

TECHNICAL MEMORANDUM POSEIDON TIDAL WETLAND RESTORATION PLAN

ALTERNATIVES ANALYSIS: OPPORTUNITIES FOR MEETING POSEIDON MARINE LIFE MITIGATION PLAN REQUIREMENTS

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Purpose of Technical Memorandum

The purpose of this technical memorandum is to evaluate and rank the potential San Diego County mitigation sites that were reviewed by Poseidon Resources to meet their compliance with Special Condition 8 of the Coastal Development Permit No. E-06-013.

Specifically, Poseidon Resources requested that I review materials prepared by Poseidon and its contractors and provide an independent review of the potential for Poseidon to meet its mitigation requirements within San Diego County.

CDP Permit Requirements

Special Condition 8 (as revised in September 2009) requires that Poseidon Resources provide 66.4 acres of tidal wetland in one or two phases of construction (an initial phase of at least 42.5 acres followed by up to 23.9 acres). The any restoration site must meet a set of 9 minimum standards and any restoration plan must meet a set of 13 objectives. As a result, a successful restoration plan is contingent upon achieving compliance with both the minimum standards and the objectives. Ultimately, the success of the plan is to be judged in relation to four Long-term Physical Standards and six Biological Performance Standards.

San Diego County Lagoons Considered

The following sites are considered in my analysis for the project:

- Loma Alta Lagoon
- Agua Hedionda Lagoon
- Buena Vista Lagoon
- Batiquitos Lagoon

- San Elijo Lagoon
- San Dieguito Lagoon
- Los Penasquitos Lagoon
- Lower Otay River Floodplain
- Tijuana Estuary

The current status of these sites in meeting the CCC requirements have been reviewed extensively in reports submitted by Nordby Biological Consulting (2010 and 2011) and this information along with my professional experience at these sites was used to rank each of the sites.

I used a ranking scale of 1 to 5 in my analysis. Rank order was assigned as follows:

- 1 = Site clearly meets this criteria without substantial issues
- 2 = Site meets this criteria with some minor exceptions
- 3 = Site can generally meet this criteria; however, there may be substantial exceptions
- 4 = Site does not meet this criteria without significant modification of the criteria by Commission
- 5 = Site cannot meet this criteria

The specific definitions used for the rankings are given in Table 1. This table is based on the descriptions provided for the minimum standards and restoration objectives within the CCC permit. I understand that some criteria may be more significant than others and that some criteria refer to both the site selection and to the later restoration design; however, I did not do any weighting of the criteria in my analysis.

In order to meet the overall permit condition, only those areas that meet both the minimum requirements and objectives and have sufficient acreage to be considered as either a Phase I or Phase II project are feasible. In cases where a site is scored as 5, this is a threshold requirement that cannot be met at the site and therefore it eliminates that site from further consideration. A site that is scored as 3 or 4 will require that the Commission change their minimum standards and objectives for the project.

The ranking for each of the lagoons using this scoring system is provided in (Table 2). The assessment was based on potential project(s) that could be accomplished within each of the lagoons as described by Nordby Biological Consulting (2010 a, b)¹ and in WRA/AECOM (2009)². A brief synopsis of the project type being considered for each of the lagoons is given below:

Loma Alta: Restoration potential for 3 acres of coastal salt marsh on small lagoon

1 a. Comparison of Selected Southern California Tidal Wetlands as Potential Sites for Mitigation of Impacts Associated with Poseidon Resources Proposed Carlsbad Desalination Plant. January 2010. 52pp. with appendices
 b. Supplemental Analysis of CCC Standards and Objectives. January 2011. 51pp.
 2 San Diego Regional Lagoon Overview. Phase 1 Planning Study. I-5 North Coast Corridor Project. San Diego County, California. December 2009. 75pp with appendices

Buena Vista: Tidal restoration of whole or part of Buena Vista Lagoon to provide for improved marine fish habitat as described in Buena Vista Lagoon Feasibility Study

Agua

Hedionda: Restoration of small perimeter areas to coastal salt marsh habitat as described in WRA/AECOM (2009). Excludes AH-3 which is being used by others.

Batiquitos

Lagoon: Restoration of small perimeter areas to coastal salt marsh habitat as described in WRA/AECOM (2009).

San Dieguito

Lagoon Restoration of small parcels outside of approved plan but are potentially available for restoration as described in WRA/AECOM (2009). Excludes lands not available or being used by others.

San Elijo

Lagoon Restoration of wetlands to be determined as part of overall restoration plan currently being developed by the San Elijo Lagoon Conservancy.

