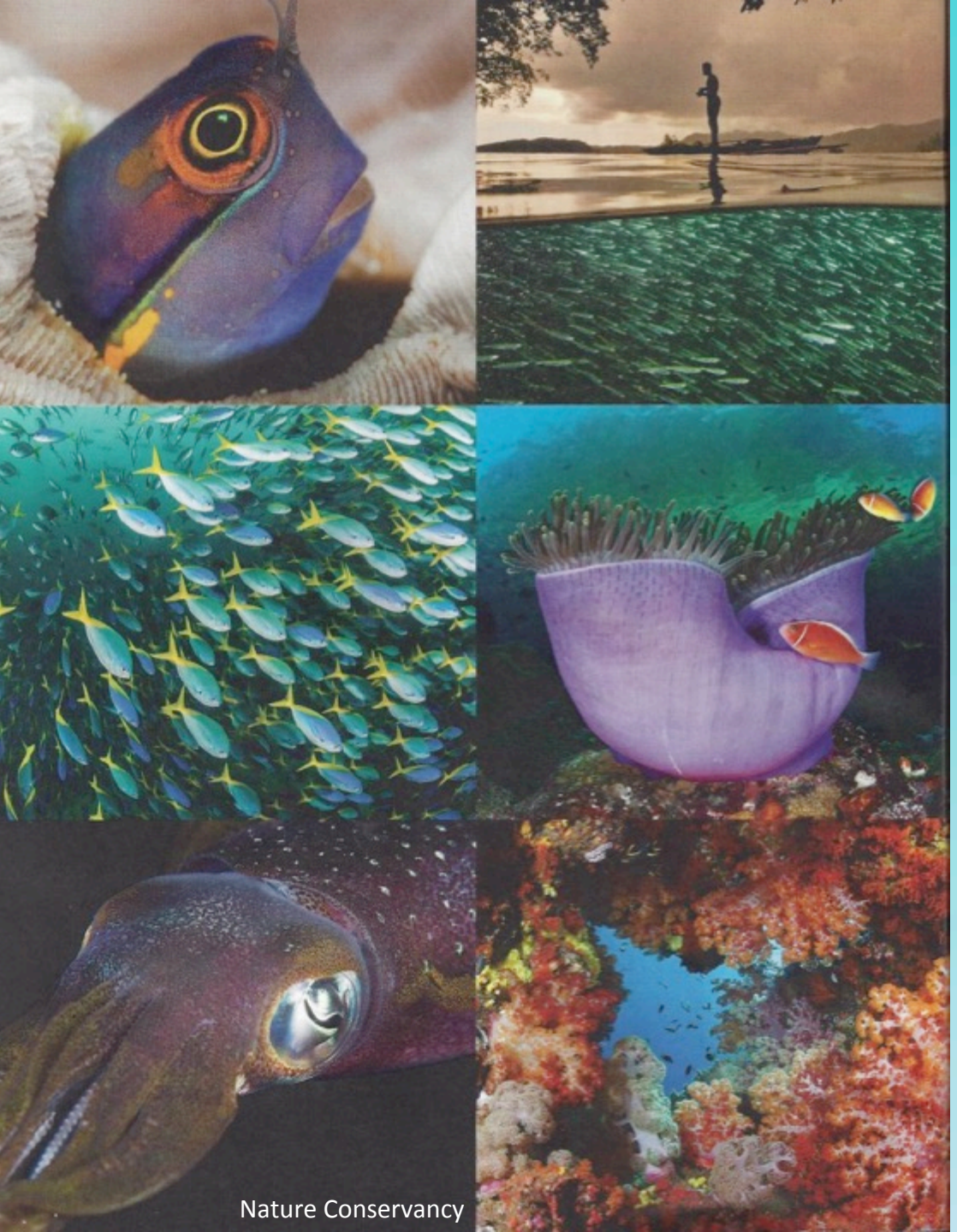


Marine Toxins & Ecosystems

WHAT IS WORKING WELL

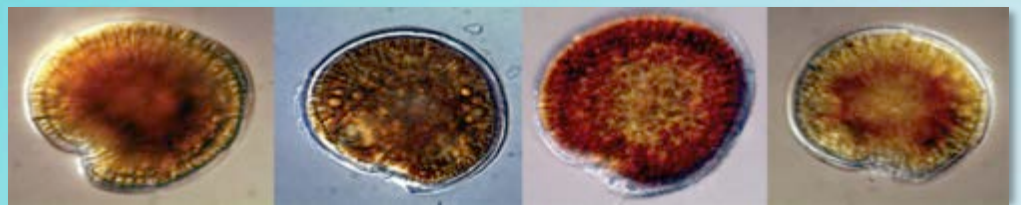
1. Samoa – Cell based monitoring is effective

2. Marshall Islands – Local & traditional knowledge is effective
3. Molecular detection of species (qPCR)
4. Sampling protocols (vetted and published)




PROBLEMS & GAPS

1. Identify mechanisms causing toxicity
2. Interactions within BHAB communities physiology, allelopathy & genetic factors
3. Treatment options for CFP victims
4. Address lack of & under reporting of CFP cases
5. Characterize habitat requirements
6. Lack of toxin standards
7. Biotransformation of toxins

