CUMULATIVE IMPACTS ANALYSIS FOR POSEIDON PROJECT

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Christine Whitcraft, Ph.D.
CSU Long Beach, Wetland Ecologist

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Introduction

I was asked by the California Coastkeeper Alliance to review numerous materials regarding several proposed and ongoing projects (listed chronologically below) near the Huntington Beach Wetlands in Huntington Beach, CA with a specific focus on the impacts to the Huntington Beach Wetlands Complex (HBW) (Talbert, Brookhurst and Magnolia Marshes). Most of the impacts discussed in regards to these three properties would also impact the fourth HBW-associated property, Newland Marsh. As a wetland ecologist with experience in the evaluation of wetland health and impacts of human activities on wetland health, I worked at the HBW Complex, located next to the proposed project sites, since 2008.

1) AES Demo and Re-Power
2) Ascon Landfill Remediation
3) Magnolia Tank Farm – Tank Removal and Grading
4) Proposed Magnolia Tank Farm Development
5) Entrainment and Impingement from the Poseidon plant.

Specifically, I was asked to review these California Environmental Quality Assessment (CEQA) documents to address two specific questions:

1) Did the CEQA documentation for these developments initiated after certification of the 2010 Poseidon SEIR accurately and adequately analyze impacts to wildlife and habitat – both in the marine environment and the wetlands adjacent to the proposed Poseidon facility?
2) Do any of the CEQA documents adequately analyze the cumulative impacts from the concurrent or consecutive demolition and construction of the several projects?

As explained in more detail below and in the summary statement, there are issues with the accuracy and adequacy of the several CEQA documents, and improvements could be made to ensure better results for informing the public and government agencies. Importantly, none of the CEQA documents published since the City certified the Poseidon SEIR in 2010 provide adequate cumulative impacts analyses.

Historical Context and Background Information

As background, my understanding of the historical CEQA compliance for the proposed Poseidon desalination facility is as follows.

- In 2005, the City of Huntington Beach certified an EIR for the proposed Huntington-Poseidon desalination facility to be co-located with the AES-Huntington power plant and utilize the cooling water discharge as source water for the desalination facility.
- In 2010, the City of Huntington Beach certified a Subsequent EIR (SEIR) in response to significant changes prior to facility construction, as mandated in CEQA. Poseidon proposed to operate as a “stand-alone facility”, utilizing the cooling water intake and outfall structures after AES discontinued withdrawing ocean water for cooling purposes.

Since that time Poseidon has not initiated construction of the proposed facility. In 2017, Poseidon again made significant changes to the proposed facility by proposing to modify the intake and outfall structures. The State Lands Commission certified a SEIR narrowly focused on environmental impacts related to the proposed modifications. It is my understanding that any additional CEQA requirements were to be fulfilled by different state agencies with regulatory authority to issue permits for the proposed facility.

Further, since 2010 when the City certified the SEIR, there have been significant changed circumstances in close proximity to the site of the proposed Poseidon facility. These changes include:

- Demolition of the existing generators at the AES power plant and construction of new generators;
- Demolition of the oil storage tanks at Magnolia Tank Farm and grading of the property;
- Clean-up abatement of the Ascon Toxic Waste Facility; and most recently,
- Proposed development of the Magnolia Tank Farm as a mixed-use property.

All of these projects represent a significant change in the project area since certification of the 2010 Poseidon SEIR. In addition, the projects include significant demolition and construction activities on properties immediately adjacent to sensitive wetland habitats. The individual effects of these projects, when considered together or when considered as consecutive events, are likely to be considerable and are likely to compound other environmental impacts. In fact, the proximity of and scale of the project relative to the size of the neighboring wetlands is concerning, and I feel more attention to should be given to the proposed projects as a whole through a cumulative impacts analysis (Figure 1b). All of these proposed developments have certified CEQA documentation, with the exception of the proposed development of the Magnolia Tank Farm which has a recently published Draft EIR.

Methodology

This assessment was done using two fundamental approaches: 1) a review of the accuracy of past documents and reports on the impacts to wetlands and 2) assessment of the conditions at HBW Complex based on data collected from 2008 – present. My work includes consideration of assumptions from prior reports, potential affected species lists, survey techniques, and valuation assumptions that affect the accuracy of permitting and mitigation. This report is not a comprehensive review of all aspects of the study nor of the technologies or plans themselves. It is more focused on the accuracy of past reports and areas where refinements may improve the permitting or impact assessment process.

The project team collected and I reviewed numerous relevant documents including, but not limited to

a. AES Demo and Re-Power
    a. Documents from California Energy Commission (CEC) webpage

    b. Coastal Commission Letters, Reports and Supplemental Analysis provided to CEC
    c. AES Responses to CEC Staff Focused Supplemental Analysis on Biological resources.
b. ASCON Landfill Remediation
    a. Department of Toxic Substances Site for general information
    b. 2014 Recirculated EIR for Remedial Action Plan
    c. Community update from DTSC (July 2017)
    d. 2017 Annual Report for the Ascon Landfill Site Southern Tarplant Mitigation at Fairview Park and Zedler Marsh for the Ascon Landfill Site mitigation measures BIO-3 and BIO-1 of the Interim Removal Measure and Remedy Mitigation Monitoring and Reporting Programs
    e. Nesting bird report (Chamber Group, 2017)
c. Magnolia Tank Removal and Grading
    a. Information from City of Huntington Beach
    b. Draft EIR from development project
d. Proposed Magnolia Tank Farm Development
    a. Draft EIR
e. Entrainment and Impingement from the Poseidon plant.
    a. Davis et al. 2006 report "Huntington Beach Units 3 and 4 Entrainment and impingement study results, mitigation options, staff and working group recommendations, and ACE's response and objections to the recommendation"
    b. Comprehensive Demonstration Study for AES Huntington Beach Generating Station Final Report (January 2008)
    c. Energy Research and Development Division, Final Project Report. Compensation for cooling water intake entrainment effects and the habitat production forgone method (April 2012)
    d. Emails between Poseidon and Santa Ana Water Boards (May 2018)

Site Description

Huntington Beach Wetlands Complex (HBW Complex)

A little background information on the wetland site is useful for interpreting the analysis that I have conducted. The Huntington Beach Wetlands (HBW) Complex is an approximately 80-hectare remnant of a 1200-hectare wetland area which historically existed at the mouth of the Santa Ana River in Huntington Beach, Orange County, California (33˚ 39' N, 117˚ 59' W) (Figures 1a, b). This area consists of restored salt marsh and coastal dune habitat and is bisected by roadways into four distinct sections, including the Talbert, Brookhurst and Magnolia Marshes. These salt marshes are hydraulically linked to each other and to the Pacific Ocean by a flood control channel running along the northeastern border of the site (Huntington Beach Channel).

