SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
50 California Street • Suite 2600 • San Francisco, California 94111 • (415) 352-3600 • FAX: (415) 352-3606 • www.bcdc.ca.gov

May 24, 2006

TO: San Francisco Bay Area Water Trail Steering Committee

FROM: Sara Polgar, Water Trail Project Manager (415/352-3645 **sarap@bcdc.ca.gov**)

SUBJECT: Background Report on Wildlife, Habitat and Water Quality Issues
(For Committee consideration on June 6, 2006)

Introduction

The Water Trail Steering Committee will address wildlife, habitat and water quality issues in its upcoming meeting (on June 6, 2006). A primary goal for this meeting will be to develop a common understanding of these potential issues and how they may affect water trail development. Additionally, Committee will be asked to discuss and come to agreement on principles that provide a structured approach to wildlife, habitat and water quality issues for the water trail plan. The principles will set the stage for the following meeting when the Committee will develop detailed management strategies.

In preparation for the discussions, staff compiled background information on the issues from literature reviews and interviews with scientific experts, resource managers and other stakeholders.[1] The report is divided into four sections; the first two review the potential impacts and circumstances where and when impacts might occur in the Bay. The third section describes the existing management framework of applicable regulations, policies and jurisdictions regarding environmental protection. The final section synthesizes key conclusions from the background information and proposes a set of principles for the Committee to discuss. Staff recommends that the Committee review, revise and adopt these principles.

[1] The report was also reviewed by scientific experts, some of whom will be attending the June 6th meeting to present about wildlife, habitat and environmental quality issues, answer questions and participate in the discussions.

Background

Non-motorized small boating (NMSB) offers opportunities to enjoy the natural, scenic and historic resources of San Francisco Bay (the Bay) in a manner that is generally compatible with sustaining these resources. Compared with other types of recreation on the Bay, human-powered boating activities are usually lower impact; they require fewer land-side amenities and are less intrusive on the water (e.g. quieter, slower speeds, no wakes, no air/water emissions). For many outdoor enthusiasts, this low-impact factor is a primary motivation for participating in NMSB activities. Despite these favorable attributes, human powered boating and sail boarding can have adverse impacts on Bay resources, and addressing these issues creates unique challenges for resource and land managers.

The Bay has more than 130 access points for launching NMSBs, and participation in these activities in the Bay is growing. The San Francisco Bay Water Trail planning process is a unique effort to comprehensively address the suite of issues related to NMSB activities in the Bay. The product of this effort, the Water Trail Plan, will guide trail implementation and be a resource to many agencies and organizations. Where existing access sites are brought under the umbrella of water trail management, they could provide improved access for NMSB users as well as better and consistent education, outreach and management programs. This comprehensive planning approach is especially valuable for addressing safety and wildlife, habitat and water quality concerns about NMSB activities in the Bay.

Wildlife, Habitat and Water Quality Issues

This section describes potential adverse wildlife, habitat and water quality impacts related to NMSB activities. The impacts discussed here were identified by the Steering Committee, the public and resource experts, and addressed in the scientific literature. They are not uniquely trail-related – a wide variety of human activities can have similar effects in the Bay – and the discussion is not exhaustive.

Wildlife. Potential public access effects on wildlife have been well-reviewed as part of two Bay-related projects: the Public Access and Wildlife Compatibility (PAWC) Policy Development Project led by BCDC, and the South Bay Salt Ponds Restoration (Restoration) Project. For this section of the background report, staff drew primarily from the PAWC staff report[2] and the Restoration Project *Science Synthesis for Issue 9*[3] *(Science Synthesis)* as well as recent literature published since these two documents were published.

Both the PAWC report and the *Science Synthesis* broadly categorize recreation activities that affect wildlife as consumptive or non-consumptive. Water trail activities (as envisioned by the Steering Committee) fall into the latter group. The PAWC report notes that:

---

[2] San Francisco Bay Conservation and Development Commission (BCDC). 2001. *Staff Report: Public Access and Wildlife Compatibility*. BCDC, San Francisco, CA.

[3] Trulio, L. 2005. Science Synthesis for Issue 9: Understanding the Effects of Public Access and Recreation on Wildlife and their Habitats in the Restoration Project Area. South Bay Salt Ponds Restoration Project. Retrieved April 20, 2006 from http://www.southbayrestoration.org/Science.html.

> Although adverse effects from non-consumptive activities have traditionally been considered harmless to wildlife, this point of view has been changing.[4] Boyle and Samson[5] reviewed 166 articles on the effects of non-consumptive recreational uses on wildlife and found that the majority of the articles reported negative effects on wildlife from non-consumptive recreational uses.

Impacts of non-consumptive activities can be short-term (such as alarm calling) or long-term (such as decreased reproduction), and direct or indirect. Potential direct effects are "behavioral changes, especially increased flight and decreased foraging time, physiological changes due to stress, changes in reproductive productivity, and death."[6] Activities that destroy habitat through vegetation trampling, spread of invasive species and conversion of habitat for recreation-related facilities, can indirectly affect wildlife populations.

Based on a conceptual framework for wildlife response to recreation activities developed by Knight and Cole[7], disturbances that elicit behavior change are the most visible adverse impacts to wildlife due to water trail users. Specific effects depend on the situation – the type of boating activity and behavior of boaters, the location and weather conditions, the timing (seasonally and daily), the frequency and magnitude of disturbances, and the characteristics of the wildlife such as species, group size, age and sex.

Generally, behavioral responses to disturbance fall under three categories: attraction, avoidance and habituation. "Attraction behavior is associated with interactions with humans that result in rewards (i.e., food)."[8] These responses can be directly harmful to humans and wildlife, causing injuries or deaths, or lead to dependence on humans for food, potentially affecting wildlife survival in the absence of humans. Interactions that "result in pain or penalty for the wildlife" are associated with avoidance behavior because they elicit "panic-type avoidance responses as a result of abrupt, fearful or unexpected intrusion."[9] Changes to resting, foraging and nesting behaviors are potential results of avoidance responses. In the presence of repeated, non-threatening (and non-attracting) human activities, wildlife may become habituated, reacting less to activities that previously elicited a disturbance response. Habituation can make wildlife more susceptible to harmful activities and result in injuries or deaths (e.g. vessel strikes, poaching). Habituation responses vary among species and individuals in a population.[10]

---

[4] Cited in the quotation: Flather, C.H. and H.K. Cordell. 1995. Outdoor Recreation: Historical and Anticipated Trends, *in* R. Knight and K. Gutzwiller (Eds.), *Wildlife and Recreationists: Coexistence through Management and Research.* Island Press, Washington D.C.

[5] Cited in the quotation: Boyle, S.A. and F.B. Samson. 1985. Effects of nonconsumptive recreation on wildlife: A review. *Wildl. Soc. Bull.* 13:110-116.

[6] Trulio, 2005.

[7] Knight, R.L. and D.N. Cole. 1995 Wildlife Responses to Recreationists. Pp. 51-69 *in* R. Knight and K. Gutzwiller (Eds.), *Wildlife and Recreationists: Coexistence through Management and Research.* Island Press, Washington D.C. Causes of recreation impacts to wildlife include harvest, habitat modification, pollution and disturbance.

[8] Quoted from BCDC, 2001. Original source for the three categories of behavioral response: Knight, R.L. and S. Temple. 1995. Origin of Wildlife Responses to Recreationists, *in* R.Knight and K. Gutzwiller (Eds.), *Wildlife and Recreationists: Coexistence through Management and Research.* Island Press, Washington D.C.

[9] Knight and Temple, 1995; and Olliff, T.K. Legg and B. Kaeding (Eds.). 1999. *Effects of Winter Recreation on Wildlife of the Greater Yellowstone Area: A Literature Review and Assessment.* Report to the Greater Yellowstone Coordinating Committee. Yellowstone National Park, Wyoming.

[10] Olliff and Kaeding, 1999.

Based on literature reviews and feedback from the Steering Committee, members of the public and wildlife experts, staff identified three groups of Bay wildlife that are of primary concern due to potentially adverse impacts from NMSB activities: harbor seals, Bay-related birds, and certain special status species.

Harbor seals. The concern for harbor seals (*Phoca vitulina richardsi*) with respect to NMSB activities is potential disturbance at haul out sites – locations around the Bay where the seals rest and breed on shore. In general, behavioral responses due to disturbance at a haul out site are types of avoidance: increased alertness or vigilance (head alerts), seals moving from their resting spots towards the water and seals flushing into the water.[11] Calambokidis et al. identify various effects of disturbance reported in the literature:

1) change in behavior at site by altering haul-out times, 2) abandonment of preferred haul-out areas, 3) mother-pup separation during bond formation, 4) interruption of nursing, 5) increased stress during the molt, 6) potential stress during other seasons (e.g. mating), and 7) interruption of rest resulting in lower fitness and health.[12]

In studies of disturbances at haul outs reported in the literature, frequencies of flushing and disturbance distances from haul out sites for kayaks and canoes are comparable to or even greater than those observed for powered vessels.[13] Paddle boaters tend to travel closer to shore and in groups (though each group is treated as one boat in the reviewed disturbance studies) potentially increasing the likelihood of disturbances. Furthermore, the capability to approach very quietly allows kayakers to get quite close to a haul out before detection, possibly eliciting a "higher startle response" in the seals.[14] A recently completed monitoring study of three major San Francisco Bay haul outs supports these findings; at two of sites, kayaks caused 15% and 20% of watercraft-related disturbances and usually approached closer to the haul outs. [15]

---

[11] Suryan, R.M. and J.T. Harvey. 1998. Variability in reactions of Pacific harbor seals *Phoca vitulina richardsi*, to disturbance. *Fish. Bull.* 97:332-339.

[12] Calambokidis, J., G.H. Steiger, J.R. Evans and S.J. Jeffries. 1991. Censuses and disturbance of harbor seals at Woodard Bay and recommendations for protection. Final report to Washington Department of Natural Resources, Olympia WA. 45p.

[13] Suryan and Harvey, 1998 observed kayaks causing seals to flush at sites in the northern San Juan Islands 55% of the times when they approached within 1km of a haul out site (compared to 9% for powerboats).
Calambokidis et al, 1991. reported that kayaks flushed harbor seals into the water as far as 300m from the haul out site, however reported mean distances for kayak disturbances ranged from 84m to 130m.
See also: Allen, S.G., D.G. Ainley, G.W. Page and C.A. Ribic. 1984. The effect of disturbance on harbor seal haul out pattern at Bolinas Lagoon, California. *U.S. Fish. Bull.* 82:493-500; and
Lelli, B. and D.E. Harris. 2001. Human disturbances affect harbor seal haul-out behavior: Can the law protect these seals from boaters? *Macalester Env. Rev.* Retrieved April 20, 2006 from http://www.macalester.edu/environmentalstudies/MacEnvReview/index.htm; and Calambokidis J., G.H. Steiger and L.E. Healey. 1983. Behavior of harbor seals and their reaction to vessels in Glacier Bay, Alaska (Abstract). *5th Biennial Conference on the Biology of Marine Mammals*, Boston, MA.

