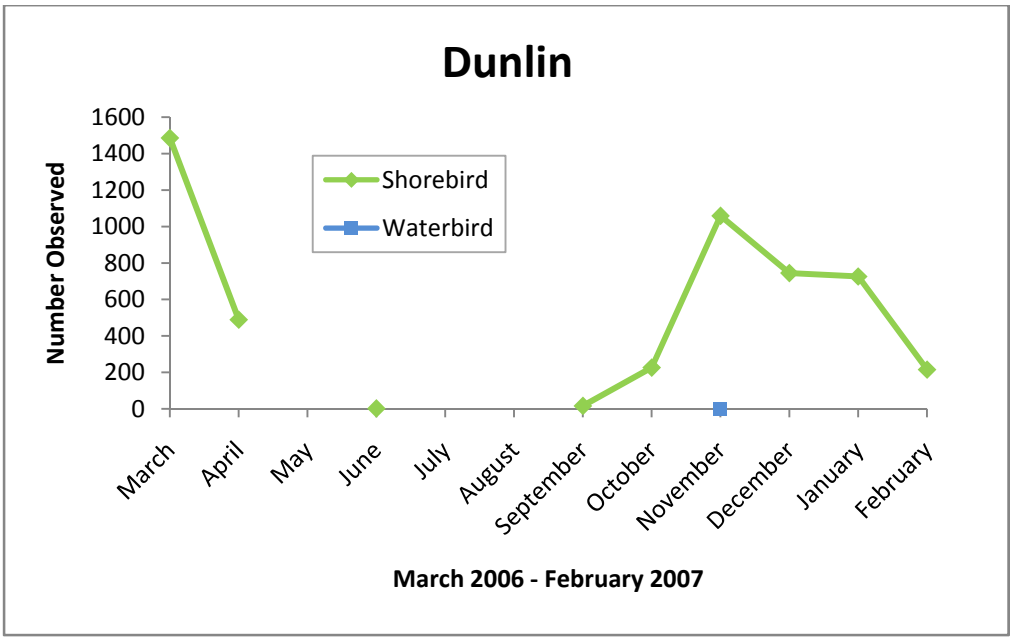
The least sandpiper is a migrant and winter visitor in San Diego County, occurring in widespread habitats including San Diego Bay (Unitt 2004). A total of 4,283 least sandpipers were seen during these surveys. Birds were detected during every survey month, except for June. The high count was of 618 birds in October and the low count was of 78 birds in April. The south bay supported the most birds followed by the salt ponds. A few birds were seen in the north and south-central bay and in the ocean grid.

Baird's sandpiper (Calidris bairdii)

Thirteen Baird's sandpipers were observed during these surveys. Two in September and 11 in October, all in the south bay salt ponds. These birds are somewhat rare in San Diego County, with the majority of them occurring as juveniles during fall migration. The reduction of muddy ponds and irrigated areas has reduced sites available for this bird in the county (Unitt 2004).

dunlin (Calidris alpinia pacifica)

The dunlin winters in San Diego County, arriving in September and usually departing by May. They concentrate towards the coast, mainly in San Diego and Mission Bays (Unitt 2004). A total of 6,123 dunlins were seen during the surveys with a high count of 1,486 in March and a low count of two in June. Birds were detected during every survey month, except for August. Dunlins were mostly seen in the south, salt ponds, and south-central eco-regions of the bay. Birds were also seen in the ocean grid and a few birds were seen in the Harbor Island area in April.



stilt sandpiper (Calidris himantopus)

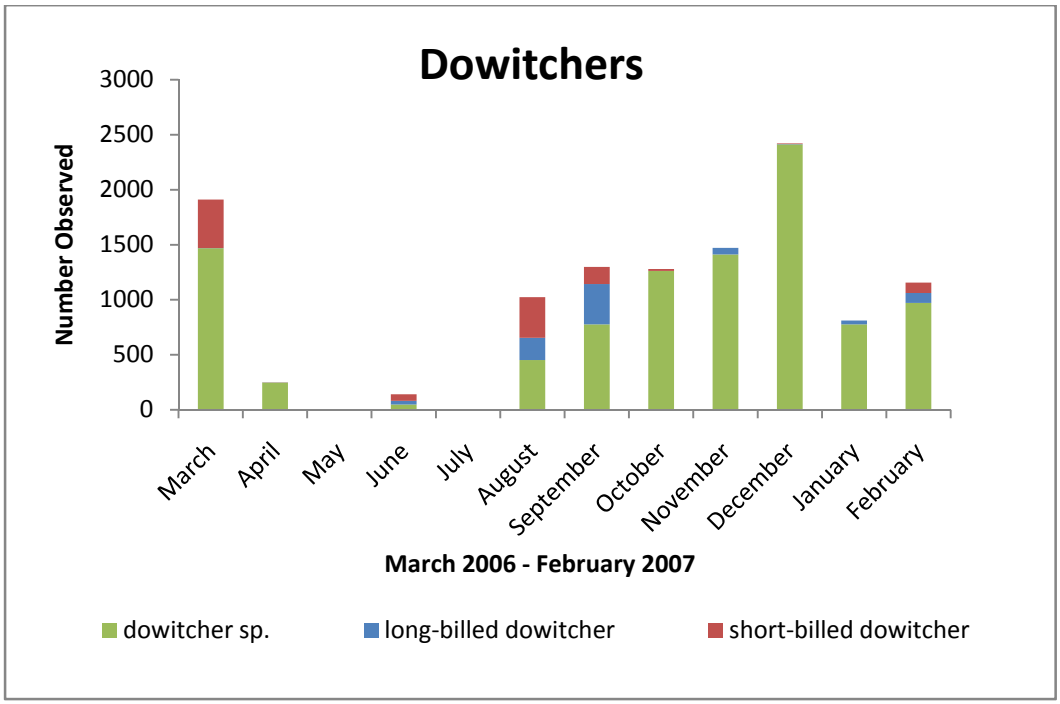
Stilt sandpipers are rare along the Pacific coast, occurring mainly in the fall (Unitt 2004). Six were observed during these surveys. Five were seen in the northwest corner of the salt ponds in August, and one was seen in the NTC boat channel in November.

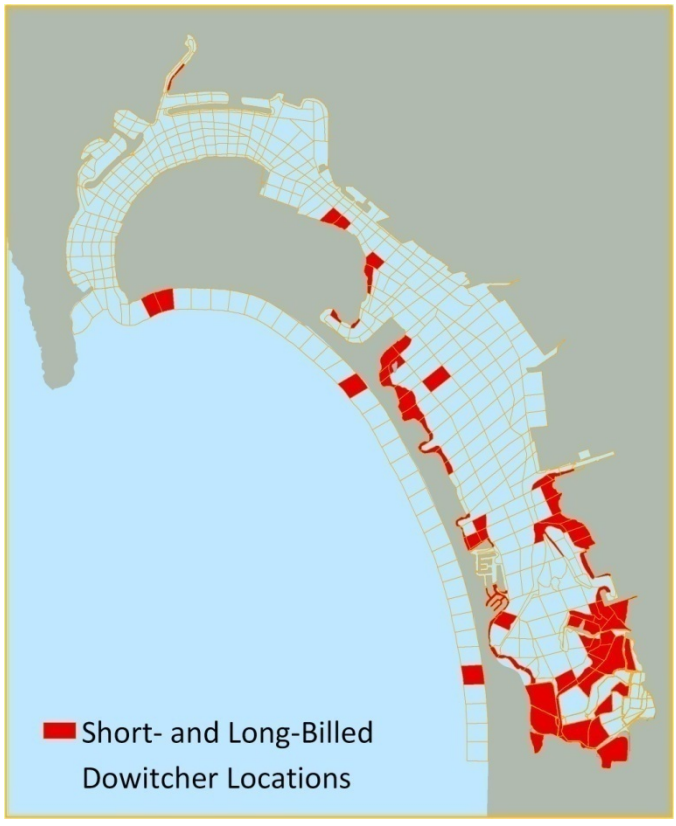
short-billed dowitcher (Limnodromus griseus caurinus)

Short-billed dowitchers are common on tidal flats around San Diego Bay, increasing in number during migration (Unitt 2004). This species is not easily distinguished from the long-billed dowitcher; therefore, many observations, 12,078 total, recorded the species simply as dowitcher sp. A total of 1,148 short-billed dowitchers were recorded during the surveys with a high count of 441 in March and a low count of one in April and one in November. Birds were seen in every survey month, except for January. Birds were mainly seen in the south bay, but a few birds were also seen in the south-central and the salt pond regions of the bay.

long-billed dowitcher (Limnodromus scolopaceus)

The long-billed dowitcher is less common on the tidal flats of San Diego Bay than the short-billed dowitcher. They also rarely remain through the summer, unlike the short-billed (Unitt 2004). A total of 874 long-billed dowitchers were recorded during these surveys. Birds were detected during every survey month, except in October. The high count was 367 birds in September and the low count was one bird in March. The majority of the birds were seen in the south bay. Four birds were seen in the NTC boat channel in April and December and two birds were seen in the salt pond in March and November. The graph that follows includes observations of short-billed, long-billed, and dowitcher sp., as the distinction can be hard to make in the field. Dowitcher sp. observations were by far the most common.





