



## Water Traffic and San Francisco Bay Birds



USGS

### How do waterbirds respond to the bustling recreational and transit water traffic of San Francisco Bay?

The San Francisco Bay Estuary is a critical migratory stop-over and wintering area for diving waterfowl and other waterbirds in the Pacific Flyway. Wildlife surveys show that large numbers of unique species, such as **diving ducks**, **guillemots** and **grebes**, rely on Bay waters seasonally or year-round.

At the same time, San Francisco Bay is one of the most dynamic and growing waterfronts in the U.S., accommodating shipping ports, recreational and commercial boaters, and water transit year-round, not to mention special celebrations and events such as the America's Cup sailing race. A flotilla of rafting birds and piloted vessels share our Bay.

Yet little is known about how water traffic disturbance may affect habitat use and foraging ecology of rafting waterbirds. Studies elsewhere have shown that high-speed ferry routes can discourage habitat use by waterbirds within certain distances, while boat traffic disturbance can cause waterbirds to expend more energy flying and flushing from roosting and foraging sites, and spend less time feeding — thereby losing valuable energy that could be stored for breeding or migration.

The **USGS Western Ecological Research Center** works with many local and state institutions to study the wildlife ecology in the San Francisco Bay Area and California at large. **As part of the USGS mission to survey America's natural resources**, our scientists study how birds and other wildlife respond to different environmental factors, be it wildfires, invasive plants and predators, environmental pollutants, or human activity.

Our research projects on water traffic and waterbirds in San Francisco Bay will not only help inform the management decisions of local institutions and agencies — but it also will contribute to our knowledge of wildlife science in general, and help us all discover new knowledge about San Francisco Bay's ecosystem and natural resources.

### RESEARCH CONTACTS

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# Research Overview and FAQ

## RESEARCH OBJECTIVES

USGS scientists studying San Francisco Bay water traffic and waterbirds seek to answer the following ecological questions:

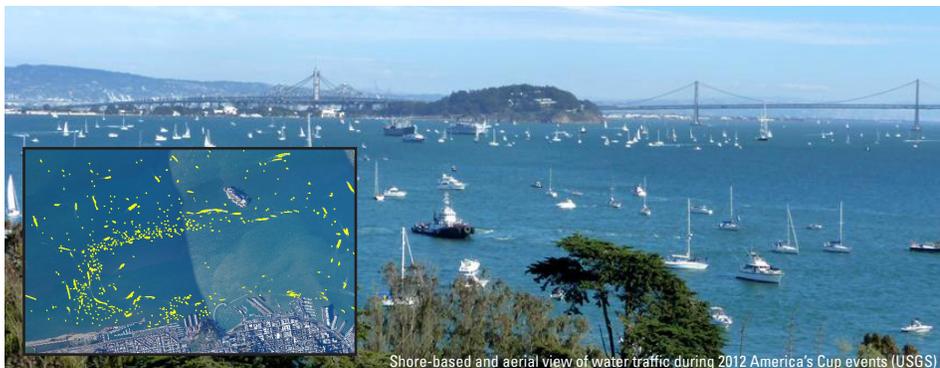
- Does transit and recreational water traffic influence waterbird access to resources (habitat, food) that they would otherwise use?
- Does boat traffic cause waterbirds to flush from roosting and foraging sites, resulting in prolonged habitat displacement?
- In addition to on-going recreational and transit activities that occur in SFB, do major spectator events affect waterbird energetic efficiency?

## RESEARCH METHODS

Scientists employ a mix of land-based and air-based surveys to observe waterbird responses to human activity. For example, in the America's Cup study, scientists are doing the following:

**Aerial Surveys:** Observers ride on small aircraft and fly along survey transect grids to record bird activity before and after specific race events. Bird species, numbers and location data will be taken.

**Land Surveys:** Observers will monitor a set of study transects before, during, and after specific race events to record bird response to spectator boats. Bird species, flock size, flock sex ratio, disturbance type and bird response are among the data recorded.



Shore-based and aerial view of water traffic during 2012 America's Cup events (USGS)

## FREQUENTLY ASKED QUESTIONS: AMERICA'S CUP STUDY

The 2012/2013 America's Cup sailing events have generated much public interest. Here is how USGS waterbird research relates to the race:

### What has USGS been asked to study?

USGS has been asked by the City of San Francisco and Golden Gate Audubon to **1)** determine the distribution of rafting birds on race routes and in adjacent areas across the Central Bay before and after race events using aerial surveys, and **2)** examine species-specific responses (avoidance, displacement, resettling times) to motorized and non-motorized watercraft with land-based observer surveys.



Pigeon Guillemots (Wikimedia)

### What will you be looking for?

The race events intersect with different life history stages for different bird species. Several seabird species are still nesting adjacent to the event area during July and August, and their young are fledging and learning to forage on the water. During September, additional migratory bird species begin arriving to rest and forage. We are looking for any changes in the number, distribution or behavior of these birds during the race events, in comparison to non-event periods.



Greater Scaup (USGS)

### How will this study contribute to our community?

The Bay is an important area for migratory and nesting birds, and many species that use this area are declining, so there is a great need to understand how birds are influenced by human and other factors.

The America's Cup event is an important opportunity to study how birds respond to concentrated water traffic, and the findings will further our knowledge of wildlife-human interactions, and help inform natural resource management plans that balance both human and wildlife uses of Bay waters.

### When are the study results expected?

The final round of data collection (post-event baseline observations) will end in November 2014. Final data delivery and scientific journal submissions will likely begin in March 2015.



Clark's Grebe (USGS)

The USGS Western Ecological Research Center (WERC) is an Ecosystems mission science center of the U.S. Geological Survey serving California, Nevada and the greater Pacific West.

Our research is as varied as our region, including sea otter population surveys along the California coastline, greater sage-grouse habitat mapping in Nevada, forest health studies in Redwood, Yosemite and Sequoia national parks, and wildfire risk studies in southern California chaparral.

Learn more online at [www.werc.usgs.gov](http://www.werc.usgs.gov)