Historically, this site was subject to diking and filling of natural marsh creeks for the purpose of oil and gas exploration, which isolated the area from surface tidal exchange for over 70 years (Dage and Reardon 2004). In 1984 the land was designated as open space and industrial energy production by the City of Huntington Beach's Land Use Plan. The dike separating Talbert Marsh (25 acres) from the flood control channel was breached in 1989, restoring full tidal influence to this marsh area. An additional restoration project restored tidal flow to Brookhurst Marsh (67 acres) in 2009. With acknowledgement that it is also a restored site, we chose to use Talbert Marsh (now a 20-year restored marsh) as a reference site in this study due to its proximity and similarity to Brookhurst Marsh.

Since their respective restorations, all three marshes have grown to support many species and habitats characteristic of a southern California salt marsh. Pickleweed (*Sarcocornia pacifica*) dominates most of the intertidal areas. Patches of cordgrass (*Spartina foliosa*) are found in the low marsh. Small areas of saltgrass (*Distichlis spicata*), saltwort (*Batis maritima*), and alkali-heath (*Frankenia salina*) occur in the middle marsh (Merkel and associates 2004, Whitcraft et al. 2013). The marshes also serve the function of improving flood control, and are home to state-endangered bird species and commercially and recreationally valuable fish species.

AES Demo and Re-power

Huntington Beach Energy Project (HBEP) would be developed by AES Southland Development, on a 28.6-acre privately owned site located on Newland Street near intersection with PCH. The project borders a recreational vehicle park on the west, ASCON tank farm on the north, the Magnolia Marsh on the north and east, and the Pacific Ocean and Huntington Beach State Park on the south and southwest. The Huntington Beach Generating Station (HBGS) is currently on the site and would be replaced with the HBEP. The HBEP facility would be air-cooled, eliminating the need for large quantities of once-through cooling seawater (CEC 2014).

Summary of main questions for this report

1) Is the information contained in the reports accurate and adequate?
    a. Some of the information contained in the reports is both accurate and adequate. I agree with the staff assessments that issues of concern continue around noise and vibration impacts, setbacks from the sensitive wetland habitats, and nitrogen deposition. I feel that these need to be addressed in future planning documents beyond evidence in the rebuttals to the staff reports.
2) Is there an accurate and adequate cumulative impacts analysis in any of all of the reviewed CEQA documents?
    a. There is no cumulative impacts analysis in the documents I reviewed, and the issues that have been raised by staff reports are in the same categories as those raised in several other concurrent or planned projects in the same location. This should require a cumulative impact analysis as part of CEQA.

Additional details are below.

The staff reports (CEC 2014, Coastal Commission 2014) indicated several unresolved issues: construction and demolition noise impacts to special-status birds and rehabilitating wildlife, operational noise impacts to rehabilitating wildlife, and nitrogen deposition impacts to sensitive habitats. These are the similar issues identified as potential issues in the Ascon landfill site and the Magnolia Tank Farm Project, highlighting the needs for appropriate mitigation as well as a cumulative impact analysis. In addition, the Coastal Commission staff noted that several components of the project as currently proposed (2014) are inconsistent with LCP Policy C7.1.4, which requires new development to be located at least 100 feet from wetlands. Additionally, project construction and operations are expected to cause adverse indirect impacts to nearby wetlands and ESHA due to dewatering, noise, and vibration.

The responses of the CEC to the Coastal Commission concerns do cite evidence that clapper rail (light-footed ridgeway rails) continue to nest at Tijuana Estuary despite high noise levels. I agree with the citations that Tijuana Estuary has high populations levels, but more information needs to be provided about the distance of the nesting from the noise sources as Tijuana Estuary is significantly larger than the area being considered here. The suggestion of buffers (approximately 200 feet) seems to have been accepted in the CEC response based on the studies available for Belding's Savannah Sparrow.

Ascon Landfill Remediation

The Ascon Landfill site is a vacant 38-acre parcel which formerly operated as a landfill from 1938 through 1984. Much of the waste came from oil drilling operations, including waste drilling muds, waste water brines, and other drilling wastes. In addition, amounts of chromic acid, sulfuric acid, aluminum slag, fuel oils, styrene (a form of plastic), and other wastes were also disposed on the site into open lagoons and pits.

The site is adjacent to residential areas, parks, a high school, and an industrial area; it is approximately 0.25 miles from the beach and a neighbor to the HBW complex. The site is zoned for residential use in the future. Clean-up work is ongoing at the site.

Summary of main questions for this report

1) Is the information contained in the reports accurate and adequate?
    a. Some of the information contained in the reports is both accurate and adequate. The 2017 report about bird nesting activity needed more justification as to why no birds would be impacted by the activities
2) Is there an accurate and adequate cumulative impacts analysis in any of all of the reviewed CEQA documents?
    a. There is no cumulative impacts analysis in the documents I reviewed, and the issues that have been raised above are in the same categories as those raised in several other concurrent or planned projects in the same location. This should require a cumulative impact analysis as part of CEQA.

Additional details are below.

Birds

According to the Chambers Group 2017 report, no active nests were observed within the project site or adjacent buffer. However, overall bird activity was high both in the project site and in the adjacent buffer with courtship, foraging, and nesting activities observed. In addition, sensitive wildlife species, including Cooper's hawks, were observed within the project site and gnatcatchers were in the adjacent buffer. The consultant opinion is that the birds were not likely to be impacted by construction activities.

