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## Restoration Database

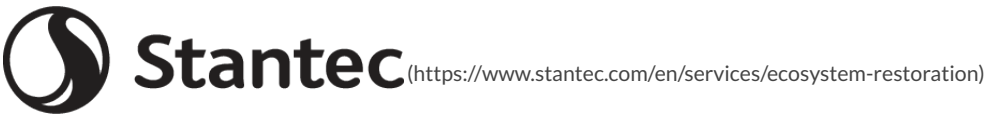


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The RRC provides a searchable database of restoration projects from around the world intended to serve as a resource for practitioners, researchers, educators, students, and the general public. Projects have been freely contributed by users of the SER website, or have been compiled from publicly available information by SER staff or other designees of SER. Expand the filter tool below to search for projects by country, region, biome, ecosystem, cause of degradation, or any combination of these factors.

Although SER does review all submissions for relevance, quality, and completeness before approving them for inclusion in the database, they are not subjected to peer review nor has project information been independently verified in the field. SER therefore makes no claim as to the accuracy of the information presented here or the degree to which the methods, techniques, and strategies used for a particular project adhere to generally accepted standards for ecological restoration practice. Anyone interested in learning more about a particular project is encouraged to contact the project lead or the responsible organization directly for further information.

If you have field experiences you'd like to share, we encourage you to submit your own project (<https://ser-rrc.org/submit-a-project/>) to the database!



The Project Database is generously supported by Stantec (<https://www.stantec.com/en>)

Filters (1 selected)

Ecosystem Functional Groups / Biomes

Regions

Countries

Keyword

Restoring Bolsa Chica Wetlands

Project Filters

Degradations

Restoration activities implemented

STAPER Filters

[What is STAPER?\(\)](#)

Assessment of opportunities for ecosystem restoration

Improving the institutional enabling environment for ecosystem restoration

Planning and implementation of ecosystem restoration activities

Monitoring, evaluation, feedback, and disseminating results

Currently selected: Keyword: Restoring Bolsa Chica Wetlands ×

Projects (1)	Resources (0)	Institutional Members (0)	Academic Programs (0)
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Showing 1 to 1 of 1 matching projects



Overview

The Bolsa Chica wetlands are located in Orange County, CA, surrounded by the City of Huntington Beach. The project site lies adjacent to the California Department of Fish and Game's Ecological Reserve and consists of 350 acres of habitat within 1300 acres of lowlands, most of which the State owns. The complicated history to restore the Bolsa Chica wetlands stretches back over several decades but began to reach fruition in the mid-1990s. In October 1996, eight state and federal agencies (California State Lands Commission, California Department of Fish and Game, State Coastal Conservancy, Resources Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, National Marine Fisheries Service, and U.S. Environmental Protection Agency) and the Ports of Los Angeles and Long Beach entered into an Interagency Agreement to establish a project for wetlands acquisition and restoration at the Bolsa Chica Lowlands, located along the northern Orange County shoreline. After almost a decade of planning and support activities, on the ground restoration of nearly 600 acres of Bolsa Chica was begun in 2004. In the summer of 2006 seawater flowed into the restored wetland for the first time in over 100 years facilitating the recreation of wetland habitat benefiting a variety of species including several threatened and endangered species. The Bolsa Chica wetland restoration was the largest coastal wetland restorations ever undertaken in Southern California (Amigos 2008).

Project Details

X

Lead entity types:

- Governmental Body

Adaptive management

Describe adaptive management processes and mid-course corrections taken to address unforeseen challenges and improve outcomes in each of the following categories:

Other:

The Bolsa Chica wetland restoration was the largest coastal wetland restorations ever undertaken in Southern California (Amigos 2008). The project restored full and muted tidal wetlands function to almost 600 acres of the Bolsa Chica Wetlands. The increased quantity and quality of open water and intertidal mudflat habitats at Bolsa Chica will provide overwinterintg habitat for migratory shorebirds, seabirds, and waterfowl. A diverse community of marine and estuarine invertebrates will undoubtedly flourish In the full and muted tidal basins. Restoration of full tidal influence will recreate conditions that will be very beneficial for up to 60 species of fish. The project went forward and it appears has a good chance of success in spite of significant sources of disturbance surrounding the area.

