SAN FRANCISCO BAY

SAVE WETLANDS

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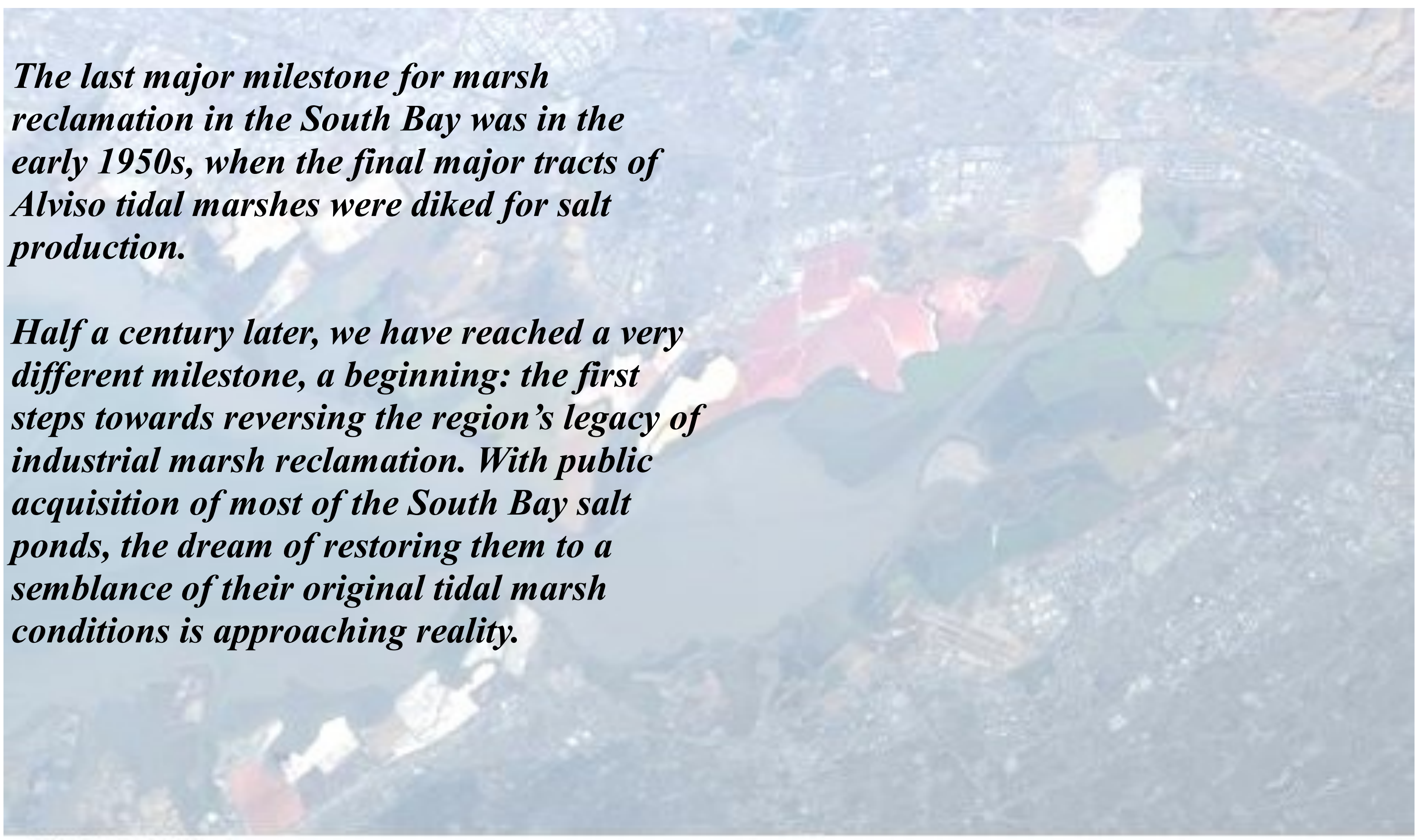
Vision for Restoration of South Bay Salt Ponds: dream or fugue?

[fugue: 2. Psychiatry. a period during which a patient suffers from loss of memory, often begins a new life, and, upon recovery, remembers nothing of the amnesic period. – Random House College Dictionary]

By Peter Baye, Ph.D., coastal plant ecologist



The last major milestone for marsh reclamation in the South Bay was in the early 1950s, when the final major tracts of Alviso tidal marshes were diked for salt production.

