San Francisco Bay Area
Wetlands Restoration Program

Letter of Review

Lake Merritt Marsh Restoration Study
Oakland, California
03/07/03

IMPORTANT NOTICE: Please note that project review by the Design Review Group (DRG) does not constitute DRG endorsement of a project nor does it constitute a step in the regulatory and/or permitting process. Project proponents are free to pose questions to the DRG at their discretion and the DRG responds only to those questions deemed within its scope and realm of expertise. The Design Review Team does not intend to reach consensus in all of its feedback and dissenting opinions are included as expressed. All feedback is suggestive and non-obligatory; project proponents are not required to incorporate any or all of the feedback into their project design.

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1. Project Team:

a. Project Proponent(s): City of Oakland (Lesley Estes, contact)

b. Project Presenter to Design Review Group: Markley Bavinger (Wolfe Mason Associations), Lesley Estes (City of Oakland), Laurel Marcus (Laurel Marcus and Associates), and Maxene Spellman (State Coastal Conservancy)

2. Design Review Group Participants:

a. Dates Review Team met to discuss the project: The Design Review Group, including the Lake Merritt Marsh Restoration Study Design Review Team, featured the first presentation of the project on January 6, 2003. Following the presentation, the Team discussed the project and inquired about further information.

The Design Review Group then met again on February 10, 2003, to finalize this Letter of Review.

b. Review Team: Peter Baye - Plants and ecology (Independent Biologist), Rachel Kamman - Engineering and hydrology (Kamman Hydrology), Jasper Lament - Birds and plants (Ducks Unlimited), Michelle Orr - Engineering and Hydrology (Philip Williams and Associates), and Stuart Siegel - Tidal marsh design and function (Wetlands and Water Resources)

c. Non-Review Team Meeting Attendees: (01/06/03) Myla Ablog (Golden Gate National Parks Association), Bob Batha (San Francisco Bay Conservation and Development Commission), Markley Bavinger (Wolfe Mason Associates), John Brosnan (Wetlands Restoration Program), Josh Collins (San Francisco Estuary Institute), Lesley Estes (City of

Oakland), Marti Ikehara (National Geodetic Survey, NOAA), Paul Jones (U.S. Environmental Protection Agency), Roger Leventhal (FarWest Engineering), Karl Malamud-Roam (Contra Costa Mosquito and Vector Control District), Laurel Marcus (Laurel Marcus and Associates), Molly Martindale (U.S. Army Corps of Engineers), Mike Monroe (U.S. Environmental Protection Agency), Becky Smythe (NOAA Ocean Service), Maxene Spellman (State Coastal Conservancy), Kristen Ward (Golden Gate National Recreation Area), Katy Zaremba (Invasive Spartina Project/Coastal Conservancy), and John Zentner (Zentner and Zentner)

3. Review Process:

a. Assistance requested by project sponsor: Lesley Estes, on behalf of the project's planning team, presented a list of issues to the Design Review Team. The list consisted of those issues on which he sought Design Review Team input. Items included:

i. Given that larger restoration planning efforts (Measure DD) may change the hydrologic regime of Lake Merritt in the medium term (within approximately 20 years), should we proceed with the project now or delay it to coordinate with the future planning efforts?
ii. Is it feasible to create vegetated tidal wetland at Lake Merritt?
iii. Should we consider creating other habitat types, e.g. mudflats or sand flats?
iv. Are the findings in the analysis regarding the constraints to establishing restored wetland habitat in Lake Merritt (size of project area, amount of buffer areas, impact of highly altered tidal regime, disturbance factors due to proximity to human traffic, expected vegetation type and coverage) consistent with your experience and expertise?
v. Should the City be looking at floating islands as an option?

b. Materials reviewed:

- Wolfe Mason Associates. Inc., Laurel Marcus & Associates, and FarWest Restoration Engineering. Lake Merritt Wetlands Alternatives Analysis, Administrative Draft, November 2002
- Project presentation to DRG, January 6, 2003

c. Additional Information Requested by the Design Review Team: The Review Team did not request any additional items.

4. Design Review Group Findings and Comments:

The Design Review Team provided numerous suggestions and all of those suggestions are captured in this section. The Team does not intend to reach consensus in all of its feedback and dissenting opinions are included as appropriate.

The following represents the professional opinions of the Design Review Team and select Design Review Group members, as identified. These opinions are provided for the benefit of the project proponent in direct response to those questions posed by the proponent. The project proponent is in no way obliged to incorporate any or all of the feedback herein into their project design.

a. Consistency with Habitat Goals: Lake Merritt is specifically identified in the *Habitat Goals Report* as a site for restoration. In reference to Segment K - Oakland Area, the *Goals Report* states: "Enhance Lake Merritt by improving tidal action and restoring tidal marsh along the lakeshore and that channel that connects the Lake to the Oakland Inner Harbor." The *Report* also states "Improving tidal habitats at Lake Merritt would help restore some of the area's estuarine functions, including natural water filtration and the restoration of local anadromous fish populations."

