

The Napa-Sonoma Marshes: Then and now



The interior of pond 2A in fall 1998. When water and sediment circulated with the tide cycles through the pond for the first time in over 40 years, the high elevation pond bottom went from a relatively sterile environment to one teeming with many forms of aquatic and terrestrial vegetation.

By Tom Huffman

Several thousand years ago a charm stone shaped by the early Miwok people was mislaid or perhaps placed in a burial site in what was once a 94-square mile expanse of marshland north of San Pablo Bay. Just 25 miles north of what would become San Francisco, that carved stone remained buried in the rich bay mud, a witness to the generations of tule elk, pronghorn antelope and grizzly bear that inhabited the area prior to the 1840s. In the early 1850s Chinese work crews began building some of the first levees in the marsh. Perhaps the charm stone was included with some of the mud hand-dredged by the Chinese. Or maybe it was placed on the same levee in the early 1950s by a mechanical dredge converting the area from agricultural grain production into shallow solar evaporative ponds for the salt industry. While walking along a pond edge in 1996, I found that charm stone at the base of an eroded levee. It was now on the eastern edge of pond 1A, a portion of the Napa River Unit of the Napa-Sonoma Marshes Wildlife Area (NSMWA).

The southern portion of NSMWA is part of a delta formed by the Napa River and Sonoma and Tolay creeks. The

northern edge of the marsh is a rich alluvial valley that follows these watercourses into the present day cities of Napa and Sonoma. The Wildlife Conservation Board first put together the NSMWA in the 1970s with the acquisition of parcels of the Huichica Creek Unit, and it continued to grow with the purchase of Camp 2 in 1998. This brings the NSMWA to over 13,000 acres in a 48,000-acre complex of tidal and seasonally flooded wetlands, sloughs, rivers, salt ponds, and diked agricultural fields.

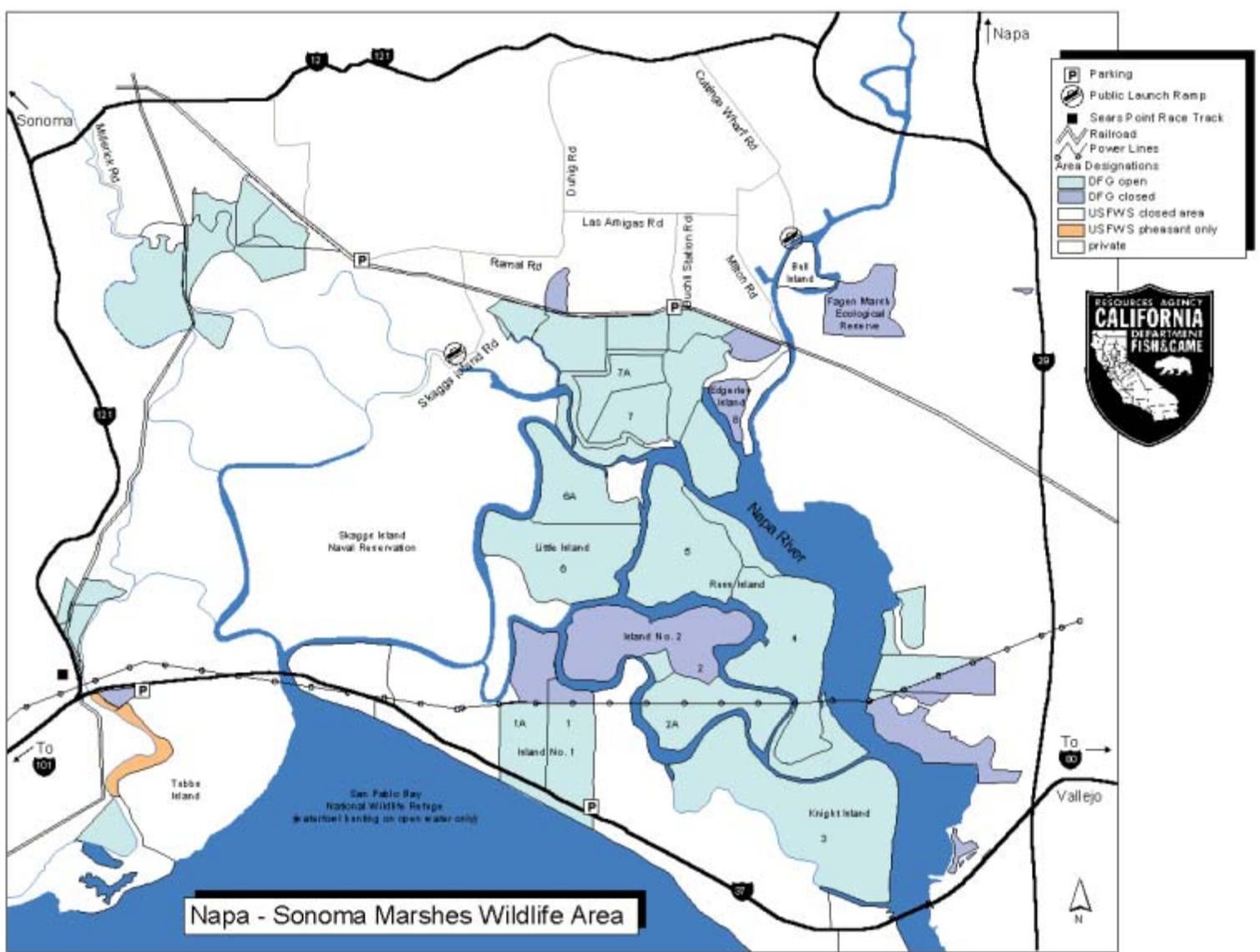
Early agriculture north of San Pablo Bay included oats, barley, wheat, wine grapes, prunes and cherries. Beginning in the 1970s through 1980s much of land once occupied by hay and dairy operations gradually shifted to wine grapes. The microclimate of the area, tempered by the cool bay winds, approximates that of the region of Burgundy in France. The shallow, dense clay soils of the area produce excellent Chardonnay and Pinot noir grapes of notable quality.