Half a century later, we have reached a very different milestone, a beginning: the first steps towards reversing the region's legacy of industrial marsh reclamation. With public acquisition of most of the South Bay salt ponds, the dream of restoring them to a semblance of their original tidal marsh conditions is approaching reality.

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The recent acquisition of 16,500 acres of Cargill saltponds represents an unprecedented and incredible opportunity to reclaim natural bay ecosystems in the south bay.

This opportunity does not come without challenges, including the great responsibility to make informed decisions. There are some daunting realities today that were not part of the original vision for completing the Refuge. Some of these challenges are internal to the South Bay Restoration Project — matters of funding, management, and the politics of public land use – all negotiable, at least in principle. Others are major external biological and physical changes in the bay that may force difficult or unpopular choices, or have unavoidable or irreversible ecological consequences for the estuary. How we deal with these challenges may make the difference between realizing the dream of actually restoring the South Bay's native tidal marsh landscapes, or the mere rehabilitation of crude surrogates. As the burden of restoring these unprecedented acreages of baylands weighs on the lead agencies, it is almost inevitable that there will be pressure to scale back the original vision of South Bay restoration to a paler, pragmatic, budget-bound version -- or even worse, be forgotten or set aside.

This article examines how our visions of marsh restoration have evolved over the last several decades. Scientific and management perspectives of what constitutes desirable tidal marsh restoration have matured since the pioneer days of salt marsh restoration when pickleweed and cordgrass cover were the prevailing naïve standards. As we have come to better understand the importance of habitat complexity, biological diversity, and the fit between wetland communities and their physical setting, our aims at tidal marsh restorations have become more ecologically realistic and meaningful. From this perspective, this article focuses on several key aspects of tidal wetland restoration in the South Bay that we dare not take for granted. They include:

How we deal with these challenges may make the difference between realizing the dream of actually restoring the South Bay's native tidal marsh landscapes, or the mere rehabilitation of crude surrogates.

- The need to design and implement South Bay marsh restoration to ensure sustainable dominance by native Pacific marsh vegetation, rather than the ascending "new dominant" nonnative South Bay marsh plant, hybrid *Spartina alterniflora*;
- Avoidance of fragmenting restored tidal wetland and related habitats in artificial, unbalanced geographic patterns;
- The need to emphasize restoration of key habitats that simply cannot restore themselves, such as high marsh and transitional upland zones within and peripheral to salt marshes;
- The importance of designs that allow or promote a diversity of habitat within salt marsh complexes, especially pans (ponds and unvegetated flats) and natural levees.

For those citizens who for decades have been dedicated to realizing the dream of restoring tidal wetlands in the South Bay salt ponds, the tour of duty is far from over. Now that real plans and decisions about large-scale salt pond restoration are on the horizon for 2005, it will be more important than ever to maintain the integrity of the original vision for the restored South Bay marshes, and to keep it at the forefront of decision-making.

Evolution of the ideal: restoration of the south bay marshlands

The ideal vision of restored South Bay salt marshes has evolved a great deal over the last four decades. The earliest days of deliberate salt marsh restoration in the 1970s pursued very narrow objectives: rapid cover by pickleweed and cordgrass to provide habitat for clapper rails, salt marsh harvest mice, and other wetland-dependent wildlife. Usually, objectives were driven by specific mitigation requirements and the constraints of small diked parcels. Nobody aimed at restoration of natural ecosystem processes and patterns, historic biotic communities, species diversity, or integration of wetland habitats in a coherent landscape. A global view of salt marsh restoration including all of its associated adjacent habitats was non-existent. Even the 1984 recovery plan for the California clapper rail and salt marsh harvest mouse viewed "restoration" of a salt marsh as a parcel-by-parcel strategy bounded by artificial levees.

Some of the results of the early salt marsh restoration efforts, like Salt Pond 3 (Hayward Shoreline), favored heavy-handed engineering over attention to ecological process and pattern. The prevalent restoration model for San Francisco Bay salt marsh even into the 1990's was simply a diked pickleweed plain fringed with cordgrass. The gold standard for salt marsh restoration was occupancy by endangered species, no matter how simplified or artificial the marsh. Biodiversity, complexity, and natural patterns and processes of tidal marshes were not emphasized in early tidal marsh restoration projects.