The scope of the proposed Lake Merritt Marsh Restoration Study would only enhance tidal marsh habitat along or near the lakeshore. In the future (over the next 20 years), improvements in tidal connectivity between the Lake and the Oakland Inner Harbor will occur. In 2002, Measure DD passed in the City of Oakland; the ballot measure calls for the removal of culverts, the installation of bridges at two locations at the south end of the lake and relocation of the Seventh Street pumping station, in order to increase the efficiency of the pump. Thus, the City of Oakland is seeking input from the Design Review Team on what shoreline restoration would be like if these tidal improvements were to take place.

The Design Review Team concurred that the whole of the project was consistent with the *Habitat Goals Report*.

The proposed project is also consistent with the Lake Merritt Master Plan.

b. Issues Addressed by the Review Team, Discussion and Findings:

The usual focus of a Design Review Team is on project designs. In contrast, the Lake Merritt Marsh Restoration Study project proponents are seeking both peer review of an existing document and hypothetical feedback based on tidal regime changes that have not yet taken place. Therefore, in proving feedback to the project proponents, specific information will be grouped under the general questions/headings below.

Of the issues presented to the Design Review Team, Team members provided feedback on the following items:

i. Given that larger restoration planning efforts (Measure DD) may change the hydrologic regime of Lake Merritt in the medium term (within approximately 20 years), should we proceed with the project now or delay it to coordinate with the future planning efforts?

Stuart Siegel commented after the meeting on two parts of this question. First, is wetland habitat appropriate? Inherently, wetlands are an appropriate goal to strive towards, so in the very broadest sense, yes. What type of wetlands becomes a critical question given the opportunities and constraints of the site today and in a projected future under Measure DD implementation. Relative to Measure DD, Stuart said that any wetland project must be planned in a larger context of the entire lake and its future under DD and that in the short term the proposed project may not yield tremendous ecological benefits.

Stuart Siegel had three comments following the presentation. First, the many constraints as they currently exist would suggest a comparatively high cost-to-benefit ratio combined with uncertain ecological outcome. The highly altered hydrologic regime does not mimic any naturalistic regime, which may affect the ability of vegetation and invertebrate and vertebrate colonization to proceed. The nutrient and trash loading problems would compromise wetland development and function. The public access needs as well as stormwater management also impinge on any wetland. Peter Baye's suggestions in item iii., below, alleviate these problems somewhat and would be worth evaluating. Second, the passage of Measure DD ensures a future change in at least some of the constraints, rendering what might be built now incompatible in some manner or to some degree with future conditions and/or constraining Measure DD implementation options. Third, Lake Merritt is large and has many uses; a wetland restoration effort should occur within a larger planning context and one that responds to Measure DD. Hence, he suggested folding it into a larger planning effort and reserving currently allocated funds.

Michelle Orr suggested assessing the response of restored habitat to changes in the tidal/flooding regime under Measure DD. This type of evolution assessment would provide a basis for addressing questions related to whether or not to attempt restoration now. Will habitat created by this project evolve into other desirable habitat? If not, is a short-lived restoration acceptable and consistent with project goals? Are there ways to anticipate the hydrologic changes within the current design?

Jasper Lament felt that the primary goals of the project are somewhat unclear. He stated that, given small size of proposed restoration area, its not likely to contribute substantially to "natural water filtration" or "the restoration of local anadromous fish populations;" project should be careful not to promise too much. It's not likely to become a major shorebird area either. With improvements in water quality, it could support more waterfowl.

Karl Malamud-Roam (Design Review Group member) suggested first determining the "must haves" of the flood control district; this will help understand what is doable in the near-term.

Paul Jones (Design Review Group member) suggested linking this restoration effort to the U.S. EPA TMDL program in an effort to garner additional funds. He suggested taking this to the Regional Board staff, too, who may have access to additional funding and resources.

Rachel Kamman suggested investigating operational changes as opportunities to increase tidal exchange or flushing, thereby improving water quality, Lake aesthetics and existing habitat values. Other investments in restoration need be design to maximize circulation and habitat vales under both existing and anticipated tidal regimes.

Rachel Kamman stated that stating project goals as "restoration" of historical wetlands was not a good idea and suggested using "habitat enhancement" as alternative terminology (this would aid in avoiding preconceived notions for the project). Jasper agreed.

Jasper stated there is a need to ensure compatibility of any changes with the water management system of 2022.

ii. Is it feasible to create vegetated tidal wetland at Lake Merritt?

Peter Baye stated that good-quality tidal wetlands could have a 2-foot tidal range. He added that a top layer of sand used in restoration can compensate in a system with too many nutrients. Peter suggested a focus on retaining the Merritt sands, which would correctly adjust the slope of the site and result in intermediate sand flats and mudflats. He added that birds would likely acclimate to the presence of humans. Peter added that use of finer sediments in restoration could lead to more odors.

