Testimony Regarding the Olowalu Town EIS

John Helly to: luc 12/01/2015 10:03 PM

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Aloha.
Please consider this as my testimony regardinth Olowalu Town FEIS. I am firmly opposed to accepting it in its current form.
J. Helly

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Review of Major Conclusions of Olowalu Town Marine Assessment

This document is submitted by Dr. John Helly,[1] and is a review of the report:

Assessment Of Marine Water Chemistry And Biotic Community Structure In The Vicinity Of The Olowalu Town Master Plan Olowalu, Maui, Hawaii
Prepared For:
Olowalu Town, Llc And Olowalu Ekolu, Llc 2073 Wells St., Suite 101
Wailuku, Maui, Hawaii 96793
Prepared By:
Marine Research Consultants, Inc. 1039 Waakaua Pl. Honolulu, Hi 96822
July 2011.

It is submitted by Dr. Helly acting as an individual citizen and does not represent the views or opinions of any institutions he is associated with. He has not been paid for this review and has no conflicts of interest. The major conclusions of the report from the *Executive Summary* are summarized individually and review comments follow each summarization.

This review is limited by the lack of access to the supporting data from the study. A more detailed analysis requires a digital copy of the geophysical results tabulated in the report and a copy of the imagery used in the biotic analysis. The reviewer encourages the cognizant governmental bodies to require the submission of digital data used in producing the analysis and report as part of the review process. These data should be made public.

1 Project Objectives

The concept for the Olowalu Town Master Plan centers on recognition and appreciation of the value of the natural and cultural resources, and will provide for the long-term stewardship and preservation of these resources.

1.1 Review Comments

This concept is used later to support a claim that the developer's good intentions are sufficient to accept that adequate consideration will be given to minimizing negative impacts to the environment. If such claims were sufficient evidence of a probable good outcome for an environment under development, there would be no need for environmental impact studies and reports.

2 Water Quality

Evaluation of the nearshore marine environment off the Olowalu Master Plan project site in west Maui was carried out in 2010-2011.

1. Fieldwork was conducted on June 10, 2010 by swimmers working from the shoreline and with the use of a 22-foot boat for offshore sampling.
2. Assessment of nearshore marine water chemistry was carried out by evaluating data from 60 water samples that were
3. collected at five ocean sites spaced within the project boundaries.
4. Water samples were collected on transects perpendicular to shore, extending from the shoreline to distances of approximately 500-600 meters (m) offshore.
5. Analysis of fourteen water chemistry constituents included all specific constituents in DOH water quality standards.

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2.1 Review Comments

Field samples and data were collected on only a single day, June 10, 2010 (p.6). A single sample provides no information about the range of variability, components of variability or characteristic values of the parameters measured. It fundamentally limits any assessment of the scale and scope of potential impacts **including the assessment of alternatives to the proposed development.** Any conclusions that are drawn from this smallest possible temporal sample, with N=1, are specious.

Furthermore, no attempt was made to put these data in a broader baseline context even though there are data available from federal agencies and other sources to help provide a more meaningful baseline for reference.

3 Water Quality Gradients

Several dissolved nutrients (Si, NO3-, PO43-, TN and TP) displayed strong horizontal gradients at multiple transect sites,

1. with highest values closest to shore and lowest values at the most seaward sampling locations.
2. Correspondingly, salinity was lowest closest to the shoreline and increased with distance from shore.
3. These gradients were most pronounced at the northern boundary of the project site and weakest in the southern region of the project area southwest of Olowalu Point.
4. These patterns are indicative of groundwater efflux at the shoreline, producing a zone of mixing where nearshore waters are a combination of ocean water and groundwater.
5. In all cases, the nearshore zone of mixing was restricted to a narrow region that extended a maximum of only tens of meters from the shoreline. Beyond this distance, water chemistry at all sites was representative of pristine open coastal waters.

3.1 Review Comments

Field samples and data were collected on only a single day, June 10, 2010 (p.6). A single sample provides no information about the range of variability, components of variability or characteristic values of the parameters measured. Any conclusions that are drawn from this smallest possible temporal sample, with N=1, are entirely specious.

Additionally, regarding gradients, it is likely that the day of sampling, and possibly those preceding, was one of mild ocean and atmospheric conditions since sampling was done from a small boat and with swimmers. Consequently, low-turbulence conditions would have pertained ensuring that the least spatially-extensive mixing and dispersal of chemical and geological constituents would have been observable. This is, again, an example of inadequate sampling.

