

Methods

The study area included beaches in three different counties in the greater San Francisco Bay area. Several Half Moon Bay and Pacifica beaches (Linda Mar Beach also known as Pacific State Beach) were surveyed in San Mateo County. Ocean Beach and Crissy Field were surveyed in San Francisco County and Stinson Beach and Limantour Beach in Marin County.

We conducted 88 surveys for Snowy Plovers from November 21, 2007 to January 17, 2008. Frequency of visits varied with Ocean Beach and Crissy Field each receiving the highest visitation rate. From late November to mid-December, Ocean Beach and Crissy Field were surveyed every day, with a few exceptions. During the same period, Pacifica State Beach, Stinson Beach and Limantour Beach were surveyed two times per week and Half Moon Bay was visited once per week. In late December, visits to Ocean Beach and Crissy Field were reduced to two per week but the visitation rate to the other beaches did not change through the end of December. In mid-January, one follow-up survey was conducted at Ocean Beach and Pacifica State Beach and two at Crissy Field. In addition to the surveys, we trapped and banded oiled Snowy Plovers at Ocean Beach and/or Crissy Field on 7 days between November 21st and December 5th.

The surveys were undertaken to determine the total number of Snowy Plovers in an area, the number that were oiled, and the proportion of color-banded oiled birds that survived to the end of the survey period. Surveys were conducted during all daylight hours and tides. On most occasions the entire beach was surveyed, except for Stinson Beach where birds were found at a predictable location on each survey. Surveys were completed by one and trapping by two persons, except for one time when one person trapped alone.

For surveys, we walked below the mean high tide line and stopped approximately every 30-50 meters to scan ahead with binoculars. Upon finding a roosting or feeding flock of plovers, we counted the total number of birds from a distance to avoid disturbing them as much as possible. Color bands often were also read from this distance. We then approached the birds to assess the degree of oiling on individuals; we tried to minimize disturbance and took care not to flush flocks or cause them to run great distances. When large groups of people, off-leash dogs, or kite-boarders approached the flock, we backed-off to eliminate our possible disturbance. We also attempted to contact people approaching the flock to minimize their disturbance to plovers.

The collection of oil data was standardized as much as possible among the four different observers that participated in the censuses. Observers specified whether or not a bird had visible oil, and if so, made a written description. This included listing the oiled body part/s, the percent of the body part/s covered with oil, and the apparent degree of penetration into the feathers. Also described, were the size and shape of the oil spot and where it was located on that body part. Note that some body parts, such as the vent and undertail coverts were used interchangeably by different observers and that the lower breast, upper belly, and the flanks were not always readily separated from one another in

the field . In some cases, a sketch of the oil was drawn onto a plover outline or photographs of oiled birds were taken.

When a flock was found on trapping days, birds were counted and checked for color bands. The unbanded birds were evaluated for the presence of visible oil and the most heavily oiled ones were chosen for trapping. One observer acted as a lookout and asked approaching people to avoid the area where the flock was roosting. The other trapped using 3 to 4 noose mats usually placed in a line 5-10 meters from the flock. The trapper attempted to move the chosen bird over the traps by walking casually towards it in the flock and flushing it over the traps. The trapper attempted not to displace or flush birds from their general roosting area.

Upon capture of an individual, the traps were left in place or removed depending on the number of people on the beach and if there were any more birds to catch in the flock. Typically the flock was not approached again for at least 30 minutes. A metal USFWS band was placed on the upper left leg of all birds and one to two plastic color bands on each lower leg. Each body part was systematically checked for oil and the percent of coverage, the depth of penetration, and the pattern of the oil were noted for each body part. A sketch of the oil was made on a plover drawing for a few of the birds. The wing chord and mass were recorded and pictures were taken of the oil on most birds. The birds were then released and observed to determine if they were behaving normally. Most birds immediately rejoined the flock. Trapping efforts then continued with the same flock until there were either no more birds to catch, the flock started to get restless, or we had been with the same flock for between 1-2 hours. We then attempted to locate a new flock.