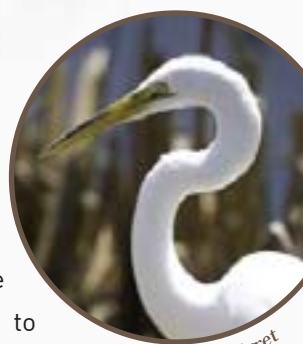




Restoring Wetland Environments

A Wetland Reconnected

THE BOLSA CHICA SALT MARSH near Huntington Beach, California was once a thriving estuarine refuge and wildlife habitat of more than 2,400 acres under full tidal influence from the Pacific Ocean. In 1900, the wetland's full tidal nature was essentially destroyed when the property was sold to the Bolsa Chica Gun Club and the site's natural ocean inlet was closed to improve duck hunting. The ensuing years saw the area used for agriculture, cattle grazing, military coastal artillery emplacements and oil production.



Snowy Egret

Continued on Page 2

MODEL MITIGATION: VPA'S PLUM POINT PARK

IN 2002, the Virginia Port Authority embarked on a \$280 million renovation project at Norfolk International Terminals on Norfolk's Elizabeth River. To help select a suitable site and get the project permitted, the VPA selected Moffatt & Nichol.

Because the project would incur environmental impacts, compensatory mitigation was required. Rather than simply obtain compensatory credits to support an established mitigation project area, the VPA wanted to undertake a project that would benefit the community and ecosystem surrounding the river. With the assistance of the

Elizabeth River Project—a local non-profit organization—and the City of Norfolk, the VPA selected Plum Point, an undeveloped 5-acre peninsula overlooking Norfolk Harbor. After years of neglect, the site was an eyesore with overgrown vegetation, an eroding shoreline, and a littered waterway awaiting transformation.

"So many mitigation projects go unseen by the general public because they are at the bottom of a river or fenced off in a rural area," says VPA Director of Environmental Affairs, Heather Mantz. "Our goal in developing a mitigation site in an

urban area was to provide public access to the waterfront where visitors can see firsthand the effects of wetlands and riparian habitats on the local ecosystem."

At first, regulatory agencies were hesitant to approve the Plum Point plan because it did not meet a traditional 1 to 1 mitigation compensation ratio. However, Moffatt & Nichol was able to facilitate regulatory approval for the Plum Point Park project by bringing the focus to bear on the overall environmental and socioeconomic benefits of a complete restoration of the upland, shoreline, surrounding



Photo courtesy of VPA

"...visitors can see firsthand the effects of wetlands and riparian habitats on the local ecosystem."

open water, and marsh.

In addition to guiding the project through environmental permitting, Moffatt & Nichol provided design and construction management for riprap shoreline protection including marsh toe reinforcement, debris clean-up, the removal of over 500 tons of timber piles and debris from the river bottom, and an acre of wetland plantings.

Today, residents and visitors enjoy Plum Point Park's landscaped bike trail and restored wetland marsh, which serve as a model for future mitigation sites that directly benefit affected communities. ■

Creating Viable Wetlands in the Chesapeake Bay

THREATENED BY RISING SEA LEVELS and commercial and residential development, the Chesapeake Bay watershed's naturally occurring wetlands shield waterways from unfiltered runoff, help control flooding, slow erosion, and provide essential habitat for native plants and animals. To ensure continued protection and habitat survival, Moffatt & Nichol—in collaboration with the Port of Baltimore, Maryland Environmental Services and the National Aquarium in Baltimore—has worked to establish about 20 acres of viable tidal wetlands in Maryland's Upper Chesapeake Bay, including the Fort McHenry Wetlands and the Swan Creek Tidal Wetlands.

Constructed in the mid-1980s, the 7-acre Fort McHenry Wetlands had become choked with silt and invasive plants, and littered with debris. Moffatt & Nichol designed a plan to regrade the site, remove invasive plant species, and construct inlets to promote the flow of water between the wetlands and the harbor. The restored wetlands not only provide habitat for

wildlife and help improve bay water quality, but also serve as a living laboratory for the National Aquarium to demonstrate the importance of wetland conservation.

South of Fort McHenry in Anne Arundel County, the Swan Creek Tidal Wetlands were created as mitigation for the Cox Creek Dredged Material Containment Facility. The Cox Creek project called for filling in sections of open water in the Patapsco River to create additional capacity for the storage of up to 6 million cubic yards of material dredged to maintain Baltimore Harbor's shipping channels. Moffatt & Nichol worked with the Port of Baltimore and Maryland Environmental Services to prepare a tidal wetlands design for the 12-acre site which included removing invasive plants and creating tidal inlets, creeks and ponds

to improve the flow of oxygen-rich water through the wetlands. The National Aquarium also contributed to the Swan Creek project by providing opportunities for community volunteers to plant the tidal wetlands with native grasses. ■



Swan Creek Tidal Wetlands

A Wetland Reconnected

...Continued from Page 1

IN 1973, the State of California acquired an initial 300 acres to be restored as an ecological reserve, and Moffatt & Nichol's involvement with the

Bolsa Chica wetlands restoration began as a member of the team that established a land use plan for the site at that time.