Generally, the diverse habitats within the HBW Complex (open water, mudflats, vegetated salt marsh, salt pannes, upland transition zone) provide valuable loafing and foraging habitat for both resident and migratory birds. The site is presently used for breeding by the state-listed Beldings savannah sparrow and for foraging by the California Least Tern and Brown Pelican (Whitcraft et al. unpub, HBWC 2004) (Table 3). Thus construction site impacts are important to understand and minimize. Temporary indirect impacts may occur to gnatcatchers, hawks, and other bird species as a result of noise, night lighting, introduction of invasive species, dust, erosion, sedimentation, and human encroachment resulting from the project.

First, noise and vibrations associated with the use of heavy equipment during construction of the proposed project has the potential to disrupt gnatcatcher nesting and foraging behaviors in adjacent habitat by masking intraspecific communication and startling birds (e.g., Dooling and Popper 2007). When possible, I think it would be advisable to incorporate some measures (listed below) into the project to reduce the effects of construction noise on essential gnatcatcher behaviors (breeding, feeding, sheltering) to a lower or insignificant level. Construction and operational lighting has the potential to affect gnatcatchers, hawks, and other birds. Light that alters natural light patterns in ecosystems can lead to increased predation, disorientation, and disruption of inter-specific inter actions (Longcore and Rich 2004). I have not seen documentation of any such measures although they potentially exist and were just not part of my review.

Potential measures to reduce impacts of noise and light to neighboring wetlands and associated bird species

1) All equipment will be equipped with properly operating and maintained mufflers to reduce construction noise.
2) No pets will be allowed on the property.
3) All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will be restricted to designated disturbed/developed areas. These designated areas will be located to prevent run-off from entering existing native vegetation and potential habitat areas.
4) If nighttime construction is occurring, all project lighting should be placed and directed onto disturbed areas within the construction site and away from sensitive habitats including the wetlands.
5) If possible, light glare shields should be used to reduce the extent of illumination into sensitive habitats.

Species of special concern

Southern Tar Plant (*Hemizonia parryi ssp. australis* or *Centromadia parryi ssp. australis*) is a dicot, annual herb that is native to California. It is included in the CNPS Inventory of Rare and Endangered Plants on list 1B.1 (rare, threatened, or endangered in CA and elsewhere). Species on this list are considered rare throughout their range and at risk of becoming extinct. All such plants are protected by the Department of Fish and Wildlife and are eligible for state listing as either threatened or endangered. Southern tarplant is also a federal species of concern. It is a summer-blooming annual that looks and acts weedy where it occurs. This means that disturbance is a key feature to its continuing populations in the area.

Tarplant were counted at the ASCON site during a high productivity year and mitigation standards were set to have 150,000 individuals in the first year. Two remote sites were chosen for transplanting (Zedler Marsh in Los Cerritos Wetlands and Fairview Park). Both seem appropriate and have been monitored appropriately for success. HBW Complex would have been a good site to receive tarplant, but logistics were not possible at the time.

Invasive species

The same Chambers Group report from 2017 noted that vegetation within the survey site contains non-native vegetation, e.g. ice plant, and mustard (*Brassica sp.)*. Both in terms of impacting birds and the neighboring wetland habitat itself, I would also like to see the project incorporate measures (discussed below) to prevent the introduction and spread of invasive species.

Potential measures to reduce impacts of invasive species to neighboring wetlands

1) Project landscaping should not include exotic plant species listed on the California Invasive Plant Council's (Cal-IPC) "Invasive Plant Inventory" list (http://www.cal-ipc.org)
2) Attention should be paid to transport, use, and disposal of soils form the site that might contain invasive weed seeds to ensure that invasive weeds are not spread into neighboring habitat or new areas by the project.
3) All construction equipment should be washed and cleaned of debris prior to entering a new area to minimize the spread of invasive species.
4) Eradication strategies should be implemented on site if an invasion of a non-native plant occurs.

Air quality

As noted in page 14 of the REIR, this effort and cleanup requires significant construction equipment usage as well as truck traffic on and off the site. The project is going to remain in exceedance of the SCAQMD regional threshold for NOx from these activities for most days throughout the duration remediation project. In addition, PM_{10} emissions due to exhaust and fugitive dust will be higher than regional standards, resulting in localized concentrations of NO_2 in excess of standards. These high concentrations are likely to affect wildlife and flora in the closest properties, especially HBW complex (e.g. Magnolia Marsh).

There are relatively few studies of N (and other pollutant) deposition effects on intertidal salt marsh systems, but generally we know that salt marsh vegetation is N-limited (Mitsch & Gosselink, 2000), which would make it vulnerable to eutrophication effects from atmospheric N deposition.

Some single-application, N addition experiments that have shown have shown that the age of the marsh will influence the ecosystem response. This is because as marshes age *i.e.* during succession, N availability changes, increases as organic matter that has accumulated in the sediments is released through mineralization (http://www.apis.ac.uk/node/968). Boorman & Hazelden (2012) suggest that the earlier successional low – mid saltmarsh areas are more resilient to N deposition than the mature upper areas and that effects of N deposition are likely to be found in the tall vegetation of the upper marsh communities where interspecific competition is greatest. Most likely impacts would be loss of N-sensitive species and increases in tall grass and graminoid biomass (Bobbink et al. 2011) which has been seen in other southern Californian systems like coastal sage scrub (e.g. Talluto and Suding 2008).

There is potential for ecosystem change in the HBW Complex as a result of the reduced air quality associated with the project. This has been identified as the Environmentally Superior Alternative, and I think consideration of the impacts to the HBW Complex would strengthen that argument even further. Thus, alternative 3 (lower intensity, longer duration schedule), which could mitigate the intensity of potential impacts should be considered in the recirculated draft EIR.

Outreach

Site orientation, information, and tours have been provided to representatives from the Huntington Beach Wetlands Conservancy (HBWC, landowners of the HBW Complex). Continuing engagement with the HBWC is essential for this project. Since 1972, the site has an industrial fuel oil storage facility containing three above-ground, 25 million-gallon tanks (DEIR 2019). When the AES power plant was converted to natural gas, fuel storage was no long needed, and the storage tanks became obsolete.