[14] Borhorquez, A.S., M.J. Galloway, D.E. Green, E.K. Grigg, S.G. Allen and H. Markowitz. 2000. Differential Response of Pacific Harbor Seals (*Phoca vitulina richardsi*) Towards Kayaks Compared to Other Watercraft. Animal Behavior Society Confrerence, Georgia, August 5-10, 2000. Abstract.

[15] Allen, S.A., H. Markowitz, D. Green, E. Grigg. 2006. Monitoring the Potential Impact of the Seismic Retrofit Construction Activities at the Richmond San Rafael Bridge on Harbor Seals *(Phoca vitulina):* May 1, 1998 – September 15, 2005. Richmond Bridge Harbor Seal Survey.
Borhorquez et al. 2000. concluded from the first portion of the Richmond Bridge Harbor Seal Survey monitoring that "A higher proportion of kayaks elicit a disturbance response from the seals than all other types of watercraft within 200m of the haul-out sites. Kayaks within 200m also caused a higher proportion of flushes."

Censuses from the past two decades of the Bay harbor seals indicate that the population is stable in contrast to the steadily increasing coastal population. Higher rates of disturbance in the Bay that discourage seals from using the Bay may contribute to the different population trend.[16] In the Bay, suitable sites for haul out are limited by shoreline morphology, preferences of harbor seals for secluded, non-urbanized locations that are near prey sources. Repeated disturbances to haul out sites can lead harbor seals to abandon existing suitable locations. Disturbances (from a landside trail) appear to have caused seals to abandon a haul out at Strawberry Spit in Richardson Bay, and efforts to buffer the site from disturbances have failed to attract seals back.[17]

Studies of impacts suggest that watercraft are less likely to disturb harbor seals if they (1) do not get too close to a haul out site, (2) make a parallel (as opposed to a head-on) approach to seals, (3) travel at constant, slow speed and avoid erratic behavior and noises. Suitable approach distances are context dependent. For example, seals are more sensitive to disturbance during molting and breeding seasons (mid-March through July)[18]; a seasonal 'no-entry' buffer zone around a primary haul out site may be appropriate to prevent significant adverse impacts to the Bay population.

Birds. Disturbances of Bay-related birds (birds) due to water trail-related activities are a concern. These disturbances might negatively affect survival and fecundity causing bird populations to decline. Flushing (taking flight away from the area of disturbance) or diving responses to disturbance can cause abandonment of and increased predation on nests, decreased foraging time, higher energy expenditures, and avoidance or abandonment of suitable habitat areas.

"Researchers agree that breeding birds are very sensitive to human disturbance, whether the disturbance is from trail use, boats, or research."[19] When breeding birds are disturbed, their responses can result in nest abandonment and reproduction failure of the adults. Colonial breeding birds (such as terns) are "particularly susceptible to boating disturbances" because of their high-density nesting patterns.[20] Specific behavioral and population-level responses to disturbances depend on the location, species, disturbance source, habituation of the individuals and colony type.[21]

For non-breeding birds, sufficient resting and foraging times are important factors in their survival. Frequent human disturbances that flush non-breeding birds can decrease their energy stores by increasing locomotion time and reducing foraging and resting times leading to poorer fitness (e.g. for migration) and lower survival rates. For example, studies of two waterfowl species found that when undisturbed (beyond natural disturbances), they spent 73-85% of daylight hours resting or foraging and only 6-11% in locomotion behavior (i.e.

---

[16] Lidicker, Jr., W.Z. and D.G. Ainley. 2000. "Harbor Seal," *in* Goals Project. (2000) Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish and wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, (Ed.). San Francisco Bay Regional Water Quality Control Board, Oakland, CA. Pp.243-246.
[17] Lidicker and Ainley, 2000.
[18] Allen et al. 2006.
[19] Trulio, 2005.
[20] Trulio, 2005.
[21] Pers. Comm. J. Evans, Avocet Research, October, 24, 2005; and Trulio, 2005.

flying or swimming without the purpose of feeding or breeding).[22] Repeated disturbances can also cause birds to abandon foraging or rafting areas, or change feeding patterns (e.g. forage nocturnally instead of during the day).[23] The degree of sensitivity and impacts are very context-dependent. For example, certain species, including canvasback and surf scoter, appear to be especially sensitive to disturbance.[24] The *Science Synthesis* notes:

> Studies show that bird responses vary based on a number of factors, such as proximity of approach, directness of approach, species, time of year, habituation, location, speed of movement, and type of recreational activity. In general the faster and louder the approach, the sooner birds will flush and the larger the waterbird the sooner it will flush.

Additionally, direct approaches to birds are much more likely to cause disturbance responses than tangential approaches.

The essential role of the Bay in supporting Pacific Flyway migratory bird populations as well as ongoing tidal marsh habitat restoration efforts and water transportation development in the Bay provide the context for concern about potential disturbance effects due to NMSB activities. "Overall, San Francisco Bay holds higher proportions of the region's total wintering and migrating shorebirds than any other coastal wetland within the U.S. Pacific Coast wetland system."[25] Wintering waterfowl counts (1985-1998) indicate that the Bay and Delta support about 3%-25% of waterfowl in California, and nearly half of the scaup and scoter duck populations of the Pacific Flyway spend the winter in the Bay.[26] Large salt pond restoration efforts in the Bay create uncertainty about short and long-term habitat availability for some migratory species.[27] For example, some diving duck species

---

[22] Green, A.J., A.D. Fox, B. Hughes, G.M. Hilton. March 1999. Time-activity budgets and site selection of White-headed Ducks *Oxyura leucocphala* at Burdur Lake, Turkey in late winter. *Bird Study*, 46: 1, pp. 62-73; and Rave, D.P. and C.L. Cordes. 1993. Time-activity budget of northern pintails using nonhunted rice fields in southwest Louisiana. *Journal of Field Ornithology.* 64: 2, pp. 211-218.

[23] Takekawa, J.Y. and C.M. Marn. "Canvasback" *in* Goals Project. 2000. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish and wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, (Ed.). San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

[24] Miles, K.A. "Surf Scoter," and Takekawa, J.Y. and C.M. Marn. "Canvasback, " *in Goals Project 2000.*

[25] Hickey, C., G.W. Page, W.D. Shuford and S. Warnock. 2003. Southern Pacific Shorebird Plan: A Strategy for Supporting California's Central Valley and Coastal Shorebird Populations. PRBO Conservation Science, Wetlands Division, Stinson Beach, CA, p.25.

[26] Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, CA/S.F. Bay Regional Water Quality Control Board, Oakland, CA, p.37, Figure 2.16.

[27] Warnock, N., G.W. Page, T.D. Ruhlen, N. Nur, J.Y. Takekawa and J.T. Hanson. 2002. Management and Conservation of San Francisco Bay Salt Ponds: Effects of Pond Salinity, Area, Tide and Season on Pacific Flyway Waterbirds.

such as canvasback and ruddy ducks favor shallow salt ponds for foraging and rafting, and conversion of these ponds (as part of restoration efforts) to tidal marsh may decrease available habitat for these species.[28] Furthermore, a variety of proposed cross-Bay ferry service expansions may lead to increased disturbances of roosting, rafting and foraging waterfowl, and diminish suitability of open water habitat around ferry routes for birds. [29]

Few studies of NMSB disturbance of birds have been conducted in the Bay Area.[30] In a study at Aquatic Park in Berkeley, researchers conducted six disturbance trials in kayaks to measure response characteristics of the wading shorebirds, diving and dabbling ducks and gulls that roost and forage in the lagoon. Consistent with the literature on disturbance, larger shorebird species flushed farther from disturbance sources than did smaller species. Additionally, larger flocks of diving ducks flushed more readily than smaller ones, and despite the high ambient disturbances at the lagoon (e.g. road traffic, passing trains, etc), birds remained "sensitive (rather than habituating) to direct disturbance."[31] The study highlights the context-dependence of disturbance responses and impacts. For example, timing is especially important; birds were more sensitive to disturbance (i.e. flushed more readily) during migratory periods (just after arrival to an area or before leaving for the season). Preliminary results from a similar ongoing study at the Berkeley North Basin (to be completed in 2007) also suggest that disturbance responses in the Bay strongly depend on the characteristics of the location, seasons, species, flock size and other factors.[32]

Special Status Species. The Bay is home to a variety of wildlife species listed under the Federal and California Endangered Species Acts. A subset of these (Table 1) may be directly or indirectly affected by water trail-related activities.

For the clapper rail, black rail, the Western snowy plover and the California least tern, disturbance during breeding season may lead to nest abandonment and breeding failures. The draft Western Snowy Plover Recovery Plan specifically identifies human disturbance of breeding and wintering habitat as one factor currently limiting species recovery.[33] The Salt Marsh Harvest Mouse is indirectly susceptible to water trail-related activities that result in destruction of pickleweed habitat (e.g. through trampling by boaters at launch sites and marshes where boaters may spontaneously stop).

---

[28] Takekawa, J.Y. and C.M. Marn. "Canvasback,"; and Miles, A.K. 2000. "Ruddy Duck," and Casazza, M.L. and M.R. Miller. 2000. "Northern Pintail," *in* Goals Project. 2000.
Hickey et al. 2003, p. 29-30, describe similar preferential forage in salt ponds among shorebird species such as Black-Necked Stilts and Red Phalaropes.

[29] San Francisco Bay Area Water Transit Authority. 2003. Final Program Environmental Impact Report: Expansion of Ferry Transit Service in the San Francisco Bay Area. San Francisco California, p. 3.5-39.

[30] I learned of only three studies of watercraft-related disturbance on birds in the Bay: the Aquatic Park study (discussed in the text), an in-progress study at the North Basin in Berkeley conducted by Jules Evens, and a Water Transit Authority study (conducted by U.S. Geologic Survey) of disturbance responses in rafting birds to ferry traffic on the Bay. This last study is on-going with one more full winter of data collection left.

[31] Avocet Research Associates. 2005. Aquatic Park, Berkeley, California: Waterbird Population and Disturbance Response Study 2004. Point Reyes Station, CA, p.29.

[32] J. Evans, Avocet Research. October, 24, 2005. Pers. Comm.

[33] U.S. Fish and Wildlife Service. 2001. Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. Portland, Oregon, pp. v, 30.

Table 1. Endangered and threatened species that might be adversely affected by water trail-related activities.

Species	Listing	Habitat
California Clapper Rail (*Rallus longirostris obsoletus*)	Endangered (Federal and CA)	Tidal salt marshes with pickleweed and native cordgrass (nesting and wintering)
California Black Rail (*Laterallus jamaicensis coturniculus*)	Threatened (CA)	Tidal salt marshes where pickleweed is the primary vegetation. Fresh water and brackish marshes at low elevations.
Western Snowy Plover (*Charadrius alexandrinus*)	Threatened (Federal)	Sandy beach along Bay and salt ponds (nesting)
California Least Tern (*Sterna antillarum browni*)	Endangered (Federal and CA)	Bare, sparsely vegetated flat beaches or alkali flats (nesting)
Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*)	Endangered (Federal and CA)	Salt marsh habitat with primarily pickleweed vegetation

In addition to listed species some Bay species are "Species of Special Concern". According to the California Department of Fish and Game (CDFG), this status "applies to animals not listed under the federal Endangered Species Act or the California Endangered Species Act, but which nonetheless 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist."[34] A subset of these species of special concern (Table 2) may be susceptible to adverse impacts from NMSB activities for similar reasons as those identified for listed species.

