Preliminary Assessment of Benthic Macrofauna within the Kaneohe Bay Yacht Club Harbor, Oahu, Hawaii

By:

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Introduction

The Kaneohe Bay Yacht Club is preparing to formally request a permit to allow maintenance dredging in their harbor facility to a depth of 8 ft. (2.4 m MLLT) in south Kaneohe Bay, Oahu, Hawaii (Figure 1). Surveys and activities to mitigate damage to biological resources within the harbor were conducted in 1996-97 when dredging was initially planned. The harbor supported a large coral community of *Montipora capitata* and *Porites compressa* with scattered *Pocillopora damicornis* coral colonies in 1996 (Kolinski and Jokiel 1996). Roughly 1000 corals were successfully relocated to a nearby reef at Malae that had been dredged circa 1939 for a seaplane runway (Figure 1). Although the mitigation activities minimized damage to yachts and corals by clearing paths for safe navigation within the harbor, the dredging never occurred. The requirement for a new permit for maintenance dredging introduced the need for reassessment of biological resources within the harbor and consideration of avoidance, minimization and/or mitigation needs.

Site Evaluation

Methods: On 22 April 2004, John Naughton and Steve Kolinski (National Marine Fisheries Service, Pacific Islands Regional Office, NOAA Fisheries) conducted a preliminary rapid in-water visual assessment of the benthic resources likely to be impacted by harbor dredging activities. The inner harbor and entrance area were transited and assessed using snorkeling apparatus (Figure 2). The assessment was limited to diurnally active organisms (09:30 – 11:10 am).

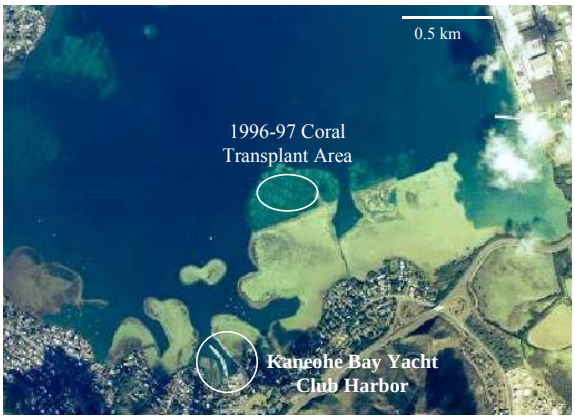

Figure 1. Kaneohe Bay Yacht Club Harbor and Malae transplant receiving reef.

Figure 2. April 2004 survey route, Kaneohe Bay Yacht Club Harbor, Oahu.

Status of Benthic Resources: Three species of coral were noted in the preliminary survey. Scattered colonies of *Pocillopora damicornis*, *Porites compressa* and *Montipora capitata* were located in mid and harbor entrance zones (Figures 3-6). *Pocillopora damicornis* was dominant in terms of abundance of large and mid-sized colonies (≤ 10 % cover). Recruitment to the area was evidenced by the presence of numerous small sized colonies. The dominance of *P. damicornis* contrasts with the coral community structure of 1996 in which this species was a minor constituent (Kolinski and Jokiel 1996). However, this finding is consistent with noted coral successional processes of recovery on Hawaiian reefs (Grigg and Maragos 1974). Large heads of *P. compressa* and *M. capitata* were identified mainly in the harbor entrance area. Recruits of *M. capitata*, a species that dominated the 1996 harbor community, were encountered in large

numbers (Figures 7-9). The potential for rapid growth of *M. capitata* once reaching visible sizes in calm water environments suggests that, barring additional disturbance to the harbor coral community, a rapid rebound of this species is set to occur.

The inner harbor adjacent to shoreline was dominated by fine silt-mud sediment accumulation that was stated to re-suspend into the water column when disturbed by overhead propellers (Harvey Minsky, pers. comm., Figure 10). Infauna was not assessed. Sediment covered hard substrate was apparent throughout the remaining harbor area. Turf algae appeared to be trapping some of the sediment. *Gracilaria salicornia* and *Dictyosphaeria cavernosa* were observed in mid and harbor entrance areas. The inner reef slope underneath the northern-most pier was blanketed by *Gracilaria salicornia* (Figure 11). No seagrass was observed.

Notable fish included *Acanthurus dussumieri* (palani), *Abudefduf abdominalis* (mamo) and a large school of *Mulloidichthys flavolineatus* (weke a ‘a). Macroinvertebrates observed included the featherduster worm *Sebellastarte spectabilis* and the sea cucumber *Opheodesoma spectabilis* (weli). The structural functioning of the reef was limited. The majority of coral reproductive potential and structure had been transplanted in 1996-97. The observed biological community was indicative of an impacted low water motion area in recovery.