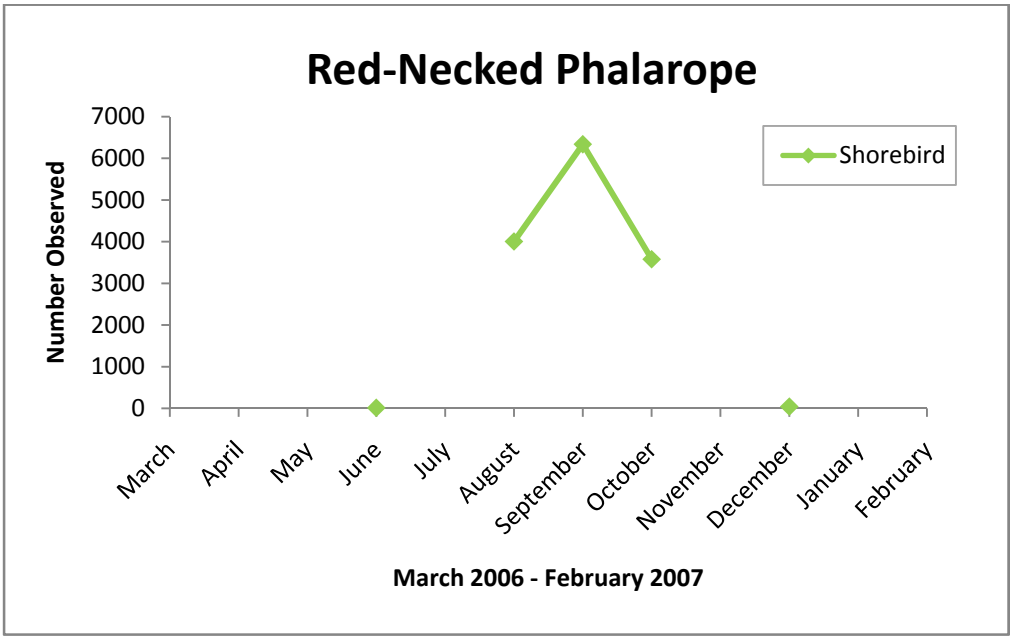
Wilson's phalarope (Phalaropus tricolor)

San Diego County is not included in the Wilson's phalarope's main migration route, but they birds are common during fall migration, including at the salt ponds in south San Diego Bay (Unitt 2004). Five Wilson's phalarope were seen during these surveys: four in April and one in August. The April birds

were all in the salt pond grid cell SW21 and the bird seen in August was in cell 501 of the south bay, adjacent to the salt ponds.

red-necked phalarope (Phalaropus lobatus)

These birds are common migrants and winter visitors, concentrating at the San Diego Bay salt ponds during fall migration (Unitt 2004). A total of 20,137 red-necked phalarope were seen during these surveys. Birds were seen in April, June, August through October, and December. The high count was of 6,340 birds in September, and the low count was of 10 birds in June. Red-necked phalaropes were mostly observed in the salt ponds and in the south bay. One bird was seen in the ocean grid just west of Zuniga jetty in April, and one bird was seen in the ocean grid in the Breakers Beach area in September.



red phalarope (Phalaropus fuclicarius)

Only one red phalarope was seen during the surveys. The bird was seen in the NTC boat channel in January. These birds are rarely seen ashore, although occasional flocks do appear. They usually occur October through May (Unitt 2004).

Laridae (Terns, skimmers, gulls, and jaegers)

The following species, while listed on the Bay INRMP species list, were not observed during this effort. The sooty tern and sandwich tern are listed as accidental sightings in the San Diego Bay INRMP. The laughing gull is considered a rare vagrant to the California coast. The Franklin's gull is considered a rare migrant in San Diego County. One bird was seen at Coronado in February 1997 and one bird was observed at the south bay salt ponds in May 1999 (Unitt 2004).

Sabine's gulls migrate through North America between their breeding grounds in the arctic to their wintering grounds in South America, but are mainly seen offshore. In the San Diego Bay area, one bird was seen on the bay in 1908 and one bird at Silver Strand State Beach in 1962.

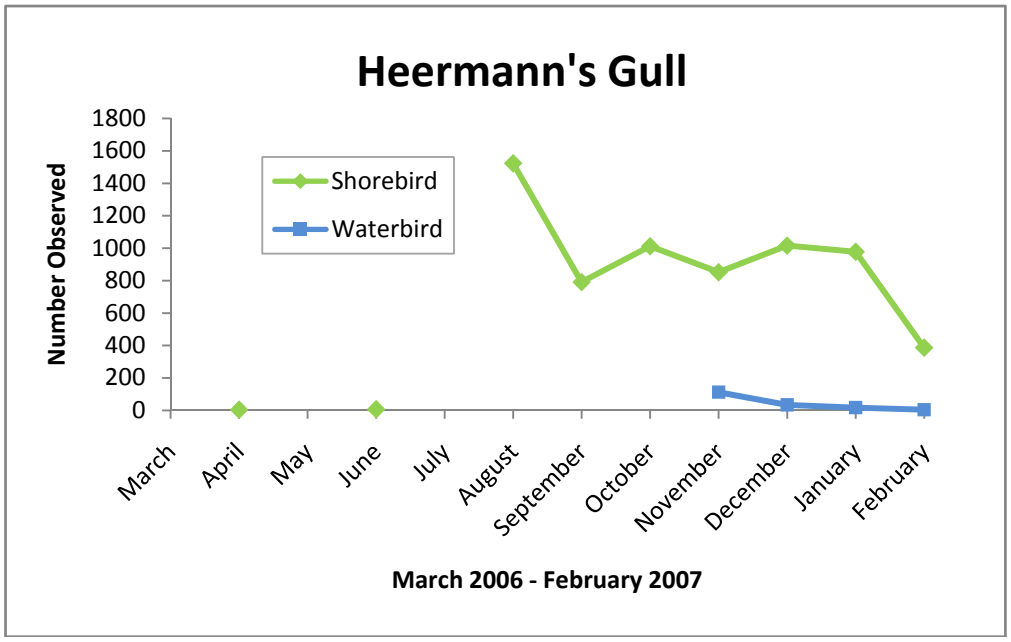
The black-legged kittiwake is a pelagic species and is rarely seen onshore. One bird was spotted on San Diego Bay during migration in November 1962 (Unitt 2004). The arctic tern migrates over the Pacific and Atlantic Ocean between its arctic breeding grounds and its Antarctic wintering grounds. It is very rarely seen onshore.

Bonaparte's gull (Larus philadelphia)

The most regularly seen gull in San Diego County, Bonaparte's gull, is most abundant on the ocean. This gull is also common in San Diego Bay as a wintering bird and spring and fall migrant (Unitt 2004). Sixty-nine Bonaparte's gulls were seen between December and February. Most birds were seen in the south bay and salt ponds except for one bird observed in the south-central region of the bay, just south of Fiddler's Cove, in January.

Heermann's gull (Larus heermannii)

Nearly 8,800 observations of Heermann's gulls were made during this survey effort. These gulls are very common along the San Diego coastline with lowest numbers in the spring, increasing in the summer, and then decreasing again in the winter (Unitt 2004). Some gull observations were recorded with codes making ambiguous the distinction between Heermann's and herring gulls. A total of 527 observations fall in this category. The ratio of identified Heermann's versus herring is over 60:1. If we use this ratio to estimate the number for each species, less than ten herring gulls are likely in these ambiguous records.

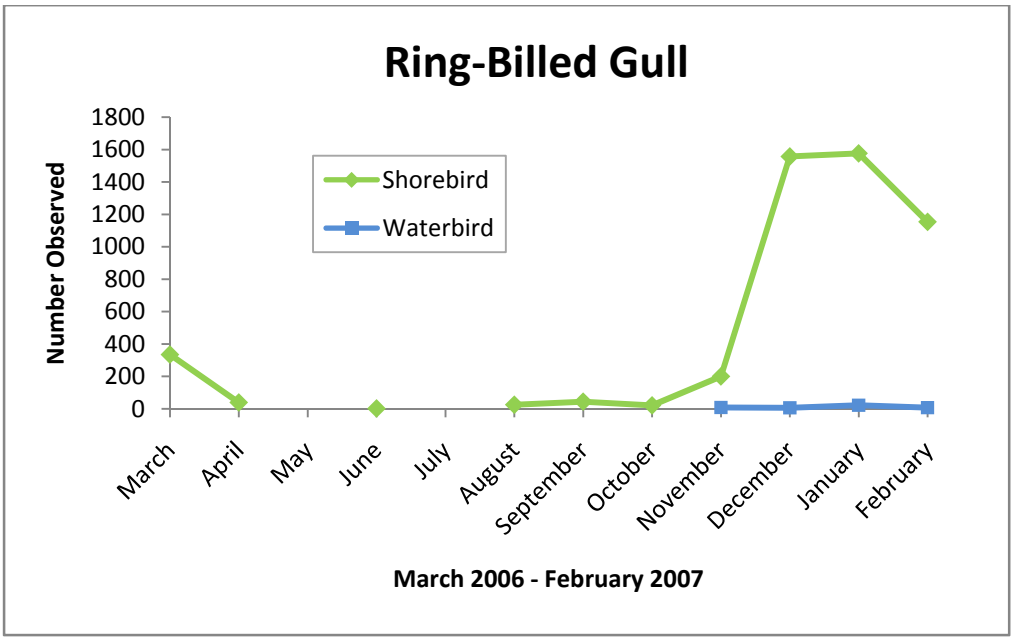


mew gull (Larus canus brachyrhynchus)

San Diego County is at the southern end of the mew gull's winter range. They concentrate in two areas along the coast in the County, one of which is along the beach of Naval Air Station North Island (NASNI) and along the shore of the Hotel Del Coronado (Unitt 2004). Thirty-three mew gulls were seen in December through February. Two birds were seen in December and 29 birds were seen in January, all in the ocean grid along the Coronado and NASNI shoreline. Two birds were seen in the bay in February just north of the Coronado Bridge.