Magnolia Tank Farm: Tank Removal and Grading

The 28.9-acre Magnolia Tank Farm project site is located on the west side of Magnolia Street at Banning Avenue in the southeastern area of Huntington Beach, California. This portion of the project is needed for development of project by Shopoff Realty Investments, discussed in the next section. This project has been completed but is included in the analysis because it is one of major projects taking place in the vicinity of the Huntington Beach Wetlands. In 2013, the City of Huntington Beach issued a Coastal Development Permit to the property owner, Plains All-American Pipeline for the demolition of the three storage tanks and associated oil-related facilities as well as minor grading to facilitate drainage (DEIR). Tank demolition was completed in July of 2017, and the site is currently leased to AES as a staging and parking area for the demolition of the existing power plant and construction of the new plant. The new power plant is expected to be operational in 2020. Discussion of this project (completed) is included here to

demonstrate the consecutive nature of all of these projects and as such, the potential for their impacts to be greater because they occur one after another.

Magnolia Tank Farm: Development Project

This project is proposed on the Magnolia Street site discussed above and has two improvement scenarios. Scenario 1 is a mixed use 230,000 sq. ft. lodge with up to 175 guest rooms, a guesthouse with 40 beds, varied retail stores and dining venues. In addition to this, there would be 2.5 acres of coastal conservation land and 2.6 acres of parkland. Scenario 2 is residential units (up to 250) and open space in the form of parkland.

For evaluation of this project, I reviewed the draft EIR (DEIR) published in December 2018. I have focused on ecosystem components likely to be affected by this project, primarily birds and plants. My concerns and recommendations are similar between the Ascon Landfill Remediation project. Some language in the DEIR, such as reference to use of the area within 300 feet of the project boundary by "a few native bird species" indicates that additional investigation needs to be conducted to determine how much use is actually present as the neighboring wetland area is used by numerous native bird species. Significant changes in the viewscape, that might be in conflict with City of Huntington Beach guidelines to protect the Coastal Zone's visual resources (2011), are likely to result from this project, which are highlighted in the DEIR. Specifically related to this project, neighboring landowners have communicated with new landowners and developers about the project. Hopefully that input will help guide decision making to minimize impacts to neighboring wetlands. Of the two scenarios presented, Scenario 1 with conservation land is preferred as it is designed to reduce potential impacts to the neighboring wetlands. The proposed design includes elements that can serve as a buffer zone for the wetland habitat, and this is crucial to protect the eelgrass (*Zostera marina*) habitat in the neighboring channel and the wetlands themselves.

In addition, the plan for the area encourages the development of interpretive educational programs and docent-led tours for visitors on the site. These are intended to be coordinated with the wetland landowner, the Huntington Beach Wetland Conservancy to minimize impact to the Magnolia Marsh.

The Draft EIR (DEIR) for the tank farm includes a cumulative impact analysis and a table (Table 4-1) that lists pending projects in surrounding cities. The projects discussed prior in this document (Huntington Beach Generating Station Demolition and Replacement with Huntington Beach Energy Project Demolition and reconstruction of the power plant, ASCON Landfill, and Poseidon Construction of a 50-million gallons-per-day sea water desalination plant) are included in this table. This cumulative impact analysis should be included in documentation for the other project as the combination represents a significant impact to sensitive wetland habitats.

Poseidon Entrainment and Impingement Comments

The proposed location of the desalination facility is a 12-acre site inshore of Pacific Coast Highway, next to the AES Huntington Beach generating station. The site has an existing 1,800-ft long seawater surface intake that is being used to bring cooling water into the power plant and a 1,500-ft outfall used to discharge the water back to the sea (ISTAP Phase I 2014). The proposed site is adjacent to a very busy state beach, a least tern nesting colony on the state beach, the Huntington Beach Wetlands Conservancy (Figures 1a, b), and is one mile north of the mouth of the Santa Anna River.

For evaluation of this project, I have focused on ecosystem components likely to be affected by this project, primarily fish. In each section, I have provided a summary of the issues I see with exiting documentation or addressed specific questions from background materials.

Summary of main questions for this report

1) Is the information contained in the reports accurate and adequate?
    a. Some of the information contained in the reports is both accurate and adequate. Specifics are detailed in the report below, but the two areas of concern in accuracy involve the classification of which fish species are estuarine and which are found in the area near Huntington Beach porject.
        i. Combtooth blennies and diamond turbot should be classified as estuarine, not open ocean fish, and thus not excluded from the entrainment and impingement calculations. Estuarine-dependent species with life history stages in the ocean are likely to be affected by entrainment and should be considered as part of any estimation of ETM/ATF or wetland mitigation value.
        ii. Two target taxa, gobies and northern anchovies, should be included in the HPF analysis as we have data showing they occur nearby and are likely to be affected as part of the project.
2) Is there an accurate and adequate cumulative impacts analysis in any of all of the reviewed CEQA documents?
    a. No cumulative impacts analysis in the reviewed CEQA document for this project.
    b. Specifically related to fish, literature supports that impacts of entrainment and impingement on fish populations with coastwide distributions should be should be assessed on a cumulative basis, accounting for all water withdrawals that could affect each species (e.g. Barnthouse 2013).

Additional details are below.

1) Fish Community

Davis et al. (2006) and Mayer and Nordby had two of the most comprehensive studies of the entrainment and impingement from Units 3 and 4 at Huntington Beach that I reviewed. They estimated that entrainment in the cooling water used for Units 3 and 4 was equivalent to the loss of productivity of 104 acres of habitat for coastal fishes and 15.35 acres for CIQ gobies. Their

study differed from others (primarily MBC and Tenera 2005) by including gobies but did not include other fish that are found in the HBW Complex (See below).

We (Whitcraft et al.) have extensive data on fish use of these wetlands. Of the 37911 fish captured in both beam trawls and beach seines from 2009-2013, there were 24 species and topsmelt made up 42% of all fish captured, followed by 11% killifish, 7% pipefish, 7% staghorn sculpin, and 4% goby complex (Table 1). All other species made up 26% of the total. Undoubtedly, the fish habitat value of these marshes has continued to increase since this sampling period (now more than five years ago).

Even without the inclusion of the additional fish species discussed below, Davis et al. (2006) found that the potential loss of productivity due to entrainment and impingement represented functional loss for the neighboring wetlands including loss of habitat for fish and plants as well as degradation of bird habitat. I strongly agree with this funding and think that their estimate of entrainment of all the organisms could even be an underestimate of the degradation of the quality of the estuarine environment.

