Seabird Baseline Monitoring in the MLPA North Coast Study Region in 2014
Aerial Photographic Surveys of Breeding Colonies of Surface-nesting Seabirds

In 2014, all Common Murre, Brandt’s Cormorant, and coastal Double-crested Cormorant breeding colonies in the North Coast Study Region were surveyed once with aerial photographs on 5 June (Punta Gorda to Oregon border, including Humboldt Bay) or 7 June (Point Arena to Punta Gorda). These species often breed in intermixed colonies and in colonies with discrete perimeters, such that complete coverage of all breeding areas with aerial photographs is easily obtained. All previously known colonies were surveyed, and other coastal areas were inspected to detect possible new colonies. Complete coverage of Western Gulls and Pelagic Cormorants was targeted only at Castle Rock NWR, where typically all surface area is photographed for complete coverage of Common Murres. Complete coverage of Western Gulls (which have broader and less dense nesting distributions than murres and cormorants) and Pelagic Cormorants (which nest on cliff ledges) typically requires greater aerial survey effort and boat surveys, respectively. Roosting Brown Pelicans also were photographed where they occurred near or adjacent to murre and cormorant breeding colonies.

Surveys were conducted from a California Department of Fish and Wildlife Parthenavia aircraft at altitudes of about 650’ to 1000’ above sea level, utilizing a port in the belly of the aircraft for vertical photography. Photographs were taken between 11:00 and 16:00 hrs, with murre colonies all surveyed by 14:30 hrs. Two biologists photographed each colony completely, using Canon 60D and 50D cameras equipped with a 200 mm telephoto lens (for the principal photographs used for counting) and 17-85 mm and 70-200 mm zoom lenses (for overview and broader coverage photographs), respectively. A third observer in the copilot’s seat recorded handwritten notes on flight log datasheets. Aerial photographs (nearly 3,000 images totaling more than 24 GB of storage) were archived by UC Santa Cruz and USFWS (Don Edwards San Francisco Bay National Wildlife Refuge). These surveys followed methods that have been standardized since 1985, with updates to vertical photography in 1997 and to digital photography in 2007 (Carter et al. 1992, 2001; Capitolo et al. 2014).

This data package includes a representative overview aerial photograph of each breeding colony that was active in the study region in 2014. For some colonies, more than one overview photograph was needed to show all breeding areas. A few colonies did not have breeding murres or cormorants in 2014, but were included because roosting Brown Pelicans were counted. Overview photographs were archived with a standardized file name consisting of a prefix (Survey Date and Camera #) and a sequential number. For example, the first overview photograph taken on 5 June has the file name “5June2014Camera2 001”. All colonies and subcolonies had been previously named and mapped in California Seabird Colony Catalogs and subsequent reports.
Seabird Baseline Monitoring in the MLPA North Coast Study Region

Analysis of Aerial Photographs of Breeding Colonies of Surface-nesting Seabirds, 2000-2014

From archived digital aerial photographs, whole-colony counts of breeding seabirds were determined throughout the North Coast Study Region in 2014 for baseline data. Focal species were Brandt’s Cormorant, Double-crested Cormorant, and Common Murre. For these species, all active colonies in the study region were surveyed and counted. Whole-colony counts of Western Gulls and Pelagic Cormorants were determined only for Castle Rock NWR. Non-breeding Brown Pelican roosts also were photographed and counted.

In addition, archived aerial photographs of Castle Rock NWR and Cape Vizcaino and Rockport Rocks colonies from past years were analyzed to complete a time series for those colonies to strengthen trend analyses. For Castle Rock NWR, complete colony counts were determined for 2012 and 2010. For 2013, 2011, 2009, 2008, 2006, 2005, 2002, and 2000, only the East side of the island was counted. For Cape Vizcaino and Rockport Rocks, colony counts were determined for 2011-2013, completing an annual time-series for the 1996-2014 period.

From among many photographs of a colony, the best, considering quality and extent of colony coverage, were analyzed by manually marking nests, sites, and birds on images, using Image-Pro software developed by Media Cybernetics, and following standardized protocols (Carter et al. 1992, 2001; Capitolo et al. 2014). Multiple images were used to determine complete colony counts, with overlapping areas delineated to prevent double-counting. Categorical counts were tallied automatically by the software. A screen capture of each counted image was saved, and counts from individual screen captures were entered into a relational database and summed to determine whole-colony counts.

For Common Murres, only birds were counted because murres do not build nests. For cormorants, nests were categorized by stage of development, including poorly built nests (pre egg-laying), well built nests with an incubating adult, and nests with visible chicks. Empty (attended by an adult) and abandoned (not attended by an adult) well built nests also were categorized, though few occurred. Birds in suitable breeding habitat and densities, but with little or no nesting material present, and that sometimes can be seen to be displaying, were categorized as territorial sites. Territorial sites are not included in total numbers of nests for cormorants, though some of these likely become egg-laying sites following aerial surveys. Other cormorants such as attending mates were categorized as birds. All categorical counts (except Abandoned nests) were summed for a complete total of cormorants attending a colony. Western Gulls were categorized by posture typically, with sitting birds marked as either a site or a nest (if nesting material was seen). Standing gulls were marked simply as birds, unless two standing gulls appeared to be a mated pair, in which case one of the birds was marked as a site. Nest and sites were summed to estimate breeding population size. No correction factors were applied to whole-colony counts. Roosting Brown Pelicans were aged as adults (white heads) or immatures.