Jasper Lament stated that, as noted by LMA on p.10, some species are more prone to acclimate than others. The "missing" shorebirds are least likely to acclimate.

The group generally agreed that moving the restoration effort away from the perimeter of the lake and outside of the reach of disturbance would be most beneficial. The rationale for this recommendation included increasing habitat perimeter and providing a disturbance buffer.

Jasper Lament was not sure why shorebirds are identified as the primary goal (decline in waterfowl usage is the most apparent change in habitat value). He stated that the original PWA marsh restoration design wouldn't really provide shorebird habitat at all; shorebirds generally use mudflats, not pickleweed plains.

Rachel Kamman suggested that a circulation study would be valuable for characterizing the habitat and water quality benefits that could be realized by creating shallow or intertidal habitat under both the existing and anticipated tidal regimes.

Rachel stated that shorebirds likely would use habitat at Lake Merritt, if available, especially if it provided high tide refuge during storm events. Jasper disagreed somewhat, stating this statement exaggerates the shorebird habitat potential of the proposed one acre constructed wetland/tombolo/sandy shoreline. Jasper stated that the LMA Report p. 8 gives a realistic assessment of the shorebird constraints (disturbance, size, invert community, proximity to mudflats) facing the site; if the primary goal to provide shorebird habitat, then the project is difficult to justify. The project would provide a small amount

marginal shorebird habitat at a high cost. To benefit shorebirds, a million dollars would be better spent optimizing water management of a de-activated salt pond in the South Bay. Shorebird habitat would be more readily attainable if and when tidal circulation was improved, resulting in tidal exposure of mudflats.

Michelle Orr stated that restoring the tidal regime to more natural conditions (as in Measure DD) should increase the feasibility of creating high quality vegetated salt marsh. The current water management practices include long periods of continuous high and low water levels, which stress vegetation and limit growth. Other muted tidal systems with different water management regimes support thick stands of pickleweed and salt grass (e.g., muted tidal marshes at Redwood High School and Aquatic Park Radio Tower Pond). Grazing, foot traffic, and other factors also contribute to sparse vegetation at Lake Merritt and would need to be addressed in the restoration plan, even with a more natural tidal regime. The above discussion assumes that salt marsh is the target habitat. If bare mudflats are the target habitat, then the current water level management regime helps meet this target.

iii. Should we consider creating other habitat types, e.g. mudflats or sand flats?

Peter added that, dependent upon sediment grain sizes, swash bars and sand shoals could be used to stabilize bay mud. He added that there is potential for creation of a tombolo (a sandbar that connects an island to the mainland or to another island) and that some such areas could establish. He suggested determining the precise substrate grain sizes and using a malleable substrate. Additional discussion on substrate is provided in 4.b.iv, below.

Jasper stated that restoration of SAV is a more reasonable, ecologically significant and attainable goal than building a 1-acre "instant wetland."

iv. Are the findings in the analysis consistent with the expertise of the Design Review Team members?

Michelle Orr stated that the findings seemed to provide a reasonable assessment of project benefits, costs, and risks. Since the habitat benefits appear limited (or at least risky), the value of this project may lie more in public use benefits (recreation and education) associated with creating wetlands in an urban setting. The costs of the project, in the vicinity of hundreds of thousands to one million dollars per acre, are much higher than those for other restoration projects in San Francisco Bay.

Michelle also stated that the expectations of relatively sparse vegetation coverage with intervening areas of bare mudflat -- as presented in the meeting and in the Alternatives Analysis Administrative Draft (November 2002) -- appear reasonable given the current water management regime. Since the sites are small (1 to 3 acres) she would expect just a few tidal channels on each.

(Peter Baye provided detailed comments on constructed sand systems; other members of the Design Review Team did not provide feedback on these comments but limited their feedback to the scope set forth by the proponent.) Peter Baye stated that the emphasis on wetland habitat constraints at Lake Merritt appears to me to be due to a mismatch between objectives related to reference wetland systems (models for habitat reconstruction) and the prevailing environmental setting at Lake Merritt today. He suggested a more appropriate model for Lake Merritt wetlands would be *microtidal beaches, flats, and fringing salt marshes* associated with intermittent coastal lagoons. Modern Lake Merritt is in fact an intermittent microtidal lagoon: it is subject to prolonged episodic nontidal impoundments at high water levels, and periods of choked tidal circulation with a tidal range less than 60 centimeters. Prior to herbicide applications in previous decades to eliminate submerged aquatic vegetation (wigeongrass [*Ruppia maritima]* and epiphytic algae, ironically treated together as nuisance species), the lake supported abundant dabbling and diving ducks typical of shallow coastal lagoons with SAV beds (Appendix B, Laurel Marcus and Associates 2002). Natural coastal lagoons historically occurred in San Francisco Bay, mostly in the form of estuarine barrier beaches at stream mouths in sandy segments of the Central Bay (northern San Francisco Peninsula, Richmond-West Berkeley, and southeast Marin shoreline). No natural examples remain in SF Bay, but Brisbane Lagoon (South San Francisco/Brisbane, west of 101) is probably the closest approximation to a large microtidal lagoon with fringing marsh in SF Bay. Highly managed large nontidal lagoons also occur at Foster City and Bel Marin Keys. Some of the best natural examples of intermittent tidal lagoons in the region occur along the central coast at drowned valleys and stream mouths, such as Rodeo Lagoon, Abbotts Lagoon, and along the edges of Tomales Bay (Marin Co.), as well as Pescadero Marsh (San Mateo Co.), Russian River, Gualala River (Sonoma Co.). These lagoons and fringing flats and marshes support highly significant habitats for migratory waterfowl and shorebirds. Their fringing wetlands are highly distinct in character from the intertidal drainage systems of San Francisco Bay.