The San Francisco Bay Area Wetlands Ecosystem Goals Project (Goals Project) provided a stronger scientific blueprint and rationale for wetland restoration of the South Bay. With early guidance from the San Francisco Estuary Institute, it put the big picture first, introducing perspectives from pre-historic and historic tidal marsh landscapes, and included the integration of multiple habitat types, species-specific ecological requirements, and physical processes. It assembled an unprecedented amount of collaboration and expertise among wetland scientists and managers in the region, still unmatched.

The Goals Project was not a static parcel-by-parcel restoration design, but provided a general, robust regional rationale for restoration. It allows for the flexible adaptation of new scientific information as estuarine restoration is implemented over time. *But it also set a deservedly high standard for an ecologically coherent wetland landscape in the south bay.*

Will the South Bay Restoration Project extend and amplify the Goals Project, building on its strengths, and compensating for its limitations? Or will the Goals Project recommendations be viewed merely as a form of early public outreach prior to the design phase of the South Bay restoration?

As a long-term participant in the Goals Project, and a former U.S. Fish and Wildlife Service planner for endangered species ecosystem recovery plans for coastal California estuaries, I offer the following thoughts about the continuity between the emerging restoration plans for the South Bay, and the vision and planning that preceded it.

The fate of perimeter salt pond levees: restoration of critical high marsh habitat, or retention of terrestrial predator corridors and den/ nest sites? Key questions: Where will recreational trails be a priority, and where will high marsh be a priority for restoration of salt pond levees?

Premiums and pitfalls for the South Bay restoration: matters of size.

Intrinsic benefits of large-scale salt marsh restoration.

One of the most heartening aspects of the south bay restoration is its sheer size. When habitat restoration occurs at a very small scale, the resulting habitats often develop in off-target patterns not befitting natural physical and ecological patterns. This is one of the many reasons why highly specific restoration criteria often fail in small micro-managed sites.

One of the advantages of restoring large salt ponds to tidal processes is that there is room for variable, somewhat unpredictable outcomes of habitat development. Restoration of large, complex slough systems still embedded in salt ponds may revive many of the physical patterns and processes that maintain important natural habitat structure in San Francisco Bay salt marshes. Instead of having to artificially re-engineer functional facsimiles of natural marshes, much of the original structure can simply be cultured in place if native species can dominate.

Some typical problems of restored tidal marshes, like excessive predation of resident marsh wildlife by red fox, can be addressed simply by creating wide expanses of tidal marsh whose interiors are far from terrestrial edges thus creating deep, remote marsh and slough systems that limit efficient access by foxes.

In the long term, restoring tidal marsh in the huge footprints of salt ponds, or fused complexes of salt ponds, should help dissipate chronic predation or disturbance impacts. Where very large new tidal marshes become buffered by miles of sloughs and marsh plains, free of artificial levees and upland fills, predation and disturbance of marsh habitat along the urban edge may become a proportionally smaller problem than in recent history.

This ecological scale is one of the greatest inherent potential assets of the south bay restoration, and is a cause for hope of its long-term success for recovering the California clapper rail. Even a "shotgun" approach to restoration has a chance of being successful, given enough shotguns and large enough targets; with careful scientific aim the odds for success are even better.

Fragmentation by recreational trails.

If, however, the recreational demand for perimeter trail networks prevails over ecological restoration objectives, the greatest inherent benefits of large-scale salt marsh restoration would be severely degraded or forfeited. Retention of upland levees with maintained trails would bring most or all of the newly restored salt marsh within easy reach of all terrestrial visitors, human and non-human. Remote bayshore trails may be intended for human enjoyment, but will also be used as bayshore superhighways by rats, foxes, dogs, and raccoons seeking access to a restored restaurant of marsh and mudflat delicacies. Eliminating incompatible artificial levees and recreational trails is at least as important for recovery of endangered wildlife as the physical restoration designs for the marshes.

Trails have a different effect around baylands with open water feeding and roosting habitats like salt ponds than when the interior is salt marsh, and the resident wildlife have local home ranges and nest sites.

Gambling the south bay marshes on a corrupted flora: is wetland weed invasion "restoration"?