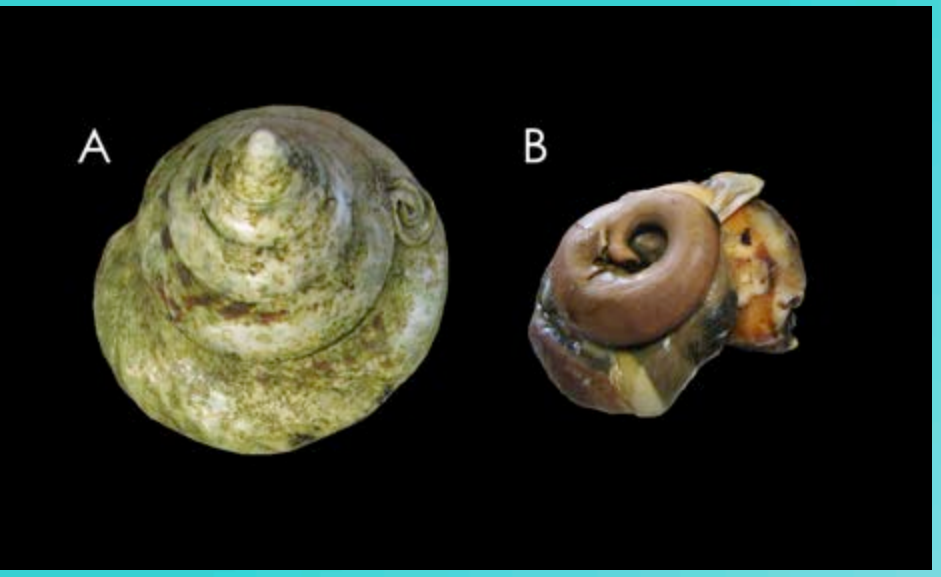


RESEARCH PRIORITIES to REDUCE HAZARDS

1. Standardized sampling protocols & environmental metadata
2. Habitat characteristics conducive to blooms/outbreaks
3. Country-based capacity & research facilities & technical expertise
4. Honor traditional knowledge using science to validate observations
5. Epidemiology, clinical aspects & reporting
6. Fate of toxins in fish & shellfish

TECHNOLOGY & INNOVATION TO RECUDE HAZARDS

1. Detection of *Gambierdiscus* & other benthic HAB species
2. Low cost, portable toxin detection tool
3. Mass production of toxin standards
4. Global & regional support monitoring & research activities
5. Awareness tool for the public and resource managers & public health
6. HAB monitoring of deep sea mining sites
7. Improved field toxin monitoring capabilities



TROCHUS POISONING
Marquisas – July 2014
CASE STUDY

Figure1: Specimen of troca, *Tectus niloticus* (Linnaeus 1767), sampled in Anaho bay after collective poisoning. A) Shell, B) gastropod. © Institut Louis Malardé

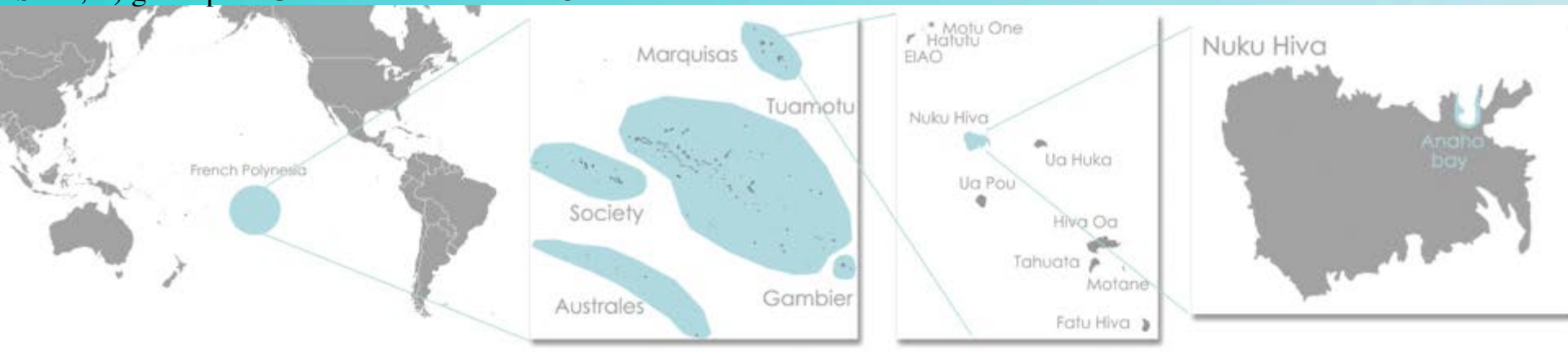


Figure 2: Anaho Bay, Nuku Hiva island, Marquesas archipelago, French Polynesia. © Institut Louis Malardé

CASE STUDY TROCHUS POISONING
Protected Species (gastropod)

1. 9 tourists ill after eating trochus caught in an area avoided by local residents
2. Symptoms similar to CFP – 7 hospitalized
    a. Gastrointestinal
    b. Neurological - cold allodynia
    c. Cardiovascular
    d. Chronic symptoms – still experiencing problems after 5 months
3. Under reporting of illnesses by local residents
4. Origin of toxin – cyanobacteria, dinoflagellates or both? Multiple toxins
5. Spatial component– toxic & non toxic trochus were sampled within same reef systems, separated only by small distances
    a. Ecosystem microhabitat?
6. Human impacts- fishing pressure, reef degradation?
7. Factors leading to outbreak
    a. Genetic driver?
    b. Competition?
    c. Defense?
    d. Community physiology?
    e. Increasing temperatures?