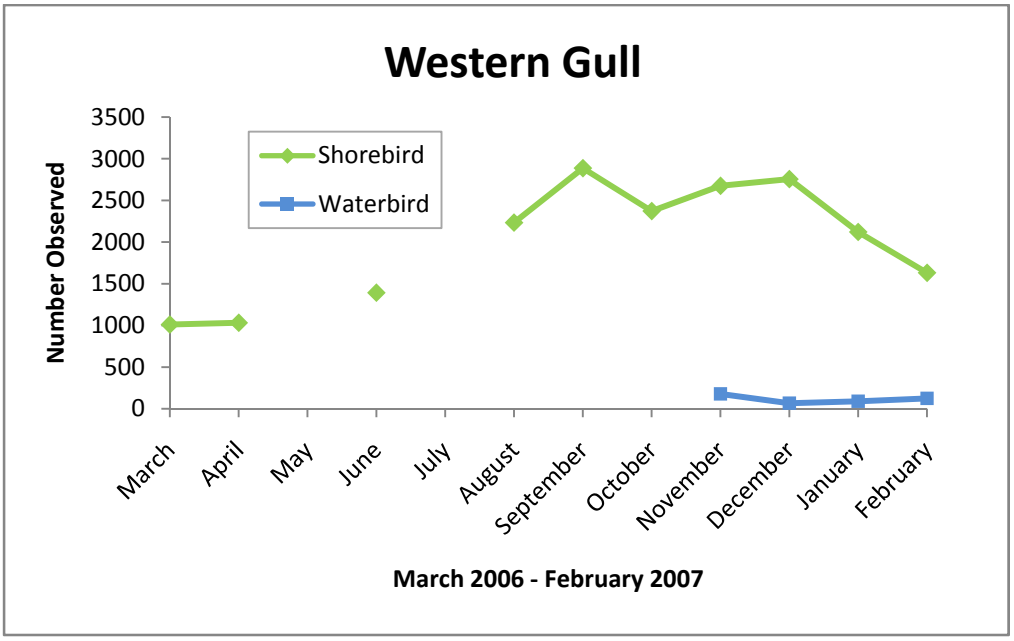
ring-billed gull (Larus delawarensis)

Although not the most numerous, the ring-billed gull is the County's most widespread. They are primarily here as winter visitors but more of them over-summer than other migratory gulls (Unitt 2004). A total of 6,168 ring-billed gulls were seen during the surveys. Birds were recorded during every survey month with a high count of 1,577 in January and a low count of two in June. Sightings were scattered in all regions of the bay and in the ocean grid.



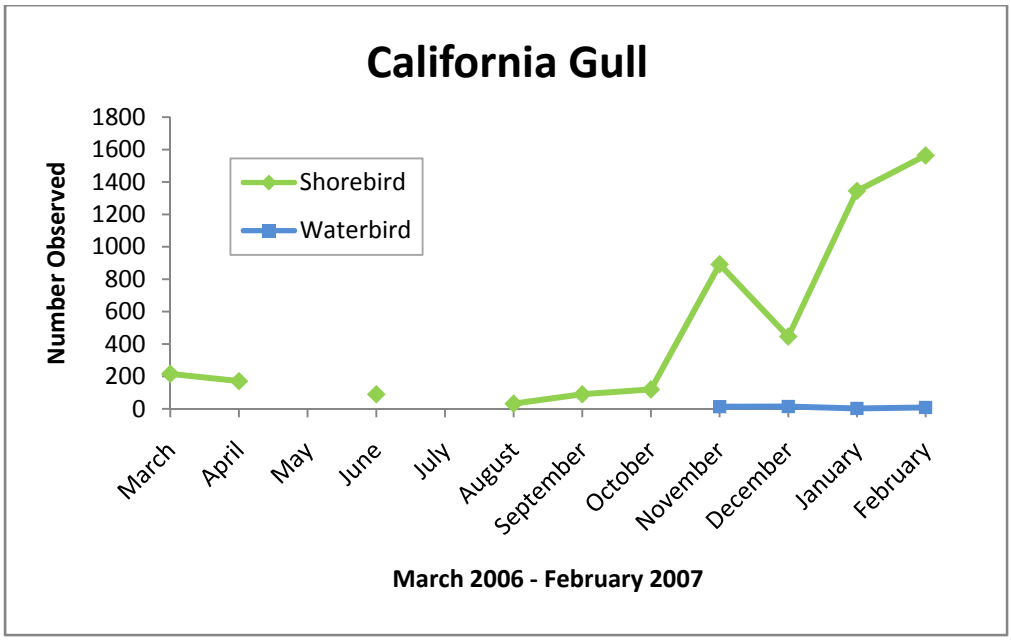
western gull (Larus occidentalis wymani)

The western is one of the most numerous gulls in the County, and the one observed most during these surveys. They are present as both breeding and winter residents, as the only gull nesting in San Diego County (Unitt 2004). A total of 26,633 western gulls were seen in all of the survey months with a high count of 2,887 birds in September and a low count of 1,010 birds in March. Western gulls were seen in all regions of the bay and in the ocean grid.



California gull (Larus californicus californicus)

California gulls winter in San Diego County primarily along the coast, with a few non-breeding summer residents remaining throughout the year (Unitt 2004). California gulls, 6,862 in total, were seen in all regions of the bay and in the ocean grid during every survey month. Somewhat low numbers were observed in June and August. Less than one hundred were seen in June, August, and September and just over one hundred were observed in October. The highest numbers were recorded November through February.



herring gull (Larus argentatus smithsonianus)

The herring gull is uncommon to fairly common in San Diego County using beaches and inland wetlands, although being more common along the coast. They are an uncommon to locally common winter visitor in San Diego (Unitt 2004). A total of 153 herring gulls were seen in March, and again in October through February. The highest number was in February with a count of 39 birds and the lowest count was in October with only a single individual seen in the north bay near the NASNI shore. The other sightings were scattered in all regions of the bay and in the ocean grid.

Thayer's gull (Larus thayeri)

Thayer's gulls mainly winter along the coast north of San Diego, but are present in the County annually in low numbers (Unitt 2004). Two Thayer's gulls were seen during these surveys, one in March in the NAB area and one in January around Homeport Island.

glaucous-winged gull (Larus glaucescens)

The glaucous-winged gull is uncommon in San Diego County; it is primarily a winter visitor present in low numbers along the coast (Unitt 2004). Fourty-one glaucous-winged gulls were seen during the surveys. The highest concentration of these gulls was seen in February with a count of 12 birds; this is near the normal peak of their abundance in the County. Most of the birds were observed in the south bay, except for two seen in the ocean grid. The remaining sightings were scattered in January, March, April, August, November, and December as single birds or groups of two or three birds, scattered in the north, south, south-central, and salt pond regions of the bay, as well as in the ocean grid.

olympic gull (hybrid between glaucous-winged and western gulls)

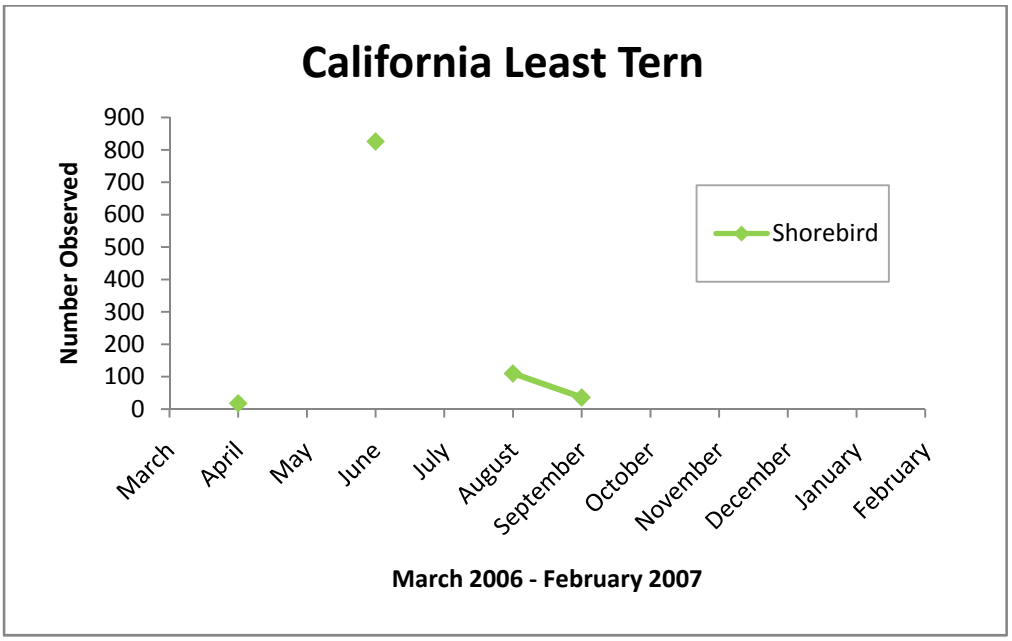
One hybrid between the glaucous-winged and western gull was identified in the ocean grid across from NAB in August.

glaucous gull (Larus hyperboreus)

Glaucous gulls are rare winter visitors to San Diego County, which is at the southern end of their range (Unitt 2004). Six glaucous gulls were seen during the surveys: 4 in March and 1 in November and January. The March birds were seen in the Chula Vista Wildlife Refuge and the November bird was seen near D Street Fill.

California least tern (Sternula antillarum browni)

The California least tern is listed as endangered by both the federal and California state government but is regularly seen around San Diego Bay where many nest at protected federal, state, and local sites. Over 1,200 observations were made of California least terns during these surveys. All birds were seen during the months of April through September. The terns were observed throughout the bay foraging, resting, and nesting.



gull-billed tern (Gelochelidon nilotica vanrossemi)

The gull-billed tern breeds in San Diego County only at the salt ponds in south San Diego Bay (Unitt 2004). They are recognized as a Bird Species of Special Concern by the California Department of Fish and Game. A total of 346 gull-billed terns were seen in March, April, June, and August. The highest number was seen in June with a count of 102 birds; the lowest count was of a single bird seen in the south bay in August. Only three birds were seen in the north bay. The remaining birds were seen in the ocean grid and in the south-central, south, and salt pond regions of the bay.