Large-scale restoration of ecosystem processes can buffer errors in restoration design, but it also has the potential to magnify some problems to an unmanageable and irrevocable extent. **In my view, the single greatest threat to the integrity of existing and restored tidal marshes is the accelerating spread and dominance of the aggressive invader, hybrid smooth cordgrass, *Spartina alterniflora* x *foliosa*.** The ecological consequences of this biological invasion are still grossly underestimated, and poorly understood, by many wetland conservationists and managers. The new hybrid cordgrasses of San Francisco Bay do not represent a mere substitution of one plant species for another within an intact community, but a systemic, fundamental *replacement* of the structure, function, and community composition of South Bay tidal marshes. The hybrids effectively create distinctively Atlantic salt marsh types in a Pacific setting.

The timing of levee breaching to tides: sequence hybrid *Spartina* control, and creation of vast new *Spartina* seedling nurseries in flats of salt pond interiors. Key questions: Will the successful control of hybrid *Spartina* invasion be a prerequisite for levee breaching, a contingency for scheduling the start of restoration? Or will project management schedules alone determine the timing of levee breaches, risking proliferation of hybrid infestations at the cusp of control?

The new hybrids have eclipsed the original non-native species *S. alterniflora*, and have confirmed their the ability to rapidly dominate breached-levee restoration sites. They spread by leaps and bounds not only by seed, but by super-fertile hybrid pollen as well, making hybrid factories out of native cordgrass stands. The pattern of hybrid cordgrass dominance in restored tidal marshes has given new meaning to "if you build it they will come".

Because of the huge scale of salt pond restoration, "passive" revegetation – allowing seeds dispersed by tides to settle, germinate, and establish in new flats – is by necessity the primary method for restoring tidal marsh vegetation. It works miraculously well when the neighborhood pioneer flora (species capable of directly colonizing new mudflats) is healthy and composed of native species: for example, Napa Salt Pond 2A yielded over 500 acres of luxuriant native cordgrass-bulrush marsh a few years after breaching, with no human "restoration" assistance. But most of the South Bay's marsh seed banks are currently quite corrupted by hybrid *Spartina alterniflora*.

Unfortunately the current state of marsh restoration sites like Cogswell Marsh, Martin Luther King Marsh, Cargill Mitigation Marsh, and Oro Loma Marsh confirm this. Tidal mudflats in breached salt pond interiors act as seedling nurseries for cordgrass. When salt ponds are breached while hybrid seeds still predominate, hybrid cordgrass dominates the new vegetation.

Weeding out hybrid cordgrasses among native cordgrass in interbreeding mixed colonies over hundreds of acres is impossible. "Control" of non-hybrid weeds works when they are a growing minority, not the overwhelming majority from the start. Most of the recent restored salt marshes in the central and south bay have been overwhelmingly or exclusively dominated by hybrids that have to be eliminated. Reinfestation of treated restored marshes is inevitable until seed sources are also eliminated. Eradication is the only feasible end-point for "managing" an aggressive hybrid population that spreads by both pollen and seed. The concept of "managing" or "controlling" hybrid cordgrass, as though it were a typical weed species subject to selective removal, is basically wishful thinking.

When the dominant vegetation in a tidal restoration site is a non-native weed that forms stable, mature vegetation – what exactly does "restoration" mean? Can conversion of salt pond to uniform meadows of hybrid S. *alterniflora be considered meaningful "restoration" of San Francisco Bay tidal marsh? Or is it merely the "greening over" of one artificial habitat (salt ponds) for another (alien cordgrass meadows)*?

This is an urgent contemporary issue, not just a future one. The Baumberg salt ponds were scheduled for tidal restoration in 2004. The Baumberg site is effectively at the epicenter of the hybrid *Spartina* invasion. The scheduled breach time was delayed to avoid creating hundreds of acres of new hybrid marsh, but it isn't at all clear what will happen in 2005. It is certain that control of hybrid seed sources will not be close to complete in one year, even if initial treatments are highly successful.

A colony of hybrid Spartina alterniflora-S. foliosa marches across a large natural shallow pond (flooded salt pan) within a pickleweed salt marsh, converting dabbling duck and shorebird habitat within the marsh to solid vegetation. The prospects for "internalizing" natural patterns of habitat diversity and abundance of waterfowl and shorebird habitat within restored tidal marshes are poor if hybrids spread during restoration. The artificial dichotomy between managed pond habitat and restored tidal marsh as high and low quality waterbird habitat would be magnified by "restoration" with a hybrid cordgrass ecosystem. Photo by Peter Baye

How will the larger South Bay restoration project deal with integration of the schedules for levee breaching and hybrid *Spartina* control? Although coordination between the regional *Spartina* Control Program and the South Bay restoration exists, the control of invasive hybrid cordgrass has *not* been proposed as a prerequisite for tidal restoration. Yet if effective control of hybrids is not a prerequisite to breaching, all evidence indicates that hybrids will become persistent dominants of restored marshes.