Peter stated that coastal lagoons in central and northern California alternate between tidal, choked, or nontidal conditions. Choked or nontidal conditions usually prevail when beach ridges dam inlets or stream mouth outlets, often in spring and summer months. Marsh vegetation is limited to the upper fringes of intermittent tidal lagoons because prolonged periods of nontidal impoundment at high water levels cause lethal waterlogging and "drowning" of vegetation established in the lower and middle intertidal zones during tidal phases. Prolonged high water levels also enable wave energy to concentrate marsh erosion along a narrow, high elevation along the shoreline. In sandy lagoons, fringing salt marsh often develops on stabilized prograded beach ridges (e.g. Drakes Estero, Tomales Bay) above sand flats and transient swash bars. This inherent restriction on the vertical tidal range of marsh vegetation within intermittent tidal lagoons provides an enlarged area of emergent unvegetated

flats during "drawdown" of tidal phases. In addition, prolonged immersion of stable bottom sediments encourages establishment and growth of submerged aquatic vegetation (SAV), usually wigeongrass (*Ruppia maritima*) where salinities in summer exceed 15 ppt. SAV is highly valuable forage and nursery habitat for prey items of many dabbling and diving ducks. These natural conditions are a reasonable approximation of the actual and potential condition at the modern Lake Merritt, and they are not at all incompatible with potential high wetland habitat values, just not those associated with fully tidal salt marsh creek systems.

Accordingly, it may be useful and appropriate to develop an alternative "fringing lagoon wetland" system composed of SAV beds, flats, and fringing salt marsh of intermittent coastal lagoons to develop design criteria and habitat objectives for Lake Merritt wetlands. Peter suggested that sandy substrates be incorporated in the design for several reasons:

(1) the dynamic surface of sand in response to variable water levels and wave energy in the intertidal zone would minimize growth of attached filamentous or membranous green algae, which could create nuisances (reduce shorebird foraging, accumulate necromass);

(2) sand has low cation exchange capacity, and is relatively "transparent" to excess nutrients and contaminants from urban runoff sources. It would partily mix with fine sediment in the middle and lower intertidal zone, but would partly offset the excessive nutrient enrichment (eutrophication) of Lake Merritt as a substrate for attached algae and marsh vegetation;

(3) sand has superior porewater exchange and aeration compared with silt and clay (bay muds), and is thus less likely to add to excessive near-surface production of hydrogen sulfide ("rotten egg" gas), and allow for better drainage for marsh plant growth during periods of highly damped tidal range;

(4) the morphodynamics of sandy swash bars may allow for interesting cyclic and long-term wetland changes associated with swash bar migration, erosion, fusion, emergence, and new marsh formation, replicating aspects of natural systems.

(5) though not "native" to Lake Merritt, sandy shorelines were typical of the Richmond-Alameda marsh shoreline prior to urban and port development, and are poorly represented in the modern bay shoreline. For this reason, they may have distinctive interpretive/educational value. They are also more resilient in terms of public values in case of underperforming habitat values: sandy foreshores have "back-up" recreational value in an urban setting.

(6) engineered placement of sand (hydraulic, mechanical) is more predictable and efficient than placement of fine sediment.

The most practical reference system in San Francisco Bay for microtidal lagoon saline wetlands would probably be Brisbane Lagoon (South San Francisco/Brisbane). Like Lake Merritt, it has flood control and adjacent land use constraints (railroad, highway), but it supports significant and diverse wetland habitat (including pickleweed/saltgrass/gumplant marsh, beach ridges, flats, subtidal shallows), recreational values, and esthetic values along many segments of its shorelines. It also supports potential habitat for regionally rare salt marsh plant species, which may also be considered for Lake Merritt. Berkeley's Aquatic Park has limited but equivalent shoreline salt marsh vegetation, and ample *Ruppia* beds as well as impressive use by diving and dabbling ducks, cormorants, and wading birds. Other valuable wetland design insights for Lake Merritt may be obtained from examination of (less similar but more natural) Rodeo Lagoon, Abbotts Lagoon, and portions of Drakes Estero and Tomales Bay edges. Within the SF estuary, Point Pinole, Emeryville Crescent, Pier 94N (San Francisco), Roberts Landing and Albany (SE corner of "dump"-peninsula) have instructive examples of sandy salt marsh/beach ecotones.