Caspian tern (Sterna caspia)

The south San Diego Bay salt ponds are a major nesting site for Caspian terns; they are generally less common in the winter but present in San Diego Bay (Unitt 2004). These terns began nesting at the salt ponds in 1941; 357 nests were counted in 2005 (USFWS 2006). A total of 1,580 Caspians were seen during these surveys. Caspian terns were seen during every survey month; the highest number of birds was seen in June at 774 individuals. Birds were seen in every region of the bay and in the ocean grid.

black tern (Chlidonias niger surinamensis)

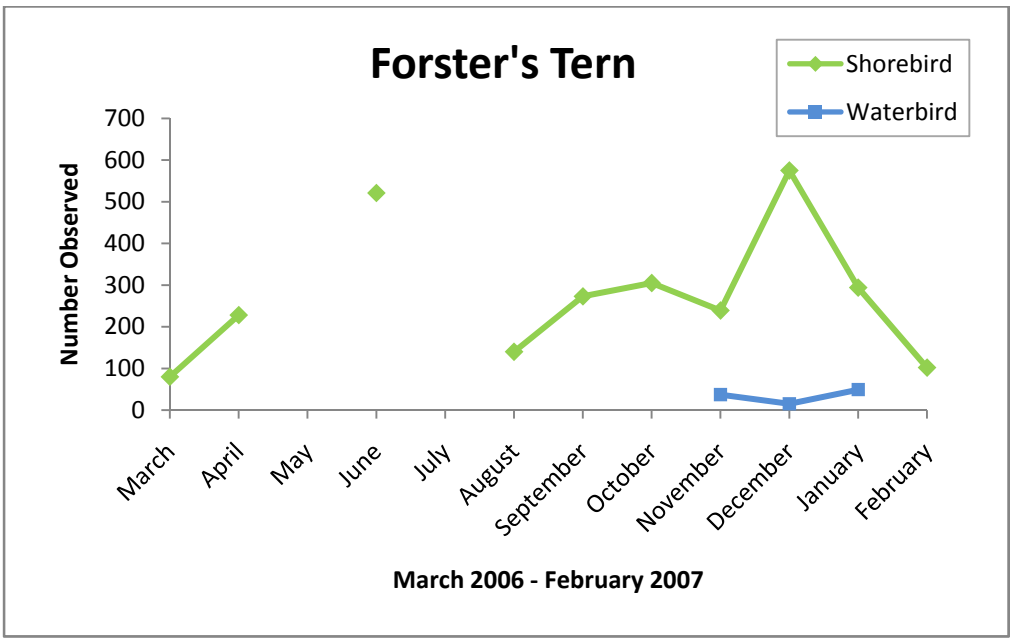
The black tern does not nest in San Diego County but is present as a migrant (Unitt 2004). Fifteen black terns were seen during these surveys. All birds were seen in August and September, consistent with their fall migration. Six were seen in the southwest corner of the south bay in August and nine were seen in ocean grid cell C7 to the east of Zuniga Jetty in September.

common tern (Sterna hirundo hirundo)

The common tern is somewhat uncommon in San Diego County (Unitt 2004). A total of 305 terns were seen, mostly in August and September, with two sightings in October. These sightings would be consistent with the species fall migration. The majority of the birds were seen in the ocean grid. Thirty-six birds were seen upland in the southwest corner of the salt ponds. The remainder of the sightings were distributed between the south and south-central bay.

Forster's tern (Sterna forsteri)

The most widespread tern in San Diego County, Forster's tern is common year round. Their oldest nesting site in southern California is at the salt ponds in south San Diego Bay, as many as 415 nests were present in 2005 (Unitt 2004; USFWS 2006). A total of 3,915 Forster's terns were seen during the surveys. Birds were seen during every survey month with a low count of 80 in March and a high count of 575 in December. Birds were seen in all regions of the bay and in the ocean grid.

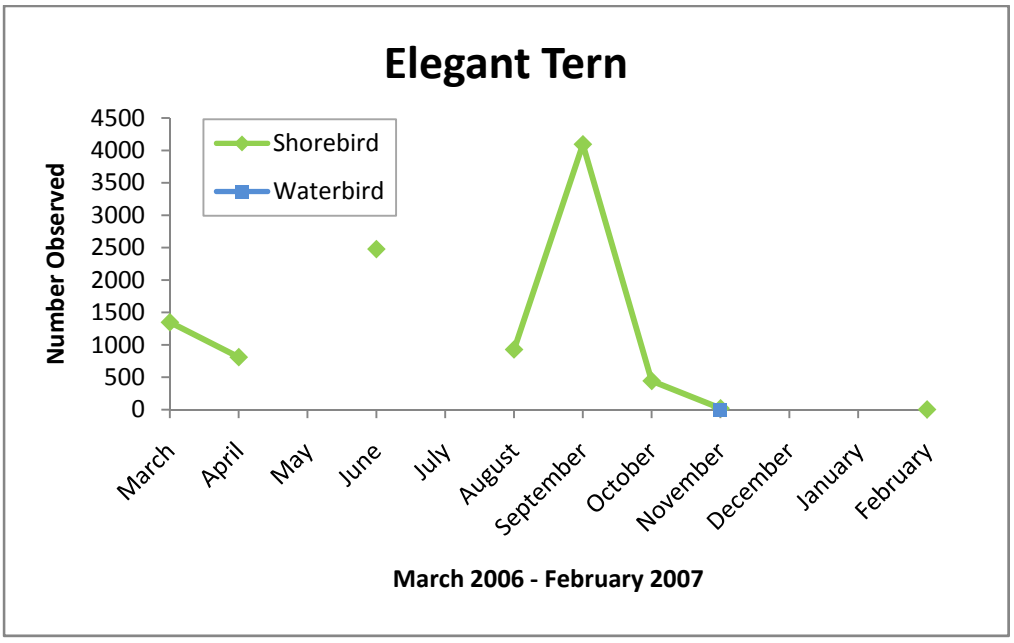


royal tern (Thalasseus maximus)

Royal terns are primarily winter visitors to the County, but they do breed in the salt ponds in southern San Diego Bay (Unitt 2004; USFWS 2006). A total of 1,678 royal terns were seen during all the survey months with a high count of 183 birds in August and a low count of 19 birds in April. Royal terns were seen in all regions of the bay and in the ocean grid.

elegant tern (Sterna elegans)

The elegant tern breeds in southern San Diego Bay; at one point the colony reached 10,300 nests (in 2003; USFWS 2006). The bird does not normally winter in the County, but they are commonly present in the spring and fall as migrants, when they may be most abundant (Unitt 2004). A total of 11,727 elegant terns were recorded. Most of the birds were seen March through October. In February, three elegant terns were seen, and 21 were detected in November. Birds were seen in all regions of the bay and in the ocean grid.



black skimmer ***(Rynchops niger niger)***

Black skimmers are present in the County year round, most birds shifting summer and winter habitats between southern San Diego Bay and Mission Bay, respectively (Unitt 2004). They nest in the south bay salt ponds; 752 nests were counted in 2005 (USFWS 2006). Black skimmers were seen during every survey month, although in higher numbers during the spring/summer months. Birds were seen in the ocean grid and in all the regions of the bay, although in higher numbers in the south bay and salt ponds. In total 4,895 black skimmers were observed.

Stercorariidae (Jaegers)

parasitic jaeger ***(Stercorarius parasiticus)***

The parasitic jaeger is a winter visitor and migrant in San Diego County (Unitt 2004). Thirteen were seen September through January. All birds were seen in the ocean grid, except for one bird seen between Delta Beach North and South.

Alcidae (Alcids)

A live Cassin's auklet (*Ptychoramphus aleuticus*) was not observed during this survey effort. One dead one was observed in ocean grid cell C13 in June. During the winter these birds usually remain at least five miles away from the coast but can sometimes be seen from shore during strong winds (Unitt 2004).

Columbiformes

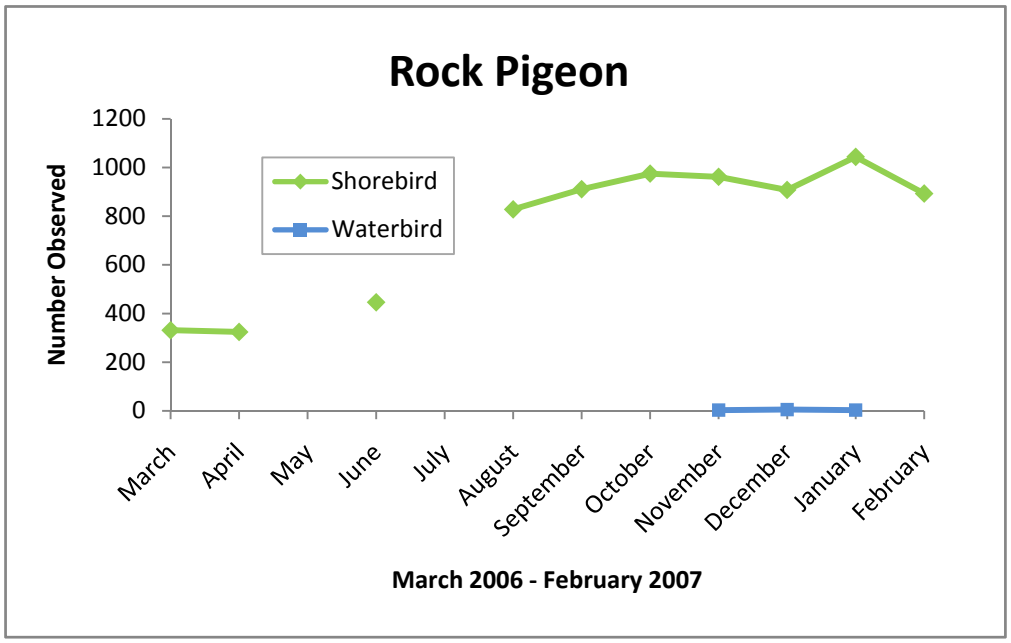
Of the birds listed under this Order on the San Diego Bay INRMP species list, the spotted dove (*Streptopelia chinensis*) and white-winged dove (*Zenaida asiatica*) were not observed during this effort.

Columbidae (Pigeons, doves)

The spotted dove is listed as an accidental observation in the San Diego Bay INRMP and has been extirpated from the County. The white-winged dove is a bird of desert habitat; eastern San Diego County is the edge of its range, although migrants can venture closer to the coast (Unitt 2004).

rock pigeon (Columba livia)

Rock pigeons are not native to North America but have been abundant in southern California for decades, where they are mainly confined to developed areas (Unitt 2004). A total of 10,474 rock pigeons were seen during the peaking and falling tide surveys. Birds were seen during every survey month with a high count of 1,051 birds in January and a low count of 331 birds in March observed during the falling tide surveys.



Eurasian collared dove Streptopelia decaocto

As implied by their name, the Eurasian collared dove is not native to North America; they first arrived in San Diego County in 2002 (Unitt 2004). A total of 23 Eurasian collared doves were seen over the course of the surveys. Birds were seen in April, August, and September through January with a high count of 5 birds in January and a low count of 1 bird in October. Thirteen birds were seen in the Shelter Island/Harbor Island area, and ten birds were seen in the south bay in Emory Cove and the Coronado Cays.

mourning dove Zenaida macroura marginella

The mourning dove is common in San Diego County year round, where they are more abundant in developed than in their native habitat (Unitt 2004). A total of 568 mourning doves were seen during the surveys. Birds were seen during every survey month with a high count of 101 in January and a low count of 1 in November. Birds were seen in all regions of the bay and in the ocean grid.

