

Coral Disease: Prescription for Change

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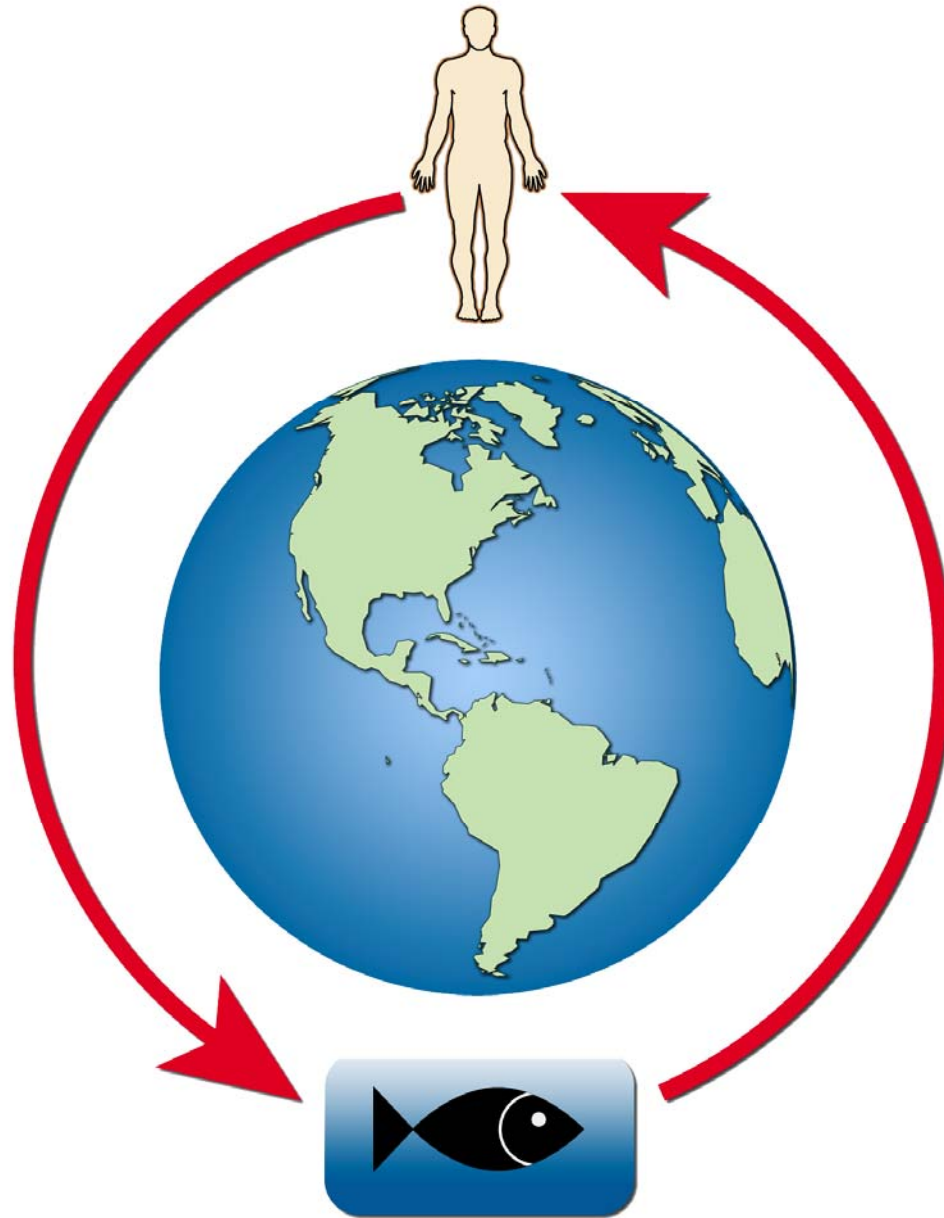
Hollings Marine Laboratory

Charleston, South Carolina



A school of small, blue fish swimming in clear, shallow water. The water is a vibrant blue-green color, and the sandy bottom is visible at the bottom of the frame. The fish are scattered throughout the scene, moving in various directions.