Peter stated that engineering relatively stable sand foreshores at Lake Merritt would require selection of shorelines with suitable configuration, orientation to prevailing local (wind-) wave approach, and possibly island or headland "anchors" to confine and trap sand transport, limiting long shore drift. Swash-aligned beaches would probably not require rock slope "toes" as proposed for previous wetland designs: appropriate slopes, grain size distribution, and configuration may be engineered to maximize internal "recycling" of sand and minimize offshore and alongshore outputs. Sandy mud intertidal zones may also be esthetically more acceptable to urban waterfront esthetics than pure bay mud. They may also provide potential attractions to shorebirds at high tides. However, there is a risk that they could be dominated by more aggressive gulls or geese, as sand islands at Crissy Field marsh (Presidio) have become.

One option for placement of flats and marsh could be as tombolos (beach ridges among artificial existing islands). Detaching flats and marsh from the high-traffic shoreline may allow for greater waterbird roost habitats.

Dominant vegetation on sandy marsh berms (stabilized beaches) would probably be saltgrass and gumplant, with pickleweed increasing in proportion with percent silt/bay mud. Spearscale (*Atriplex triangularis*), sand-spurrey (*Spergularia marina*) are also likely to establish on sandy marsh berms. In addition, Bay rarities such as beachbur (*Ambrosia chamissonis*, common on the outer coast), Pacific dunegrass (*Leymus mollis*, very rare in SF Bay, occasional on the coast) and California saltbush (*Atriplex californica*, now extinct in SF Bay) could probably be established readily. *Jaumea carnosa, Plantago maritima, Troglochin concinna, T. maritima* would also be likely associated species, depending on severity of impoundment periods. Cordgrass objectives should be discouraged, since the best adapted cordgrasses for Lake Merritt would probably be *Spartina densiflora* and *S. alterniflora* x *foliosa*, noxious aquatic weeds in this region.

Re-establishing SAV is desirable from a waterfowl and fish habitat perspective, but because *Ruppia* develops epiphytic algae during summer (potentially to nuisance levels) it should be evaluated carefully. Jasper Lament added that *Ruppia* could be managed in summer with mechanical harvesting; from bird perspective, it's most important to make sure its available in fall. Water clarity (light penetration to bottom) is a potential constraint.

v. Should the City be looking at floating islands as an option?

Peter Baye, stating that this was his subjective opinion, said that islands are not good educational tools when trying to create educational opportunities about wetlands restoration.

c. Issues Not Addressed by the Review Team and Rationale:

The Design Review Team did not determine any issues to be outside of the scope of the Design Review Group.

d. Phasing and Coordination.

e. Other issues:

5. Disclaimers:

a. The recommendations of the Restoration Program are not binding on any permitting agency and they will not restrict any agency's authority.

b. The Restoration Program makes every effort to provide guidance, we cannot guarantee issuance of permits by any regulatory agency.

c. The Restoration Program is intended to provide comments and feedback on plans and designs. This assistance will necessarily be limited, and should not be expected to substitute for professionally prepared site evaluations, hydrological studies, final designs, and construction plans.

d. The Restoration Program and the participating agencies will not be liable for the failure of any project.

e. Project review by the Design Review Group does not constitute an endorsement of the project by the Design Review Group or by the Wetlands Restoration Program.

ATTACHMENT A

PROJECT DESCRIPTION

i. Project objectives:

The stated project objectives are to create tidal wetlands habitat along the shore of Lake Merritt. The City of Oakland came to the Design Review Group requesting peer review of the Lake Merritt Wetlands Site Selection Analysis prepared by Wolfe Mason Associates, Inc., Laurel Marcus and Associates and Farwest Restoration Engineering, Oct. 24, 2002. The Lake Merritt Wetlands Site Selection Analysis is a review of findings of past reports and a definition of the feasibility of a wetland habitat project at the Lake. The City is also posing hypothetical questions about the Lake's tidal marsh restoration opportunities relative to the passage of City Measure DD (to enhance the tidal regime in the Lake).

