



Oil field to wetlands

Restoring California's Bolsa Chica Lowlands

Historically, a stretch of coastline in Huntington Beach, Calif., just south of Los Angeles, comprised thousands of acres of vibrant saltwater and freshwater marshes, providing habitat for a wide range of plants and animals—including brown pelicans, snowy plovers and waterfowl. During the past 100 years, much of this area, known as the Bolsa Chica Lowlands, was drained by developers and industry. But now, thanks to a broad-reaching partnership of state and federal agencies, more than 1,200 acres of wetlands are being restored, and CH2M HILL played a crucial role.

The disappearance of much of the Bolsa Chica wetlands dates back to 1899, when a gun club diked and drained the area. Beginning in the 1940s, oil companies discovered reserves of crude oil, and soon oil wells dotted the landscape. By the 1970s, the site included 430 active or abandoned wells and a vast network of pipelines and related equipment. In addition

to the contamination from these industrial sources, storm drainage from neighboring areas flowed into the wetlands, further contributing to the area's ecological problems.

From the early 1970s to the mid-1990s, the remaining wetlands at Bolsa Chica came under increased pressure from commercial and residential developers. But in 1997, the State of California purchased most of the remaining wetlands under a state-federal interagency agreement, in an effort to protect and restore what little remained of the original wetlands.

CH2M HILL was tasked with conducting a confirmatory sampling program and preparing an ecological risk assessment in support of the restoration effort. The sampling and analysis of soil and sediment, water, and plant and animal life was completed to characterize contamination within the lowlands and to establish cleanup criteria for contaminated sites.

Harry Ohlendorf led the CH2M HILL project team, with support from Marjorie Eisert, Trudy Pulley, Brad Sample and many others. The project team worked directly for a technical committee, which in turn reported to a steering committee consisting of representatives from stakeholder agencies—California State Lands Commission, California

Department of Fish and Game, California State Coastal Conservancy, California Resources Agency, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers and U.S. Environmental Protection Agency.

The 1,200-acre site had been divided into 60 cells through construction of levees and roads. The project team took core samples from each cell at a rate of one core per four acres and also sampled selected locations such as waste sumps and pipelines.

Sampling the site was challenging because of the need to minimize disturbance of sensitive habitats as well as the need to sample under difficult site conditions (for example, flooded ponds and mudflats). More than 2,000 samples were analyzed to assess potential contamination, and a subset was tested for toxicity. Biological sampling included plants, invertebrates, fish, bird eggs and small mammals. The project team incorporated the results of these studies into the ecological risk assessment and assisted the technical committee in determining cleanup levels and developing a strategy for the most cost-effective cleanup approach.

"The Bolsa Chica project was a great experience because of the excellent working relationship

we had with the technical committee representing various federal and state resource agencies, the unique challenges of characterizing this complex site, the great project team, and the reward of seeing results implemented in the ongoing restoration activities," Ohlendorf said. "We'll be able to see the positive effect of our contributions for years to come."

CH2M HILL's work at the site ran from late 1997 through April 2005. Construction is currently underway and is scheduled to be completed in summer 2006. In April, the U.S. Fish and Wildlife Service presented Ohlendorf and Eisert with certificates of appreciation honoring CH2M HILL's contribution to this important restoration project. 

Project goals

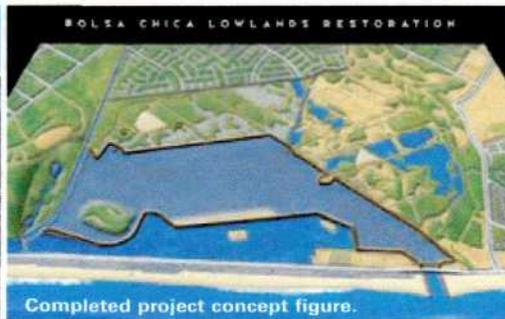
The \$125 million Bolsa Chica Lowlands Restoration Project is the largest-ever wetlands restoration project in southern California. The project has five key goals:

- restore full tidal influence to a portion of the area to reinvigorate the wetland ecosystem
- create and enhance aquatic habitats and intertidal wetlands
- create and enhance habitat for threatened and endangered birds
- preserve nontidal wetlands
- remove oil field equipment and clean up contamination

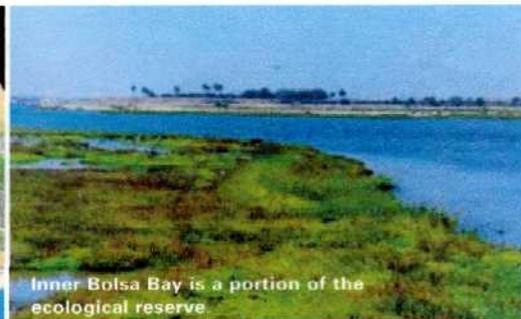
Project features include a 366-acre tidal basin, an ocean inlet, an entrance jetty and a Pacific Coast Highway bridge over the new inlet.



Core sampling was conducted in each of the project's 60 cells.



Completed project concept figure.



Inner Bolsa Bay is a portion of the ecological reserve.