Specifically, I wanted to address several species that were discrepancies among different reports and that were specifically questions in the emails between Poseidon staff and the Santa Ana Regional Water Board (dated May 2018). Overall, I think that the Poseidon project plan (As detailed in April 2018 presentation) that relies on expertise from Drs. Raimondi and Calliet is sound. I am primarily focusing on the issues identified as inconsistencies in that report and in an email correspondence from May 2018.

1) Should combtooth blennies and diamond turbot be classified as open ocean species as they were in MBC and Tenera 2005 and Davis et al. 2006? Or should they be classified as estuarine taxa as has been done in the draft Environmental Impact Report for the proposed West Basin Ocean Water Desalination Project? (Combtooth blennies also were classified as estuarine for the Carlsbad Desalination Project.)

Diamond turbot (*Hypsopsetta guttulata*)

a. Diamond turbot should be classified as an estuarine taxon (e.g. Miller and Lea 1972; Lane 1975; Present 1987). In the literature, this species has been classified as an estuarine group, based on their demersal nature and association with the marsh surface for food (Armstrong et al. 1995; West et al. 2003; Madon 2008).
b. Tagging studies and otolith trace element fingerprints show that adult diamond turbot have limited migration among estuaries (Lane 1975; Swearer et al. 2003). *Hypsopsetta guttulata* settles at the smallest size of any near-shore California flatfish (Ahlstrom et al. 1984) and exhibits a moderate pelagic larval duration of 5–6 weeks (Gadomski and Peterson 1988). From this, it should be determined how many days these larvae are at risk of entrainment (as suggested in Figure 2).
c. From our data (Whitcraft et al. 2013 – report, Holcombe et al. in review, Table 1), small diamond turbot (average 4.95 $\pm$ 0.22 cm) were more abundant and larger in Talbert Marsh, the more established marsh, than newly restored Brookhurst Marsh. Over a representative one-year period with monthly sampling, we caught

238 diamond turbot in beach seines. Loss of larval turbot would be a loss of estuarine-dependent species.

Combtooth blenny

d. Combtooth blenny is an interesting catch-all designation. In the Davis et al. 2006 repot, these are *Hypsoblennius* spp., indicating multiple species within this designation. The most common species in the associated estuarine system is the bay blenny (*Hypsoblennius gentilis*)

a. From our data (Whitcraft et al. 2013 – report, Holcombe et al. in review), bay blennies (*Hypsoblennius gentilis*) (average 4.95 $\pm$ 0.22 cm) were not found in high abundances but were present throughout the wetland complex. Over an example one-year period with monthly sampling, we caught 13 bay blennies in beach seines. It should be noted that seining for blennies does not always yield the highest catch numbers so these are likely an underestimate of the population in this system; beam trawling is frequently a higher catch method (e.g. Pondella and Williams 2009).

2) Should the taxa included in the original ETM analysis for the Huntington Beach Generating Station in MBC and Tenera 2005 and Davis et al. 2006 be used for the Project?

a. Table 3 (HPF estimates are from Biology Table 2 of Davis et al. (2006b), included with California Energy Commission's Order Requiring Post-Licensing Studies, http://energy.ca.gov/sitingcases/huntingtonbeach/compliance/index.html)

i. Estimates in table were based on permitted flow of 507 MGD.

ii. Restoration cost was based on an estimate of $74,660 per acre for initial restoration costs and $784 per acre

iii. Final Energy Commission decision was based on actual operational flow of 235.5 MGD for Units 3 and 4, and required 66.8 acres and $5,511,000.

b. However, this analysis did not include two target taxa—gobies and northern anchovies—in the HPF analysis. The rationale for this was that gobies do not occur near Huntington Beach Generating Station (HBGS) as adults, and northern anchovies occur over a much larger area than the nearshore SWA (Davis et al. 2006b)

Gobies (Family Gobidae)

a. Gobies (Family Gobidae) are demersal estuarine-dependent taxa; the three species that comprise the CIQ goby complex (*Clevelandia ios*, *Ilypnus gilberti*, *Quietula y-cauda)* live their whole lives within estuaries (Mayer and Nordby). Adult gobies are very abundant in shallow southern California estuaries (Horn and Allen 1985, Esmond et al. 2002).

b. Goby larvae are dominant in the larval assemblage of southern California estuaries with densities as high as 63/m^3 reported during one reproductive pulse at Tijuana Estuary (Nordby 1982).

c. Impingement in an open coast plant is unlikely to be an impact to adult gobies. However, entrainment of goby larvae can be high especially in facilities located in embayments (e.g. data within Mayer and Nordby, Tenera Environmental 2008).
d. The ETM formula requires division of the average density of the taxon from the entrainment station by the average density of the taxon from the source water sampling stations.
    a. It is worth noting that many studies (including Whitcraft et al. in HBW, Allen 1980) under-sample gobies and other difficult-to-catch species. This has been noted by Steele et al 2006a,b.
    b. Strange et al. (2012) was considering a different method (habitat production foregone method) but noted differences in reliability by location. HPF was relatively reliable for estimating the extent of restoration needed in embayments and estuaries while more unreliable when used for power plants located on the open coast. Additionally, restoration scaling results could be made more reliable by using more comprehensive methods to determine predicted fish losses that consider entrainment, recruitment, and biomass production rates.

3) Or should additional taxa be added to the ETM/APF analyses for the Project (e.g., salema, northern anchovy, jacksmelt, sand crab)? Why or why not?
    a. I think that additional taxa should be added to the ETM/APF analyses for the project. The species listed in this question salema, anchovy, jacksmelt are all commonly occurring fish species in the estuarine environment. Entrainment of their larvae will affect the adult estuarine species population (Figure 3).
4) What is the scientific rationale for consideration of which taxa to include or exclude?
    a. Estuarine-dependent species with life history stages in the ocean are likely to be affected by entrainment and should be considered as part of any estimation of ETM/ATF or wetland mitigation value.
    b. When specific data are available about the neighboring properties (in this case HBW complex), those data should influence the list of species likely to be affected.
5) In addition to the habitat identified in the National Wetlands Inventory, should Long Beach Harbor be included as potential habitat for CIQ gobies for calculating the TSWB? (CIQ gobies are known to be present in the harbor and may be a source of larvae to the Project site.)
    a. Yes. The Long Beach harbor should be included as potential habitat for CIQ gobies for calculating the TSWB. These gobies are present all over the harbor and as such as certainly a source of larvae to the project site. Studies of essential fish habitat from the harbor (e.g. https://www.portoflosangeles.org/EIR/APL/DEIR/Appendix%20F3%20EFH%20Assessment.pdf) indicate that gobies (*Clevelandia*, *Ilypnus*, and *Quietula* [CIQ] goby complex), yellowfin goby (*Acanthogobius flavimanus*), white croaker, and bay goby (*Lepidogobius lepidus*) were the four most abundant taxa comprising nearly 90 percent of the fish collected.