Psittaciformes

Psittacidae (Parrots)

Red-crowned parrot (Amazona viridigenalis)

Four red-crowned parrots were seen in the Point Loma and Shelter Island area in April. This region in the bay is one of its centers of population in the County (Unitt 2004).

Cuculiformes

The two species in this order listed in the San Diego Bay INRMP, the yellow-billed cuckoo (*Coccyzus americanus*) and greater roadrunner (*Geococcyx californianus*), both in the Cuculidae family, were not observed during this effort.

Cuculidae (Cuckoos)

The yellow-billed cuckoo is listed as an accidental observation in the Bay INRMP. In San Diego County, the greater roadrunner is an uncommon resident of the Anza-Borrego desert and can also be found on coastal slopes (Unitt 2004).

Strigiformes

Of the birds listed under this order in the INRMP, the great horned owl (*Bubo virginianus*) in the Strigidae family and the barn owl (*Tyto alba*) in the Tyronidae family were not observed during this effort.

Tytonidae (Barn owls)

The barn owl is an uncommon year-round resident in San Diego County. It nests in tree cavities and on cliff ledges as well as in palm trees, buildings, and nest boxes (Unitt 2004). The barn owl is a nocturnal species and its diurnal roosting habit makes it difficult to detect during the day.

Strigidae (Typical owls)

The great horned owl is an uncommon, but widespread year-round resident in San Diego County. It inhabits woodlands and open scrub (Unitt 2004). The great horned owl is a nocturnal species. Its diurnal roosting habit makes it difficult to detect during the day.

burrowing owl (Athene cunicularia)

Burrowing owls are a California Department of Fish and Game Bird Species of Special Concern. They have been extirpated from many of the areas in which they used to breed and are in danger of disappearing from the County entirely (Unitt 2004). Two burrowing owls were seen during the surveys. The two birds were observed upland in salt pond 20A in January.

short-eared owl (Asio flammeus flammeus)

Short-eared owls are mainly visitors to San Diego County, concentrated around south San Diego Bay and the Tijuana River estuary. They have recently been recorded in the County in the spring (Unitt 2004). Eight short-eared owls were observed during these surveys. Two were seen in the Chula Vista Wildlife Refuge area in November, and two were seen in Emory Cove in December, as well as several observed in the salt ponds in November and December.

Caprimulgiformes

None of the birds listed under this order in the INRMP, the lesser nighthawk (*Chordeiles acutipennis texinsis*) and the common nighthawk (*Chordeiles minor hesperis*), both in the Caprimulgidae family, were observed during this effort.

Caprimulgidae (Nightjars)

The lesser nighthawk is an uncommon summer visitor in San Diego County. It can be found in the Anza-Borrego Desert and in the coastal lowlands, mainly in the MCAS Miramar area. It inhabits sparsely

vegetated areas (Unitt 2004). The common nighthawk is listed as an accidental observation in the Bay INRMP.

Apodiformes

Of the birds listed under this order in the INRMP, the black-chinned hummingbird (*Archilochus alexandri*), Costa's hummingbird (*Calypte costae*), rufous hummingbird (*Selasphorus rufus*), Allen's hummingbird (*Selasphorus sasin*), and Calliope (*Stellula calliope*) hummingbird, all in the Trochilidae family, were not observed during this effort.

Apodidae (Swifts)

Vaux's swift (Chaetura vauxi vauxi)

Vaux's swift is a migrant and winter resident in San Diego County. They are known to winter on Point Loma and pass through as migrants around the rest of the bay (Unitt 2004). A total of 28 Vaux's swifts were seen during the surveys. Twenty-seven were seen in April and one was seen in October. The single individual seen in October was observed in the southwest corner of the salt ponds. The remaining birds were seen in the north-central, south-central, south, and salt pond regions of the bay.

white-throated swift (Aeronautes saxatilis)

The white-throated swift is common in San Diego County year round and is the only swift that breeds here (Unitt 2004). Four white-throated swifts were seen during the surveys. All four birds were observed in salt pond 20A in December.

Trochilidae (Hummingbirds)

The black-chinned hummingbird is a fairly common migrant and summer resident in San Diego County (Unitt 2004). The Costa's hummingbird is a common breeder and winter resident in San Diego County (Unitt 2004). The rufous hummingbird is a common migrant in the county and some individuals spend the winter (Unitt 2004). Allen's hummingbird is a common migrant in San Diego County and one individual was confirmed nesting for the first time in 2001 (Unitt 2004). The Calliope hummingbird is considered a rare spring migrant (Unitt 2004). None of these birds, although listed in the INRMP species list, were detected during this survey.

Anna's hummingbird (Calypte anna)

Anna's hummingbirds are well adapted to urban environments although they can still be found in their native habitat. They are present year round, concentrated closer to the coast in the winter (Unitt 2004). A total of 188 Anna's hummingbirds were seen during the surveys. Birds were detected during every survey month with a high count of 18 in March and a low count of five in August. Birds were observed in all regions of the bay and in the ocean grid.

Coraciiformes

Alcedinidae (Kingfishers)

belted kingfisher (Ceryls alcyon)

Lying at the southern end of the belted kingfisher's breeding range; San Diego County is rarely home to breeding kingfishers. As a winter visitor the bird is more abundant, but still uncommon (Unitt 2004). The only bird of its order listed on the INRMP species list; a total of 157 belted kingfishers were seen during the surveys. Birds were observed in March and April, and again from August through February with a

high count of 24 birds in December and a low count of 1 bird in August. Birds were seen in all regions of the bay. Belted kingfishers were not observed in the ocean grid.

Piciformes

Picidae (Woodpeckers)

northern flicker (Colaptes auratus)

The northern flicker is the County's largest woodpecker; it is more common during the winter than in the summer when migrants from the north add to the population (Unitt 2004). One northern flicker was observed in the north-central bay just north of the Coronado Bridge in November. This is the only bird listed in this order on the Bay INRMP species list.

Passeriformes

Of the birds listed under this order in the INRMP, the cedar waxwing (*Bombycilla cedrorum*) and phainopepla (*Phainopepla nitens lepida*) in the Bombycillidae family, the rufous-crowned sparrow (*Aimophila ruficeps canescens*), red-winged blackbird (*Agelaius phoeniceus neutralis*), tricolored blackbird (*Agelaius tricolor*), Nelson's sharp-tailed sparrow (*Ammodramus nelsoni*), lark bunting (*Calamospiza melanocorys*), myrtle warbler (*Dendroica coronata hooveri*) ("eastern" subspecies of the yellow-*rumped warbler*), hermit warbler (*Dendroica occidentalis*), palm warbler (*Dendroica palmarum palmarum*), Baltimore oriole (*Icterus galbula*), yellow-breasted chat (*Icteria virens auricollis*), MacGillivray's warbler (*Oporornis tolmiei tolmiei*), swamp sparrow (*Passerella georgiana ericrypta*), green-tailed towhee (*Pipilo chlorurus*), western tanager (*Piranga ludoviciana*), vesper sparrow (*Pooecetes gramineus*), chipping sparrow (*Spizella passerine arizonae*), Lucy's warbler (*Vermivora luciae*), Virginia warbler (*Vermivora viginiae*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), and golden-crowned sparrow (*Zonotrichia atricapilla*) in the Emberizidae family, the Lawrence's goldfinch (*Carduelis lawrencei*), and pine siskin (*Carduelis pinus pinus*) in the Fringilidae family, the Purple martin (*Progne subis subis*) in the Hirundinidae family, the sage thrasher (*Oreoscoptes montanus*) and California thrasher (*Toxostoma redivivum redivivum*) in the Mimidae family, the red-throated pipit (*Anthus cervinus*) in the Motacillidae family, the blue-gray gnatcatcher (*Polioptila caerulea*) in the Muscipacidae family, the golden-crowned kinglet (*Regulus satrapa apache*) in the Regulidae family, the cactus wren (*Campylorhynchus brunneicapillus sandiegoense*), Bewick's wren (*Thryomanes bewickii*) in the Troglodytidae family, the hermit thrush (*Catharus guttatus*), Swainson's trush (*Catharus ustulatus*), mountain bluebird (*Sialia currucoides*), and American robin (*Turdus migratorius propinquus*) in the Turdidae family, the olive-sided flycatcher (*Contopus cooperi*), western wood-pewee (*Contopus sordidulus sordidulus*), western flycatcher (*Empidonax difficilis difficilis*), Hammond's flycatcher (*Empidonax hammondii*), dusky flycatcher (*Empidonax oberholseri*), willow flycatcher (*Empidonax traillii*), gray flycatcher (*Empidonax wrightii*), and tropical kingbird (*Tyrannus melancholicus satrapa*) in the Tyrannidae family, and the least Bell's vireo (*Vireo bellii pusillus*), warbling vireo (*Vireo gilvus swainsoni*), and solitary (blue-headed) vireo (*Vireo solitarius solitarius*) in the Vireonidae family were not observed in this effort.

Tyrannidae (Flycatchers)

The olive-sided flycatcher, western wood-pewee, western flycatcher, Hammond's flycatcher, dusky flycatcher, willow flycatcher, gray flycatcher, and tropical kingbird were not observed during this effort.

black phoebe (Sayornis nigricans semiatra)
The black phoebe is more common in developed than in natural environments. It exists in the county as both a summer breeder and winter resident, not varying its habitat much between these seasons (Unitt 2004). A total of 271 black phoebes were seen during the surveys. Birds were detected during every survey month with a high count of 52 in January and a low count of 6 in August. Black phoebes were seen in all regions of the bay and in the ocean grid.

Say's phoebe (Sayornis saya saya)
Say's phoebes are mainly winter visitors in the County, but they are also present as an uncommon breeding species (Unitt 2004). A total of 148 Say's phoebes were seen during the surveys. Birds were detected during every survey month, except in August, with a high count of 34 in December and a low count of one in April. Say's phoebes were observed in all regions of the bay and in the ocean grid, although only one bird was observed in the north-central bay, in the Coronado Golf Course area.

ash-throated flycatcher (Myiarchus cinerascens cinerascens)
Ash-throated flycatchers are rare in the winter but common in the summer in San Diego County (Unitt 2004). They are present mainly as migrants around San Diego Bay, although one was seen during the summer during these surveys. Two ash-throated flycatchers total were seen during these surveys. One bird was observed along the Coronado shore in the north-central bay in April, and one was observed between Fiddler's Cove and the Coronado Cays in June.