Recommendations

Maintenance dredging to 8 ft. will negatively impact living coral colonies within the harbor. Mitigation in anticipation of dredging in 1997 had occurred under a previous permit. This involved the successful movement and long-term survival of corals (Kolinski and Jokiel 1996, Kolinski in review). It is recommended that efforts be made to relocate new and/or remaining large colonies of *Porites compressa, Montipora capitata* and *Pocillopora damicornis* to the dredged reef area off Malae (Figure 1). This would likely involve one to two pontoon boatloads of corals (if done within the next year), placing corals in large shaded tubs for transport. Extreme care should be taken to ensure corals collected for transport do not contain invasive *Kappaphycus* or other potentially problematic algae. Monitoring of coral transplants over time can be done by NOAA Fisheries personnel, and assistance with the transplantation might be also be provided. In addition, NOAA Fisheries would be interested in conducting a rapid benthic assessment within the harbor following dredging activities to gather baseline data for, over time, assessing the form and rate of coral community recovery.

References

Grigg, R. W. and J. E. Maragos. 1974. Recolonization of hermatypic corals on submerged lava flows in Hawaii. Ecology 55: 387 – 395.

Kolinski, S. P. In Review. Harbors and channels as source areas for materials necessary to rehabilitate degraded coral reef ecosystems: a Kāneʻohe Bay, Oʻahu, Hawaiʻi case study. Restoration Ecology.

Kolinski, S. P. and P. L. Jokiel. 1996. Coral transplantation in conjunction with dredging of the Kaneohe Bay Yacht Club Harbor, Oahu, Hawaii. Feasibility Study Final Report, 6 p.

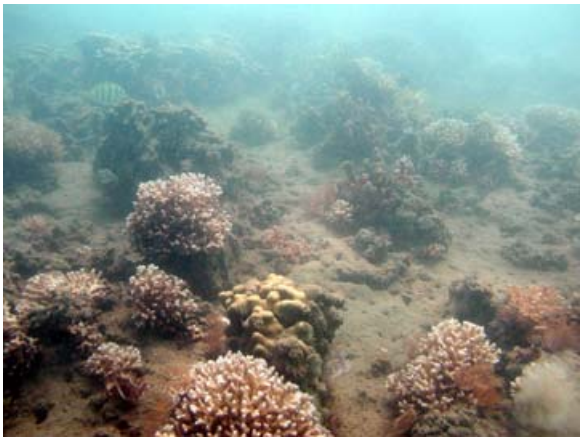

Figure 3. Scattered *Pocillopora damicornis* colonies, mid harbor/entrance area.

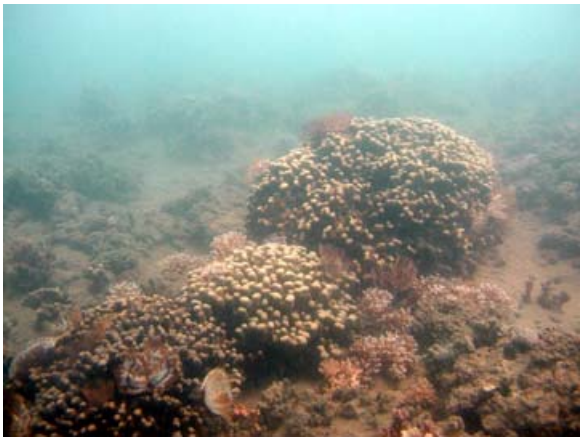

Figure 4. *Porites compressa* colonies, mid harbor/entrance area.

Figure 5. *Montipora capitata*, mid harbor/entrance area.

Figure 6. *Pocillopora damicornis*, *Porites compressa* and *Montipora capitata*, harbor entrance.

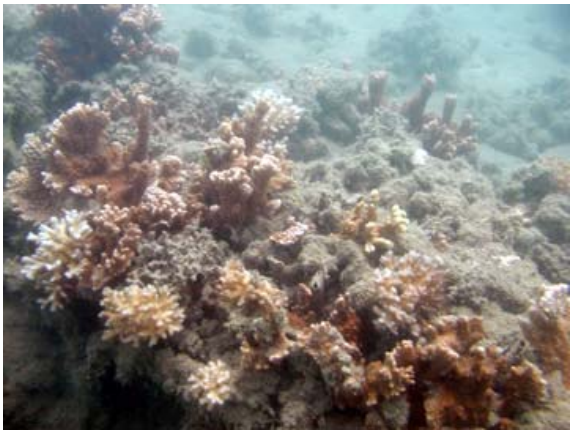

Figure 7. *Montipora capitata* and *Pocillopora damicornis* recruits.

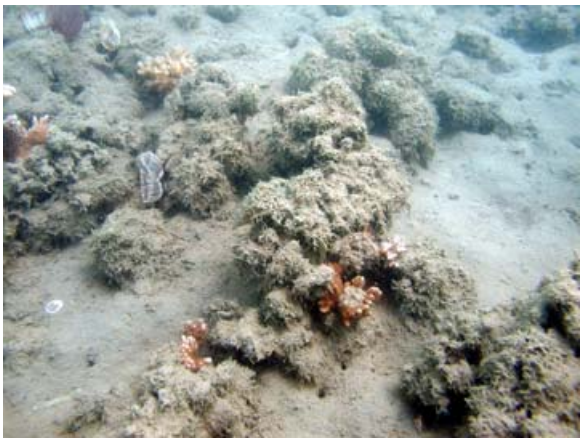

Figure 8. *Montipora capitata* recruits.

Figure 9. *Montipora capitata* recruits.

Figure 10. Sediment, inner harbor adjacent to shoreline.

Figure 11. *Gracilaria salicornia*.