DOCKETED

Docket Number:	17-EPIC-01
Project Title:	Development of the California Energy Commission Electric Program Investment Charge 2018 â€“ 2020 Triennial Investment Plan
TN #:	215845
Document Title:	Daniel Pondella Comments: Modeling manmade reefs for optimizing offshore energy projects
Description:	N/A
Filer:	System
Organization:	Daniel Pondella
Submitter Role:	Applicant
Submission Date:	2/10/2017 11:44:41 AM
Docketed Date:	2/10/2017

Comment Received From: Daniel Pondella
Submitted On: 2/10/2017
Docket Number: 17-EPIC-01

Modeling manmade reefs for optimizing offshore energy projects

Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

The Energy Commission is currently soliciting ideas and stakeholder input for the 2018 – 2020 EPIC Triennial Investment Plan. For those that would like to submit an idea for consideration in the 2018-2020 EPIC Triennial Plan, we ask that you complete the form below. Submittals are due by **5:00 p.m. on February 10, 2017.**

Part 1. Initiative Description and Purpose:

1. Please provide a brief description of the proposed initiative:

The proposed initiative will provide a critical evaluation of the biological state and contribution of manmade reef habitats offshore of central and southern California. Little is known about the relative extent of manmade marine reef habitat and how these alternative habitats contribute to overall fish production in this region. The submerged structures associated with new offshore renewable energy programs will likely create substantial hard substrate fish and invertebrate habitat and our results will be critical to the evaluation of their fisheries value from a regional perspective, informing policy related to the permitting, licensing and environmental monitoring. Our previous research has provided guidance on the decommissioning of existing oil and gas platforms and evaluating the impacts of these structures on fishery resources (Claisse et al. 2014, Claisse et al. 2015, Pondella et al. 2015). A thorough map of the available manmade habitats and the evaluation of biological communities, biomass and production on these artificial reefs will allow for a better understanding of the extent to which manmade reefs can enhance both commercial and recreational fisheries. Understanding which physical features are associated with increased productivity will provide a basis for manmade reef design for future reefing projects. In addition to reef composition, it is crucial to understand how the location of project that will create new reef habitat will impact the local biological communities and associated productivity. We will evaluate what environmental and habitat factors are correlated with the occurrence and biomass of important fishery focal species.

We propose to study and analyze artificial structures in California to augment the existing nearshore rocky reef, kelp bed and oil platform research (Pondella et al. 2015, 2016). We plan on first developing a 'the current status of artificial reefs' that will include biological and physical surveys of most known manmade structures in the region. In addition to these quantitative surveys, each reef will be mapped and georefernced with a multi-phase echo sounder (sidescan). After the initial assessment of these structures representative manmade reefs that will most likely be similar to future infrastructure projects will be identified. These reefs will then be surveyed multiple times (at least 4) to produce the biological data that will enable appropriate production estimates of fishes and invertebrates (Claisse et al. 2014, Claisse et al. 2015, Pondella et al. 2015). With this physical and biological data we will generate mapping and modeling products that will allow resource managers and stakeholders to appropriately contextualize the addition of new manmade structures to the marine environment and potentially lend insight into reefing designs and engineering that will maximize the benefits of these new habitats.

2. What technical and/or market barriers would the proposed initiative help overcome? For scientific analysis and tools, what knowledge gaps would the proposed initiative help fill?

While there is relatively complete data for the distribution of different hard substrates that make up the total natural and manmade reef habitat across the region, much of these data are from disparate sources and remain unsynthesized. In particular, recent mapping products for specific manmade reef structures are either out of date or do not exist. For manmade structures, there are point localities of shipwrecks, oil and gas platforms, and manmade rocky reefs, but these data primarily only report their location and original construction materials, but no information is available on habitat characteristics or extent of habitat that are likely to correlate with fish and invertebrate production, or their current status. In many cases, small engineering changes can dramatically increase the value of the production value of these habitats. This has been shown for oil platforms in the region where the orientation of the bottom crossbeams and the variation in platform design generate different levels of fish production. There is an important need to generate high quality mapping products for these manmade structures and synthesize this biological survey data to be able to understand what biological communities and associate fish production can be expected when new structures associated with energy production are deployed in the marine environment in this region.

Part 2. Benefits and Impacts

3. If this initiative is successful, either fully or partially, what would be the expected impact? Who are the primary users and/or beneficiaries?

The results will permit improved evaluation by state and federal agencies of current resources and pending or future projects that will create additional manmade habitats. Specifically, it will provide an evaluation of the current productivity of manmade reefs, whether additional manmade habitat may benefit recreational and commercial fisheries and provide predictive capabilities for what species are likely to occupy new manmade habitats. Additionally, the focal species for the proposed initiative will be of high value to recreational and/or commercial fishers, or have some kind of protected status, which makes them a management priority. Most of them also occur in the California Department of Fish and Wildlife's Nearshore Fisheries Management Plan and/or in the Pacific Fishery Management Council's Pacific Coast Groundfish Fishery Management Plan. The proposed research will provide managers with extensive information on the current and potential distribution and productivity of these species, allowing for more informed management and regulatory decisions. This research will also be directly applicable to cost–benefit approaches that are particularly useful to determine the situations under which management tools may be most effective. Moreover, by creating a set of resources to assess potential locations and characteristics of manmade reef habitat, managers will be able to identify potential spatial explicit impacts of potential projects. These products will be extremely valuable in terms of comprehensive ocean and coastal planning and management and educating important stakeholders, providing for an increased capacity to make scientifically informed decisions related to the fishery resources they find most valuable.