However, it would not be until 1997, in an atmosphere of growing public concern over coastal conservation, that restoration efforts began in earnest. After what had been many years of long-standing struggles between development and conservation interests, state and federal officials were able to generate an inter-agency agreement to establish a wetlands acquisition and restoration project within the Bolsa Chica Lowlands.

With state acquisition of an additional 880 acres, federal and state agencies entered into a memorandum of agreement with the Port of Los Angeles and Port of Long Beach to move forward with restoration of 600 acres as a mitigation project. The planning phase for what would be a \$147 million project was complete in 2001. Moffatt & Nichol provided final engineering services for the project and—when construction began in 2004—program management services as well. ■



Black-Necked Stilt



California Least Tern

involvement with the Bolsa Chica wetlands restoration began as a member of the team that established a land use plan for the site at that time.



Common Loon



Belding's Savannah Sparrow



Restoring San Francisco Bay's Tidal Marsh



PRIOR TO CALIFORNIA'S GOLD RUSH, Bair Island comprised thousands of acres of contiguous, pristine tidal salt marsh. Now dotted with abandoned commercial salt evaporator ponds, the island is part of the Don Edwards San Francisco Bay National Wildlife Refuge in Redwood City, the largest urban wildlife refuge in the United States. A haven for native shorebirds, oysters, and harbor seals, the area is also a popular resting spot for migratory waterfowl.

Much sought after by real estate developers, in response to public opposition the 2600-acre island was sold to the Peninsula Open Space Trust for conservation. In 2006, the U.S. Fish & Wildlife Service and California Department of Fish & Game selected Moffatt & Nichol to design the 1,400-acre restoration project and coordinate with stakeholders, a key issue in the project's success.

"So many groups have an interest in Bair Island, including area environmental groups, local governments, and the regulatory community," explains the U.S. Fish & Wildlife Service's Clyde Morris, who manages the refuge. "Although many of them are not always in agreement with each

other on what should be done with land around the San Francisco Bay Area, in this case, everyone's worked together to create a well-balanced project. We had a lot of stakeholders to please, and I think we've accomplished that, and the work that Moffatt & Nichol did was essential to making it happen."

Work has begun on the first of the project's four phases, which will elevate sections of the inner island that have subsided over time and improve safety at the adjacent San Carlos Airport: when the site is filled, waterfowl that had moved inland will return to the natural shoreline, thus reducing bird strike hazards at the airport. About one million cubic yards of fill material is needed, with much coming from the Port of Redwood City federal navigation channel at no cost to the refuge.

"Restoration projects such as these present unique challenges in that they are multidisciplinary, requiring expertise in hydrodynamics, structures, public access, regulatory issues, and constructability. They truly utilize both the creative and practical sides of Moffatt & Nichol," observes Moffatt & Nichol's Dilip Trivedi, Dr. Eng., P.E., project manager for the Bair Island project.

Future phases will include levee breaches, hydraulic control structures, a pedestrian bridge, wildlife viewing platforms, and parking and restroom facilities. ■

"A haven for native shorebirds, oysters, and harbor seals..."

NEW VISIONS for Northwest Estuary

IN 1911, when architects Walter Wilder and Harry White envisioned a reflecting pool for the Washington State Capitol Building in the heart of Olympia, they could not have foreseen that the vision instead would create controversy. In 1951, the Deschutes River mouth was dammed creating Capitol Lake and its reflecting pool, while blocking tidal action from the Puget Sound and spawning a shallow reservoir with a growing list of environmental problems.

CAPITOL LAKE'S lovely views and recreational properties endear it to many Olympia residents. However, it has become increasingly unsustainable in its current configuration. The dam hinders migrating and spawning salmon, and nitrogen and phosphorous buildup

in the lake causes algal blooms that rob the salmon of oxygen. The shallow lake is filling with sediment and invasive weeds.

To address these issues, the Washington State Department of General Administration is developing a plan, the Capitol Lake Adaptive Management Plan, and the CLAMP steering committee has been charged with evaluating all alternatives for the lake's future, including the possibility of restoring tidal action to the estuary.

Moffatt & Nichol is actively working with the Washington Department of Fish and Wildlife, the firm's client and a member of the CLAMP steering committee, to determine whether a viable estuary can be restored without damaging Olympia's urban infrastructure—and at reasonable cost.

"The project is interesting because it involves a major restoration right in the middle of a heavily used downtown area; it will have major benefits to the wildlife but will also dramatically change the cityscape," says Moffatt & Nichol's Susan Tonkin, Ph.D., project manager for the study.

To address potentially conflicting issues, Moffatt & Nichol explored a number of project alternatives. Common to all alternatives is a new bridge at the estuary mouth, with a 500-foot span to allow free tidal flow. A second common element is a channel pre-dredging project that will decrease future maintenance dredging at the Port of Olympia, an otherwise potentially costly and disruptive endeavor.

