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California's Salton Sea - A Troubled Ecosystem

USGS biologists are working to gain a better understanding of the ecological factors driving the massive fish and wildlife die-offs at the Salton Sea. Their scientific findings are used by federal, state and local agencies managing this ecosystem.

The Salton Sea is California's largest inland body of water and a stop-over point for millions of migratory birds searching for water in a state that has lost 90% of its original wetlands. Up to half of California's white-faced ibis, nesting black skimmers and Caspian terns, and more than 350 other species, can be found at the Sea. The abundance and diversity of bird life is recognized worldwide, attracting thousands of bird watchers annually. The Salton Sea also supports a multi-million dollar recreation and tourism industry, including a highly productive sport fishery.

In recent years, frequent large scale die-offs of fish and birds have focused national attention on the Sea and raised concerns that the Salton Sea ecosystem is in trouble. Since the early 1990s, disease has killed hundreds of thousands of birds in the Salton Sea. USGS scientists diagnosed avian botulism (type C) and avian cholera as the cause of many of the large, recurrrent bird die-offs. In 1997 and 1998, Newcastle disease, a viral agent that is also a threat to domestic poultry, killed thousands of double-crested cormorant nestlings. Other disease problems, such as the cause of the 1992 die-off of over 150,000 eared grebes and ruddy ducks, remain undiagnosed. Massive fish kills, often numbering in the millions, are not uncommon at the Sea. Low oxygen levels and disease agents, such as bacterial infections, algal toxins, and parasites, have been implicated in these fish die-offs.

The USGS National Wildlife Health Center (NWHC), based in Madison, WI, regularly sends wildlife disease specialists to investigate and document the massive mortality events occurring in birds at the Salton Sea. The Center provides extensive field and laboratory technical support to federal, state and local agencies to manage the mortality and limit the spread of disease.

USGS scientists are also conducting several research projects on disease in birds at the Salton Sea. Researchers are attempting to determine the links between the occurrence of botulism in fish-eating birds and fish ecology, food habits, morbidity, and mortality. Thousands of fish, both sick and apparently healthy, have been collected at the Sea during botulism outbreaks in birds and are being tested for botulinum toxin and the bacterium that produces the toxin. In another project, researchers are working to determine the cause of the undiagnosed disease of eared grebes that has recurred nearly every year at the Sea since 1992. Algal toxins are being investigated as one of the potential culprits.

The cause and epizootiology of the massive mortality events in birds is likely as complex as the Salton Sea ecosystem itself. The USGS plans to continue its research to help improve management of this unique environment and reduce wildlife mortality in years to come.

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