California Halibut (*Paralichthys californicus)*

a. The California halibut, *Paralichthys californicus*, is one of the most important flatfishes to recreational and commercial fisheries in nearshore waters of central and southern California (Allen et al., 1990) and is considered to be a facultative user of estuaries for nursery habitat (Fodrie and Levin, 2008). The diet of juvenile halibut is age- and size-dependent, shifting from a majority of benthic crustaceans in younger, smaller fish to a diet comprised mostly of teleosts for older, larger individuals (Kramer, 1990).
b. Adult halibut occur most frequently across the continental shelf in depths less than 60 m (Allen et al., 1990). Spawning occurs year round along the coast (Moser and Watson, 1990), where larvae spend 3-4 weeks before transport shoreward for settlement (Allen, 1988; Kramer, 1991).
c. Past studies in southern California have revealed that 58% to 69% of juvenile halibut reside within different types of estuarine environments, despite the fact that these protected embayments make up only ~15% of potential nursery habitat area (Fodrie and Mendoza, 2006; Fodrie and Levin, 2008). As a consequence, halibut are a model organism for explicit consideration in these discussions.
d. From 2008 - 2011, Freedman et al. (2016) conducted an intensive study of use of the HBW Complex by specific fish species including California halibut. Our study was not designed to determine the size of the California Halibut population found within the HBWC. The mix of gear types that we used (hook-and-line, beach seine, and beam trawl surveys) was selected to efficiently sample all of the HBWC with its differing habitat complexity, and therefore the data are not comparable across gear types and cannot be combined to obtain a strong, local population estimate. See Table 2.
e. However, the relative abundance estimates (counts of individuals) are presented here to demonstrate the habitat value of this wetland complex to species like halibut. These recreationally and commercially valuable species are likely to be affected by impingement and entrainment due to their natural history of pelagic, oceanic larval forms.

Comments on proposed mitigation location

While there is a clear need for continued maintenance and dredging at Bolsa Chica, the idea of off-site mitigation at Bolsa Chica (WRA 2016) presents a problem as there are neighboring wetlands that need maintenance (e.g. Magnolia Marsh) and restoration (e.g. Newland Marsh). These sites are much closer to the likely impacts than properties further away (like Bolsa Chica) so I feel that both wetlands should receive mitigation funding. At a minimum, some justification for not devoting some mitigation funds to the immediate neighboring wetlands should be provided. Prior, in December 2006, AES Huntington Beach fulfilled its obligation to provide funding to the Huntington Beach Wetlands Conservancy (HBWC) for the restoration of 66.8 acres (0.270 km^2) at the HBW complex (AES. 2008). At the time, California Energy

Commission staff determined that wetland restoration would be most appropriate, and that restoration at the adjacent Huntington Beach Wetlands would be the best project (AES 2008).

Summary notes

One challenge of considering this impacts study was that each of the proposed projects is considered individually in terms of impacts and activities. Generally, and certainly in this case, the total cumulative impact of these projects on the wetland ecosystems (specifically HBW complex) is greater than each activity's impact in isolation, and the combination of activities has the potential to cause severe environmental degradation. In the past OCCK has written to object to the divisions of the Poseidon project into single CEQA documents, but none of the documents that I specifically reviewed address the cumulative impacts of these projects (Poseidon, AES Recertification, ASCON cleanup, Magnolia tank farm) together.

In general, the effects of these projects are cumulative impacts because of the common location and on a particular resource that is similar in nature (wetlands). The individual effects of these projects, when considered together, are considerable and are likely to compound other environmental impacts (as stated in CEQA Guidelines Section 15355). In fact, an aerial view of the site shows how large the footprints of the projects are relative to the size of the impacted wetlands (Figure 1b). Based on my review of the documents provided, I feel two key pieces are missing from the environmental review of these projects: 1) a cumulative impact analysis needs to be conducted to understand the impacts of these projects on numerous categories (especially birds, plants, air quality) and 2) a cohesive timeline in which all project pieces are considered together.

Figures and Tables

(a)

(b)

Figure 1. (a) Aerial view of HBW complex with storage tanks on Magnolia Street north of the Magnolia and Brookhurst Marshes. Photo: OC Register (b) Aerial imagery showing the footprint of the wetlands versus the surrounding project footprints (yellow). Photo: Google Earth

Table 1. Fish & macroinvertebrate species by marsh as collected by beach seines in marsh channels & by beam trawls in tidal channels (Fall 2010 – Spring 2013)

Group	Talbert Marsh	Brookhurst Marsh	Magnolia Marsh	Channel
Fish	Anchovy Diamond Turbot Halibut Killifish Longjaw Mudsucker Pipefish Sculpin Staghorn Sculpin Topsmelt Yellowfin Goby	Anchovy Diamond Turbot Diamond Turbot Halibut Jacksmelt Killifish Leopard Shark Longjaw Mudsucker Pipefish Round Ray Sandbass Scallop Sculpin Shiner Surfperch Smoothhound Staghorn Sculpin Topsmelt Yellowfin Goby	Anchovy Bay Blenny Diamond Turbot Goby Kelp Bass Killifish Longjaw Mudsucker Mullet Pipefish Shadow Goby Shiner Surfperch Smoothhound Staghorn Sculpin Tongue Fish Topsmelt Yellowfin Goby	Pipefish Spotted Bay Bass

Table 2. Number (ranges in parentheses) of California Halibut captured, by location and gear type. Due to differences in sampling efficiency among the collection methods, the values cannot be standardized and compared quantitatively. The values do not include the halibut that were acoustically tagged, as those fish were captured during an independent, non-standardized fishing effort. For more details, see Freedman et al. 2016.