No doubt any restoration project manager would be reluctant to explain to legislators, resource agency and foundation executives that schedules are off for levee breaching ribbon-cutting ceremonies because something as trivial-sounding as "weed control" is still in progress, and doesn't have a certain date of completion! Nonetheless, we need explicit discussions among responsible resource agencies about criteria for salt pond breaching based on thresholds of "manageable" rates of hybrid *Spartina* invasion. To do otherwise will effectively guarantee that hybrid cordgrass will permanently invade and persist in all "restored" salt marsh in the San Francisco estuary and neighboring Pacific estuaries.

For clapper rails invasive hybrid cordgrass is a mixed blessing. In youth, hybrids expand marsh area rapidly, and grow lush and taller than the height of peak tides. The newly expanded marsh initially provides attractive, useful cover and nesting habitat for rails. However, clapper rails, both Atlantic and California subspecies, generally nest within about 15 feet of tidal channels and marsh edges, where they prefer to feed. The hybrids invade and choke small tidal channels (existing ones or newly restored ones) as easily as they do the flats. Solid stands of hybrid cordgrass would, in the end, have negative impacts on the endangered clapper rail.

When we look at aerial photos of preserved, intricate networks of fine, shallow, sinuous channels in salt pond beds, we anticipate the restoration of these distinctively Californian marsh signatures. But these quintessential San Francisco Bay salt marsh patterns are also engulfed by hybrid *Spartina* meadows, leaving only the larger sloughs with mud beds and banks.

The potential impacts of hybrid cordgrass on restoration of salt ponds are sometimes misrepresented or misunderstood as subtle botanical nuances between indistinguishable sibling marsh grasses. On the contrary, the differences between a South Bay restored with hybrid cordgrass and native California cordgrass is a choice between actual restoration of native salt marsh habitat (described previously) and all its associated functions and values for wildlife, or its replacement with an Atlantic salt marsh vegetation pattern and structure. "Restoration" with hybrid cordgrass in the long term ultimately implies the extinction native Pacific cordgrass in San Francisco Bay.

The ability of hybrid *Spartina* to invade smaller tidal sloughs has ecological ramifications. Lacking drainage from small channels in marsh interiors, Atlantic *S. alterniflora* marshes become waterlogged and naturally support only stunted, sparse, "short-form" cordgrass marsh. A "wait and see" approach to this irrevocable pattern of long-term marsh development in the restored south bay tidal marshes would be a gamble.

If hybrids are allowed to invade thousands of acres of newly breached ponds, the prospect of containing infestation of the rest of the bay is virtually nil. The North Bay, and other California estuaries, would be indefensible against the massive seed production and dispersal from the South Bay. And with accelerated sea level rise, the robust hybrid *S. alterniflora* would have an even more lopsided competitive advantage over all native salt marsh vegetation.

The decisions made about the priorities and integration of hybrid *Spartina* control and restoration will be the most fundamental, far-ranging, and enduring influences on the fate of the San Francisco Bay now, and into geologic time. All other restoration decisions, even high-profile controversies such as recreational access on levees, can either be revisited and modified, or could eventually become moot as sea level rises. *The Spartina question is the ultimate test of short-term versus long-term planning for the restoration of the Bay: if the premature large-scale restoration of tidal marsh irreversibly enlarges the hybrid cordgrass population beyond control, the ecological fate of the estuary will be sealed.*

One of the many variable forms of the hybrid Spartina alterniflora-S. foliosa establishes a colony that extends from the banks of a tidal channel near the Don Edwards Refuge headquarters, up, through, and over high salt marsh previously dominated by pickleweed and gumplants along the banks. As the ecological range of the rapidly evolving hybrids proceeds, and the hydrology of the south bay changes with large-scale restoration and the inevitable sea-level rise, having the hybrid swarm in the mix of restored marsh vegetation will risk replacing diverse native salt marsh vegetation with monotypic wetland weeds. The idea of perpetually "managing" such an invasion within "acceptable" levels, may sound feasible, but in reality may be extremely difficult to achieve, if at all. Photo by Peter Baye