Cassin's kingbird (Tyrannus vociferans vociferans)
Cassin's kingbird's take advantage of suburban and rural sprawl clearing native brush and scrub habitat, and have been increasing in the County. They nest and roost in tall exotic trees, not differing in their winter and breeding season abundance or distribution (Unitt 2004). Fourty-two Cassin's kingbirds were seen during the surveys. Two birds were observed in the NRRF area of the ocean grid: one in June and one in September. Three birds were observed in the south bay: two in the D Street fill area in April and one in the J Street area in November. The remaining birds were seen in pond 20A of the salt pond in March, June, Sept, November, December, and January.

western kingbird (Tyrannus verticalis)
The western kingbird is rare in the winter in San Diego County but common as a migrant and during the breeding season (Unitt 2004). A total of twelve western kingbirds were seen in March and April, during the bird's spring migration. One bird was observed in the Shelter Island area of the north bay. Two birds were observed in the D Street fill area of the south bay. Seven birds were observed in the southeast corner of the salt pond. One bird was observed along Breakers Beach and one bird was observed in the NRRF area of the ocean grid.

Laniidae (Shrikes)

loggerhead shrike (Lanius ludovicianus)
The loggerhead shrike is an uncommon year round resident in the County. It most commonly breeds in the desert, but has been seen breeding and wintering around San Diego Bay (Unitt 2004). Twenty-one loggerhead shrikes were seen during the surveys. Birds were detected in all survey months, except for March and December. Sightings ranged from one to four birds per month. Loggerhead shrikes were observed in the south and salt pond regions of the bay, and in the ocean grid.

Vireonidae (Vireos)
The Least Bell's vireo, warbling vireo, and solitary (blue-headed) vireo were not observed; although, they are listed on the Bay INRMP species list.

Corvidae (Jays, crows)

western scrub-jay (Aphelocona californica obscura)

The western scrub-jay is a year-round resident in San Diego County. It inhabits chaparral and oak woodlands and can also be seen in urban areas (Unitt 2004). One scrub-jay was observed in the Shelter Island area of north bay in December.

American crow (Corvus brachyrhynchos hesperius)

The American crow historically occurred in riparian and oak woodlands before expanding to take advantage of orchards and urban environments. It is a non-migratory year-round resident in the County, with similar winter and breeding distributions (Unitt 2004). A total of 444 American crows were seen during the surveys. Birds were seen during every survey month with a high count of 68 in October and a low count of 11 in August. American crows were observed in every region of the bay and in the ocean grid.

common raven Corvus corax clarionensis

One of the most widespread breeding birds in San Diego County, the common raven is a permanent resident utilizing all County habitats (Unitt 2004). A total of 126 common ravens were seen during the surveys. Birds were seen in March, April, and June and again in October through February with a high count of 48 in March and a low count of 2 in October.

Alaudidae (Larks)

horned lark (Eremophila alpestris)

The horned lark is common around San Diego Bay during both the breeding and winter season; they utilize salt flat and bay fill habitats around the Bay (Unitt 2004). A total of 1,779 horned larks were seen during these surveys. Birds were observed during every survey month with a high count of 227 in November and a low count of 34 in February. Horned larks were seen in the ocean grid and in every region of the bay except for the north-central region.

Hirundinidae (Swallows)

The purple martin was not observed during this survey effort as it is a declining summer visitor restricted almost completely to the mountains in this County. It is listed as an accidental observation in the Bay INRMP.

tree swallow (Tachycineta bicolor)

San Diego County is at the southern end of the tree swallow's breeding range, the bird is primarily seen as a migrant in the area (Unitt 2004). Fifty-five tree swallows were seen during these surveys, during its spring and fall migration as well as during the winter. Birds were seen in March, April, June, and September through February with a high count of 20 in December and a low count of one in September. All the tree swallows were observed in the south and salt pond regions of the bay.

violet-green swallow (Tachycineta thalassina thalassina)

In San Diego County, the violet-green swallow is far more common as a breeding and migratory bird than during the winter. Around San Diego Bay, they are primarily migrants, with the birds observed during this survey seen during the peak of their spring migration (Unitt 2004). Eight violet-green swallows were seen during the surveys. All birds were detected in March. Two birds were observed in the ocean grid C17 along Breakers Beach, two in the South Bay Biological Station area, two in the D Street Fill area of the south bay, and two along Delta Beach South in the south-central bay.

northern rough-winged swallow (Stelgidopteryx serripennis)
Common in summer and during migration but rare in the winter, the northern rough-winged swallow is widespread in the coastal lowland of San Diego County (Unitt 2004). Thirty rough-winged swallows were seen during the surveys. Birds were seen from March through August and again in October with a high count of 8 in March and a low count of one in August and October. The birds were mainly observed in the south and salt pond regions of the bay. One bird was seen in the Harbor Island area of the north bay in August, and four birds were seen in the ocean grid along Breakers Beach in April and June.

bank swallow (Riparia riparia riparia)
The bank swallow no longer nests in San Diego County and is rare as a migrant (Unitt 2004). Two bank swallows were observed in ocean grid C17 along Breakers Beach in April, which would be during its spring migration.

cliff swallow (Hirundo pyrrhonota tachina)
The cliff swallow is a common summer resident, largely absent from the County in the winter. It has adapted well to nesting on man made structures, but may be on the decline in San Diego County (Unitt 2004). A total of 748 cliff swallows were seen during the surveys. Birds were seen in March through October with a high count of 216 in June and a low count of 1 in October. Cliff swallows were observed in all regions of the bay and in the ocean grid, although only one bird was seen in the north bay, and six in the north-central bay.

barn swallow (Hirundo rustica erythrogaster)
The barn swallow, while widespread in North America, is most common in San Diego County as a migrant. It does nest in limited areas in the County though, including on Point Loma and Coronado, and shows an increasing trend during the winter (Unitt 2004). A total of 1,456 barn swallows were observed during the surveys. Birds were seen in March through November with a high count of 400 in October and a low count of 2 in November. Barn swallows were observed in all regions of the bay and in the ocean grid.

Aegithalidae (Long-tailed tits)

bushtit (Psaltriparus minimus melanurus)
The bushtit is one of San Diego County's most common songbirds; it is a year round resident and successful adapter to urban environments (Unitt 2004). A total of 84 bushtits were seen during the surveys. Birds were seen in June through November, and January, with a high count of 23 birds in August and a low count of 3 birds in September.

Troglodytidae (Wrens)
The cactus and Bewick's wren were not observed.

rock wren (Salpinctes obsoletus)
Rock wrens are present year round in San Diego County, dispersing somewhat from their breeding range during the winter. Around San Diego Bay it is present as a winter and migratory bird (Unitt 2004). Two rock wrens were seen during the surveys: one in November and one in December. Both rock wrens were observed along the North Island shore in north bay.

house wren (Troglodytes aedon parkmanii)
Most common as a breeding bird in the County, the house wren is increasing as a year round resident and winter visitor, as demonstrated by these survey results. It is primarily confined to forested habitat but is beginning to settle more in urban environments (Unitt 2004). Three house wrens were seen

during the surveys. One was observed along the Coronado shore in the north-central bay in November, one in salt pond 20A in December, and another in salt pond 52 in September.

marsh wren (Cistothorus palustris)

The marsh wren occurs in San Diego County as both a year round resident and winter visitor. It is confined mainly to coastal marshy habitats, more so during the breeding season (Unitt 2004). Forty-five marsh wrens were observed during these surveys. Birds were detected in March, June, and again in October through February with a high count of 18 in December and a low count of 1 in June and February. All marsh wrens were observed in the south and salt pond regions of the bay.

Regulidae (Kinglets)

The golden-crowned kinglet was not observed.

ruby-crowned kinglet (Regulus calendula calendula)

The ruby-crowned kinglet is a common winter visitor and migrant in the County, most abundant in riparian and oak woodland (Unitt 2004). Five ruby-crowned kinglets were seen during the surveys. Three kinglets were seen in November and two in December. All birds were observed along the Coronado shore in the north-central bay.

Muscicapidae (Gnatcatchers)

The blue-gray gnatcatcher was not observed during this survey effort despite being on the Bay INRMP species list.

California gnatcatcher (Polioptila californica californica)

The California gnatcatcher is listed as threatened under the Endangered Species Act and lives only in southern California's coastal sage scrub. It is present mainly along the coast, being constrained to the east by colder temperatures (Unitt 2004). Eight of these gnatcatchers were observed during these surveys, in November, January, and February. All birds were seen in the Sweetwater Channel during the shorebird surveys.

Turdidae (Thrushes)

The hermit thrush, Swainson's trush, mountain bluebird, and American robin were not observed.

Timaliidae (Babblers)

wrentit (Chamaea fasciata henshawi)

The wrentit is abundant in San Diego County chaparral, but also present in sage scrub and in the understory of riparian and oak woodland (Unitt 2004). Three wrentits were seen during these surveys. All birds were observed in June. One wrentit was seen at salt pond 20A and two wrentits were seen along Point Loma in the north bay.

Mimidae (Mimic thrushes)

The sage thrasher and California thrasher were not observed during this effort.

northern mockingbird (Mimus polyglottos polyglottos)

The northern mockingbird is common year round, occurring in urban, rural, and natural landscapes (Unitt 2004). Eighty-one northern mockingbirds were seen during the surveys. Birds were detected in all survey months with a high count of 22 in June and a low count of one in October, November and January. Northern mockingbirds were seen in all regions of the bay and in the ocean grid.

Sturnidae (Starlings)

European starling (Sturnus vulgaris vulgaris)

European starlings are abundant in San Diego County during both summer and winter, most abundant in agricultural and urban areas (Unitt 2004). A total of 3,044 European starlings were seen during the surveys. Birds were detected during every survey month with a high count of 548 in December and a low count of 46 in April. European starlings were seen in all regions of the bay and in the ocean grid.