Literally a stone's throw from the southern edge of these grape vineyards are found the annual and perennial grasslands. These uplands begin a series of habitats that transition with the decreasing elevation to seasonal



DFG photos by Tom Huffman

Ken Border of DFG holds a striped bass caught in pond 1.



wetlands to brackish and tidal salt marsh to intertidal mudflat and ultimately to open water. Each habitat is distinct. The native perennial bunchgrasses of the uplands provide habitat for the western meadowlark and savannah sparrow, nesting cover for the mallard and gadwall as well as a foraging area for northern harriers and black-shouldered kites. At a much lower elevation, the intertidal mudflats provide migratory staging areas for wintering shorebirds such as western sandpipers and dowitchers. They feed on a rich fauna including isopods, insects, bivalves and polychaete worms. When higher tide conditions cause these feeding grounds to become inundated, other shorebirds such as willets and godwits are often found in the pickleweed, salt grass, rushes and sedges that grow in areas of high marsh or accreted berms. These areas are also preferred refuge for the endangered salt marsh harvest mouse and California clapper rail.



Above, a waterfowl hunter scans a seasonal pond for a place to set decoys.



Right, pheasants responded to upland habitat improvements in the Huichica Creek Unit.

DFG photos by Tom Huffman

Over 128 species of birds have been identified in the marsh including over 20 species of waterfowl. Historically, migrating ducks have wintered in the open water areas of San Pablo Bay and on some of the larger salt ponds. Today, large groups of canvasback, scaup and redhead are often seen using the salt ponds adjacent to State Highway 37. The more isolated sloughs and marshes are still used as breeding areas for resident puddle ducks and Canada geese. The late Napa County native, Stewart Duhig, was a descendant of one of the first families to actively farm the area. In fact, his family name identifies the road on which the current marsh field office is located. During his lifetime, Duhig recounted stories of his father's childhood in the marsh around the mid-1800s. On springtime walks through the shoulder-high grasses, the boy would have to be careful "not to step on any of the myriad of baby ducks and geese rising from their breeding grounds."

Until 1915, the bay shrimp fishery flourished in the nearby waters of San Pablo Bay and many Chinese shrimp "camps" were set up in the area. Back then, the lower section of the Napa River was an important nursery area for juvenile steelhead as well as a favorite location for striped bass fishing. Today, the waters of the Napa-Sonoma Marshes provide habitat for 25 species of fish including starry flounder, white and green sturgeon and the endangered delta smelt.