Table 2. Species of 'Special Concern'[35]

Species	Status	Habitat
Salt Marsh Wandering Shrew (*Sorex vagrans haliocetes*)	Federal, CDFG	Salt marsh habitat with primarily pickleweed vegetation
Ornate Shrew (*Sorex ornatus sinuosus*)	CDFG	Salt marsh habitat densely vegetated with native cordgrass or pickleweed
Salt Marsh Common Yellowthroat (*Geothlypis trichas sinuosa)*	Federal, CDFG	Fresh and saltwater marsh with thick vegetation (e.g. tule) (nesting)

[34] California Department of Fish and Game, Habitat Conservation Planning Branch. August 5, 2003. "California's Plants and Animals: Species of Special Concern." Retrieved April 27, 2006 from: http://www.dfg.ca.gov/hcpb/species/ssc/ssc.shtml; and Sacramento Fish and Wildlife Office. "Species of Concern." Retrieved April 27, 2006 from http://www.fws.gov/sacramento/es/spp_concern.htm.

[35] South San Francisco Ferry Terminal Project. 2006. Draft Environmental Impact Report/ Environmental Assessment: Appendix B2: Special Status Species Table. SCH No. 2004122091. San Francisco Bay Area Water Transit Authority, San Francisco California; and U.S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia, p. 55; and Hickey et al. 2003.

Continuation of Table 2. Species of 'Special Concern'[36]

Species	Status	Habitat
Song Sparrow (*Melospiza melodia pusillula* (Alameda), *samuelis* (San Pablo), *maxillaries* (Suisun))	Federal, CDFG	Tidal marsh and tidally influenced streams around the Bay (nesting)
Marbled Godwit (*Limosa fedoa*)	CDFG	Mudflats and estuarine habitats (winter)
Whimbrel (*Numenius phaeopus*)	Federal	Mudflats and sandy shoreline (winter)
Black Skimmer (*Rhynchops niger*)	Federal, CDFG	Levees, beach (nesting) and protected, shallow water (foraging)
Double Crested Cormorant (*Phalacrocorax auritus*)	CDFG	Cliffs, islands (nesting) and open waters (foraging)

Habitat. Potential impacts to habitat due to the water trail could include trampling of vegetation at trail heads, from disembarking in habitat areas while enroute, and conversion of habitat to launch-related facilities (such as a ramp or parking). Since the land-side portion of the trail consists only of the water trail launch sites, trampling effects are likely to be limited to occasions when access to the water is not well-defined (and informal access paths are created) or if boaters land at vegetated sites that are not intended as access or resting spots.

In areas that are habitat for wildlife, the presence of NMSBs has the potential to adversely affect the utility of that habitat for some species. In certain respects, these potential impacts are redundant to those discussed under wildlife, but description of broad habitat categories – roosting, foraging and nesting/breeding – for Bay wildlife are provided here to clarify the types of areas where conflicts could occur.

The numerous migrant and resident Bay-related birds use a wide range of habitats for roosting and foraging. Diving ducks tend to raft and forage in shallow open Bay waters and salt ponds. Dabbling ducks roost and forage in tidal marshes and salt ponds.[37] Herons and egrets roost in trees along the shoreline and forage in seasonal wetlands, mudflat tidal edges, along streams flowing into the Bay, and salt ponds.[38] Shorebirds tend to roost in sparsely vegetated areas (e.g. levees and islands), and forage (and roost) in tidal mudflats, shallow salt ponds and salt pannes.[39] Terns forage in a variety of habitats: open bay, salt ponds, marshes, rivers and others. They roost on levees, mudflats, beaches, slough channels and in the bay.[40] Rails forage and roost in tidal salt marshes with pickleweed or native cordgrass vegetation. Other species such as brown pelicans and double-crested cormorants roost on islands, breakwaters and other human-made structures, and forage in open Bay waters (as well as rivers and sloughs in the case of cormorants).[41]

---

[36] South San Francisco Ferry Terminal Project. 2006. Draft Environmental Impact Report/ Environmental Assessment: Appendix B2: Special Status Species Table. SCH No. 2004122091. San Francisco Bay Area Water Transit Authority, San Francisco California; and U.S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia, p. 55; and Hickey et al. 2003.

[37] Warnock et al. 2002.

[38] Bousman, W.G. "Snowy Egret," *in* Goals Project 2000.

[39] Goals Project. 2000, pp. 281-309.

[40] Ryan, T.P. "Caspian Tern," and Feeney, L. "California Least Tern," *in* Goals Project 2000.

[41] Ainley, D.G. "Brown Pelican," and "Double-Crested Cormorant," *in* Goals Project 2000.

Breeding bird species use a smaller range of habitats around the Bay. Clapper and black rail species use tidal salt marshes and Salt Marsh Common Yellowthroats and song sparrow species use brackish marshes.[42] Terns and some shorebirds (e.g. stilts and avocets) nest on moderate to sparsely vegetated levees and islands. Herons and egrets nest in shoreline trees and on islands in the Bay and in dense brackish water vegetation.

Table 3. Habitats used by Bay-related birds.

Habitat	Foraging (F) and Roosting (R)	Nesting/breeding
Salt and brackish marshes	Rail species (F, R) Dabbling ducks (F, R)	Rail species Yellowthroats, song sparrows, black-crowned night herons (brackish marshes) Cinnamon teal and ruddy ducks
Tidal mudflats	Herons and egrets (F) Shorebirds (F, R) Terns (R) Dabbling ducks (F)	
Sparsely vegetated areas (e.g. levees, islands, breakwaters typically in salt ponds)	Terns (R) Shorebirds (R) Pelicans (R) Cormorants (R) Gulls (R)	Terns Shorebirds (some species) Herons and egrets Gulls
Salt ponds	Diving ducks (F,R) Dabbling ducks (F, R) Shorebirds (F, R) Herons and egrets (F) Terns (F, R)	
Shallow open waters	Diving ducks (F, R) Terns (F) Pelicans (F) Cormorants (F)	
Shoreline trees	Herons and egrets (R)	Herons and egrets

The Salt Marsh Harvest Mouse and Wandering Shrew live fully in tidal marshes with pickleweed vegetation (see Tables 1 and 2). For resting, molting and breeding, harbor seals utilize gradually sloped, muddy shoreline areas that are undisturbed and near deeper waters (for foraging).

Indirectly, NMSB activities might affect habitat by spreading invasive species (e.g. Spartina alterniflora). Invasive species might hitchhike on boater's clothing and equipment or in water that collects in the boat.

Water Quality. Non-motorized small boating activities are low impact forms of on-water recreation in terms of their effects on water quality. However, water trail activities may negatively affect water quality at trail heads if sites are not equipped with bathrooms.

Conversely, poor Bay water quality may cause health problems for water trail users who are exposed to contaminants and pathogens. Wet-weather runoff can carry contaminants to the Bay and lead to high fecal bacteria levels or concentrations of other contaminants. Major

[42] Terrill, S. "Salt Marsh Common Yellowthroat," *in* Goals 2000.

contaminant sources include urban runoff and, during heavy rain events, discharges of untreated wastewater overflow from treatment facilities. Dry-weather flows can also cause high fecal bacteria levels near storm drain outfalls.[43] Non-pollution related health risks such as parasites (e.g. swimmer's itch) that are present in Bay habitats are also a concern for water trail users.

Locations and Conditions of Potential Impact Areas

The discussion thus far has identified an array of potential wildlife, habitat and water quality impacts associated with NMSB activities. To minimize these, a consistent education and outreach program should be implemented across the entire trail to foster safe and responsible boating as general NMSB-practice in the Bay Area. In certain locations and times, additional specific management tools and efforts may be necessary to prevent significant adverse wildlife, habitat or water quality impacts. The McAteer Petris Act, Section 66694(a)(5) requires that BCDC develop water trail recommendations that identify these "sensitive wildlife areas where access should be managed or prohibited." The following section draws on Bay-specific studies and data to identify locations where, and conditions under which, impacts could occur.

The spatial and temporal information discussed here should be interpreted cautiously in developing water trail management policies. Although an overarching goal for implementation of the trail is to minimize negative impacts, applying a trail-wide standard of 'no impacts' is unrealistic. Furthermore, existing environmental protection laws (discussed later) do not support application of a 'no impact' standard[44] There may be circumstances under which having no impact is important or required because any level of change will be significantly detrimental to a species' Bay population or habitat. Most instances of potential water trail impacts will be far less extreme. Regardless, the appropriate standard should be 'no significant adverse impacts' to wildlife populations, habitat and water quality.

It is also important to recognize that the water trail is one of a variety of causes of potential impacts to wildlife, habitat and water quality. The trail plan should account for the potentially cumulative nature of impacts due to various sources, and recommend appropriate management strategies to accomplish an overarching objective to minimize adverse effects.

Harbor seals. Harbor seals have been observed hauling out at twelve Bay locations on a consistent basis. Protection of haul out space is essential to maintaining the Bay harbor seal population. Management policies that inform and educate NMSB users about guidelines (e.g. those promoted under the Leave No Trace ethic) and boating practices that avoid or minimize disturbance at haul outs are appropriate on a trail-wide basis. A few of the haul outs serve as primary resting and pupping sites and the Bay population of seals may be vulnerable to significant disturbance impacts at these locations: Castro Rocks (near the southeastern edge of the Richmond-San Rafael Bridge), Yerba Buena Island and Mowry Slough.[45] Special efforts to prevent disturbances at these locations during molting and pupping seasons (mid-March through July) is a priority. The Mowry Slough site is part of the Don Edwards National Wildlife Refuge. FWS closes the slough (from the mouth

---

[43] Chastain, A. SF Baykeeper. April 26, 2006. Pers. comm. Most cities have permits to discharge untreated wastewater (overflow) to the Bay during storm events. Baykeeper sampling of water quality at storm drain outfalls in the East Bay has indicated consistently high fecal coliform counts at certain drains. The precise sources are undetermined, but Baykeeper has identified aging, leaking wastewater pipes and illegal sewer connections as likely causes.

[44] For example, the Marine Mammal Protection Act explicitly defines a negligible, or insignificant, impact; ``an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.'' 50 CFR §216.103

[45] Allen, et al. 2006.

inwards) to boating during the breeding season to prevent disturbances.[46] Harbor seals breed in smaller numbers at a few additional sites: Corte Madera Creek, Corkscrew Slough (part of the Don Edwards Refuge) and Red Rock. Disturbances during pupping season at these locations also might have significant adverse affects on the Bay population. FWS is considering a seasonal boating closure at Corkscrew Slough because of concerns about disturbance to breeding harbor seals.[47]

Birds. Birds utilize large areas of the open Bay and shoreline for roosting, foraging and nesting. In general, bird populations are more susceptible to significant adverse impacts during breeding season because disturbance can cause nesting failures, directly effecting on population size. Special efforts to prevent disturbances in nesting areas during breeding season – particularly in locations that do not currently experience NMSB activities – may be critical for preventing significant population effects. Frequent disturbances of roosting and foraging birds might prevent them from feeding and resting sufficiently (reducing fitness and survival), or cause birds to abandon or under-utilize important habitat areas. These the disturbance responses might significantly affect Bay populations.

