Porpoises and Dolphins Find New Habitat in San Francisco Bay

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Harbor porpoises (*Phocoena phocoena*) have returned to daily, year-round use of SF Bay after an absence of approximately 65 years. Re-occupation of historical habitat in the central bay may be related to the health of the ecosystem. Our efforts are focused on the photo-identification of individuals, habitat use and behavioral observations. Photo-identification has not been successful with harbor porpoises in other locations because of their small size, timidity and lack of prominent markings. However, using a combination of platforms—bridge, shore, and boat—we have been able to catalog 600 animals, recognizable from scars and pigmentation patterns. By tracking known females over time we may be able to determine their birth rate, previously possible only through examination of carcasses. We use the Golden Gate Bridge as a platform to observe mating behavior heretofore unseen in wild harbor porpoises. Concurrently, we report a range extension of bottlenose dolphins (*Tursiops truncatus*) to SF Bay. The coastal stock's previous northern range limit of Pt. Conception was surpassed during the 1982-83 El Niño event, after which it occupied Monterey Bay, and more recently has become regular in SF Bay and the adjacent coast. Our efforts resulted in the photo-identification of 41 uniquely marked individuals, of which 93% (n =38) are matched to the Monterey Bay catalog. The dolphins using SF Bay Area comprise about 10% of the estimated California stock. Photo comparisons with Southern California Bight catalogs revealed that one dolphin sighted in Bodega Bay in 2012 was seen off Ensenada, Mexico in 2000. This longshore movement record of approximately 1000 km confirms previous research suggesting high mobility of the stock. Ecological effects of this northward range extension include predation on chinook salmon, previously unreported as prey for coastal bottlenose dolphins, and lethal aggression against harbor porpoises.

Keywords: Harbor Porpoise, *Phocoena*, Bottlenose Dolphin, *Tursiops*, Re-Occupation, Range Extension, Photo-Identification

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Speaker Biography: William Keener is a former Executive Director of The Marine Mammal Center in Sausalito, California, and his experience includes work as a field observer on vessel-based transects for the harbor porpoise population census in the Gulf of the Farallones conducted by Cascadia Research Collective from 1987-1989. He was also on the expedition team that first surveyed birds and marine mammals at Cordell Bank, which helped lead to its establishment as a National Marine Sanctuary. He co-founded the nonprofit Golden Gate Cetacean Research in 2010 to focus on the scientific study of porpoise, dolphins and whales inhabiting the San Francisco Bay Area.

Distribution and Population Trends for the Endangered California Clapper Rail

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Habitat loss and degradation in San Francisco Bay has resulted in decreases in populations of tidal marsh birds over the past 150 years. The federally Endangered California Clapper Rail (*Rallus longirostris obsoletus*), historically abundant, now numbers less than 2,000. To better understand the status and drivers of the California Clapper Rail population, agencies and organizations have conducted standardized surveys since 2005. Using imperfect detection models we reduced errors due to failure to detect individuals when present ("false zeroes"). Our goal was to identify changes in abundance independent of any changes in detection probability among sites or among years. Factors affecting the probability of detecting Clapper Rails included time of season with peak probability of detection occurring mid-February and time of day which peaked c. 25 minutes before sunrise and c. 25 minutes after sunset. The California Clapper Rail population was relatively stable in 2005-2007, declined significantly in 2008 followed by low but relatively stable densities through 2011. The decline in the South Bay was steeper and, as a result, densities lower than in the North Bay during the period 2008-2011. At the landscape level, channel density was the most important feature favoring high Clapper Rail density which peaked around 75 m of channel length per hectare. The increases in density seen in response to tidal marsh restoration were dramatic occurring, on average, after 17-20 years. The fast pace of restoration in SF Bay offers the best hope yet for Clapper Rail recovery. With sea-level rise threatening long-term recovery efforts, decisions informed by the best available science and considering the full range of scenarios and potential outcomes will improve our chances of achieving resilient and functioning tidal marsh ecosystems. A monitoring program to assess impacts of climate change and track recovery of Clapper Rails is vital to achieving shared goals.

Keywords: Clapper Rail, Detection Probability, Imperfect Detection, Tidal Marsh

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Speaker Biography: As the San Francisco Bay Program Leader at Point Blue, Julian develops and leads projects focused on understanding bird response to wetland restoration and helps develop and promote conservation actions that result in healthy bird communities and wetland ecosystems within the context of a rapidly changing environment.