Motacillidae (Wagtails, pipits)

The red-throated pipit was not observed during this effort and is listed as an accidental observation in the Bay INRMP (Navy and Port 2000).

American pipit (Anthus rubescens pacificus)

American pipits are present in San Diego County only as a winter visitors and migrants (Unitt 2004). A total of 370 observations of American pipits were made during this survey effort. These birds were seen in March, June, and November through February, primarily in the ocean, south, and south-central eco-regions.

Bombycillidae (Waxwings)

The following birds were not observed during this effort: The cedar waxwing is a winter visitor in San Diego County and its abundance varies from year to year. They are frugivores and feed on wild berries as well as berries from ornamental trees (Unitt 2004). The phainopepla is common in the desert in the fall, winter, and spring. It is common on the coastal lowlands oak and riparian woodlands and open chaparral in the spring and summer (Unitt 2004). In the vicinity of the San Diego Bay, the San Diego County Bird Atlas (Unitt 2004) only shows occurrence on Point Loma as presumed migrants.

Parulidae (Warblers, Redstarts, and Yellowthroats)

The myrtle warbler, a subspecies of the yellow-rumped warbler, is an uncommon winter visitor in San Diego County, with most records being from the coastal lowland in October through May. The hermit warbler is not commonly seen, with current numbers less than those 30 years ago (Unitt 2004). The palm warbler is a rare but regular visitor to the county, however more common farther to the north. The yellow-breasted chat is a locally common riparian bird, recovering in numbers since the mid 1980s (Unitt 2004). It has not been typically observed in San Diego Bay. MacGillivray's warbler is most likely found in spring at oases on the eastern base of the county's mountains (Unitt 2004). Lucy's warbler only colonized San Diego County in 1990; its breeding distribution is localized in the Borrego Valley. They have been observed in the winter around San Diego Bay. Virginia's warbler is a rare vagrant to coastal southern California (Unitt 2004). Currently only two or three are reported in the county per year.

orange-crowned warbler (Vermivora celata)

The orange-crowned warbler is fairly common year-round in San Diego County, in different habitats during its migration, breeding, and winter seasons. It is more common around San Diego Bay during the winter, consistent with this survey's results (Unitt 2004). A total of 23 orange-crowned warblers were seen during the surveys. Birds were seen in March and April, and again in November through February with a high count of 2 in several months. Most of the birds were seen in the north-central bay. Some birds were seen in the north, south, and salt pond regions of the bay, as well as in the ocean grid.

Nashville warbler (Vermivora ruficapilla ridgwayi)

The Nashville warbler is most common as a spring migrant in San Diego County (Unitt 2004). One Nashville warbler was seen in the north-central bay along the Coronado shore in April, consistent with its peak spring migration abundance.

yellow warbler (Dendroica petechia)

The yellow warbler is a fairly common migrant and breeding season bird in the County, but is somewhat rare in the winter (Unitt 2004). It is listed as a California Second Priority Species of Special Concern during the breeding season (CDFG 2008). A total of 107 yellow warblers were seen during these surveys. One bird was seen in ocean grid C17 along the Coronado shore in April. Twenty-one birds were seen in November in the north-central, south-central, south, and salt pond regions of the bay, and in the ocean grid. Twenty-four birds were seen in January in the north-central and south-central bay, and in the ocean grid.

yellow-rumped warbler (Audubon's) (Dendroica coronata auduboni)

One of San Diego County's most abundant winter visitors is the yellow-rumped warbler. It is also a recent breeding colonizer, confined to the County's highest mountains. The dominant subspecies in the County, and the one recorded during this survey is *D. c. auduboni* (Unitt 2004). A total of 205 Audubon's warblers were seen during the surveys. Birds were seen in March and April, and again in November through February with a high count of 72 in December and a low count of 2 in April. Audubon's warblers were observed in all regions of the bay and in the ocean grid.

black-throated gray warbler (Dendroica nigrescens)

The black-throated gray warbler is rare in the winter and breeding season and sometimes common during migration through San Diego County (Unitt 2004). Two black-throated gray warblers were seen in ocean grid C17 along the Coronado shore in late March.

Townsend's warbler (Dendroica townsendi)

Not a breeder in San Diego County, the Townsend's warbler occurs most in the County as a spring migrant and rarely as a winter visitor (Unitt 2004). One Townsend's warbler was seen in ocean grid C17 along the Coronado shore in March, one was seen in ocean grid C16 in April, and one was seen in the north-central bay along the Coronado shore in December.

American redstart (Setophaga ruticilla)

Occurring most commonly in San Diego County during fall migration, the American redstart has been previously recorded during this time on Point Loma (Unitt 2004). One American redstart was seen in the north-central bay along the Coronado shore in April, which would be during the species spring migration.

common yellowthroat (Geothlypis trichas)

The common yellowthroat is present in the County in both the summer and winter, and is the second most common bird in the area's riparian woodland (Unitt 2004). A total of 82 common yellowthroats were observed during the surveys. Birds were observed in March and April, and again in September through February with a high count of 16 in January, and a low count of one bird in February. Common yellowthroats were mainly seen in the north-central, south, and salt pond regions of the bay. One bird was seen in the south-central bay, along the Silver Strand in January.

Wilson's warbler (Wilsonia pusilla)

San Diego County is at the southern end of the Wilson's warbler's breeding range, with only three or four pairs. The bird is common during spring and fall migration and is rare during the winter (Unitt

2004). Two Wilson's warblers were seen during these surveys, in April. One bird was observed in Fiddler's cove in the south-central bay and one bird was observed along the Coronado shore in the north-central bay.

Thraupidae (Tanangers)

The only bird of this family on the INRMP species list is the western tanager, which was not observed during this effort. It has been observed during the winter around the bay, it is most numerous in Balboa Park during this season (Unitt 2004).

Emberizidae (Sparrows, Towhees and Buntings)

The following birds were not observed during this effort: The rufous-crowned sparrow is a year-round resident in San Diego County. It inhabits coastal sage scrub and can also be found in burned chaparral and in openings in mature chaparral, they are rarely seen very far from their breeding habitat (Unitt 2004). The Nelson's sharp-tailed sparrow is a rare winter visitor in San Diego County, it is usually found in coastal salt marshes. Around San Diego Bay, Nelson's sharp-tailed sparrows were seen in the Sweetwater River estuary in 1987 and 1994 (Unitt 2004). The swamp sparrow is a regular rare fall migrant and winter visitor in California. It inhabits freshwater marshes and riparian woodland understory; the San Diego County Bird Atlas (Unitt 2004) mentions sightings on Point Loma for fall migrants. The vesper sparrow is an uncommon winter visitor in San Diego County. It inhabits open grasslands and sparse scrub (Unitt 2004). The chipping sparrow is a breeder and migrant in San Diego County. It usually breeds in open pine and oak woodlands, although a breeding colony has established itself on Point Loma around native scrubs and ornamental plantings (Unitt 2004). The golden-crowned sparrow is a winter visitor in San Diego County where it is widespread over the coastal slopes (Unitt 2004). The lark bunting is rare in California, and is primarily seen as a rare spring migrant in the desert. It is listed as an accidental observation in the Bay INRMP. The green-tailed towhee is rare in the winter, but has been observed during this time around San Diego Bay.

spotted towhee (Pipilo maculatus)

Spotted towhees are common in chaparral as a year-round resident in San Diego County. They are not well adapted to urbanization and are vulnerable to habitat fragmentation (Unitt 2004). One spotted towhee was seen in the north bay along Point Loma in June.

California towhee (Pipilo crissalis)

The California towhee is common in coastal sage scrub as well as in chaparral, riparian and high-desert scrub, and in the undergrowth of riparian and oak woodlands. It also adapts well to urbanized environments and is common in the County during the winter and breeding seasons, not widely varying its distribution (Unitt 2004). Two California towhees were seen in salt pond 20A in February and one was seen in the ocean grid along Point Loma in March. Six were observed in total.

Savannah sparrow (Passerculus sandwichensis)

The Savannah sparrow is split into many subspecies, several of which occur in San Diego County. Three of these visiting as winter migrants from the north are not safely distinguishable from each other in the field, including *P. s. anthinus*, *P. s. nevadensis*, and *P. s. brooksi*. Another, the Belding's (*P. s. beldingi*), is a non-migratory year round resident (Unitt 2004). A total of 1,414 undifferentiated Savannah sparrows were recorded during the surveys. Birds were observed during every survey month with a high count of 184 in December and a low count of 14 in February. Birds were mostly seen in the south-central, south, and salt pond regions of the bay. One Savannah sparrow was observed on the upland riprap in ocean grid C6 on the east side of Zuniga Jetty.

Belding's Savannah sparrow (Passerculus sandwichensis beldingi)

Endemic to the coast of northern Baja and southern California, the Belding's Savannah sparrow is a non-migratory subspecies of the Savannah sparrow. It is primarily restricted to pickleweed dominated coastal marshes and is designated as endangered by the California Department of Fish and Game (Unitt 2004). A total of 1,053 Belding's Savannah sparrows were seen during these surveys. Birds were seen during every survey month with a high count of 166 in September and a low count of 11 in October. The majority of the birds were seen in the south and salt pond regions of the bay. Four Belding's Savannah sparrows were seen along the North Island shore in the north bay in March. A single bird was sighted in ocean grid C41 in April, November, and February, and nineteen birds were seen along the shore of the Delta beaches in the south-central bay in March.

large-billed Savannah sparrow (Passerculus sandwichensis rostratus)

The large-billed Savannah sparrow is a subspecies of Savannah sparrow whose post breeding individuals reach San Diego County from northeastern Baja California and northwestern Sonora (Wheelwright and Rising 2008). This subspecies differs from the others in its large size, body streaking, and thick bill (Unitt 2004). Sixty-two large-billed Savannah sparrows were seen during the surveys. Birds were seen in August and September, and again in November through February with a high count of 6 in September and a low count of two birds in November and February. The majority of the birds were seen in the south-central bay between the Sweetwater River channel and Naval Station San Diego. One bird was observed in the northwest corner of the salt ponds in February, and 16 birds were observed in the south bay in the Chula Vista Wildlife Refuge and D Street Fill area.

fox sparrow (Passerella iliaca)

The fox sparrow is much more common in the County as a winter visitor, as the area is marginal to the sparrow's breeding range (Unitt 2004). Although its preferred habitat is chaparral, one fox sparrow was seen in the NTC boat channel in the north bay in June.

song sparrow (Melospiza melodia)

The most abundant bird in San Diego County riparian woodlands, the song sparrow makes limited use of heavily urbanized areas (Unitt 2004). A total of 105 song sparrows were observed during the surveys. This year round resident was seen during every survey month with a high count of 28 in June and a low count of one bird in August and November. Most birds were seen in the south and salt pond regions of the bay. Four birds were observed along the Point Loma shore in the north bay in June, one bird was observed in ocean grid C11 along Breakers Beach in March, and two birds were seen in ocean grid C12 along Breakers Beach in February.