A recent U.S. Geologic Survey (USGS) survey of wintering waterfowl populations (generally present October through April in the Bay) shows that these species favor the relatively shallow waters (generally <6m) in San Pablo Bay, as well as some portions of the East Bay between the Dumbarton Bridge and the Oakland Airport and between Emeryville and Richmond; the Peninsula shoreline near San Mateo; and the South Bay salt ponds and open waters (Figure 1). Areas along the Contra Costa county shoreline between Pt. Molate and Pt. Wilson are also heavily used by diving ducks.[48] Some of these areas (e.g. China Camp State Park, the San Mateo shoreline and portions of the East Bay shoreline) are already very popular sites for boating recreation. In other areas (e.g. San Pablo Bay and the South Bay[49]), water trail development might introduce boating to a previously undisturbed area. This is a particular concern because these sites might serve as "safe havens" for waterfowl species and/or groups of individuals that are especially sensitive to human disturbances.[50]

Figure 1. Waterfowl distributions on San Francisco Bay. (Conducted by USGS.)[51]

---

[46] Morris, C. Don Edwards National Wildlife Refuge, Manager. U.S. Fish and Wildlife Service. April 27, 2006. Pers. comm.

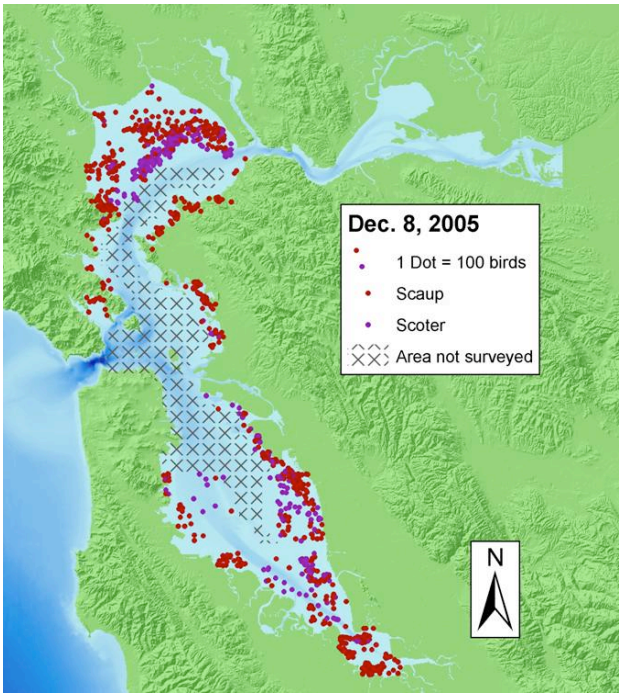
[47] Ibid.

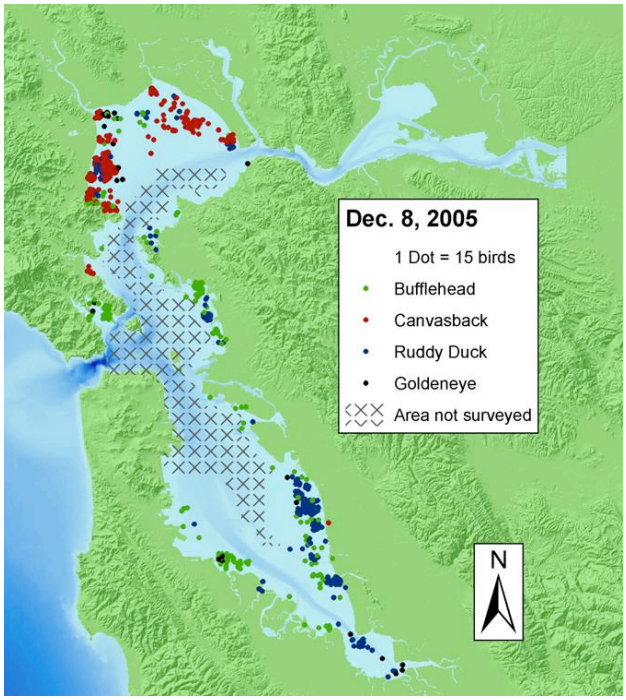
[48] Susan Wainwright-De La Cruz, Wildlife Biologist, USGS San Francisco Bay Estuary Field Station. May 19, 2006. Pers. comm. via email. The area between Pt. Molate and Pt. Pinole was not part of the aerial survey shown in Figure 1. Additionally, the shoreline between Pt. Pinole and Pt. Wilson is heavily used by scaup and canvasbacks in early winter (October –December) with counts of >10, 000 scaup during surveys in past years.

[49] Natural conditions such as winds and expansive mudflats in much of San Pablo Bay and the South Bay are not conducive to NMSB activities. Very few launch sites provide access to these waters and opportunities to increase access are limited by these natural conditions and land-use limitations of the surrounding shoreline. The two major landowners in these areas, FWS and CDFG, are limited by regulations and available management resources in the location and number of launch access points they can offer. For example, because all tidal marsh habitat on these lands is protected for California Clapper Rail and the Salt Marsh Harvest Mouse, the San Pablo Bay National Wildlife Refuge has only one potentially suitable (i.e. un-vegetated) shoreline location for adding NMSB launch access. (Smith, C. San Pablo Bay National Wildlife Refuge, Manager. May 4, 2006. Pers comm.)

[50] Takekawa, J. U.S. Geologic Survey. November 13, 2005. Pers. comm.

[51] U.S. Geologic Survey. 2006. Unpublished preliminary data. Images were created by Natalie Wilson, Biological Science Technician, USGS San Francisco Bay Estuary Field Station.





Shorebirds such as the Marbled Godwit, Black Turnstone, Whimbrel and Red Knot rely heavily on tidal mudflats along the north shoreline of San Pablo Bay, the East Bay (south of Oakland Airport) and South Bay for roosting and foraging.[52] To a large extent, expansive mudflats in these areas provide a natural buffer from NMSB activities on the Bay during low and medium tides. During migratory periods (fall and spring months), though, shorebirds might be more prone to flush and flush at much greater distances.

For both waterfowl and shorebird species, the large-scale restoration projects in the Bay may alter habitat conditions substantially. Water trail policies must be flexible to accommodate changing management needs in these areas for these species, and trail managers need to coordinate with wildlife and habitat experts and resource managers to anticipate and address issues.

Special status species. Preliminary results of Bay-wide PRBO Conservation survey[53] of California capper rails (conducted from January through April 2005) indicate relatively high densities in certain locations[54]:

- Central Bay at San Bruno Point and the SamTrans Peninsula and the Corte Madera Ecological Reserve* (Heerdt and Muzzi Marshes);
- San Pablo Bay along Gallinas Creek (including China Camp State Park*) and at Bahia Lagoon, Carl's Marsh and Port Sonoma Marina; and

[52] Goals Project. 2000. Pp. 281-316.

[53] Liu, L., M. Herzog, N. Nur, P. Abbaspour, A. Robinson and N. Warnock. 2005. San Francisco Bay Tidal Marsh Project Annual Report: 2005. PRBO Conservation Science, Stinson Beach, CA, pp. 9, 53-54, Table 9. I do not reference sites identified in the Recovery Plan for the CA Clapper Rail because it is outdated (last updated in 1984).

[54] Most of these locations are also near existing NMSB launches: San Bruno Point, SamTrans Peninsula, Corte Madera, Gallinas Creek, Port Sonoma Marina, Seal Slough, East Palo Alto, and the Palo Alto Baylands.

- South Bay at Middle Bair and Greco Islands, Seal Slough (San Mateo), the East Palo Alto (Faber-Laumeister Tract*), the Palo Alto Baylands* and Mowry Slough

In another, breeding season, tidal marsh survey by PRBO, clapper rails were also detected at four of these sites (indicated by asterisks).[55] Additionally, a relatively recent survey of Arrowhead Marsh in the Martin Luther King Jr. Regional Shoreline detected 60 clapper rails.[56]

The PRBO breeding season tidal marsh survey also detected Black Rails, Salt Marsh Common Yellowthroats and Song Sparrows. Black Rails were found in higher numbers in San Pablo Bay at China Camp State Park, the Petaluma River mouth, Black John Slough, Coon Island and Mare Island, as well as Suisun Marsh (at Rush Ranch and Pt. Edith). None were detected in the Central and South Bay.[57] The Yellowthroats and Song Sparrows are more widespread than the two rail species. Sites with high numbers of Yellowthroats included Petaluma Marsh, Black John Slough and Coon Island (San Pablo Bay); Palo Alto Baylands; and most Suisun Marsh locations. Song sparrows were common throughout the surveyed tidal marshes.

The former Naval Air Station on the western side of Alameda Island is the northern-most nesting site for California Least Terns. Over 400 tern pairs nested at this site in 2004.[58] Western Snowy Plovers also nest at this site. The actual nesting locations are set back quite a bit from the shore, so nesting and roosting birds are buffered from very small vessels such as a kayak. In addition to Alameda Island, Western Snowy Plovers are found at more than 20 sites on levees and pannes in and around the South Bay salt ponds. These are also buffered against disturbances from open water access.[59]

A few marine bird species such as pelagic cormorants breed on Alcatraz Island. This is "one of few estuarine breeding sites for many of these species."[60]

The Salt Marsh Harvest Mouse and Wandering Shrew both use tidal marsh areas with pickleweed vegetation. Since population surveys of these species are not feasible and analyses of important habitat for species recovery have not been recently conducted, [61] resource managers protect these species by avoiding and minimizing potential disturbances in tidal marshes.

Areas specially designated for wildlife or habitat protection. Areas designated by FWS and CDFG as "critical habitat" for threatened and endangered species may require special water trail management to prevent impacts. Of the species identified Table 2, critical habitat has only been proposed for the Western Snowy Plover. This proposal does not

---

[55] Liu, et al. 2005. p.44, Table 2.
[56] Neuman, K. October 2004. Bird Use of Martin Luther King Jr. Regional Shoreline Wetlands Project. 5-Year Summary. Final Report. Retrieved May 23, 2006 from http://www.goldengateaudubon.org/PDFs/MLK_5year_report.pdf
[57] Ibid.
[58] Golden Gate Audubon. n.d. "Alameda Wildlife Refuge." Retrieved May 1, 2006 from http://www.goldengateaudubon.org/html/conservation/wetlands_wildlands/awr.htm.
[59] U.S. Fish and Wildlife Service. 2001. Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. Portland, Oregon, pp. xv-xvi.
[60] PRBO Conservation Science. 2006. "Alcatraz Island." Retrieved May 23, 2006 from http://www.prbo.org/
[61] The recovery plan for the Salt Marsh Harvest Mouse was last updated in 1984.

address habitat in the Bay because management goals for this species in the Bay are uncertain due to the large-scale restoration efforts that are in progress. In the future, if federal and/or state agencies designate critical habitat for Bay species, trail head managers will have to ensure that trail activities are consistent with the designation.