It is perhaps informative to note that we expect to see horizontal, as well as vertical, gradients from land-to-sea and that their existence is not a 'discovery' in any sense. What is important is how those gradients are distributed in space and time and this study provides nearly the least possible information about that.

4 Non-groundwater Constituents

Water chemistry constituents that are not major components of groundwater also displayed distinct gradients with respect to either distance from the shoreline or depth in the water column.

1. Chl a and turbidity were generally elevated in nearshore samples with decreasing values moving seaward.
2. Application of a **hydrographic mixing model** to the water chemistry data was used to determine if increased nutrient concentrations in nearshore waters are the result of mixing of natural groundwater with oceanic water or inputs from activities on land. The model indicates that, at the time of sampling, there was a distinct subsidy of nitrate nitrogen (NO3-) to the ocean at the survey site located near the northern boundary of the property (Site 1) and off the eastern side of Olowalu Point (Site 4).
3. There was no external supply of nitrate at Site 2, located directly off of Olowalu Stream. However, there was a subsidy of phosphate phosphorus (PO43-) off Olowalu Stream, which did not occur at any other location.

4. Evaluating water chemistry from the single sampling in 2010 using DOH specific criteria for Open Coastal Waters
   (a) indicates many of the measurements in the nearshore areas (within 10 m of the shoreline) exceed standards, particularly for various forms of nitrogen.
   (b) As these standards do not take into consideration the mixing of high-nutrient, naturally occurring groundwater with ocean water in the nearshore zone, such exceedances are expected and normally occur throughout most Hawaiian nearshore marine areas.

4.1 Review Comments

Field samples and data were collected on only a single day, June 10, 2010 (p.6). A single sample provides no information about the range of variability, components of variability or characteristic values of the parameters measured. Any conclusions that are drawn from this smallest possible temporal sample, with N=1, are entirely specious.

No information on the characteristics of the hydrographic mixing model, not even a name, have been provided. Consequently, it cannot be verified and validated (V&V) and therefore cannot be adequately reviewed and should not be considered evidence of anything. Such models require extensive V&V and any conclusions drawn without this information must be regarded as naive, at best.

The statements about the DOH standards include a phrase *...normally occur throughout most Hawaiian nearshore marine areas. ...* is unsubstantiated. If these data exist, they should be presented or cited. Additionally, there is no reason DOH standards should *consider* the mixing of naturally-occurring groundwater; begging the question of what is naturally-occurring here. The definition of contaminated water is not a relative definition. It is based on objective criteria of risks to ecosystem and human health.

5 Biota

Characterization of the marine habitat and biotic community structure was carried out using

1. a fully georeferenced WorldView-2 multispectral satellite image of the Olowalu area purchased from the Image Library at DigitalGlobe.com (image data originally acquired on February 10, 2010).
2. Ground-truth, termed calibration-validation (cal/val), data derived from georeferenced digital photographs collected in-situ at 200 representative points provided the input to create benthic habitat maps of the Olowalu reefs.
3. Spectral data within the satellite image were classified and analyzed using the aforementioned georeferenced ground-truth data, covering an area of about 1.8 million square meters, or 454 acres.
4. Overall coral cover in the mapped area was about 37% of bottom cover, while macroalgae accounted for about 8% of bottom cover; 21% of the bottom was covered with sand and 33% of the bottom consisted of mud and sediment bound in algal turf.

5.1 Review Comments

The methods used to conduct the classification and analysis are, in principle, sound if presented as remote sensing research; which they are not. There is insufficient information about the methods used to enable the results to be independently reproduced and validated. In particular, the classification error rates are high yet there are no error terms reported with the results. Consequently, these results would not be publishable and should not be considered authoritative here.

6 Reef Structuring Forces

In most open coastal areas of Hawaii physical forces from wave energy are the dominant factors responsible for reef structure and species assemblages. The reefs at Olowalu are considered somewhat unique in that sediment deposition (or lack thereof), rather than wave forces, appears to be the major determinant of physical and biotic reef structure.

1. Along the northern side of Olowalu Point, deposition of terrigenous sediment emanating from Olowalu Stream creates a habitat where coral communities are limited to species and growth forms that can withstand the sub-optimal conditions created by high rates of sediment deposition.
2. South of Olowalu Point, a shallow, wide, triangular-shaped reef flat, formed from deposition of alluvial material from Olowalu Stream, terminates in a fore-reef composed of actively accreting coral assemblages that show little or no effect of sediment stress.
3. Reefs at the southeastern end of the project site (14-Mile Marker) also showed distinct indications of sediment stress, although no major streams discharge regularly in this area.