Global Health Crisis

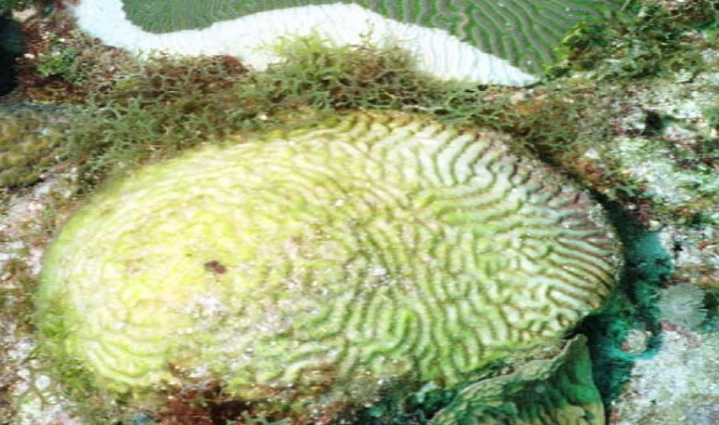
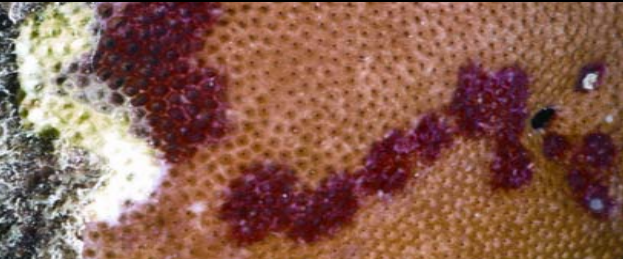
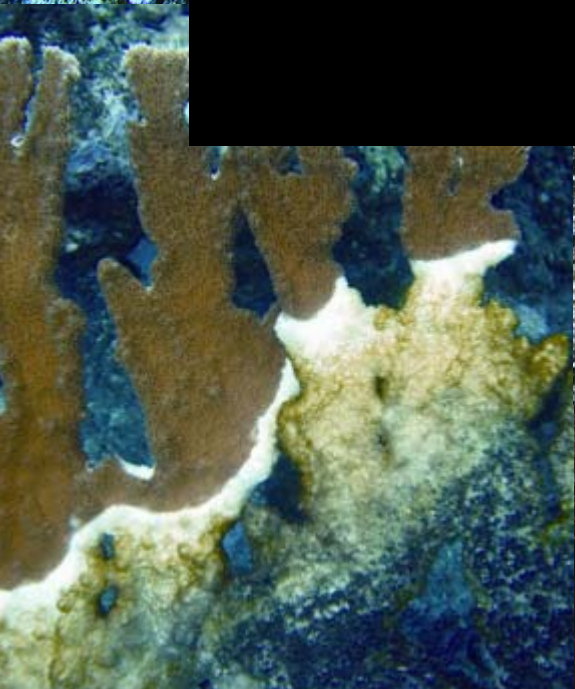


Coral Reef Deterioration





Coral Disease



A top-down view of a large school of small, dark fish swimming in clear, bright blue water. The fish are densely packed and move in a coordinated pattern, creating a shimmering effect on the water's surface. The background is a gradient of blue, from a deep blue at the bottom to a lighter, turquoise blue at the top.

SIGN

&

INSTRUMENT

Link?