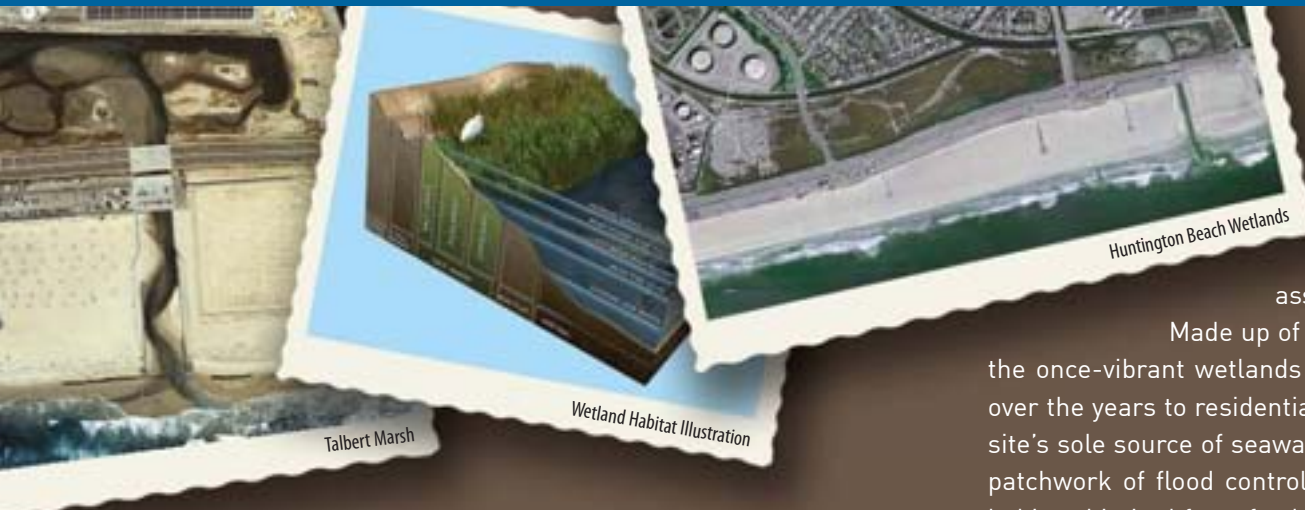
Dr. Tonkin finds one approach particularly interesting—one that would include a split basin design, similar to Wilder and White's original vision that provides a reflecting pool to the east and a free flowing estuary to the west.

"This alternative recognizes the value of a reflecting pool for the State Capitol while reconnecting the Deschutes River with Budd Inlet," comments Tonkin.

The CLAMP steering committee is scheduled to make recommendations on the Deschutes River's future in June, 2008. ■



Capital Lake



Talbert Marsh

Wetland Habitat Illustration

Huntington Beach Wetlands

A Relic Marshland on the Road to Recovery

CALIFORNIA'S HUNTINGTON BEACH WETLANDS represent one of few remaining opportunities to undo the damage of past industry and reconnect one of the state's rare relic marsh plains with the Pacific Ocean. The not-for-profit Huntington Beach Wetlands Conservancy embraced the undertaking in 1985 and, over 22 years, acquired land and \$7.5 million of a projected \$10 million needed for the project.

Aware of Moffatt & Nichol's successes at the Batiquitos Lagoon to the south and the Bolsa Chica Wetlands to the north, the conservancy recently contracted with the firm to begin phased restoration targeting 130 acres of the 188 acres that remain of the 2,900-acre historic Santa Ana River estuary.

"This project is especially interesting because we are rehabilitating a large area of former wetlands in an urban setting. We are building on the 25-acre restoration of the adjacent Talbert Marsh," comments Moffatt & Nichol's Robert Sloop, P.E., assistant project manager for the restoration.

Made up of salt marsh, seasonal ponds, and coastal dunes, the once-vibrant wetlands at the mouth of the Santa Ana River gave way over the years to residential, agricultural, and industrial development. The site's sole source of seawater filled with sand, trapped from tidal flow by a patchwork of flood control levees and channels, leaving a thirsty coastal habitat. Limited from further development by the California Coastal Act of 1972, the site today stands alone, flanked by upscale residential tracts.

The project will restore fish and wildlife habitats, improve flood control and water quality, and provide controlled public access. Phased over three years to accommodate the breeding seasons of native birds, construction will move about 129,000 cubic yards of sandy sediment from the Talbert Marsh and Ocean Channel.

"The critical issue in the restoration plan is the distribution of various types of habitat to establish a viable wetland ecosystem," explains Sloop. "The different habitat zones are separated by elevation and tidal inundation, so we performed detailed hydraulic modeling with varying grading plans to create the proper mix of subtidal, mudflat, salt marsh cord grass, pickleweed, salt grass, salt panne, and upland areas. We also proposed a staged construction scheme to provide the existing endangered species a place of refuge during the construction."

In compliance with the California Environmental Quality Act, documentation and permits are now under public review, and construction is anticipated to begin by 2008. ■

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