6.1 Review Comments

Water depth and clarity are also important reef-structuring factors; not simply sediment deposition. As pointed out previously, the field sampling is inadequate to characterize and evaluate the turbidity of the water on meaningful scales in space and time. Additionally, there is no discussion of the impacts of projected sea-level rise and the consequences for the likely changes in water-level on the reef. This will affect water depth, coastal erosion, and turbidity in this area.

7 Fish

Populations of reef fish in the area were typical of Hawaii reefs, although numbers of larger fish were very low, likely as a result of fishing pressure. The most abundant families consisted of wrasses, damselfish and surgeonfish. As is generally the case, density of fish was a function of vertical complexity of the benthic surface, with the highest abundance on the outer fore-reef. Reef fish were rarest in the areas with heaviest deposition of mud. Numerous sharks were observed on the inner reef flat.

7.1 Review Comments

Field samples and data were collected on only a single day, June 10, 2010 (p.6). A single sample provides no information about the range of variability, components of variability or characteristic values of the parameters measured. Any conclusions that are drawn from this smallest possible temporal sample, with N=1, are entirely specious.

8 Limited Sediment Impacts

Overall, results of this study indicate that existing episodic discharge to the ocean of land-derived sediment is the most pervasive stress to the reefs off Olowalu. However, the geographic extent of such deposition is limited and does not impact all areas of the reef. Reef communities on the outer reef flat and fore-reef represent essentially pristine ecological settings unaffected by most activities of man (fishing being the exception).

8.1 Review Comments

The results of this study are inconclusive. The bald statement that *...existing episodic discharge to the ocean of land-derived sediment is the most pervasive stress to the reefs off Olowalu. ...* is unsubstantiated by this report. Sampling is inadequate to support it and there are no results presented regarding the nature and impacts of episodic events. It is unclear why such a conclusion should even be here.

9 Engineering Analysis

Engineering analysis indicates that, with full build-out of the planned project, groundwater flow to the ocean will be slightly reduced.

1. Groundwater nutrient fluxes to the ocean will be reduced by about 1% and increased by about 10% for phosphorus and nitrogen, respectively.

2. Combining groundwater flux with episodic surface runoff is projected to result in increases of both nitrogen (13%) and phosphorus (1%) to discharge to the nearshore ocean over present conditions.
3. Depiction of the existing marine environment indicates that, at present, groundwater is so restricted in distribution that there is essentially no effect on marine community structure.
4. Thus, the small changes in groundwater dynamics projected to result from the project do not present a mechanism for future negative effects to offshore marine communities.
5. Predicted changes in groundwater composition and flow rates have been supplied by Tom Nance Water Resource Engineering (TNWRE 2011).

9.1 Review Comments

It is unclear what constitutes an *engineering analysis* here and what it is intended to connote. There are no results presented in this report to support the conclusion although there is frequent appeal to another report, (TNWRE 2011), which is not included in the bibliography and is not part of this report. This entire section should be disregarded as anecdotal opinion.

10 Retention Basins

A planned component of the Olowalu Town Master Plan is a series of retention basins within the project boundaries for the purpose of retaining stormwater runoff prior to discharge to the ocean. While the project will increase the area of impervious surfaces, the inclusion of retention basins is predicted to result in no change to the discharge of water to the ocean compared to the present scenario. However, should the retention basins function to reduce sediment discharge to the ocean relative to present conditions, they can be viewed as a positive aspect contributing to recovery of impacted reefs.

10.1 Review Comments

There are no results presented to support this view regarding the performance of retention basins. This section should be disregarded as anecdotal opinion.

11 Avoid Any Unforseen Impacts

Planning for the Olowalu Town Master Plan focuses on continued maintenance and stewardship of the unique natural resources of the area.

1. As a result, as long as best management practices are utilized to avoid any unforeseen impacts during the construction and operational phases of the project, and
2. engineering considerations in the design of the retention basins include maximizing sediment trapping,
3. there is no rationale to indicate a potential changes that could be considered negative impacts to the marine environment.

11.1 Review Comments

This puzzling language is logically confused. Additionally, these conclusions are unsubstantiated by this report and should be disregarded as anecdotal opinion.