Location	Gear type	No. of samples	Fish <25 cm	Fish >25 cm
Marshes	Hook and line	229	0	0
	Beach seine	360	125 (1.1–29.0)	7 (34.1–60.5)
	Trawl	130	16 (2.6–20.3)	0
Channel	Beach seine	24	2 (7–17.8)	0
	Hook and line	96	0 (27.4)	5 (32.0–51.3)

Table 3. Sensitive species known from the vicinity with potential to occur in the Huntington Beach wetland Complex (from Merkel et. al. 2004)

Species	Common Name
Plants	
Aphanisma blitoides	Aphanisma
Atriplex coulteri	Coulter's Saltbush
Atriplex pacifica	South Coast Saltscale
Atriplex serenana var. *davidsonii*	Davidson's Saltscale
Astragalus pycnostachyus var. *lanosissimus*	Ventura Marsh Milk-vetch
Centromadia parryi ssp. australis	Southern Tarplant
Cordylanthus maritimus ssp. *maritimus*	Salt Marsh Bird's-beak
Juncus acutus ssp. *leopoldii*	Southwestern Spiny Rush
Lasthenia glabrata ssp. *coulteri*	Coulter's Goldfields
Nemacaulis denudata var. *denudata*	Coast Woolly-Heads
Nama stenocarpum	Mud Nama
Navarretia prostrata	Prostrate Navarretia
Suaeda esteroa	Estuary Seablite
Animals	
Athene cunicularia	Burrowing Owl
Charadrius alexandrinus nivosus	Western Snowy Plover
Cicindela gabbi	Gabb's Tiger Beetle
Panoquina errans	Salt Marsh Skipper
Passerculus sandwichensis beldingi	Belding's Savannah Sparrow
Pelecanus occidentalis	California Brown Pelican
Rallus longirostris levipes	Light-footed Clapper Rail
Sterna antillarum browni	California Least Tern
Trigonoscuta dorothea dorothea	Dorothy's El Segundo Dune Weevil
Tryonia imitator	Mimic Tryonia (California Brackish Water Snail)

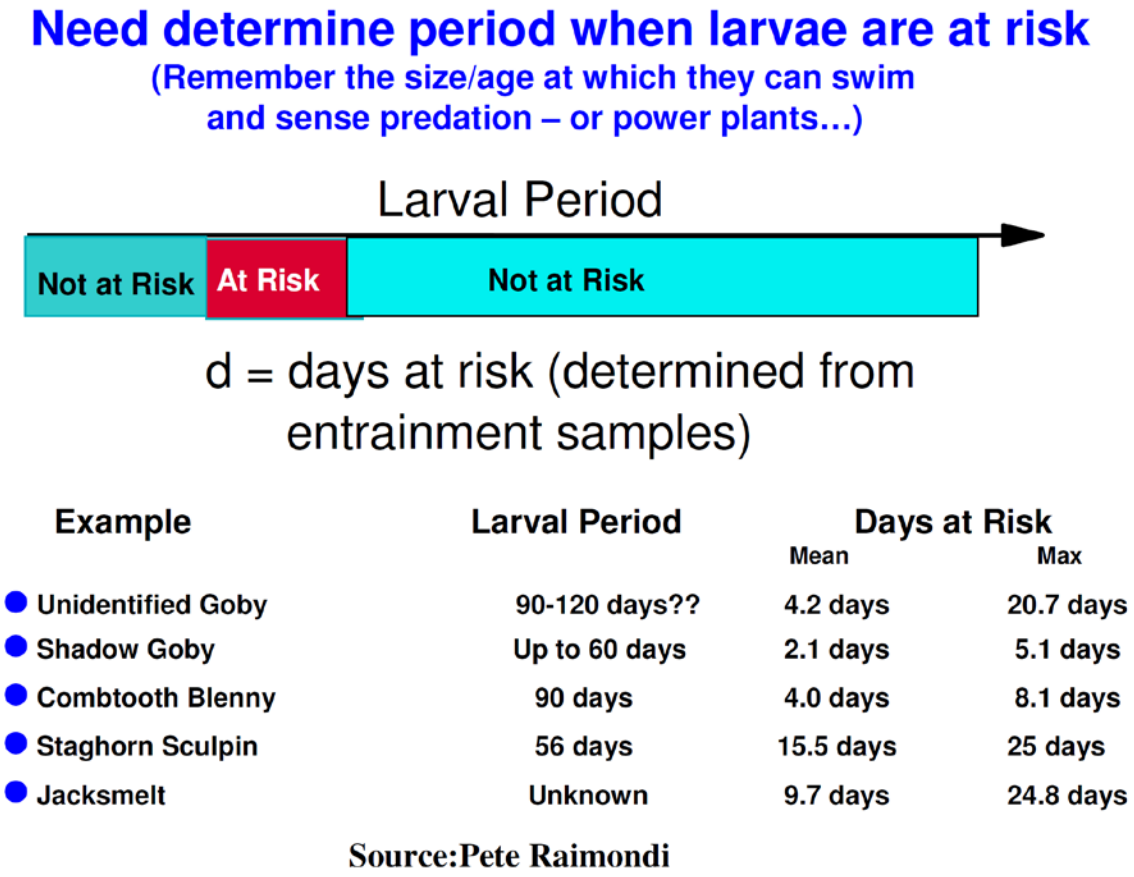

Figure 2. Larval period inflence on rish for bay and estuarine larval fish (Source – Pete Raimondi). Accessed with heading from Calliet 2006 presentation.