History:

- 1992 - The City of Oakland completed the Conservancy-funded Lake Merritt Resource Enhancement Plan, which included recommendations for creating high salt marsh habitats.
- 1997 - The Coastal Conservancy commissioned Phil William and Associates to prepare a tidal wetland and shoreline enhancement work plan and cost estimate.
- 1999 - The Coastal Conservancy Board approved a grant to the City of Oakland to prepare design and engineering plans and environmental documentation for the construction of a tidal marsh restoration project at Lake Merritt.
- 2001 - The City of Oakland hired a team of consultants led by Wolfe Mason and Associates and includes Laurel Marcus and Associates and Farwest Restoration Engineering, to evaluate the feasibility of re-establishing a tidal wetland at Lake Merritt, prepare design and engineering plans, cost estimates, permit applications and environmental review documents for three marsh restorations sites in Lake Merritt identified in the work plan prepared by PWA.
- 2001 – The consultants completed a technical review of seven potential sites.
- March 2002 – Stakeholders met to evaluate the technical review of the seven sites and selected two general locations (including 4 sites) and clarified that habitat creation is to be the project's primary objective. The City directed consultants to prepare an in depth analysis of the selected sites.
- October 2002 – Consultants completed the analysis, which is the document that the City and Conservancy request the DRG to peer review.

The report concludes that the chances that marsh restoration will attract shore birds are low or moderate, depending on the site, under current conditions. Given that the local Measure DD recently passed, which will likely result in improved water quality at the Lake and a more natural tidal flow, a review of the report's information assuming conditions will change, is desirable.

ii. Project location and map:

The proposed project's potential sites are located along the northern shore of Lake Merritt, in downtown Oakland. More detail can be found in iii., below.

iii. Type and acreage of habitats to be created or restored:

The proposed project seeks to expand waterfowl habitat, create shorebird habitat, and establish a vegetated salt marsh, ultimately increasing the habitat value for current resident species.

Four location alternatives were evaluated in the Lake Merritt Wetlands Alternatives Analysis document. One are is located within the Glen Echo Arm and the other three are located adjacent to the islands. The sites range in size from 1.2 to 2.8-acre sites and cover a range of conditions and site dimensions. These sites have defined edge conditions, size parameters, and slopes.

Site 1 is located along the Glen Echo arm of the lake. Proposed dimensions are 560 feet by 100 feet, which includes 0.32 acres of submerged area, 0.55 acres of intertidal zone and 0,20 acres of transitional zone.

Site 2a is located adjacent to the parking lot just north of the Lake Merritt Boating House. The proposed dimensions are 263 feet by 200 feet, which includes 0.40 acres of submerged area, 0.50 acres of intertidal zone and 0.14 acres of transitional zone.

Site 2b is located adjacent to one of the bird islands and is not on the shoreline of the lake, but is surrounded by water. The proposed dimensions are 200 feet by 246 feet, which includes 0.32 acres of submerged area, 0.67 acres of intertidal zone and 0.17 acres of transitional zone.

Site 2c is located along the shoreline just north of the playground and bird islands; a 24-inch outfall is located within the site. The proposed dimensions for the site are 414 feet by 308 feet, which includes 0.66 acres of submerged area, 1.02 acres of intertidal zone and 0.49 acres of transitional zone.

iv. Past use and current condition of the site:

Historically, Lake Merritt was part of San Antonio Creek and Slough, an estuarine system with a habitat mix of intertidal marshes, intertidal mudflats and open water habitats. In 1869 a dam, which created the lake itself, was constructed near the present location of the Twelfth Street Bridge. Following the construction of the dam, a rockwall was constructed in 1891 for flood control and periodic dredging of lake sediments has occurred since 1893. All the creeks that feed into the lake are now culverted and channelized and tidal fluctuations are muted, controlled entirely by tide gates at the Seventh Street Pump Station (Laurel Marcus and Associates, 2002). Today, water levels are managed for flood control purposes.

The lake has a long history with water quality issues. Most of Oakland's raw sewage emptied into the lake until 1875, when sewage was rerouted to San Francisco Bay. At present, the urban setting of the lake contributes runoff, which introduces increased concentrations of oil, litter, sediment, fertilizer, and other contaminants (Laurel Marcus and Associates, 2002). These contaminants contribute to excessive algal growth and overall poor

water quality. Lake Merritt is presently listed as an "impaired water body" with the U.S. Environmental Protection Agency for dissolved oxygen (DO) and floating trash.

Diverse vegetation exists around Lake Merritt, but most individuals are non-natives. The City of Oakland has up until very recently been planting tamarisk - a non-native tree - around the lake. The lake itself is largely subtidal and open water habitat. Invertebrate fauna is almost entirely non-native (Laurel Marcus and Associates, 2002). Wildlife that uses the lake has changed in composition over time, with decreases in dabbling ducks and increases in diving ducks, wading birds and other water-associated birds; most wildlife has to be somewhat acclimated to human disturbance found all around the lakeshore.

Present constraints to the enhancement of wetlands around the lake are numerous and include: topography, high human use patterns, space limitations, public response to aesthetics, and an irregular and highly altered tidal regime (Laurel Marcus and Associates, 2002). Any habitat enhancement project has to consider all of these constraints in project design.

v. Description of any special features or issues:

1. Public access

   All of the shoreline of Lake Merritt is accessible to the public, which poses certain design challenges when attempting to create valuable habitat for shorebirds, diving ducks, and dabbling ducks.