State of Progress:

- Closed/completed, no further follow-up

Project Start:

1995-07-11

**Project End:**

2006-08-11

**Total budgeted expenses:**

- USD >100 million

**Main source of funds:**

- National government and public institution

**Global Regions:**

- Northern America
- World
- Americas

**Countries:**

- United States of America

**Ecosystem Functional Groups / Biomes:**

- Semi-confined transitional waters biome

**Ecosystems:**

- Permanently open riverine estuaries and bays

**Extent of restoration:**

- 200-500 ha

**Degradations:**

- Other
- Other industrial and urban development
- Other forms of unsustainable agricultural practices

**Description:**

Partially-developed mesas rise at both the upcoast and downcoast ends of the lowlands. Once part of a 165,000 acre Spanish land grant, during the 1700's to 1800's ranching and later agriculture in the area may have impacted the Bolsa Chica. By 1900 the tidal nature of the wetland was essentially destroyed when the natural ocean inlet to the wetland was closed to improve duck hunting. Since then, the area has been used for agriculture, cattle grazing, military coastal artillery emplacements and oil production (Amigos 2008). In the late 1940's the Pacific Coast Highway and State beach facilities were constructed. The 1300 acres of lowlands are a remnant of a complex of approximately 2500 acres of streams and wetlands that has been reduced in size and degraded by agricultural and urban development and by construction of flood management channels, and oil and extraction facilities. The historical site activity as well as urban runoff draining into the Lowlands has resulted in contamination or physical disturbance of the plants, wildlife or their habitat on the site (USFWS 2008).

**Planning and Review****Goals and Objectives****Was a baseline assessment conducted:**

unsure

**Was a reference model used:**

RM5

**were\_goals\_identified:**

YES

**Goals and objectives:**

- Other

#### Goals Description::

Primary project goals included: removing oil production facilities and cleanup associated contaminants; protecting and enhancing marine habitat for coastal and estuarine fisheries resources; increasing and enhancing habitat for migratory waterfowl, seabirds, and shorebirds; providing habitat for endangered species; and Incorporating passive and non-intrusive human activity (USFWS 2008).

### Stakeholder Engagement



#### Were Stakeholders engaged?:

unsure

#### Description of Stakeholder Involvement:

In October 1996, eight state and federal agencies (California State Lands Commission, California Department of Fish and Game, State Coastal Conservancy, Resources Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, National Marine Fisheries Service, and U.S. Environmental Protection Agency) and the Ports of Los Angeles and Long Beach entered into an Interagency Agreement to establish a project for wetlands acquisition and restoration at the Bolsa Chica Lowlands (California Coastal Commission 2005). The Bolsa Chica Wetlands Restoration Steering Committee consisted of representatives from the eight different agencies referred to prior. To assist the USFWS in the management and administration of the project, Moffatt & Nichol Engineers was contracted for construction management. To construct all elements of the restoration project, that included the two bridges, jetties, dredging, earthwork, and groundwater barrier, the Service selected the Kiewit Pacific Company (USFWS 2008). Three citizen groups, the Amigos de Bolsa Chica, the Bolsa Chica Land Trust and the Bolsa Chica Conservancy all play a significant role in restoration efforts of the Bolsa Chica Wetlands.