Los

Penasquitos: Restoration of areas as identified in WRA/AECOM (2009)

Otay River

Floodplain: Restoration of up to 66 acres of tidal habitat as contemplated in the September 2010 Memorandum of Understanding between the U.S. Fish & Wildlife Service and Poseidon

Tijuana: Restoration of up to 66 acres of tidal habitat as part of the Friendship Marsh restoration plan.

Minimum Standards

Based on meeting the minimum standards, the Lower Otay River floodplain and the Tijuana Estuary are favored, especially in achieving the Phase I and Phase II acreage requirements. Neither site would have any minimum standards that could not be met or require modification of the Commission's requirements. The presence of listed species at Tijuana Estuary (e.g. light footed clapper rail and Belding's savannah sparrow) may affect the restoration implementation; however, there would be a net increase in habitat for these species after restoration.

San Elijo Lagoon and Buena Vista Lagoon, the third and fourth ranked lagoons in terms of meeting the minimum standards, could potentially provide enhancement of existing wetland habitat in the range of 66 acres. However, both projects would convert existing wetlands to another habitat type and would require that the Commission alter its mitigation requirements and determine that the enhancement of existing tidal wetlands (in the case of San Elijo Lagoon) or the conversion of existing freshwater wetlands to tidal wetlands (in the case of Buena Vista) met the definition of "substantially restores" in the context of the minimum standards. The

Commission, in my opinion, is not likely to accept conversion of existing wetlands, even if beneficial, as meeting Poseidon's mitigation requirements.

All other sites could not meet the minimum acreage requirements for either Phase I or II and therefore have a fatal flaw that would require the Commission to alter its mitigation requirements. Because the available acreage at the other sites is significantly lower than required, the Commission would need to revise its approach and institute an alternative means to achieve the total acreage requirement among many sites. This would likely cause further delay in meeting the Commission time requirements as it would necessitate working with multiple organizations, landowners, and interested parties. In addition, it would present difficulty for the Commission when monitoring multiple sites in conjunction with determining suitable reference areas for each of these sites.

In addition to the inability to meet the acreage requirements, these other lagoons have fatal flaws in that they could not provide sufficient buffers, their location within areas of existing nearby development limits the ability to assure long-term protection, and restoration to a diverse habitat mix would not be possible.

Restoration Objectives

When ranked in accordance with the restoration objectives, both the Lower Otay River floodplain and Tijuana Estuary are highly ranked and are the only sites where all objectives could be met without revision.

Restoration of San Elijo Lagoon is ranked third in terms of meeting restoration objectives, but has two significant constraints. Since the project is an enhancement of existing tidal habitats, it would not result in any substantial increase in the aggregate wetland habitat. It would also be difficult to ascertain what improvements to marine fish production are occurring as it is currently a tidal wetland. Because there is no consensus on an enhancement alternative at this time, it could not be completed in time to meet CCC requirements as stated in the permit conditions.

The restoration of smaller parcels in San Dieguito Lagoon ranks fourth in terms of meeting the restoration objectives; however, the areas that are currently available are not sufficient to meet the acreage requirement and are outside the areas that have been previously approved under the Master Plan EIR/EIS. As a result they would take considerable time for approval. In addition, many of the properties are owned by others and are not available to Poseidon for restoration purposes. At any rate, its restoration would not meet the minimum requirements of either Phase I or Phase II.

The other lagoons have varying degrees of compliance with the restoration objectives; however, in most instances they would not meet two or more of the objectives. The primary constraints relate to the inability to provide substantial fish benefits due to their location on the periphery of the tidal basins, the limited increase in aggregate wetland acreage, the inability to provide for sufficient buffer or upland transitional areas, and the lack of suitable plans to be considered in a timely manner.

Overall ranking

The Lower Otay River floodplain and the Tijuana Estuary ranked the highest when considering the minimum standards and restoration objectives and did not have any fatal flaws.

Implementation of a restoration plan for San Elijo Lagoon was ranked third overall; however, no final plan is available at this time to determine what the project will be. It is likely to involve some degree of modification of tidal circulation, but will not result in substantial increase in wetland or fish habitat. Because of these uncertainties, it will not meet the time line for Commission approval. In addition, this site would not meet the restoration objective that the site must result in an aggregate increase in wetland acreage in the Southern California Bight.

San Dieguito Lagoon was ranked 4th overall. Poseidon initially considered a project at San Dieguito, but was not able to reach a long-term agreement with the Joint Powers Authority to undertake restoration there. Subsequently, the California Department of Transportation entered into an agreement with the JPA for restoration in the area that Poseidon was considering. The remaining areas are relatively small in comparison to the minimum requirements and are unlikely to be available in a timely manner.