On National Wildlife Refuges (NWR), and state Wildlife Areas and Ecological Preserves, disturbance of tidal marsh vegetated is prohibited to protect endangered species habitat for Clapper and Black Rails and Salt Marsh Harvest Mouse. Boaters are allowed to navigate the open waters (with some exceptions), but are not allowed to disembark, except at designated landing and launch sites. In instances where there are violations of this policy, FWS can prohibit all boating access. This also limits the number of launch access points FWS and CDFG can offer on their lands. For example, the San Pablo Bay National Wildlife Refuge currently has only one potentially suitable (i.e. un-vegetated) shoreline location for adding NMSB launch access.[62]

FWS implements additional management measures on its lands to prevent disturbance of other (non-listed) wildlife species and address other issues. Mowry Slough and potentially Corkscrew Slough (in the Don Edwards San Francisco Bay NWR) are closed during harbor seal pupping season. Landing at Marin Islands NWR is prohibited to protect the heron and egret rookeries and prevent vandalism to the agency's dock. To prevent disturbances of nesting terns on Alameda Island, as well as roosting pelicans on a breakwater to the southwest of the island, FWS has proposed a 500-foot recreational boating corridor between the island and breakwater in a Draft Comprehensive Conservation Plan for the proposed Alameda National Wildlife Refuge.[63]

State Parks prohibits boating in three "preserve areas": the Emeryville Crescent, Albany Mudflats, and Hoffman Marsh/South Richmond Shoreline.[64] CDFG prohibits boating and other recreation activities in Albany Mudflats, Marin Islands and Bair Island State Marine Parks (SMP), and limits boating to "light-weight, hand-carry" watercraft in Redwood Shores and Corte Madera SMPs.[65]

The South Bay Salt Ponds and Napa-Sonoma Salt Pond restoration projects are two, large habitat restoration efforts by CDFG and FWS to restore a mix of tidal marshes, seasonal wetlands, managed ponds and uplands for native fish and wildlife species. The projects both include new NMSB launch sites, but opportunities to include access are necessarily limited by habitat priorities and the complexities of these large-scale restorations.

Caspian Terns and herons and egrets nest on Brooks Island which is managed by East Bay Regional Parks District as a preserve. The two areas where the terns nest are closed to the public year-round, while the heron and egret rookery is closed during breeding season (March to August).[66]

---

[62] Smith, C. San Pablo Bay National Wildlife Refuge, Manager. May 4, 2006. Pers comm.

[63] U.S. Fish and Wildlife Service. 1998. Draft Comprehensive Conservation Plan for the Alameda National Wildlife Refuge. Portland, OR, Section 4.2, Figure 9. Retrieved May 2, 2006 from http://www.fws.gov/pacific/planning/alameda_ccp.htm.

[64] East Bay Regional Park District (EBRPD) and the California Coastal Conservancy (CCC). 2002. Eastshore State Park General Plan. Prepared for the California Department of Parks and Recreation, EBRPD and CCC, p. III-7.

[65] California Department of Fish and Game. n.d. "Descriptions and Preliminary Evaluations of Existing California Marine Protected Areas." Marine Life Protection Act Initiative. Retrieved May 4, 2006 from: http://www.dfg.ca.gov/mrd/mlpa/descriptions.html

[66] East Bay Regional Park District. n.d. "Brooks Island Regional Shoreline." (brochure). Retrieved on May 2, 2006 from: http://www.ebparks.org/resources/pdf/trails/brooks_map.pdf.

Water Quality. NMSB recreational users could be exposed to high fecal coliform levels and contaminant concentrations in areas adjacent to stormwater outflows (particularly after rain events). SF Bay Keeper has identified some outfalls along the East Bay shoreline with consistently high bacteria concentrations.[67] In addition to general health information, water trail managers will need to provide easy access for trail users to regularly updated notices about water quality issues around the Bay.

Management Framework

The laws, policies and management plans affecting the Bay, and the multitude of public agencies and private entities that own and manage the Bay and shoreline provide a complex backdrop for water trail planning.

The water trail policies will provide comprehensive guidance to the trail managers on how to develop and manage NMSB access and activities in the Bay. However, these policies (with few exceptions) will not modify existing land and resource management laws and regulations. Water trail managers will work within existing regulatory frameworks, and in partnership with land and resource managers to help them develop and manage access that is also consistent with the trail policies. To be effective, the water trail plan must reflect the constraints and opportunities set by these existing laws and policies.

Public Trust Doctrine and Navigable Waters. The Public Trust Doctrine asserts that the air, seas, waterways and their shores are common assets that are held in trust by government for public benefit.[68] The U.S. Constitution grants states sovereignty over their tide and submerged lands, and the Supreme Court established the states' duty to protect (in perpetuity) the public's interest in these areas.[69] The California Constitution reflects this obligation for state waters; no one may "exclude the right of way to (navigable) waters whenever it is required for any public purpose, nor destroy or obstruct the free navigation of such water."[70] In the past, the concept of a public trust in waterways reflected the practical need to maintain open waterways for navigation, commerce and fishing.[71] The California Supreme Court expanded the range of public interest values in these waterways to include general recreation activities such as swimming and boating; and preservation of lands in their natural state as open space, as wildlife habitat and for scientific study.[72]

---

[67] Chastain, A. SF Baykeeper. April 26, 2006. Pers. comm.

[68] The concept of a public trust resource originated in Roman law. Through U.S. federal and state constitutional and case law, the doctrine has been applied to these resources in the U.S. For a more detailed discussion of the evolution of public trust law in California, refer to the Public Trust Statements at the California State Lands Commission website:
<http://www.slc.ca.gov/Policy%20Statements/Policy_Statements_Home.htm>

[69] *Illinois Central Railroad v. Illinois,* 1892. 146 U.S. 387. The Public Trust Doctrine has yet to be applied to federal lands and waters through statutes or case law.

[70] CA Constitution, Article X, Section 4.

[71] *Illinois Central Railroad v. Illinois, supra.*

[72] *Marks v. Whitney.* 1971. 6 Cal.3d 251; *National Audubon Society v. Superior Court.* 1983. 33 Cal.3d 419; *People* v. *California Fish Co.* 1913. 166 Cal. 576.
Frank, R.M. 1983. "Forever Free: Navigability, Inland Waterways, and the Expanding Public Interest. *University of California, Davis Law Review,* 16:579. California case law also establishes a link between navigation and recreation, and verges on treating the two as interchangeable public interests.

The term "navigable waters" is broadly defined in California statutes and case laws[73] giving the public extensive access rights to waterways. However, it does not preclude limitations on navigation. Governments can establish navigation restrictions to promote or protect the overall use of navigable waters, and to strike an appropriate balance among competing public trust uses of a waterway (e.g. commerce, recreation, environmental needs).[74] The report for the Baylands Ecosystem Habitat Goals Project frames this balancing act in terms of provision of public access and wildlife protection[75]:

> Agencies that encourage or require public access to the shoreline are fulfilling a part of their public trust responsibility as they enable people to use a public resource. They also are helping to ensure long-term Bay protection, as people who can use the Bay likely will seek to protect it. On the other hand, agencies that discourage public access because of concerns regarding impacts to wildlife are also fulfilling their public trust responsibilities.

State and local governments have two forms of authority to manage navigation that enable them to strike a balance between recreation and environmental needs: (1) control over development of tide and submerged lands that can affect navigability of waterways, and (2) recreational boating rules. Under the first category, the State Lands Commission manages public uses of navigable waters through its leasing program. When a public or private entity applies for a permit to lease tide and submerged lands, the Commission reviews the application to ensure that the proposed use (e.g. a marina or pier) will maintain the public benefits of the overlying navigable waters. Usually the city or county fulfills this review role because most tide and submerged lands are owned by local authorities through past legislative grants of state lands.

In California, recreational boating rules in Section 660 of the Harbors and Navigation Code empower local governments to establish ordinances that regulate navigation in waters within their jurisdiction through time-of-day restrictions, speed zones, special-use areas, and sanitation and pollution controls.[76] A recent decision by the California Court of Appeals in which a county-wide ban on all personal watercraft (i.e. jet skis) in Marin County waters was upheld, demonstrates the leeway that Section 660 grants to local governments to manage pubic trust interests.[77] The Court determined that in issuing the ban on one specific type of craft, the County was actually exercising its power to designate a "special use area," and thus did not violate the public trust conditions of the original tide and submerged lands grant by banning all navigational access.[78]

---

[73] Section 100 of the California Harbors and Navigation Code states that "Navigable waters and all streams of sufficient capacity to transport the products of the country are public ways for the purposes of navigation and of such transportation." In *People* ex rel. *Baker* v. *Mack*, the Court articulated a 'recreational boating test' for navigability; "Members of the public have the right to navigate and to exercise the incidence to navigation in a lawful manner at any point below high water mark on waters of this State which are capable of being navigated by oar or motor-propelled small craft."

[74] *City of Berkeley* v. *Superior Court*, *supra*, at 523-526; *People* v. *California Fish Co.*, *supra*, at 598-599; *Carstens* v. *California Coastal Com.* 1986. 182 Cal.App.3d 277, 289.

[75] Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, CA/S.F. Bay Regional Water Quality Control Board, Oakland, CA, p.165.

[76] Harbors and Navigation Code §660 (b).

[77] *Personal Watercraft Coalition v. Marin County Board of Supervisors.* 2002. 100 Cal. App. 4th 129.

[78] *People* ex. rel. *Younger v. County of El Dorado,* 96 Cal App.3d. 403.
Additionally, the county's actions represented a legitimate means to "exercise legislative preference for the vastly greater number of other uses and activities for which its waterways could be used, to the

Wildlife and Environmental Quality Regulations. A variety of other federal, state and local laws and regulations apply to the protection of wildlife, habitat and water quality. A subset of these (described here) have implications for the management strategies that the Steering Committee develops.

The purpose of the Federal Endangered Species Act (ESA) of 1973 is to conserve species populations that are endangered (on the brink of extinction) and threatened (likely to become endangered) to the point that they no longer require special protection. The Act provides mechanisms for listing species as endangered or threatened and identifying critical habitat areas used by these species, and establishes criminal penalties for the take of listed wildlife and fish. Take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct," and includes significant habitat alteration where it kills or injures a listed species through impairment of essential behavior. Harass means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering."[79] Responsibility for implementing this Act is shared by U.S. Fish and Wildlife Service (FWS) for terrestrial and freshwater species and National Oceanic and Atmospheric Administration (NOAA) Fisheries for marine and anadromous species.

California's Endangered Species Act (CESA) has similar objectives and requirements to the federal ESA except that a permit is required for incidental take of *all* state listed species (including plants).[80] The California Department of Fish and Game (CDFG) implements the California ESA.