Over 7,000 acres of the wildlife area are comprised of the former system of salt evaporative ponds also known as "concentrators." This site was originally selected by the salt industry to maximize the natural evaporation caused by the prevailing wind conditions. These ponds produced concentrated brine which was solar dried to make industrial grade salt through the 1980s. In 1994, the ponds were acquired from Cargill Salt by the Wildlife Conservation Board for the Department of Fish and Game (DFG). With the acquisition came a daunting management and restoration task. A total of 12 ponds ranging in size from 135 to 1,320 acres contain water with salinities that range from bay salinity (10 to 30 parts per thousand [ppt] sodium chloride) to hypersaline (120 to 250 ppt). A basic rule of thumb is that animal, plant and fish distribution and abundance decreases as salinity



DFG photos by Tom Huffman

A school group led by Americorps plant oaks along Huichica Creek.



Pond 2A breach on South Slough releasing impounded flood waters that threatened adjoining salt ponds.

increases. Salt ponds with low-to-mid-range salinity contain fish such as striped bass, sculpins, stickleback and killfish. White pelicans and Caspian and Forster terns also frequent these ponds. The higher salinity ponds contain invertebrates including brine shrimp, water boatmen and brine flies, and the plant life is limited to widgeon grass and green algae. Eared grebes, sandpipers and avocets utilize these high salinity habitats. It has been found that water depth can be as important as salinity for determining shorebird and waterfowl usage of these sites.

The water depth impounded in the salt ponds was critically high during the floods of January 1995. Heavy rains and accompanying strong winds threatened the area with uncontrolled levee breaches which could have potentially dumped millions of gallons of hypersaline water into the Napa River and adjoining slough network. It was determined that the 550-acre pond 2A could be isolated from the rest of the salt pond system and used as a tidal mixing "bowl," draining adjacent hypersaline ponds to lower water levels with the tidal cycles. Under an emergency permit obtained from the Army Corps of Engineers, a levee site was selected that would maximize water circulation within the pond.

Bob Synder, a fisheries and explosives expert from DFG's Central Coast Region, supervised the levee breach. Water and sediment from South Slough then began to circulate with the tide cycles through the pond for the first time in over 40 years with spectacular results. Within one year, the high elevation pond bottom went from a relatively sterile environment with little plant diversity to one teaming with many forms of aquatic and terrestrial vegetation. Shorebirds and waterfowl began to frequent the pond with the tidal cycles as well as many fish species. A biological monitoring program was developed to document changes in sediment deposition, vegetation development and bird and fish usage, and it is ongoing.

Encouraged by the results at pond 2A, the Napa-Sonoma Marshes Restoration Group was established in 1996 with the assistance of the California Coastal Conservancy. Members of this board-based group include representatives from the DFG, Environmental Protection Agency, United States Fish and Wildlife Service, United States Geologic Survey, San Francisco Estuary Institute,



Rabbit's-foot grass established on a berm in the center of pond 2A less than two years after the original breach.



DFG photos by Tom Huffman

A killdeer on a nest on the edge of a service road in the Huichica Creek Unit.

hydrologists from the University of California at Davis and staff from the Napa and Southern Sonoma County Resource Conservation districts. The basic task of this group is to better understand the hydrology, water quality and ecology of the salt ponds to improve future restoration projects in the marsh.

Currently, a management plan is being prepared for the wildlife area. The primary focus will be the restoration, enhancement and development of the wetlands. A diverse ecosystem of tidal salt and brackish marshes, managed salt marshes and ponds with some fresh water and seasonal wetland components is the final objective.

With over 82 percent of the original tidal wetlands of the San Francisco Bay system now gone, the marsh will never look the same as it did when that early Miwok charm stone was lost to the thick bay mud many generations ago. However, the success with the ongoing pond 2A restoration leads the managers

of the NSMWA to believe we're on the right track. Area information:

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H.Q. telephone (707) 226-3641
Central Coast Regional Office (707) 944-5500*

Most of the wildlife area is currently accessible only by boat. From Highway 37, a large sign directs visitors to the edge of one of the ponds where parking is available. Regulations governing public uses, including hunting, can be found in the DFG publication *Hunting and Other Public Uses on State and Federal Areas* which is available at license agents, DFG offices, and the DFG website.

It is anticipated that land access facilities and interpretive programs will be developed in time with completion of the management plan.

Tom Huffman is a fish and wildlife assistant currently serving as on-site manager of the NSMWA.