### Ecosystem Activities and Approaches



General Activities: In October 1996 the Interagency Agreement described a Concept Plan for wetland restoration and addressed: (1) the acquisition of approximately 880 acres of land in the Bolsa Chica Lowlands; (2) the restoration of wetlands, full tidal, and managed tidal habitats in the lowlands; (3) monitoring activities to determine the condition of restored habitats; and (4) the necessary operation, maintenance, and management of project features during and after construction. The Concept Plan included the following planning objectives for the Bolsa Chica restoration project: - Overwintering habitat for migratory shorebirds, seabirds, and waterbirds shall be enhanced. - Nesting habitat for migratory shorebirds and seabirds shall not be diminished and shall be expanded, where feasible. - Habitat for estuarine/marine fishes shall be expanded and species diversity shall be increased. - Nesting and foraging conditions for state and federal endangered species shall not be adversely affected. In addition, implementation of the plan shall contribute to the recovery of the light-footed clapper rail, California least tern, western snowy plover, and Belding's savannah sparrow. - The mix of habitat types shall include perennial brackish ponds, seasonal ponds/sand flats, pickleweed flats, cordgrass intertidal zone, unvegetated intertidal mudflat, and marine subtidal soft bottom. - Modifications to the hydraulic regime (necessary to achieve the above objectives) shall include an ocean inlet, full tidal range (i.e., +7.5 to - 1.5 feet mean lower low water), and low residence time, and shall emphasize minimized requirements for manipulation and maintenance and not degrade existing flood protection levels. - Interests of contiguous property owners shall be protected. - Once completed, maintenance and management of the area shall maximize native estuarine/marine fish and wildlife habitat of the Bolsa Chica Lowlands in perpetuity, including active removal of detrimental, non-native biota. - Allowable public uses shall include passive and nonintrusive recreation activities focused on peripheral areas, interpretive foci, and trails. - Total removal of oil extraction activities and their past effects shall be conducted in a phased, cost-effective, and environmentally sensitive manner. - Monitoring and evaluation of the success of biological objectives shall be conducted. Between 1997 and 2004, the state acquired an additional 965 acres of Bolsa Chica, setting the stage for a major restoration project involving nearly 600 acres. Restoration ground breaking occurred on October 6, 2004. Project phases included: Phase 1: A critical feature of the wetlands restoration is an inlet from the sea to supply life-giving tidal flow into the restored wetland. The first task was the construction of a bridge to allow Pacific Coast Highway traffic to pass over the ocean inlet. To protect the new bridge from storm waves, the bridge had to be raised higher than the level of the original highway. For additional storm wave protection, 31,000 tons of stone were used to build revetments on the west-facing side of the bridge. Phase 2: The 380 acres of the full tidal basin had to be cleared of all oil field remnants: 64 oil wells were removed and capped and 27 miles of pipes, 230 power poles, tons of machinery, brush and contaminated soil were hauled out. In addition, several miles of maintenance roads were leveled. The ecological risk assessment identified the types and concentrations of chemical contaminants present on the site and what chemicals may pose a risk to birds or other wildlife. The knowledge gained through development of the ecological risk assessment guided successful clean up efforts. Phase 3: Two sandy islands were constructed as nesting sites for the thousands of terns, skimmers and plovers that visit the Bolsa Chica each spring and summer. Phase 4: The full tidal area was excavated with heavy construction machinery down to about sea level. Over 2.5 million cubic yards of sand and soil were eventually removed from the full tidal basin. The full tidal basin was flooded to about 5 feet of water to float a dredge that would do the final contouring of the basin. A perimeter levee was constructed to contain the water in the full tidal basin once it was open to the ocean. Three culverts were installed to supply the muted tidal wetland with water from the full tidal basin. To protect nearby residences from water intrusion, a 10,000 foot ground water barrier was employed. Phase 5: Dredging of the full tidal basin provided the final bottom contour. 72,000 tons of rock went into the construction of the two jetties to protect the ocean inlet. Phase 6: Of the sand removed from the full tidal basin, 1.3 million cubic yards were used to construct an ebb shoal to provide sand stability to nearby beaches.

Phase 7: A third nesting island was completed, bringing the new nesting sites to a total of 20 acres. Limited excavation of the 138 acre muted tidal area was carried out to insure adequate water circulation. Phase 8: In the early morning of August 24, 2006, the inlet was opened to allow tidal water to enter nearly 600 acres of Bolsa Chica. About 190,000 cubic yards of sand taken from the inlet were added to the nearby beach for sand replenishment (Amigos 2008; USFWS 2008). The Amigos de Bolsa Chica have provided off-site programs and guided tours of the Bolsa Chica Ecological Reserve for thousands and school children and adults (Amigos 2008).

## Project Outcomes



Eliminate existing threats to the ecosystem: Recovery evaluation and monitoring are ongoing. Factors limiting recovery of the ecosystem: The site is surrounded by various sources of potential degradation and contamination including urban roadways (including a state highway), housing, human recreation, oil and extraction facilities, and urban runoff draining into the Lowlands. All may result in contamination or physical disturbance of the plants, wildlife or their habitat on the site (USFWS 2008). Economic vitality and local livelihoods: The project was especially needed because more than 90% of Southern California's original coastal wetlands have been lost to development, making the remaining wetlands critical for migratory birds along the Pacific Flyway, wildlife and fish. These salt marshes served as nurseries for commercially and recreationally important fish including California halibut (USFWS 2008)

## Monitoring and Data Sharing



Does the project have a defined monitoring plan?:

NO

Open Access URL:

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## Long Term Management



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