Federal, state and local agencies must consult with FWS, NOAA Fisheries or CDFG on proposed actions (e.g. issuing permits, funding projects) that might jeopardize endangered or threatened species. If the reviewing agency determines that an action jeopardizes the continued existence of listed species, the agency cannot move forward with the action without altering it to prevent unacceptable impacts. In the case of privately-funded projects, the agencies can issue permits for incidental take of a listed species, but the project undergoes a lengthy review process and must meet strict requirements including development of a Habitat Conservation Plan or other mitigation plan.[81]

Both FWS and CDFG implement the Migratory Bird Treaty Act (MBTA) of 1918 which prohibits take of waterfowl, shorebirds, songbirds, hawks, and others, including their body parts (feathers, plumes etc), nests, and eggs.[82] The implications of the MBTA for regulating water trail-related activities are less clear than with the ESA because "take" in this case

---

exclusion of the operation of personal watercraft." *Personal Watercraft Coalition v. Marin County Board of Supervisors, supra.*

[79] 50 C.F.R 17.3

[80] California Fish and Game Code §2080

[81] California Department of Fish and Game, Habitat Conservation Planning Branch. 2006. "Environmental Review and Species Take Permits." Retrieved May 3, 2006 from: http://www.dfg.ca.gov/hcpb/ceqacesa/cesa/incidental/incid_perm_proced.shtml; and South San Francisco Ferry Terminal Project. 2006. Draft Environmental Impact Report/ Environmental Assessment: 3.1: Biological Resources. SCH No. 2004122091. San Francisco Bay Area Water Transit Authority, San Francisco California,

[82] 16 U.S.C. §703

does not expressly include harassing which would encompass the types of disturbances (e.g. causing flushing) that are most commonly associated with NMSB activities.[83] However, disturbances that are extreme enough to cause a take, are clearly prohibited under the Act. The following scenario describes an example of this situation.[84]

> A nesting pair of Common Black-Hawks (*Buteogallus anthracinus*) was found in an area frequented by birders. Overly enthusiastic individuals, in their attempts to observe and photograph the pair, caused the nest and its contents to be abandoned. Although no one was charged in this incident, the collective actions of the birders resulted in the "taking" of migratory birds because the eggs were "killed" as a result of the parent birds' absence.

Both FWS and CDFG issue permits for incidental take of migratory birds, as well as hunting licenses for game species.

Under the Marine Mammal Protection Act (MMPA) of 1972, it is also unlawful to take any marine mammal. Take includes harassment or attempting to harass a marine mammal. Section 3(18)(A) of the Act defines ``harassment'' as:

> any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

For an activity that causes harassment of marine mammals, NOAA Fisheries defines ``negligible impact'' as ``an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.''[85] FWS is responsible for implementing the MMPA for otters (and certain other species not found the in Bay), while NOAA Fisheries is responsible for all other marine mammals. The most likely relevance of this Act for the water trail is to potential disturbances of harbor seals at haul outs.

Under the National Environmental Policy Act (NEPA) of 1970, federal agencies proposing any major federal action that might have a significant impact on the quality of the human environment must draft an Environmental Impact Statement that evaluates the proposed action as well as alternatives to the proposal. Major federal actions include new and continuing activities on federal lands, as well as projects or programs that are financed, assisted, conducted, regulated or approved by federal agencies. As a full-disclosure law, NEPA creates transparency in federal agency decision-making, but it does not include a substantive mandate to direct agency decisions.

---

[83] 50 C.F.R. §10.12.
The FWS may issue permitted exemptions from the provisions of the Act for certain activities such as possession of a hunting license to pursue specific game birds and research activities. Faanes, Craig A., Cleveland Vaughn, Jr., and Jonathan M. Andrew. 1992. Birders and U.S. Federal Laws. Birding. 24(5):299-302. Northern Prairie Wildlife Research Center Online.
<http://www.npwrc.usgs.gov/resource/birds/birdlaws/birdlaws.htm> (Version 18SEP97).

[84] Faanes, Craig A., Cleveland Vaughn, Jr., and Jonathan M. Andrew. 1992. Birders and U.S. Federal Laws. Birding. 24(5):299-302. Northern Prairie Wildlife Research Center Online.
<http://www.npwrc.usgs.gov/resource/birds/birdlaws/birdlaws.htm> (Version 18SEP97).

[85] 50 CFR §216.103

The California Environmental Quality Act (CEQA) of 1970 has four broad objectives: (1) to inform government decision makers and the public about the potential significant environmental effects of proposed activities; (2) to identify ways that environmental damage can be avoided or significantly reduced; (3) require changes in projects through the use of alternatives or mitigation measures when feasible; and (4) disclose to the public the reasons why a project was approved if significant environmental effects are involved. Like NEPA, CEQA is a disclosure law, but it has a substantive component to enforce the third objective above. CEQA applies to projects undertaken, funded or requiring an issuance of a permit by a public agency.[86] The lead agency associated with a project is responsible for conducting the CEQA review process. Projects to improve existing launch facilities or develop new access for NMSBs potentially fall within the scope the requirement to report and address the potential environmental impact of the project. The CEQA review process includes assessments of the project's potential impacts over a broad range of environmental categories (e.g. aesthetics, biological resources, public services and recreation).[87]

The McAteer-Petris Act of 1969 and the Suisun Marsh Preservation Act of 1976 establish the authority of the San Francisco Bay Conservation and Development Commission (BCDC) to control both Bay filling and dredging, Bay-related shoreline development and Marsh development. BCDC jurisdiction includes the Bay (areas subject to tidal action), a 100-ft shoreline band, salt ponds, managed wetlands, certain waterways, and the primary (wetlands) and secondary (adjacent uplands) management areas of the Suisun Marsh. The Bay Plan describes BCDC's enforceable policies. It identifies five types of priority use areas (ports, water-related industry, water-oriented recreation, airports and wildlife refuges) and provides development policies for these areas. In issuing permits for shoreline development, BCDC must require applicant to provide "maximum feasible public access." The Bay Plan Public Access policies include specific requirements for permit applicants to prevent significant adverse effects on wildlife, habitat and water quality.

The goals of the Suisun Marsh Protection Plan are to "preserve the integrity and assure the continued wildlife use of the Suisun Marsh."[88] The plan requires local agencies to develop local protection programs to bring county policies and ordinances into conformity with the Preservation Act. (Permits for projects in the Suisun Marsh are issued by Solano County.) The Plan's findings and policies on Recreation and Access support provision of public access and recreation as long as it does not adversely impact the environmental or aesthetic qualities of the Marsh.[89]

A water trail project to develop or improve NMSB access to rivers, streams, or in wetland areas will likely require a permit from the U.S. Army Corps of Engineers based on its authority under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act.[90] Section 404 requires Corps authorization for work involving placement of fill into any "waters of the United States."[91] The Corps evaluates permit based on criteria designed to protect public interest. The U.S. EPA develops criteria used by the Corps to

---

[86] California Code of Regulations §15002.
The Act defines a "project" as "any activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." Public Resources Code §21065

[87] CEQA Guidelines, Appendix G: Environmental Checklist Form.

[88] San Francisco Bay Conservation and Development Commission (BCDC). 1976. Suisun Marsh Protection Plan. San Francisco, CA, p. 9.

[89] BCDC 1976, pp. 28-29.

[90] San Francisco Bay Trail Project. March 2001. The Bay Trail: Planning for a Recreational Ring Around San Francisco Bay. Association of Bay Area Governments. Oakland, CA. p.II-2; and 33 U.S.C. §1344 and §403.

[91] 33 U.S.C. §1344

ensure permits prevent environmental degradation.[92] The Rivers and Harbors Act requires Corps authorization for work or structures in or affecting navigable waters of the U.S. Under the Corps' general policy, a project should: (1) provide public benefits that outweigh foreseeable detriments; (2) not unnecessarily alter or destroy wetlands; (3) conserve wildlife; (4) be consistent with water quality standards; (5) protect historic, scenic, and recreational values; (6) not interfere with adjacent properties or water resources projects; and (7) comply with approved coastal zone management programs.[93] These approval criteria are important considerations in trail planning and trail head design.

Other laws related to wildlife, habitat and water quality are less broadly applicable to the water trail, but they are relevant under certain circumstances. If federal or state-sponsored trail head development projects might adversely affect "essential fish habitat" as designated under the Magnuson-Stevens Fishery Resource Conservation and Management Act, the agency must consult with NOAA Fisheries on how to minimize these impacts. Under California's Porter-Cologne Water Quality Control Act of 1969 and Section 401 of the federal CWA, the State Water Resources Control Board and the Regional Water Quality Control Boards regulate discharges to surface waters (including wetlands) and groundwater, and point and non-point sources of pollution through the issuance and enforcement of waste discharge requirements. These laws potentially apply to projects to develop or improve NMSB launch sites (e.g. those that require Section 404 permits from the Corps).

Management Plans and Guidelines. Land and resource managers implement a variety of plans and guidelines that address specific Bay locations, habitat types and species. The goals and policies described in some of the plans are relevant to development of the water trail and vice versa.

Endangered and threatened species critical habitat designations and recovery plans can be sources of guidance on management policies to address potential trail-related wildlife issues. Unfortunately, critical habitat has not been designated for any of the potentially affect species (Table 1) in the Bay. The draft Western Snowy Plover Recovery Plan identifies human disturbance of breeding and wintering habitat as one factor currently limiting species recovery, and recommends minimizing these impacts through access restrictions and public education efforts.[94] Recovery information for the other species identified in Table 1 is either out-of-date (the recovery plan for the Salt Marsh Harvest Mouse and California Clapper Rail was last updated in 1984) or not available (California Least Tern and Black Rail).

The Comprehensive Conservation Plans (CCPs) for the National Wildlife Refuges (NWR) in the Bay are another policy source. The "proposed action"of the Draft CCP for Marin Islands NWR includes establishing wildlife education, interpretation and recreation opportunities on the islands (e.g. guided interpretive tours and access for fishing).[95] The

---

[92] U.S. Army Corps of Engineers. n.d. "Regulatory Program Overview: Permit Decision." Retrieved on March 1, 2006 from the U.S. Army Corps of Engineers website: <http://www.usace.army.mil/inet/functions/cw/cecwo/reg/oceover.htm>

[93] 33 C.F.R. §320.4

[94] U.S. Fish and Wildlife Service. 2001. Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. Portland, Oregon, p. 126, Table 6: Recovery Task Outline, tasks 2.2.2 and 5.