In the South Bay, native grassland transitions such as those found on alluvial fans at Point Pinole, no longer exist. Instead, intact native high salt marsh transition vegetation on terrestrial soils of natural, gentle topographic gradients have generally been replaced by steep dikes made of artificial bay mud soils (wetland muds placed in terrestrial environments) that go "sour" (acid, iron-rich, nutrient-rich clays), encouraging the rampant growth of non-native weeds over natives. Steep levees force native high marsh into artificially narrow zones at marsh edges. Most tidal restoration projects have traditionally focused only on the growth of marsh plains, and provide arbitrary, unnatural designs for the high marsh and transition zone, re-casting them as token bands of coyote brush or gumplant which are capable of tolerating drained bay mud soils, rather than diverse native communities. Will large-scale restoration of the south bay salt ponds recreate more of the same, or will we seize this tremendous opportunity to recapture vital lost habitats in the South Bay? Photos by Peter Baye

The dikes of the SF estuary are generally dominated by non-native vegetation, usually the same variable palette of weeds in the South and North Bay. In contrast, native high marsh vegetation historically displayed regional variation of native species diversity. The regional extinction of much of the salt marsh flora is associated with the replacement of high marsh transition by dike soils and slopes. Photo by Peter Baye

Ecotones and engineering: will restoration pay for transitional habitat or bigger and better levees?

One of the principal differences between natural tidal marshes and restored diked baylands is the nature of their edges; the transitions between upland and marsh, or terrestrial wetlands and tidal wetlands. These transition zones (ecotones) that previously included grasslands, vernal pools, freshwater marshes, beaches, and riparian scrub or woodland have been replaced by artificial levees with weedy, abrupt slopes.

Conventional mitigation marshes, focusing narrowly on acre-for-acre replacement of the gold standard "jurisdictional wetland" for the least cost and acreage, generally squeeze as much tidal marsh as possible on to any given restored diked bayland parcel, keeping narrow, steep levees as compressed as possible. No extra credit is given for broad, gently sloped upper marsh transition zones – even though these support some of the most important sub-habitats and highest species diversity in the ecosystem. Linkages to other scarce bay habitats, such as shell or sand beaches, grasslands, riparian scrub, have generally been ignored or avoided.

The integration of new flood control levee design with habitat restoration: Key questions: will flood control levee design take on the added cost of wider, gentler slopes, with variable sediment texture, to establish naturalistic marsh transition zones? Will flood control levees be designed for conservative rates of sea level rise, or the full range of forecast accelerated sea level rise?

Old habits die hard. While the Goals Project emphasized the importance of edge habitats and transition zones for biodiversity and habitat, most tidal marsh restoration projects in the region continue to allocate much of their budgets to engineering and construction of flood control levees, with very limited (if any) resources for added costs of transition zones.

Will the South Bay restoration, under pressure to control budgets, construction complexity, and appease demands for recreational use of levees, be able break this habit? This may depend on how persuasive a case consulting scientists, scientific reviewers, and the public make for the importance of high marsh-upland transition zones.

Not all upland edges were gentle high marsh gradients, and along much of the bayshore, open water features divided marsh and land. Detailed mid-19th century maps of South Bay tidal marshes reveal the upland/tidal marsh edge was often marked by very large, elongated ponds, not gradients linking marsh and land. Our impressions of the "upland transition zone" are overly influenced by existing artificial levees and slender marsh fringes along sloughs, highly unnatural patterns.

Are high marsh transition zones exclusively found at the edge of the bay? The natural levees along large tidal sloughs provide more extensive elevated high marsh habitats than upland edges. Resident marsh wildlife that spend most of their lives confined to their home ranges have to find local high tide cover during floods. Local emergent cover provided by tall gumplants and the woody debris they often trap are at a premium for wildlife inhabiting remote, deep marshes far from terrestrial borders. The subtle topographic and drainage gradients of natural levees along the banks of tidal channels are the prime source of "internal" high marsh cover. While these features develop naturally, they are essentially mature marsh features, and probably take decades to develop under optimal conditions. With accelerating sea level rise, their prospects for timely self-restoration are remote.