Buena Vista Lagoon, the fifth overall ranked lagoon, could potentially provide enhancement of existing wetland habitat in the range of 66 acres, assuming that either the full tidal or mixed water restoration alternatives were selected and the Commission determined that the conversion was "substantial restoration". However, this site would not result in any aggregate increase in wetland acreage in the Southern California Bight, is surrounded by development such that buffers and upland transition areas are limited, and will require inlet maintenance. Therefore, it would not satisfy the CCC's restoration objectives.

Other projects within San Diego County lagoons are very limited in size and therefore do not contribute to a substantial increase in wetland acreage. They also have significant limitations in meeting other project objectives especially as it relates to maximization of ecosystem benefits and substantial fish habitat creation.

Table 3 presents an analysis of the more significant threshold criteria, in my opinion, necessary for the sites to be selected to meet the Poseidon mitigation requirements. All sites can provide tidal habitat restoration; however, because some sites have small areas or are located on the fringe of the wetland area, it will not be possible to provide the range of habitats such as subtidal, intertidal, and tidal channels necessary to result in substantial fish habitat. In addition, for some of these smaller areas such as Agua Hedionda and Loma Alta, the surrounding land uses affect the ability to provide sufficient buffer and upland transition zone habitat to protect wetland values.

The restoration objective to create a net increase in wetland acreage is a key element to promote additional marine fish production. Both San Elijo Lagoon and Buena Vista Lagoon fail to meet this criterion as they will only result in the conversion of existing habitat to fully tidal habitat.

Land availability affects the ultimate feasibility of the project and the timeliness of meeting the Commission mitigation requirements. Although San Dieguito Lagoon was Poseidon's choice initially, the land was not made available by the JPA. The remaining parcels are also owned by other parties that are not interested in selling for mitigation purposes.

In conclusion, based on meeting the minimum standards and the restoration objectives, the lower Otay River floodplain can best accomplish the goals as set forth under the CCC permit. The Tijuana Estuary is close in overall score; however, it will likely have some impacts to existing wetlands, will require some mitigation for endangered species, and will have additional maintenance requirements should the inlet to the ocean close. These issues and the fact that no substantial design work has been implemented as of yet may result in not meeting the CCC time requirements.

Table 1. Ranking definitions as applied to each of the minimum standards and restoration objectives. Definitions given for 1, 3, and 5 scores. Scores between these represent intermediate conditions to the definitions given in each box.

CRITERA	RANKING SCORES		
	1	3	5
STANDARDS			
Location	San Diego County	Southern California	Outside S. California
Restoration to tidal wetland with extensive intertidal and subtidal	Significant mixture of tidal and subtidal habitats	Tidal marsh with some channels and mudflat	Only tidal marsh
Create or substantially restore			
Phase I (42.5 acres)	Creates acreage requirement	Restoration or enhancement of tidal action to meet acreage requirement	Does not meet acreage requirement
Phase II (23.9 acres)	Creates acreage requirement	Restoration or enhancement of tidal action to meet acreage requirement	Does not meet acreage requirement
Buffer zone of adequate size with minimum of 100 feet	Always meets minimum buffer requirement	Meets buffer requirement 50% of time	Cannot meet distance requirement
Minimal contamination does not hinder restoration	No contamination	Potential for contamination	Contaminated site that affects restoration
Preservation guaranteed	Agreements in place to assure preservation	Land currently private; requires land acquisition or easement	Not possible to assure preservation
Feasible methods to protect long-term values on site	Land uses compatible with habitat protection	Some potential for future development on or adjacent to site(s)	Adjacent land uses incompatible with habitat values
No net loss of wetlands	No net loss of wetlands		Net decrease in wetlands to implement restoration
No adverse impact on ESA species	No adverse impacts to ESA species	Mitigation available to compensate for ESA species impacts	Unavoidable loss of habitat for ESA species
OBJECTIVES			
Maximum overall ecosystem benefits including uplands and downstream	Contributes to substantial improvement in adjacent ecosystem	Improvements to adjacent ecosystem in some aspects	Provides minimal benefit to adjacent ecosystem
Substantial fish benefits	Substantial increase in marine fish productivity	Contributes to fish productivity	No contribution to fish productivity
Buffer zone with average of 300 feet, not less than 100 feet	Meets requirement	Will require some exceptions to requirements	Cannot meet requirements in any portion
Maximum upland transition areas	Provides upland transition zone beyond buffer	Some upland transition zone within buffer	No additional upland transition zones outside of buffer
Minimum wetland impacts to existing functional	No impacts to existing wetlands	Converts some existing wetlands to another	Relies on conversion of existing wetlands to