[95] U.S. Fish and Wildlife Service. Fall 2005. Planning Update 3: Marin Islands National Wildlife Refuge. (bulletin) Retrieved on May 12, 2005 from http://www.fws.gov/pacific/planning/main/docs/CA/marin%20islands/MINWR-update3.pdf

draft CCP for the proposed Alameda NWR recommends a 500-ft boating corridor between Alameda Island and breakwater to minimize disturbances of tern and snowy plover nesting colonies, and roosting pelicans. [96] CCPs will be developed for the Don Edwards NWR and San Pablo NWR beginning in 2010 and 2006, respectively.[97]

General plans for parks and park districts provide site-specific guidance for water trail policies that address wildlife, habitat and water quality. For example, the Eastshore State Park General Plan identifies three different land-use categories within the park district that have different management priorities: [98]

- Preservation Areas: Unique or fragile habitat areas where resources are protected and preserved and recreation activities are prohibited.
- Conservation Areas: Areas where natural habitat values are protected and enhanced while allowing lower intensity recreation that is compatible with and dependent on those values.
- Recreation Areas: Sites that can accommodate more intensive recreation.

The San Francisco Bay Joint Venture (SFBJV)[99] has a 20-year plan (2001) for restoration and wildlife in the Bay that articulates the importance of protecting waterfowl and shorebird habitat. The plan's waterfowl goals reflect the findings and recommendations of the Baylands Ecosystem Habitat Goals project (1999) and the North American Waterfowl Management Plan Update (1998) which both emphasize the importance of shallow water habitat – open waters and salt ponds – in the Bay for diving ducks.[100] PRBO Conservation Southern Pacific Shorebird Conservation Plan sets habitat protection and restoration priorities to increase populations of Western Snowy Plover (as described in the USFWS Snowy Plover Recovery Plan) as well as breeding populations of certain species (e.g. American Avocet) and migratory and wintering populations of all shorebirds.[101] Although, these plans do not offer specific guidelines to incorporate into the water trail policies, they highlight important planning and management considerations: proximity of trail-related launch sites and boating activities to protection/restoration projects and compatibility of these activities with the conservation objectives.

Land and Resource Managers. U.S. Fish and Wildlife Service (FWS) administers the Endangered Species Act, Migratory Bird Treaty Act and Marine Mammal Protection Act on 30,000 acres of Bay waters and shoreline that the FWS owns and manages as National Wildlife Refuges. Under the amended National Wildlife Refuge System Administration Act

---

[96] U.S. Fish and Wildlife Service. 1998. Draft Comprehensive Conservation Plan for the Alameda National Wildlife Refuge. Portland, OR, Section 4.2, Figure 9. Retrieved May 2, 2006 from http://www.fws.gov/pacific/planning/alameda_ccp.htm.

[97] U.S. Fish and Wildlife Service. November 2005. Pacific Regional National Wildlife Refuge System Comprehensive Conservation Planning Schedule. Retrieved on May 12, 2006 from http://www.fws.gov/pacific/planning/main/docs/general/CCP%20Schedule.pdf

[98] East Bay Regional Park District (EBRPD) and the California Coastal Conservancy (CCC). 2002. Eastshore State Park General Plan. Prepared for the California Department of Parks and Recreation, EBRPD and CCC, p. III-7.

[99] SFBJV is a non-profit dedicated to protecting, restoring and enhancing habitat to benefit birds, fish and other wildlife by helping its partners implement these types of projects.

[100] San Francisco Bay Joint Venture. 2001. *Restoring the Estuary: An Implementation Strategy for the SFBJV*. SFBJV, Novato, CA. Retrieved May 10, 2006 from http://www.sfbayjv.org/estuarybook.html ; and Goals Project, 1999; and North American Waterfowl Management Plan Committee. 1999. *North American Waterfowl Management Plan Update 1998: Expanding the Vision.* U.S. Department of the Interior, SEMARNAP Mexico, Canadian Wildlife Service. 32 pp.

[101] PRBO Conservation Science. 2003. Southern Pacific Shorebird Conservation Plan. Stinson Beach, CA, p. vii.

of 1966, FWS has a mission to conserve listed endangered and threatened species and migratory birds through protection and restoration of species' habitats, and managing uses, such as recreation, of Refuge areas to prevent negative impacts to these species.[102] The National Wildlife Refuge System Improvement Act of 1997 designates wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as "priority general public uses." When these activities are compatible with species protection goals (as determined by FWS), they are welcome on refuges and receive priority over other uses.[103] Additionally, the law states, in part, that "compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System and the purposes of many refuges, and which generally fosters refuge management and through which the American public can develop an appreciation for fish and wildlife..."[104] Access to Refuge waters and shoreline in the Bay for NMSB recreation is subject to restrictions set by the Refuge managers.

The National Park Service (NPS) is another federal land manager in the Bay. The NPS Organic Act of 1916 establishes a dual mission for the park system: to conserve natural and historic features and wildlife, while providing for public enjoyment of these features.[105] At Golden Gate National Recreation Area, managers balance the preservation of significant historic resources and important natural areas with provision of recreation opportunities for 16 million visitors per year. The NPS Management Policies stipulate that park managers only allow uses that are "(1) appropriate to the purpose for which the park was established, and (2) can be sustained without causing unacceptable impacts to park resources or values. Recreational activities and other uses that would impair a park's resources, values, or purposes cannot be allowed." [106] NMSB launching and overnight camping are existing managed activities in the Golden Gate National Recreation Area.

California Department of Parks and Recreation (State Parks) manages five parks – Benicia State Recreation Area, China Camp, Angel Island, East Shore and Candlestick State Parks –along the Bay shoreline. Like other resource management agencies, State Parks has a dual mission to protect the State's "most valued natural and cultural resources," and offer "opportunities for high-quality outdoor recreation."[107] The State Parks strategic plan outlines five core programs for the park system: resource protection, education/interpretation, provision of facilities (including camping and restrooms) at parks, public safety and recreation. The plan does not specifically mention non-motorized boating, but three state parks in the Bay region have facilities for launching a these types of boats and Angel Island has overnight camping facilities that are frequently used by paddle boaters.

The California Department of Fish and Game (CDFG) "manages California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public."[108] Of the numerous laws that the Department implements, the Migratory Bird Treaty Act (MBTA) and the California Endangered Species Act (CESA) are most relevant to development of launch sites and on-

---

[102] 16 U.S.C. §668dd
[103] 16 USC §668dd
[104] 16 U.S.C. 668dd (a) 3 (B)
[105] 16 U.S.C. §1
[106] National Park Service. 2001. Management Policies. Chapter 8.1. Retrieved February 27, 2006 from: http://www.nps.gov/refdesk/mp/
[107] Department of Parks and Recreation. 2004. Retrieved on March 9, 2006 from the CA State Parks website: <http://www.parks.ca.gov/?page_id=91>
[108] Department of Fish and Game. 2006. "Mission Statement." Retrieved on March 8, 2006 from the Department of Fish and Game website: <http://www.dfg.ca.gov/html/dfgmiss.html>

water use of the trail. CDFG implements MBTA on lands that it owns and/or manages by preventing "take" of migratory birds and their nests and eggs. Both FWS and CDFG issue permits for incidental take of migratory birds, as well as hunting licenses for game species. CDFG implements CESA as described previously.

CDFG owns and/or manages seven wildlife areas[109], eight ecological reserves[110], five state marine parks[111] and one state marine conservation area[112] around the Bay. Wildlife areas are managed to protect and enhance habitat for wildlife species, and to provide the public with wildlife-related recreational uses such as hunting, fishing and wildlife observation.[113] Ecological reserves are designed to conserve areas for the protection of rare plants, animals and habitats, and to provide areas for education, scientific research and recreation where these activities do not have adverse effects on wildlife and habitats.[114] Inclusion of any water trail launch sites within wildlife areas or ecological reserves is subject to the compatibility of NMSB activities with the management objectives for these areas. Existing state marine parks and conservation areas were originally established as ecological reserves, but the non-terrestrial portions of these reserves have been folded into the California Marine Life Protection Act initiative. These non-terrestrial marine or estuarine areas are specially managed for natural, historic or cultural resource preservation.[115] CDFG has discretion to establish restrictions on recreation in these areas on a case-by-case basis.

The California Coastal Conservancy is a state agency that works in partnerships with local governments, other public agencies, nonprofit organizations, and private landowners to preserve, protect and restore the resources of the California coast and San Francisco Bay. Within the San Francisco Bay Program, the Conservancy addresses both resource conservation and recreation goals, including improving public access. The Conservancy is identified in the San Francisco Bay Area Water Trail Act as the agency responsible for implementing the Water Trail plan, and is likely to be one source of funding for water trail projects. To be eligible for funding, water trail projects must be consistent with requirements in the Bay Program's enabling legislation by not causing "significant adverse impacts on… environmentally sensitive areas and wildlife, including wetlands and other wildlife habitats."[116]

Counties and cities around the Bay also own and manage shoreline areas and wetlands as waterfront parks and open space. These areas are primarily managed for recreation, but many waterfront parks contain significant natural areas with important habitat and resource values, and as a result, are managed for both recreation and preservation of these values. The management objectives for a park are described in its master plan.

Different types of special districts own and/or manage Bay shoreline and waters. Regional park and open space districts own and manage substantial portions of the Bay shoreline. The East Bay Regional Park District's (EBRPD) management priorities range from

---

[109] Wildlife Areas adjacent to the Bay: San Pablo Bay, Petaluma Marsh, Napa-Sonoma Marshes, Hill Slough, Grizzly Island and Point Edith.

[110] Ecological Reserves adjacent to the Bay: Corte Madera Marsh, Redwood Shores, Bair Island, Albany Mudflats, Marin Islands, Napa River.

[111] State Marine Parks in the Bay: Albany Mudflats, Marin Islands, Bair Island, Redwood Shores and Corte Madera. Robert Crowne

[112] Robert W. Crown State Marine Conservation Area

[113] Blankinship, T. January-February 1999. "State Wildlife Areas – Valuable places for wildlife and visitors." *Outdoor California.* Vol: 60, No. 1.

[114] Lewis, K. November-December, 2001. "California's Ecological Reserves." *Outdoor California.* Vol: 62, No. 6.

[115] California Department of Fish and Game. n.d. "Definitions." Marine Life Protection Act Initiative. Retrieved May 4, 2006 from: http://www.dfg.ca.gov/MRD/MLPA/defs.html

[116] California Public Resources Code 31162(a).

recreation-focused to emphasizing habitat preservation depending on the park resources.[117] The Midpeninsula Regional Open Space District manages its preserves under a dual mission to preserve and protect natural resources and to provide low intensity recreation and environmental educational opportunities.[118] The District has two Bay shoreline preserves, Ravenswood Preserve and Steven's Creek Shoreline Nature Study Area. Marin Open Space District owns Santa Margarita Island and Santa Venetia Marsh which are preserved for clapper rail and other wildlife, but also offer compatible recreation opportunities.[119] Hayward Regional Shoreline (part of Hayward Area Recreation and Park District) has natural and restored marshes and season wetlands as well as walking and bicycling trails. It is another example of a special district area with dual management objectives.

Flood control districts are responsible for maintaining infrastructure (e.g. flood channels, natural creeks, etc.) to control flood and storm waters. Incidental to these responsibilities, flood districts may "provide recreation facilities in connection with flood control works and improvements," and conduct or coordinate with other agencies to implement projects to protect water quality and restore habitat for wildlife.[120]

Although resource conservation districts (RCD) are not landowners, they are authorized under the California Public Resource Code to work with and provide funding to private and municipal landowners to prevent soil erosion and runoff and improve water quality and natural habitat. Suisun RCD and Southern Sonoma County RCD potentially intersect with water trail activities. Provision of recreation is not an objective of RCDs.