San Diego song sparrow (Melospiza melodia cooperi)

The San Diego song sparrow is a type locality not well differentiated from the resident song sparrow subspecies, *M. m. heermanni* (Unitt 2004). Even so, one San Diego song sparrow was reported in the south bay in Emory Cove in April.

Lincoln's sparrow (Melospiza lincolnii)

With only one summer record for San Diego County, Lincoln's sparrow is a migrant and winter visitor only (Unitt 2004). Twenty Lincoln's sparrows were seen during the surveys. Birds were seen in March and April, and again in November through February with a high count of 6 birds in December and a low count of one bird in November, in south bay. The remaining birds were observed in salt pond 20A.

white-crowned sparrow (Zonotrichia leucophrys)

The white-crowned sparrow is common in San Diego County during the winter. It normally arrives in September and departs April to May (Unitt 2004). A total of 678 white-crowned sparrows were seen

during the surveys. Birds were seen in March and April, and again from October through February with a high count of 230 in January and a low count of 7 in October. White-crowned sparrows were observed mainly in the south-central, south, and salt pond regions of the bay. A few birds were seen in the north and north-central regions of the bay, and in the ocean grid.

dark-eyed junco (Junco hyemalis)

The dark-eyed junco is common in the conifers and oaks of San Diego County's mountains; while they are seen only as migrants and wintering birds around the bay (Unitt 2004). Only two individuals were seen during these surveys. They were located in the Sweetwater channel in November during the shorebird surveys.

Cardinalidae (Cardinals and allies)

black-headed grosbeak (Pheucticus melanocephalus maculatus)

The black-headed grosbeak is common in the summer but rare in the winter in San Diego County. Breeding has been confirmed around San Diego Bay, on Coronado Island (Unitt 2004). One black-headed grosbeak was seen in ocean grid C18 along the Silver Strand in April.

blue grosbeak (Passerina caerulea)

Rare in the winter but locally common in the summer, the blue grosbeak prefers riparian woodland and scrub. They are not as common around San Diego Bay as around other parts of the County (Unitt 2004). One blue grosbeak was seen in salt pond 20A in June.

lazuli bunting (Passerina amoena)

The lazuli bunting is absent from San Diego County in the winter, but is common during breeding and migration. Unitt (2004) shows only migrants around San Diego Bay. One female lazuli bunting was seen along the beach just north of the Coronado Cays in the south bay in September.

Icteridae (Balckbirds, Orioles, and Meadowlarks)

The tricolored blackbird is a year-round resident in San Diego County. Twenty to thirty breeding colonies are known around the county, none around San Diego Bay (Unitt 2004). The San Diego County Bird Atlas (Unitt 2004) shows records of birds in the north-central bay and south of the bay in the winter. The yellow-headed blackbird is a rare migrant and winter visitor in San Diego County. Only one nesting colony was confirmed during the Atlas survey years, in the southeast county. In the San Diego Bay area, only one bird was sighted in the winter in the Tijuana River valley (Unitt 2004).

The Baltimore oriole is a rare migrant and winter visitor in San Diego County. It is mostly associated with ornamental trees (Unitt 2004). The San Diego County Bird Atlas (Unitt 2004) mentions wintering birds on Point Loma and Coronado.

Red-winged blackbird (Agelaius phoeniceus)

The red-winged blackbird is a locally common permanent resident in San Diego County. It mainly inhabits freshwater marshes, but can also use creeks, ponds, and mustard stands (Unitt 2004). One red-winged blackbird was seen in the salt ponds in April.

western meadowlark (Sturnella neglecta)

Grasslands are the most common western meadowlark habitat, but they have been observed in coastal marshes, open sage scrub and other habitats, including those around San Diego Bay. The meadowlark is common as a breeding resident, but even more so in the winter (Unitt 2004). A total of 159 western meadowlarks were seen during the surveys. Birds were seen in March and April, and again in June,

September, and November through February with a high count of 103 birds in February and a low count of one bird in June and September. Western meadowlarks were mainly observed in the salt ponds and in the south bay. Some birds were also seen in the ocean grid and in the south-central bay.

Brewer's blackbird (Euphagus cyanocephalus)

A common, but perhaps declining resident in San Diego County, the Brewer's blackbird exists in developed as well as undeveloped areas year-round (Unitt 2004). A total of 372 Brewer's blackbirds were seen during the surveys. Birds were observed during every survey month with a high count of 85 birds in September and a low count of 4 in April and February. Brewer's blackbirds were observed in the ocean grid and in every region of the bay except for the salt ponds.

great-tailed grackle (Quiscalus mexicanus)

The great-tailed grackle is a locally common resident in San Diego County, after invading and increasing in number since the mid-1970s. They nest in wetland or marsh habitat, but have been spotted only as migrants or in the winter around San Diego Bay (Unitt 2004). One of these birds was observed during these surveys, in the Sweetwater Channel in November.

brown-headed cowbird (Molothrus ater)

The brown-headed cowbird is migratory, but found in San Diego County year round. They are brood parasites, laying their eggs in small songbird nests (Unitt 2004). Two cowbirds were observed during these surveys, during the August high tide survey in salt pond 22.

hooded oriole (Icterus cucullatus nelson)

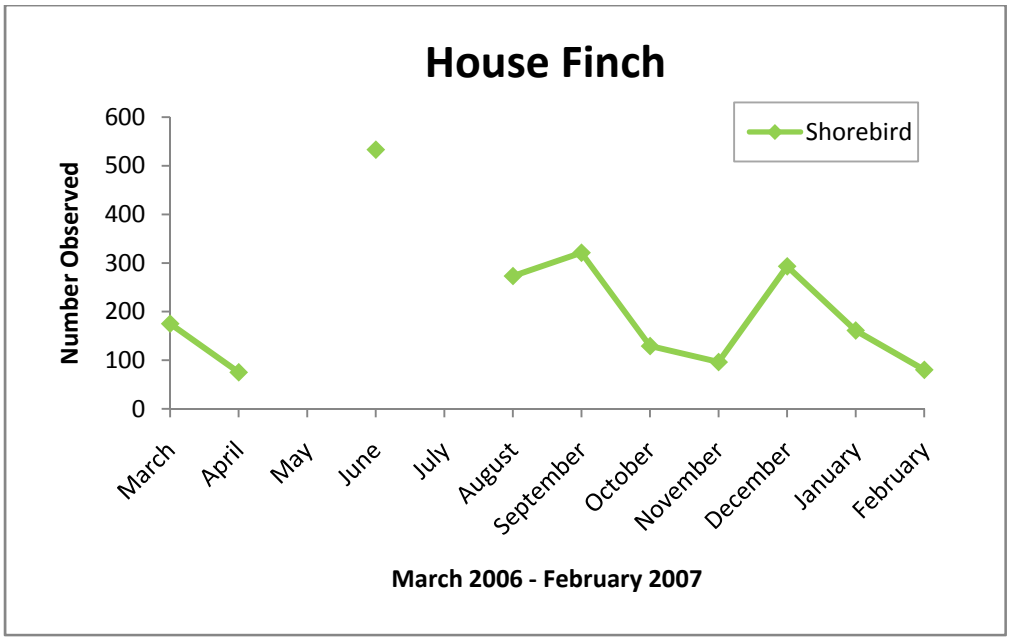
The hooded oriole is very common during the breeding season but rare in the winter in San Diego County. It is well adapted to the urban landscape, nesting in palm and eucalyptus trees (Unitt 2004). A total of seven hooded orioles were seen during the surveys, all during their reported breeding season of April to August. Four birds were observed in April: three in the south-central bay along the Silver Strand and one in the north-central bay along the Coronado shore. Two birds were observed in June: one in the south bay in the D Street fill area and one in the south-central bay along the Silver Strand. One bird was observed in the north bay in the Harbor Island area in August.

Fringillidae (Finches)

Lawrence's goldfinch and the pine siskin were not observed during this survey effort.

house finch (Carpodacus mexicanus frontalis)

Unitt (2004) describes the house finch as the most abundant bird in San Diego County. It occupies all terrestrial habitats, adapting well to urbanized areas. A total of 3,377 house finches were seen during the surveys. Birds were seen during every survey month with a high count of 533 birds in June and a low of 75 in April. House finches were seen in every region of the bay and in the ocean grid.



lesser goldfinch (Carduelis psaltria hesperophilus)

The lesser goldfinch is very common in San Diego County; it is a year-round resident utilizing a wide variety of habitats. Their winter habitat does not differ much from their breeding one; they are not as common around the bay as they are in other parts of the County (Unitt 2004). Two of these birds were spotted during these surveys, both in the Sweetwater Channel in August.

American goldfinch (Carduelis tristis salicamans)

San Diego County is at the southern end of the American goldfinch's range; it is the most widespread goldfinch in the United States. It favors primarily riparian habitat for breeding, but will venture a few miles further during the winter season (Unitt 2004). Two American goldfinches were seen during this survey, in the Harbor Island area of the north bay in April.

Passeridae (Old world sparrow)

house sparrow (Passer domesticus domesticus)

Introduced to the United States from Eurasia in the 19th century, the house sparrow is common to developed habitats (Unitt 2004). A total of 1,369 house sparrows were seen during the surveys. Birds were detected in every survey month with a high count of 174 in September and a low count of 17 in February; although, their winter distribution does not normally differ from their breeding season one. House sparrows were observed in all regions of the bay and in the ocean grid.