Together, the outcomes of the proposed research will assist managers in optimizing fishing potential in the region. When taking an ecosystem-based approach to marine resource management, managers may be able to implement a combination of management tools in order to mitigate the socioeconomic impacts of implementing any one in isolation, while providing greater overall conservation and ecological benefits (Claisse et al. 2013). Therefore, the result of the proposed project will directly relate to a stated goal of the Magnuson-Stevens Act to "minimize the adverse economic impacts of conservation and management measures on such [fishing] communities."

4. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed initiative:

Our goal is to provide insights into the Best Management Practices for deploying and designing these structures to maximize the ecological benefits to the region. As such, this proposed initiative would provide the biomass production (grams/area/time) for manmade and natural reefs in southern and central California (Pondella et al. 2002, Pondella et al. 2006, Claisse et al. 2014, Pondella et al. 2015, Claisse et al. 2015). It would also provide appropriate mapping products in these regions to assist in the assessment of new structures in context of the entire ecosystem (Pondella et al. 2015). Additional data products will include physical reef characteristics (natural and manmade; Pondella et al. 2015) and all appropriate ecological metrics for these structures (diversity, density, species richness etc.; Oakes and Pondella 2009, Pondella et al. 2015, 2016). These data and modeling products will then be synthesized into formats that are appropriate for both technical and non-technical stakeholders, providing appropriate context to managers, industry and the general public, including an understanding of the societal benefits of these structures (Pondella 2015).

5. Please provide a list of peer-reviewed references that support the responses for questions 3 and 4. Proposed initiatives that include peer-reviewed references will be given stronger consideration.

Claisse JT, Pondella DJ, II, Williams JP, Sadd J (2012) Using GIS mapping of the extent of nearshore rocky reefs to estimate the abundance and reproductive output of important fishery species. PLoS ONE 7: e30290

Claisse JT, Pondella DJ, Love M, Zahn LA, Williams CM, Williams JP, Bull AS (2014) Oil platforms off California are among the most productive marine fish habitats globally. Proceedings of the National Academy of Sciences 111: 15462-15467

Claisse, J.T., D.J. Pondella, M. Love, L.A. Zahn, C.M. Williams and A.S. Bull (2015) Impacts from Partial Removal of Decommissioned Oil and Gas Platforms on Fish Biomass and Production on the Remaining Platform Structure and Surrounding Shell Mounds. PLoS ONE 10: e0135812

Oakes, C.T. and D.J. Pondella, II (2009) The value of a net-cage as a fish aggregating device in southern California. Journal of the World Aquaculture Society 40(1): 1-21.

Pondella DJ, II, Stephens JS, Jr, Craig MT (2002) Fish production of a temperate artificial reef based on the density of embiotocids (Teleostei: Perciformes). ICES J Mar Sci 59: S88-93

Pondella, II, Daniel J., Larry G. Allen, Matthew T. Craig and Brooke Gintert (2006) Evaluation of eelgrass mitigation and fishery enhancement structures in San Diego Bay, California. Bulletin of Marine Science 78 (1): 115-131

Pondella, D.J., L.A. Zahn, M. Love, D. Siegel and B.B. Bernstein (2015) Modeling Fish Production for Southern California's Petroleum Platforms. Integrated Environmental Assessment and Management 11:4. 584-593

Pondella, D.J, II, J.P. Williams, J.T. Claisse, B. Schaffner, K. Ritter, K. Schiff K (2015) The Physical Characteristics of Nearshore Rocky Reefs in The Southern California Bight. Bulletin, Southern California Academy of Sciences 114:3 105-122

Pondella, D. J., J. E. Caselle, J. T. Claisse, J. P. Williams, K. Davis, C. M. Williams, and L. A. Zahn (2015) South Coast Baseline Program Final Report: Kelp and Shallow Rock Ecosystems. California Ocean Science Trust, Sacramento, CA. 310 p.

Pondella, D.J. 2015. State of the Bay Report. "Habitat Conditions: Rocky Reefs." Urban Coast 5(1):98-107.

Pondella, D., K. Schiff, R. Schaffner, A. Zellmer and J. Coates (2016) Southern California Bight 2013 Regional Monitoring Program: Volume II. Rocky Reefs. SCCWRP Technical Report 932. 91 p.

6. (For technologies only) What competitive advantages does the proposed technology solution have over current benchmark technologies? If the technology is beyond the prototype stage, what strategies do you suggest to bring to scale?

Part 3. Connection to Energy Commission's EPIC Framework
Energy Commission staff have developed a draft strategic framework to guide the CEC's planning and implementation of EPIC across triennial investment cycles. One of the objectives of the draft strategic framework is to communicate a consistent set of priorities for organizing current and future EPIC investments.

7. Please indicate which of the following strategic framework themes you feel the proposed initiative best fits within:
    - Advance Technology Solutions for Deep Energy Savings in Building and Facilities
    - Accelerate Widespread Customer Adoption of Distributed Energy Resources
    - Increase System Flexibility from Low-Carbon Resources
    - Increase the Cost-Competiveness of Renewable Generation
    - Create a Statewide Ecosystem for Incubating New Energy Innovations
    - Maximize Synergies in the Water-Energy-Food Nexus
    - Develop Tools and Analysis to Inform Energy Policy and Planning Decisions
    - Catalyze Clean Energy Investments in California's Underrepresented and Disadvantaged Communities

If Other, Please Specify