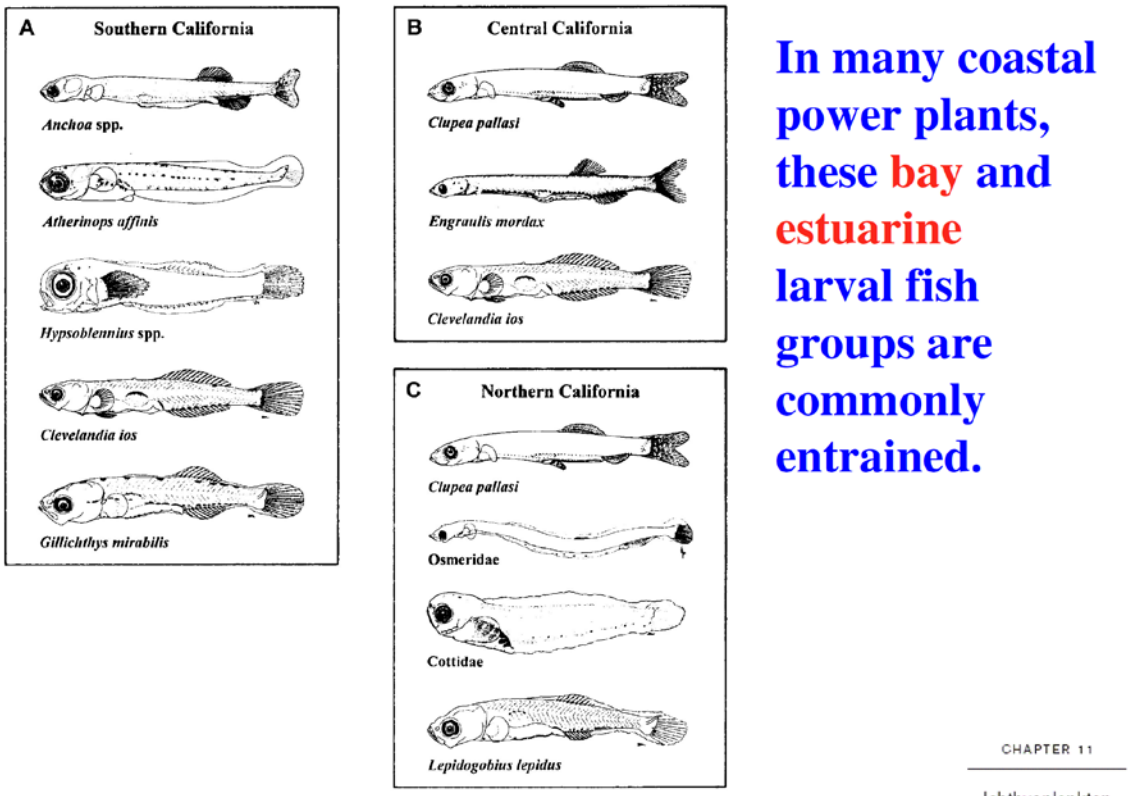

Figure 3. Characteristic taxa of bay and estuarine larval fish (Figure from Moser and Watson). Accessed with heading from Calliet 2006 presentation.

Additional Documents evaluated

AES Demo and Re-power

Documents page https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=12-AFC-02
Final Staff Assessment (see page 4.2.1) http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN202405_20140602T085620_Final_Staff_Assessment.pdf
Coastal Commission Report to CEC (see page 8)
http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN202701_20140715T081145_Letter_Re_Coastal_Commission's_30413d_Report_for_the_Proposed_A.pdf
Coastal Commission letter to CEC http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN202983_20140825T165803_Coastal_Commission_respose.pdf
CEC Staff Focused Supplemental Analysis on Biological resources.
http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN201463_20131220T161357_Supplemental_Focused_Analysis_for_the_Preliminary_Staff_Assessm.pdf
AES Response to CEC Staff Focused Supplemental Analysis on Biological resources.
http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN201582_20140121T142315_Applicant's_Comments_on_Staff's_Supplemental_Focused_Analysis_P.pdf

Comments on Focused Analysis of Biological Resources
http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN201582_20140121T142315_Applicant's_Comments_on_Staff's_Supplemental_Focused_Analysis_P.pdf
Initial CEC Staff Site Assessment (see page 4.2.1)
http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN200828_20131010T161027_Huntington_Beach_Energy_Project_Preliminary_Staff_Assessment__P.pdf

Main page http://www.energy.ca.gov/sitingcases/huntington_beach_energy/

Ascon Landfill Remediation

Department of Toxic Substances Site:
http://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=30490018

2014 REIR for Remedial Action Plan
http://www.envirostor.dtsc.ca.gov/public/community_involvement/6465253531/Ascon%20Recirculated%20Draft%20Environmental%20Impact%20Report%20October%202014.pdf

2015 Remedial Action Plan (RAP)
http://www.envirostor.dtsc.ca.gov/public/deliverable_documents/3456373453/Ascon_Final_RAP_Complete_June-2015%20%282%29.pdf

2017 project update
http://www.envirostor.dtsc.ca.gov/public/deliverable_documents/3898298501/Ascon_Fact_Sheet_July_2017.pdf

2017 Tarplant Mitigation report
http://www.envirostor.dtsc.ca.gov/public/deliverable_documents/8076109945/Ascon_STMP_combined_2017_Annual_Rpt_%2812-8-17%29.pdf

2017 bird nesting report
http://www.envirostor.dtsc.ca.gov/public/deliverable_documents/9495223820/Ascon_BIO-3_Nesting_Bird_Survey_Rpt_%2807-28-17%29.pdf

Magnolia Tank Farm – Tank Removal and Grading

https://www.huntingtonbeachca.gov/government/departments/planning/major/major-projects-view.cfm?ID=62

Magnolia Tank Farm – Tank Removal and Grading

Poseidon Project - Entrainment and Impingement from the Poseidon plant

http://www.energy.ca.gov/2013publications/CEC-500-2013-114/CEC-500-2013-114.pdf

Comprehensive Demonstration Study for AES Huntington Beach Generating Station, Final Report, January 2008 (accessed from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.588.6453&rep=rep1&type=pdf)

Pondella and Williams 2009
https://www.waterboards.ca.gov/sandiego/water_issues/programs/npdes/southbay_power_plant/docs/updates_030810/Coalition%20Files/2009_Pondella_Fish_Study.pdf

Board meeting documents from OCWD (256 pages)

https://www.ocwd.com/media/2458/sbod_20150514.pdf

The Why, When and How of Assessing Impingement and Entrainment Impacts. California State Water Resources Control Board Workshop on: Regulation and Impact Assessment of Once-Through Cooling Systems of California Coastal Power Plants (John Steinbeck)

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