Balancing the Eradication of an Invasive Ecosystem Engineer and Endangered Species Recovery

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State Coastal Conservancy and USFWS began the ISP to coordinate regional control of this ecosystem engineer in the San Francisco Estuary and as a key first step in the South Bay Salt Pond Restoration Project. For 25 years, tidal restoration efforts have been continually pushed off native marsh development trajectories by hybrid cordgrass (*Spartina alterniflora X foliosa*), resulting in low biodiversity monocultures as loci of dispersal to pollute native marshes.

While the invasion engulfed fragmented marshes and destroyed habitat for a variety of tidal flora and fauna, populations of endangered California clapper rail found refuge in hybrid cordgrass. Detections at some sites soared beyond historical densities, often on previously unvegetated mudflat that could no longer perform its own ecological services. Eliminating hybrid *Spartina* from intact marshes did not have a substantial impact on rails, but it had the anticipated effect of returning populations to estimated pre-infestation levels where there was previously little habitat value. However, by 2013 winter call count surveys documented four consecutive years of stability, indicating that population-wide impacts from *Spartina* eradication have passed.

By 2012, through the use of highly-integrated monitoring and treatment, ISP reduced hybrid *Spartina* to 39 acres from over 800. Despite this success, ISP faces grave challenges towards achieving its goals. Ten sites are not permitted for treatment in ISP's Biological Opinion due to concerns about resident rails, allowing dispersal of propagules that move freely around the Estuary, undermining progress achieved by an enormous investment of public funds.

ISP is accelerating clapper rail habitat development through active enhancement, focusing on *Grindelia* along higher order channels, native cordgrass reintroduction where extirpated by the hybrid swarm, and earthen island construction. Over 165,000 plants have been installed and 90,000 are growing at Watershed Nursery for this winter.

Keywords: Hybrid Spartina, Cordgrass, Clapper Rail, Restoration, *Spartina Foliosa*, Salt Marsh

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Speaker Biography: Drew Kerr is the Treatment Program Manager for the State Coastal Conservancy's Invasive Spartina Project (ISP). He joined ISP in 2005 when they began gearing up for Estuary-wide treatment. He moved to the Bay Area from Seattle where he had been the Aquatic Noxious Weed Specialist for the King County Department of Natural Resources. Drew attended the University of Michigan, receiving degrees in Natural Resource Management and Economics, and subsequently studied Wetland Science and Management at the University of Washington. In addition to work with invasive aquatic plants, wetland ecology, and land use policy, a primary area of focus for him has been lentic breeding amphibians.

Managing the Menace: Quagga and Zebra Mussels in California

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Quagga mussels (*Dreissena bugensis*) were first detected in California in January 2007 and are currently established in 25 southern California waterbodies supplied by the Colorado River. A single population of zebra mussels (*Dreissena polymorpha*) was discovered in 2008 in a small reservoir in Central California. Dreissenid mussels have impacted recreation (boating and fishing) and water management throughout the state. Quagga mussels heavily infest southern California water conveyance structures, and millions of dollars have been spent to maintain operations and contain the infestation. Given the existence of unregulated public access to some infested waters, water managers of uninfested waterbodies are taking action to prevent mussel introductions by implementing watercraft inspection programs and early-detection monitoring commensurate with their potential vulnerability to dreissenid mussel establishment and/or introduction. Concurrently, state agencies continue efforts to prevent over-land transport of dreissenid mussels on watercraft into the state at the borders, and between states through multi-state coordination. Integral in this effort is the Department of Food and Agriculture's Border Protection Stations, which in addition to dreissenid mussels, have intercepted a variety of potentially invasive aquatic species. The discovery and response to dreissenid mussels has underscored the importance of early recognition and preparation for invasive species, the need for scientists to effectively communicate issues and consequences in practical, understandable, and persuasive ways to non-scientists, the benefit of an organized response that draws on existing and outside expertise, the value of collaborative relationships based around common interests, and the necessity for any response to be multi-pronged, adaptive, and creative, if it is to achieve the desired goals given the limitations, boundaries, and authorities that must be worked within.

Keywords: Invasive, *Dreissena*, Mussel, Prevention, Response, Management, Collaboration

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Speaker Biography: Ms. Volkoff is a Senior Environmental Scientist with the California Department of Fish and Wildlife's Invasive Species Program, and works to prevent and minimize the impacts of aquatic invasive species on the natural resources of the state. Ms. Volkoff is the lead scientist coordinating the Department's Quagga/Zebra Mussel Project, where efforts focus on containment, early-detection monitoring, outreach and education, and building partnerships within the state and beyond. In addition, she works on a variety of species including New Zealand mudsnail, snakehead, Asian carp, and didymo. Ms. Volkoff holds a B.S. and M.S. in Conservation Biology, and began her career as a fisheries biologist performing age and growth research on salmonids to help better inform fisheries management decisions.