Quite a few of the existing NMSB launch sites around the Bay are in marinas (both public and private). Marinas have authority as well as certain obligations to implement rules and policies to prevent wildlife, habitat and water quality impacts on their properties.

Bay shoreline areas are also owned and managed by private entities (e.g. ports, businesses, homeowners, non-profit organizations) with a diversity of interests. Private owners can (and some do) provide on-water access and recreational opportunities that are open to the public.[121] Some private land owners have specific management objectives aimed at protecting habitat and wildlife. For example, Sonoma Land Trust owns and/or manages numerous wetlands restoration projects along the Petaluma River and Tolay Creek that are intended to enhance habitat for endangered species and other wildlife.[122]

---

[117] East Bay Regional Park District (EBRPD) and the California Coastal Conservancy (CCC). 2002. Eastshore State Park General Plan. Prepared for the California Department of Parks and Recreation, EBRPD and CCC, p. III-7.

[118] Midpeninsula Regional Open Space District. "About the Midpeninsula Regional Open Space District." Retrieved April 28, 2006 from: http://www.openspace.org/about_us/default.asp

[119] Marin Open Space District. n.d. "Santa Margarita Island and Santa Venetia Marsh." Retrieved May 2, 2006 from: http://www.co.marin.ca.us/pos/MCOSD/os_park_29.asp

[120] 1951:1617:3638; D.A. 1656; West 63. "Contra Costa County Flood Control and Water Conservation District Act,"; and 1951:1617:3638; D.A. 1656 §5(14); West 63. "Contra Costa County Flood Control and Water Conservation District Act;" and Alameda Flood Control and Water Conservation District. n.d. Home page. Retrieved on May 9, 2006 from: http://www.acgov.org/pwa/acfcdweb/web/home.html

[121] Like other land owners described in this section, private entities may be required to offer public access to the shoreline in a BCDC permit for Bay fill or shoreline development. In these cases, the access would have to be consistent with the Bay Plan policies for protection wildlife, habitat and environmental quality.

[122] Sonoma Land Trust. n.d. "Mision Statement." Retrieved on May 10, 2006 from: http://www.sonomalandtrust.org/mstat.htm

Staff Recommendation

Given the range of potential wildlife, habitat and water quality issues related to the water trail, the areas where impacts could occur in the Bay, and the existing management framework, the staff recommends that the Steering Committee revise and adopt four principles to structure how the water trail approach addresses these issues.

1. Identify sensitive areas where access should be managed or prohibited;
2. Articulate the components of a site-specific assessment that determines where to locate and how to develop, improve and manage trail heads to minimize or avoid significant adverse effects;
3. Develop detailed, feasible strategies for managing long-term use of the trail facilities and the Bay to minimize or avoid significant adverse effects to wildlife, habitat and water quality; and
4. Adapt a 'Leave No Trace' outreach program and boater curriculum for the water trail.

The principles adopted by the Committee will guide the development of detailed strategies to fully address the range of wildlife, habitat and water quality concerns identified by the Committee and others.

Discussion. The first principle originates from amendments to the McAteer Petris Act that require the water trail plan to make recommendations that identify "sensitive wildlife areas where access should be managed or prohibited."[123] In some cases the existing management framework provides clear criteria for this. For example, 'take' (which includes harassment) of a listed species such as a California clapper rail is a significant adverse impact under the ESA and CESA. Disturbances of harbor seal haul outs can directly reduce survival of pups or possibly lead seals to abandon a haul out site. These effects fall within the MMPA definition of 'harassment' and should be considered significant. The MBTA has been interpreted to define disturbance of nesting birds that leads to nest abandonment or increased nest predation as a 'take.' This too should be considered a significant adverse impact. The water trail plan should reflect these regulatory criteria, and identify where and when these types of impacts might occur. For example, the plan might recognize that harbor seal pupping sites are especially vulnerable to disturbance during breeding season, and describe various measures (e.g. a boat exclusion area, enhanced signage, guided tours, etc.) that water trail and resource managers can implement to prevent significant adverse impacts.

For most issues and situations described in this report, existing laws, policies and plans do not offer clear significance criteria, and we lack necessary information and time to make these detailed, case-by-case assessments in this overall trail planning process. These gaps highlight the need for the second principle: site-specific assessment. The water trail plan should provide guidance on how trail and resource managers locate, develop and manage new launch facilities and improve existing ones such that significant adverse impacts are minimized or avoided. This type of guidance has been developed for public access in general as part of the BCDC Bay Plan. Policy 4 under Public Access states that:

> Public access should be sited, designed and managed to prevent significant adverse effects on wildlife. To the extent necessary to understand the potential effects of public access on wildlife, information on the species and habitats of a proposed project site should be provided, and the likely human use of the access area analyzed. In determining the potential for significant adverse effects (such as impacts on endangered species, impacts on breeding and foraging areas, or fragmentation of wildlife corridors), site specific

[123] California Code of Regulations 66694(a)(5).

> information provided by the project applicant, the best available scientific evidence, and expert advice should be used. In addition, the determination of significant adverse effects may also be considered within a regional context. … Where appropriate, effects of public access on wildlife should be monitored over time to determine whether revisions of management strategies are needed.

This policy provides a foundation for developing more detailed site assessment strategies that address wildlife, habitat and water quality issues.

Using the information from a site-specific assessment, water trail and resource managers should implement management strategies that facilitate long-term use of the trail facilities while protecting Bay resources. As the third principle states, the water trail plan should articulate feasible management strategies that a trail head manager can implement to minimize or avoid significant adverse impacts. (The Steering Committee will address these strategies in Meeting 4.)

The fourth principle for the water trail plan stems from the need for a comprehensive education and outreach program to teach NMSB users about the potential impacts of their recreation activities and proper boating practices to minimize and prevent adverse effects, and encourage a strong ethic among boaters to follow these practices. To accomplish this, other water trails such as Maine Islands, Chesapeake Bay, Locks to Lakes (Seattle) and Cascadia Water Trails, implement customized versions of the Leave No Trace (LNT) outreach and boater training curriculum.

> Leave No Trace is an national and international program designed to assist outdoor enthusiasts with their decisions about how to reduce their impacts when they hike, camp, picnic, snowshoe, run, bike, hunt, paddle, ride horses, fish, ski or climb. The program strives to educate all those who enjoy the outdoors about the nature of their recreational impacts as well as techniques to prevent and minimize such impacts. Leave No Trace is best understood as an educational and ethical program, not as a set of rules and regulations.[124]

The Washington Water Trails Association (WWTA) and Maine Island Trail Association (MITA) have adapted the seven principles of LNT to address the needs of the NMSB trails that they manage. These associations educate boaters through trail guidebooks, boater-to-boater outreach, trail head signage, special LNT workshops and trainings and information at their websites. Reed Waite, Executive Director for the WWTA, views LNT outreach and education as the most effective tool that water trail managers have to minimize negative impacts to natural resources, keep the trail heads maintained and minimize trail user conflicts.[125] Staff recommends that the Comittee develop a similar model for the Bay Area Water Trail. This LNT-approach offers a valuable management tool for NMSB activities on the Bay– particularly for addressing wildlife, habitat and water quality issues at the many existing launch sites.

Certain conditions in the Bay Area create unique water trail issues that are not addressed (or are under-emphasized) in the original LNT principles and the WWTA and MITA adaptations. To better fit the needs of the Bay Area Water Trail, we can modify the LNT principles and also draw on 'watchable wildlife' practices.[126] Table 4 outlines a set of potential Bay-specific trail-user principles to initiate discussion at the upcoming Steering Committee meeting on June 6th.

---

[124] Leave No Trace Center for Outdoor Ethics. n.d. "Leave No Trace Programs." Retrieved on May 12, 2006 from http://www.lnt.org/programs/index.html

[125] Reed Waite, Washington Water Trails Association, Executive Director. November 11, 2005. Pers. comm..

[126] Watchable Wildlife Inc. n.d. "About Us." Retrieved May 12, 2006 from http://www.watchablewildlife.org/about/default.htm

Table 4. Proposed Bay Area Water Trail LNT principles.[127]

Plan ahead and prepare	**Educate yourself.** Know your destination, navigational and other regulations, hazards, topography, and trail head facilities. Know your wildlife, and whether sensitive or closed wildlife areas are on your route. **Plan for yourself and your group.** Match skills, behavior and group size with the type of destination and expected boating conditions. **Schedule your trip in advance.** Check tide tables, study the nautical charts and trail head maps, and obtain permits and make reservations. Notify someone of your trip plans – better yet, leave a float plan. **Use proper gear.** Be prepared for weather, hazards and emergencies. Bring appropriate attire and gear, food, water and emergency equipment such as a VHF radio and know how to use it. **Plan your meals.** Avoid leftovers and repackage food in reusable containers to minimize waste.
Use designated trail heads	**Launch, land and camp in designated locations.** To avoid damaging fragile habitat along the Bay shoreline (e.g. pickleweed and cordgrass) or getting stuck in thick mud, launch, land and camp only at designated sites, and stay on marked paths and campsites at the trail heads.
Dispose of waste properly	**Pack it in. Pack it out.** Know the trail head facilities and be prepared to pack out all trash, garbage and solid human wastes depending on the situation. (Food scraps should be picked up and packed out as well. Reducing food waste helps prevent animals from becoming attracted to humans as a food source.)
Leave what you find	**Leave natural features undisturbed.** Take only photos and memories with you. One visitor picking plants or taking a souvenir may seem harmless but the cumulative effect of many visitors doing so is quite damaging. **Avoid spreading invasive species.** Wash your boats and gear. **Preserve the past.** Do not excavate, disturb or remove cultural or historic structures or artifacts.
Respect wildlife	**Avoid sensitive times and habitats.** Learn about local marine wildlife and where and when to avoid paddling to minimize impacts. **Observe from a distance.** Avoid approaching wildlife. Use binoculars or a zoom lens on your camera to get an up-close view. If the wildlife is watching you or moving away (flushing) from you, you're too close.
Boat safely and be considerate of others	**Respect other visitors.** Keep noise levels down. Travel in small groups making use of bright colors on the water and muted colors on land. **Know and follow navigational rules.** Yield to other vessels and make your intentions clear on the water. **Let nature's sights and sounds prevail.** Avoid the use of bright lights, radios, electronics and other intrusive devices.

[127] Adapted from Maine Islands Trail Association. n.d. "Leave No Trace on Maine's Fragile Islands," http://www.mita.org/ ; and Washington Water Trails Association. n.d. "Leave No Trace Paddling Principles," http://www.wwta.org/lnt/principles.asp; and CDFG. 2006. "Watchable Wildlife," http://www.dfg.ca.gov/watchable/index.html; and Watchable Wildlife Inc. n.d. "Marine Wildlife Viewing Guidelines," http://www.watchablewildlife.org/publications/default.htm. All documents were retrieved on May 22, 2006.