Climate Change and the Marianas: What does the present tell us about what the future holds?

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“Coal is up and coral is down.”
2013: the first serious bleaching event in the Marianas in recent history: 85% of coral taxa

Bleaching in Guam shallow forereefs, August-December 2013. Reynolds (M.Sc. Thesis 2016)

Reynolds et al. 2014
2014: 2nd bleaching event, June-July, affecting shallow staghorn Acropora in Guam and Saipan

53% loss of staghorn Acropora in 2013-14 events. Raymundo et al. (In review)
2015: ENSO-related extreme low tides; reef flats exposed for prolonged periods during dry season
2016: A bleaching-and-disease double whammy
Future prognosis and management options?

- Guam Bleaching Response Plan formalized & implemented
- Identification of resilient pop’ls & favorable sites
- Active mitigation to facilitate recovery of staghoms
Are there resilient communities in favorable sites?

West Agana Sewage Treatment Plant
Mitigation: 1. Establishing reproductive biology & genetic analysis of Guam’s staghorns

<table>
<thead>
<tr>
<th>Species</th>
<th>Spawning Timing (2015)</th>
<th>Max. Avg. Egg Size (µm)</th>
<th>Range of egg size (µm) at spawning month</th>
<th>% Fecund Fragments (Total)</th>
<th>Total Number of Fragments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acropora acuminata</td>
<td>April</td>
<td>580</td>
<td>391-782</td>
<td>19.4%</td>
<td>144</td>
</tr>
<tr>
<td>Acropora aspera</td>
<td>September</td>
<td>627.8</td>
<td>207-1150</td>
<td>53.4%</td>
<td>236</td>
</tr>
<tr>
<td>Acropora pulchra</td>
<td>May</td>
<td>588.7 (695.1 without Tumon)</td>
<td>46-1058</td>
<td>41.4%</td>
<td>382</td>
</tr>
<tr>
<td>Acropora muricata</td>
<td>May</td>
<td>474.3</td>
<td>230-828</td>
<td>28.0%</td>
<td>254</td>
</tr>
<tr>
<td>Acropora cf. muricata &quot;B&quot;</td>
<td>May</td>
<td>468.1</td>
<td>253-713</td>
<td>71.4%</td>
<td>126</td>
</tr>
</tbody>
</table>

Val Lapacek, M.Sc. thesis
2. Culture of species of concern, using both sexual & asexual propagation


~800 fragments in ocean nursery from surviving resilient populations. Pruning to create next generation.

Outplanting of tiles containing sexual recruits after nursery grow-out.
Si Yu’us Maase

Funding & support from
NOAA Coral Reef Conservation Program
Guam Coral Reef Initiative
National Parks Service
Underwater World, Inc.
SECORE International, Inc.

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