CRITERA	RANKING SCORES		
	1	3	5
wetlands		habitat type	tidal habitats
Site specific and regional goals	Meets established regional and site specific restoration goals	Meets generalized goals for habitat restoration	Does not reflect regional or local restoration goals
Produce and support wetland-dependent resource	Provides breeding and foraging habitat for wetland species	Provides some support habitat for wetland species	Limited to no breeding or foraging habitat
Provides ESA species habitat	Supports several ESA species	Limited support for ESA species	No support for ESA species
Reproductively isolated native species	Reproductive habitat for restricted native species	Limited habitat potential for restricted native species	Does not support restricted native species
Increase in aggregate acreage of wetland	Substantial increase (>30 acres) of wetland habitat	Some increase in wetland habitat (>10 acres)	No increase in aggregate wetland habitat
Requires minimum maintenance	No maintenance required	Infrequent maintenance	Yearly maintenance required
Timely fashion to meet CCC requirements	Complete within required time frame	Uncertainty as to compliance with time frame	No likelihood of meeting time frames
Proximity to Carlsbad facility	In San Diego County	Outside San Diego County; but in Orange County	Other Counties

Table 2. Ranking of scale of 1 (best) to 5 (worst) of the ability of each of these sites in meeting the minimum standards and objectives for Special Condition 8. Rankings of 5 are highlighted in red as failure to meet these requirements make these locations unsuitable and rankings of 4 are highlighted in yellow as a change would be required by the Commission such that this site could be considered.

Criteria	Loma Alta	Buena Vista	Agua Hedionda	Batiquitos Lagoon	San Dieguito Lagoon	San Elijo Lagoon	Los Penasquitos	Lower Otay River	Tijuana (Friendship)
MINIMUM STANDARDS									
Location	1	1	1	1	1	1	1	1	1
Restoration to tidal wetland with extensive intertidal and subtidal areas	5	1	5	3	3	1	4	1	1
Create or substantially restore									
Phase I	5	3	5	5	5	3	5	1	1
Phase II	5	3	5	5	5	3	5	1	1
Buffer zone of adequate size	5	3	5	4	3	2	5	1	1
Minimal contamination	2	2	1	1	2	1	2	2	2
Preservation opportunity	3	1	3	3	1	1	3	1	1
Protect over long-term	3	2	3	1	1	1	1	1	1
No net loss of wetlands	1	1	1	1	1	1	1	1	1
No adverse impact on ESA species	1	3	2	2	2	2	1	1	3
TOTAL	31	20	31	26	24	16	28	11	13
RANK	8.5	4	8.5	6	5	3	7	1	2
OBJECTIVES									
Maximum ecosystem benefits	4	2	3	3	3	1	2	1	1
Substantial fish benefits	5	2	5	5	4	2	5	1	2
Buffer zone	5	3	5	4	2	2	1	1	1
Upland Transition Areas	5	5	5	4	3	1	5	1	1
Minimum wetland impacts	1	4	2	3	3	3	3	1	2

Criteria	Loma Alta	Buena Vista	Agua Hedionda	Batiquitos Lagoon	San Dieguito Lagoon	San Elijo Lagoon	Los Penasquitos	Lower Otay River	Tijuana (Friendship)
Site specific and regional goals	4	3	4	4	2	2	3	1	1
Produce wetland-dependent resource	3	2	2	2	2	2	2	1	1
Provides rare species habitat	4	3	3	2	2	3	2	1	1
Reproductively isolated native species	4	2	4	3	3	2	3	1	1
Increase in aggregate acreage of wetland	4	5	4	3	4	5	5	1	1
Requires minimum maintenance	4	5	1	1	1	3	1	2	2
Timely fashion to meet CCC requirements	5	5	5	5	4	5	5	1	2
Proximity to Carlsbad facility	1	1	1	1	1	1	1	1	1
TOTAL	48	42	44	40	34	32	38	14	17
RANK	9	7	8	6	4	3	5	1	2
COMBINED RANK	9	5	8	6.5	4	3	6.5	1	2

Table 3. Evaluation of ability of sites to meet significant standards and objectives.

Lagoon	Opportunity for tidal restoration	Substantial tidal restoration for fish habitat	Buffer and upland transition zone sufficient to protect restored areas	Net increase in aggregate tidal wetland acreage	Land available to Poseidon	Acreage Available	Timely completion
Loma Alta							
Buena Vista							
Agua Hedionda							
Batiquitos Lagoon							
San Dieguito Lagoon							
San Elijo Lagoon							
Los Penasquitos							
Lower Otay River							
Tijuana (Friendship)							