Many local naturalists and biologists have long known the incidental side-cast "islands" in salt ponds, formed by mudslinging clamshell dredges at work on levees and borrow ditches, often become very valuable habitat for shorebirds and terns. The same topographic relief, casually constructed in a tidally restored salt pond, would have comparable benefits for future resident marsh wildlife. Low side-cast dredge spoil along channels within salt ponds may approximate mature natural levee topography that provides critical cover when the tidal marsh plain is flooded. Any dredge or excavation work inside salt ponds, even with minimal engineering design, would add to restoration costs, but the ecological dividends may be great. *Side-cast spoils may be a very wise investment as a hedge against failure to form critical high tide cover in restored tidal marsh interiors as we are challenged by accelerated sea level rise.*

Shorebirds and waterfowl conservation: separate is not equal.

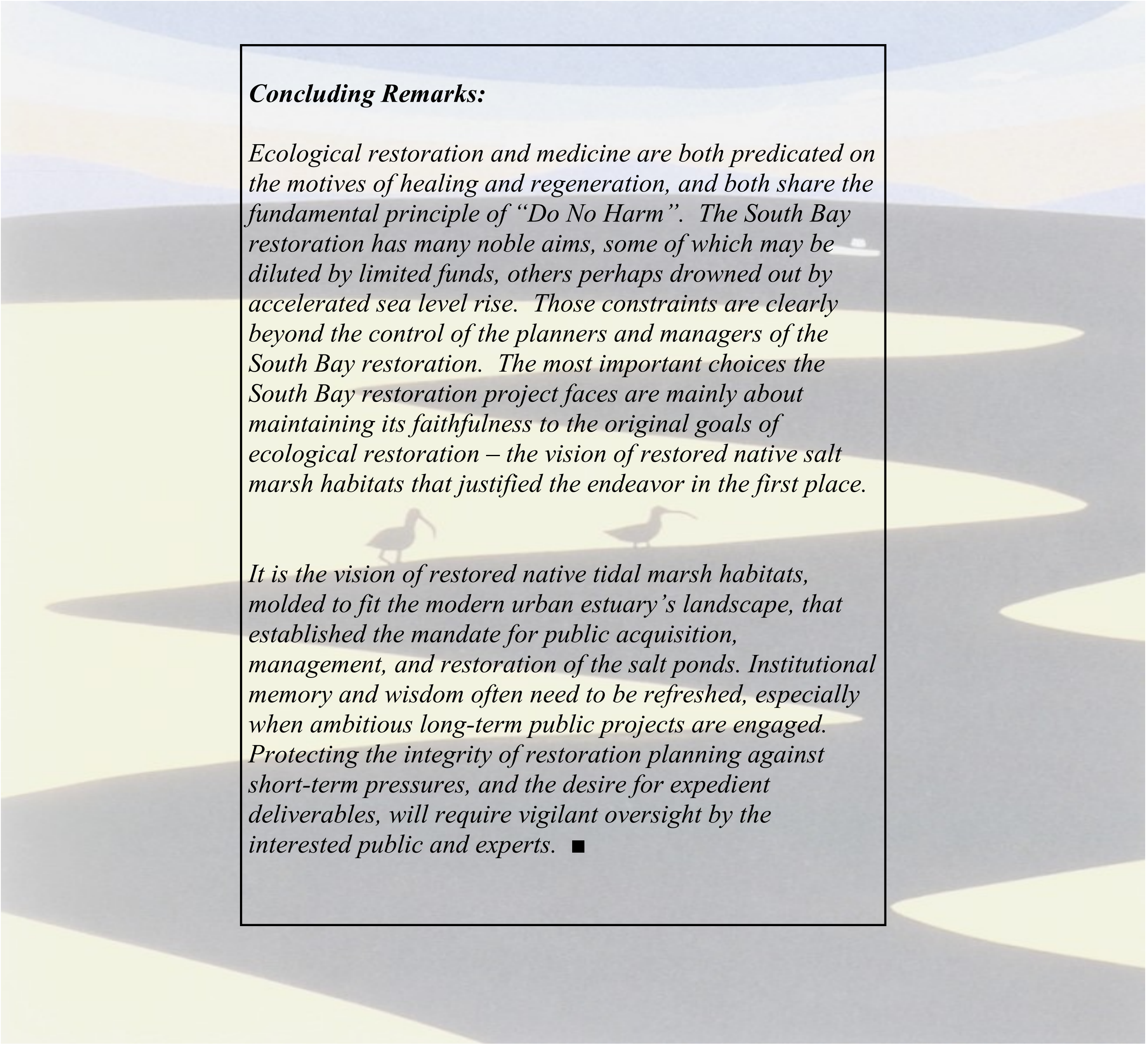
A traditional working assumption for wildlife biologists has been that salt ponds have high habitat value for a wide range of shorebirds, and salt marshes have very limited habitat value for a narrower range of shorebirds. This assumption is also strongly influenced by impressions of the prevalent artificial patterns of simplified, young salt marshes along the fringes of levees along sloughs.