2. Flood control

   The Alameda Flood Control District maintains the flood control gate that is presently located at Seventh Street (as a result of the passage of Measure DD, this pump will be relocated to another site in order to increase the pump's capacity and efficiency).

3. Subsidence

   Subsidence has not proven to represent a problem at the site.

4. Mitigation

   The Lake Merritt Marsh Restoration project is not a mitigation-based project.

5. Other adjacent/nearby projects

   The proposed project is the only such tidal marsh restoration project in Lake Merritt proposed at this time.

6. Opportunity for transitional habitats

The project does not offer a great deal of opportunity for the establishment of transitional habitats due to the urbanized environment and developed shoreline.

ATTACHMENT B

Comments specific to the Lake Merritt Wetlands Alternatives Analysis Administrative Draft, November 2002

Peter Baye provided the following specific comments on the Administrative Draft document:

LMA report p. 3: Note that Crissy Field marsh has similar multiple park uses, yet relies on "segregation" of active and passive recreation and shoreline use.

LMA report p. 4: Strongly agree w/ Kentula et al. 1993 general recommendation for very gentle slopes, gradual transitions, applied to Lake Merritt.

LMA report p. 5: note that season of prolonged submersion, high water levels, is relevant to impacts on marsh vegetation. Winter-dormant vegetation, low respiration and temperature, suffer lower mortality than in summer.

LMA report p. 5 "design incorporates a steeper slope....to provide a more variable surface habitat to accommodate the variable water levels" seems to be an internal contradiction, and is inconsistent with the Kentula recommendation.

LMA report p. 6. Pickleweed may not necessarily be the dominant species; saltgrass and gumplant may be dominant, esp. at upper edges. *Ruppia* should be considered as potential dominant in shallow subtidal.

LMA report p. 16. Perennial pepperweed (*Lepidium latifolium*) would be restricted in the marsh by summer marsh salinities near 30 ppt.

FarWest report p. 2. "...sand....not beneficial for marsh restoration" is an inaccurate generalization. For restoration of clapper rail habitat and tall cordgrass canopies, sand is not beneficial; this, however, is only one possible habitat objective among many in SF Bay. Sandy salt marshes are natural and historically common in central SF Bay and modern west Marin Co.

FarWest report p. 7. Note that variable sand grain sizes may be selected by variable wave energy/heights to self-construct sandflat platforms and steeper, mobile transient swash bars. Wave energy is erosional only when in disequilibrium with shoreface slope and particle size. Beach slopes adjust to wave energy, dissipating excess energy by decreasing slope.

LMA 2001 report p. 12. *Ruppia* colonizes fresh, brackish and marine waters; it does not narrowly indicate marine conditions. It is especially well adapted to fluctuating salinities of river mouth lagoons.

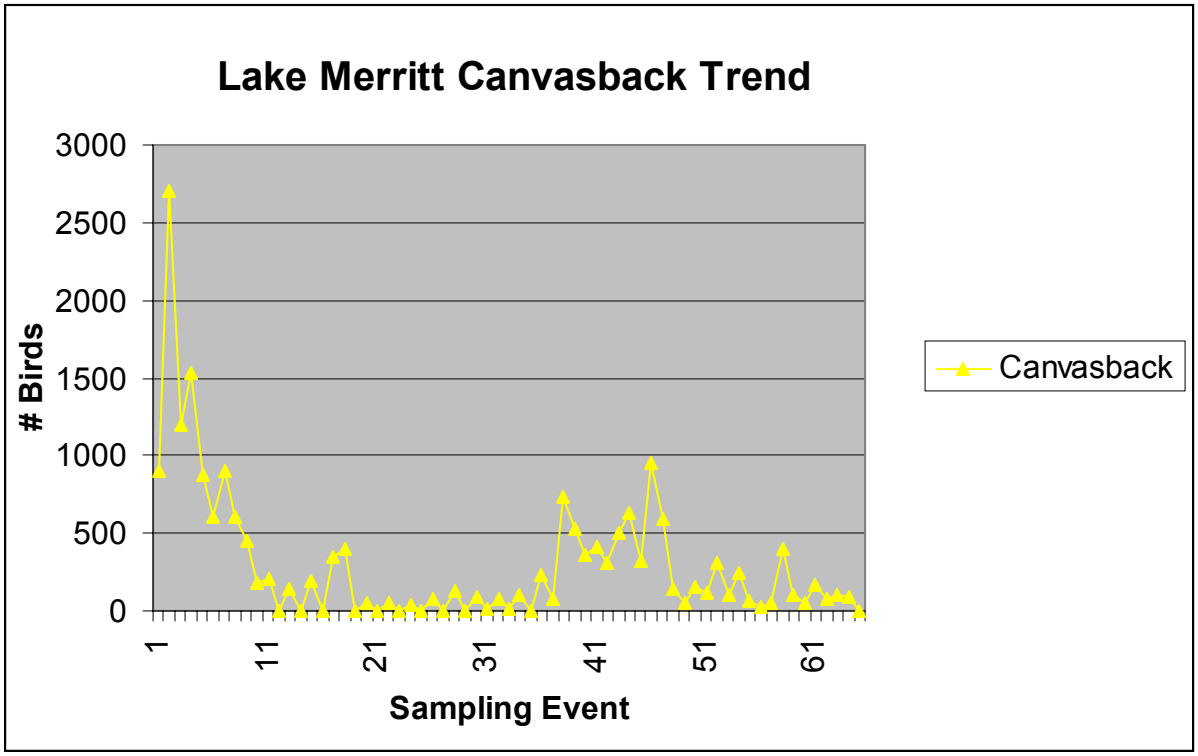
LMA 2001 report p. 22. Note that interpretive/educational values of reconstructed wetlands decrease with increasing artificiality and engineering: as they approach aquatic ornamental landscaping, ecological education values are sacrificed. Crissy Field is an example of a highly engineered wetland which nonetheless emphasized reconstruction of representative aspects of

