The Wai Opae Tidepools
Status Report for HCRI Quarterly Meeting – August 2004

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Wai Opae Study

Subproject under West Hawaii Aquarium Fish Project

Goals:

1. Obtain baseline data on corals and fishes prior to delineation of part of Wai Opae as a Marine Life Conservation District (MLCD).

2. To detect post-MLCD changes, if any, to the tidepool’s coral and fish communities.
Wai Opae – 4 x 25 m permanent transects in the area open to fishing activities (“Open”) as well as the area that is now a Marine Life Conservation District. Date of first survey was July 22, 1999.
Richardson’s Ocean Center - four 25 m permanent transect lines to serve as replicates for the Wai Opa'e Open lines. Date of first survey was April 14, 2000.
Survey Status

Substrate Analysis - Wai Opae and Richardson’s lines were videotaped in spring 2000 and re-photographed with digital stills in January & February, 2004.

Photographs were analyzed with Photogrid 1.0b using WHAP-standardized substrate types and 20 random points per photograph (2000 data points per site type).

One photo was taken each meter from 0.75 m off the bottom (25 photos per line or 100 photographs per site type).
Analysis of fishes - Wai Opae and Richardson’s lines are surveyed via strip transect by snorkeling:

1. Snorkelers search 2 meters on each side of the line to survey a rectangular transect of 25x4 meters.

2. Wai Opae and ROC have been surveyed on the same day by the same snorkelers since August 18, 2000.

3. Thirty-two surveys have been completed at Wai Opae for a total of 128 transects being searched in each of the two site types (MLCD and Open). Twenty surveys have been completed at Richardson’s Ocean Center (80 transects).
Results

A. 2004 Substrate Analysis

1. 8 species of corals commonly observed in photographs:
   - *Montipora capitata*
   - *Pocillopora damicornis*
   - *M. flabellata*
   - *P. meandrina*
   - *M. patula*
   - *Porites compressa*
   - *Pavona varians*
   - *P. lobata*

B. Fishes

1. 28585 individual fishes recorded on Wai Opae transects - 93 species from 26 families.
2. 6936 fishes have been observed at ROC - 79 species from 24 families.
Results of 2000 Videotape Analysis

Live Coral Cover

Pre-MLCD

Percent Similarity = 67%

Open
Wai Opae and ROC Substrate Analysis

**Percent Similarity**

- ROC vs OPEN = 66.8%
- ROC vs MLCD = 56.8%
- OPEN vs MLCD = 65.2%

**Bar Chart**

- Taxon Category: Turf Algae, Live Coral, Crustose Algae, Macro Algae, Sand & Rubble, Other
- Percent Cover: 0.00% to 50.00%
- Colors: ROC (blue), Wai Opae Open (maroon), Wai Opae MLCD (green)
Wai Opae / ROC Coral Cover

Percent Similarity

ROC vs OPEN = 68.0%
ROC vs MLCD = 85.0%
OPEN vs MLCD = 79.6%
Wai Opaé and Richardson's Ocean Center
Commonly Encountered Species

Individuals per 100 m²

Percent Similarity
MLCD vs Open = 65.9%
MLCD vs ROC = 70.0%
Open vs ROC = 52.3%
Wai Opae and Richardson's Ocean Center
All Fish Species Pooled

MLCD designation on June 16, 2003

Individuals per 100 m²

Date

1/1/99  1/1/00  1/1/01  1/1/02  1/1/03  1/1/04  1/1/05

MLCD  OPEN  ROC
Wai Opaee and Richardson's Ocean Center
All Fish Species Pooled

MLCD designation on June 16, 2003

Date

1998 1999 2000 2001 2002 2003 2004 2005

Individuals per 100 m^2

60 80 100 120 140 160 180

MLCD
OPEN
ROC
Abundance of Juvenile Fishes

![Graph showing the abundance of juvenile fishes at different locations. The x-axis represents the locations (OPEN, MLCD, Kalahiki, Honokohau, Red Hill). The y-axis shows the number of individuals per transect per 100 m². The graph indicates a significant difference in abundance across locations (P = 0.006).]
Wai Opae and Richardson’s Ocean Center
Common Juveniles by Species

Individuals per 100 m²

- Thalassoma duperrey
- Stethojulis balteata
- Scarus psittacus
- Gomphosus varius
- Stegastes fasciolatus
- Chlorurus sordidus
- Plectroglyphidodon johnstonianus

Legend:
- MLCD
- OPEN
- ROC
Summary

- Turf algae and lobe coral dominate the substrate at Wai Opae and Richardson’s.
- Coral cover does not appear to have changed appreciably over the last four years and is around 40% on the Wai Opae transects.
- Wrasses, damselfishes, surgeonfishes, and parrotfishes are dominant on East Hawaii transects.
- Juvenile fishes are particularly abundant at Wai Opae.
- The Wai Opae MLCD has only been in place for about a year – not long enough to detect any change in the benthic or fish community within MLCD boundaries.
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