This simple dichotomy about marsh and pond habitat value for shorebirds neglects the scale and structure of pre-reclamation salt marsh systems that contained huge ponds, flats, and salt pans. In some parts of the South Bay, pans and ponds covered more of the marsh plain than vegetated marsh itself. Thousands of smaller ponds (perennial saline pools) and pans (seasonal pond beds that dry down to salt flats) with "duck-food" submerged plants like wigeongrass (*Ruppia,* resembling a wiry seaweed, and often cloaked in algae) were interspersed in prehistoric marsh plains.

Large pans have regenerated themselves rapidly in the tidally restored Napa Pond 2A, and they have formed spontaneously in the larger modern fringing salt marshes in lower Mowry and Newark Sloughs, It is exactly this vast scale of salt marsh, so conducive to formation of pans and ponds that we are planning to restore. In contrast, most of the narrow, historic, fringing salt marshes we know today in the south bay are sparsely provided with pans; nothing like historic large saline "lakes", flats, and salt ponds that existed in compressed salt marsh spaces.

If the potential for restored salt marshes to develop internal shorebird habitats is neglected, we may overlook important opportunities to reduce the artificial segregation of managed pond and tidal marsh habitats. Very few tidal marsh restoration designs have actively aimed at forming "natural" pond or pan habitats. The Goals Project highlighted and justified the potential to integrate them in restored marshes. Will this objective become eclipsed by the "salt pond conversion model" that adopts the polarized traditional assumptions about fringing tidal marsh habitats for shorebirds? If pans and ponds internal to salt marsh become marginalized during the restoration planning process, we may permanently forfeit the opportunity to reunite these habitats in a natural landscape pattern.

Dr. Peter Baye is a coastal plant ecologist. He has studied coastal



Concluding Remarks:

Ecological restoration and medicine are both predicated on the motives of healing and regeneration, and both share the fundamental principle of "Do No Harm". The South Bay restoration has many noble aims, some of which may be diluted by limited funds, others perhaps drowned out by accelerated sea level rise. Those constraints are clearly beyond the control of the planners and managers of the South Bay restoration. The most important choices the South Bay restoration project faces are mainly about maintaining its faithfulness to the original goals of ecological restoration – the vision of restored native salt marsh habitats that justified the endeavor in the first place.

It is the vision of restored native tidal marsh habitats, molded to fit the modern urban estuary's landscape, that established the mandate for public acquisition, management, and restoration of the salt ponds. Institutional memory and wisdom often need to be refreshed, especially when ambitious long-term public projects are engaged. Protecting the integrity of restoration planning against short-term pressures, and the desire for expedient deliverables, will require vigilant oversight by the interested public and experts. ■

vegetation on the East and West Coasts of the United States, Canada and England. He has worked as an ecologist with the U.S. Army Corps of Engineers. During his time with the Corps he was involved in environmental assessments of the North and South Bay salt ponds, and was also responsible for reviewing tidal marsh restoration plans around the Bay. He worked for the U.S. Fish and Wildlife Service on regional wetlands issues and endangered species recovery plans. Dr. Baye was a long-term participant in the Goals Project, and has served as a technical consultant and in an advisory role for numerous tidal wetland restoration projects in this country and in Japan.

For more information on the South Bay Salt Pond Restoration please visit: http://www.southbayrestoration.org/

The October-December 2004 issue of BayNature Magazine included a special report: Reclaiming the Salt Ponds for Nature and People..
The issue included an article, "Once and Future Bay: Lessons from History for Revitalizing the Bay"
by Robin Grossinger and Peter Baye.
To learn more about BayNature Magazine, please visit: http://www.baynature.com/home.html