natural and historic wetland features, and allowed for instructive and uncontrolled wetland dynamics that distinguish it from fixed landscaping.

Jasper Lament provided the following specific comments on the Administrative Draft document:

LMA 2002 report p. 1-2 "show a decline in species such as the northern pintail and other dabbling ducks since 1923." There is clear evidence provided to support this statement. The decline in pintails is part of a continent-wide trend, however the decline in wigeon is not. Wigeon would probably respond to enhancement of *Ruppia* habitat. Providing habitat for wigeon (which occurred in numbers into the 1960s) would be a more attainable goal for the project than attracting large numbers of shorebirds, which probably haven't used the site in numbers since the dam was built.

LMA 2002 report p. 2 "diving ducks…have experienced increases in numbers over the years." There is no evidence provided to support this statement. My analysis of the data provided in LMA 2001 Appendix B directly contradicts this statement. For example canvasback numbers have clearly declined over the sampling period (see chart below).



LMA 2002 report p. 8 provides a realistic appraisal of the shorebird habitat potential (or lack thereof).

LMA 2001 report p. 15. re: "the sea ducks (such as the canvasback, scaup, bufflehead, golden-eye and ruddy ducks)" Not one of these species is a "sea duck." Scoters and eiders are examples of "sea ducks".

ATTACHMENT C

San Francisco Bay Area Wetlands Restoration Program
Design Review Group
Conflict of Interest Statement

The San Francisco Bay Area Wetlands Restoration Program Design Review Group (the Group) attempts to have those reviewers who participate as members of the Group avoid any conflict of interest. Conflict of interest, as it relates to the Group, is distinguished into two categories: financial and personal/institutional. The two distinct types of conflict of interest warrant two distinct courses of action of the part of each Group member. All those members having a *financial* conflict of interest with a project will NOT be allowed to evaluate proposals for which they have a financial connection and/or provide guidance and comment on that project, without exception. However, those Group members having a *personal/institutional* conflict of interest are required only to disclose any relationship, yet are not disallowed from project review and comment.

Regardless of the type of conflict of interest, each Group member has the personal obligation to avoid a conflict as well as the personal obligation to disclose any such conflict, whether real or apparent, to the Group as a whole.

Financial Conflict of Interest. The Wetlands Restoration Program expects that Group members will not review proposals in whose development they have assisted or if they would receive a financial benefit from the funded project. A conflict of interest would be considered to exist whenever a member of the Group **or** a relative of a Group member (including, for instance, a spouse, sibling, parent or child) has a personal, material, or financial interest in a transaction or project under consideration by the Group.

Personal/Institutional Conflict of Interest. If a Group member has a personal or institutional connection with a project sponsor in any way, but there is no conflict of interest, the member will be allowed to participate in the project review provided that any connection is disclosed prior to project review. A personal connection with a project sponsor is considered worthy of disclosure if any of the following relationships were applicable during the **past four years**: collaboration on research, pilot, or implementation proposal or project; co-authorship; thesis or postdoctoral advisorship; and/or supervisor/employee relationship. An institutional connection – such as between employers and their employees – will be considered worthy of disclosure. For example, an employee of a state or federal agency is considered to have an institutional connection with a proposal submitted by that agency, even if the project sponsor is in a different division of the agency than the reviewing Group member. Similarly, a university faculty member is considered to have an institutional connection with a proposal submitted by that university, even if the applicant is in a different department of that university campus.

To avoid any problems with conflict of interest or appearance of bias, scientific and technical reviewers are expected to review proposals independently and without delegating the review task in whole or in part to any other person. Any efforts to delegate review will be considered a conflict of interest. If you are uncertain about a potential conflict of interest, please contact John Brosnan at (510) 622-5048.