**Effect
(observed)**

**Potential
Cause(s)**



Coral Decline

**Global Warming
Pollution
Agricultural Runoff
Urban Runoff
Recreational Activities**



Science

Technology



Methods

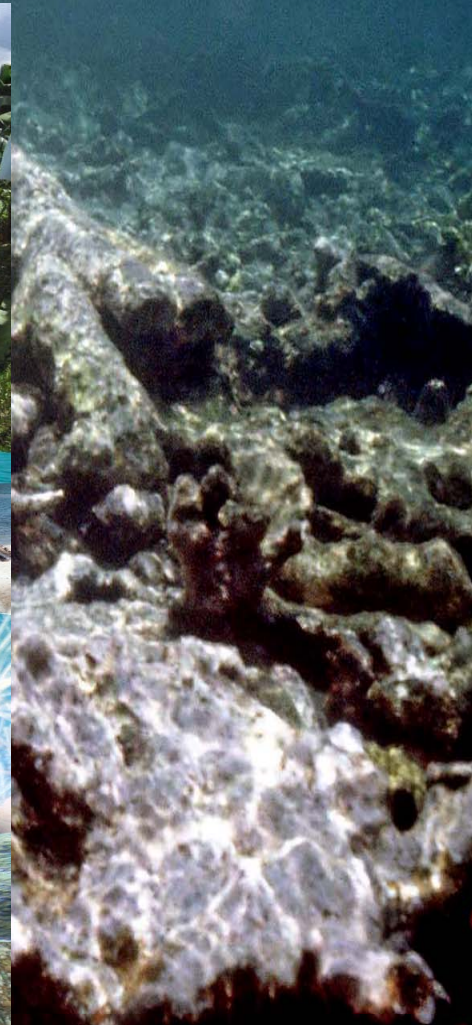
Tools

Goal...

Triage on
the Reef



Coral Health
Management



A large school of small, dark fish swimming in clear, bright blue water. The fish are scattered throughout the frame, moving in various directions. The background is a gradient of blue, from a lighter turquoise at the top to a deeper blue at the bottom.

**What are the Challenges
of Getting There?**

Issue 1

**Basic Biology of Normal
Corals is Poorly
Understood**

Recommendation

Partner with other cognizant agencies (e.g. NSF, EPA NIEHS) in targeting merit-based competitive grant opportunities

- To obtain strategic information needs in coral functional biology e.g. cellular physiology, immunology, genetics
- Engage a more diverse research community
- Enhance trans-disciplinary collaborative research
- Infuse coral biology with new techniques and ideas from areas not traditionally considered as 'marine biology'

Recommendation

Develop 'Model' Laboratory Species

- Enables rapid advances by focusing on fundamental biological concepts broadly applicable
- Living Stock Collection as biological infrastructure

Recommendation

Organize a System of Methodologies to Investigate Coral Disease

- **Provides conceptual approaches for sound science**

Issue 2

Our lack of understanding of the underlying mechanisms of coral pathologies inhibits our ability to manage the growing coral health problems.....

Recommendation

- **Conduct mechanistic studies to elucidate cause or origin of disease**
- **Scientific studies should be repeated to provide confidence in initial findings**

Issue 3

Disconnection between Science and Management

Recommendation

- **Support Coral Reef Management with Scientific Data to Manage Stressors in order to Reduce Disease Occurrence**

Issue 4

**Perception:
No Options for Managing
Coral Disease**

Disease Management

- **Disease Agent**
- **Host Population**
- **Habitat**
- **Human Activities**

Healthy Coral Management Options Now:

- **Restrict Translocation of Wild Animals to Prevent Movement of Disease**
- **Provide Guidance for the Proper Handling and Containment Regimes during Coral Disease Experiments.**
- **Review Coral Disease Studies for Inclusion of Biosecurity Procedures**

Healthy Coral Management Options Now:

- **Monitor Proposed Coral Disease Studies to Minimize or avoid Ethical Problems**
- **Promote the use of universal precaution measures when dealing with diseases in the field (i.e., work from clean to dirty areas)**
- **Encourage good hygiene, improved sanitary practices among divers and other users of the marine environment**

Issue 5

**Managers Do Not have
Adequate Tools to Manage
Coral Disease Outbreaks**

Recommendation

- **Establish a Coral Disease Outbreak and Unusual Mortality Response Program**
- **Train Response Teams in Strategic Pacific and Caribbean Locations to Investigate Coral Disease Outbreaks**
- **Provide a Manual with a Set of Tools and Procedures for Investigating Coral Disease**

Issue 6

There is a critical need to build scientific capacity in the field of coral pathology and offer a health management perspective in resource management

Recommendation

Create and Support Advanced Educational Opportunities

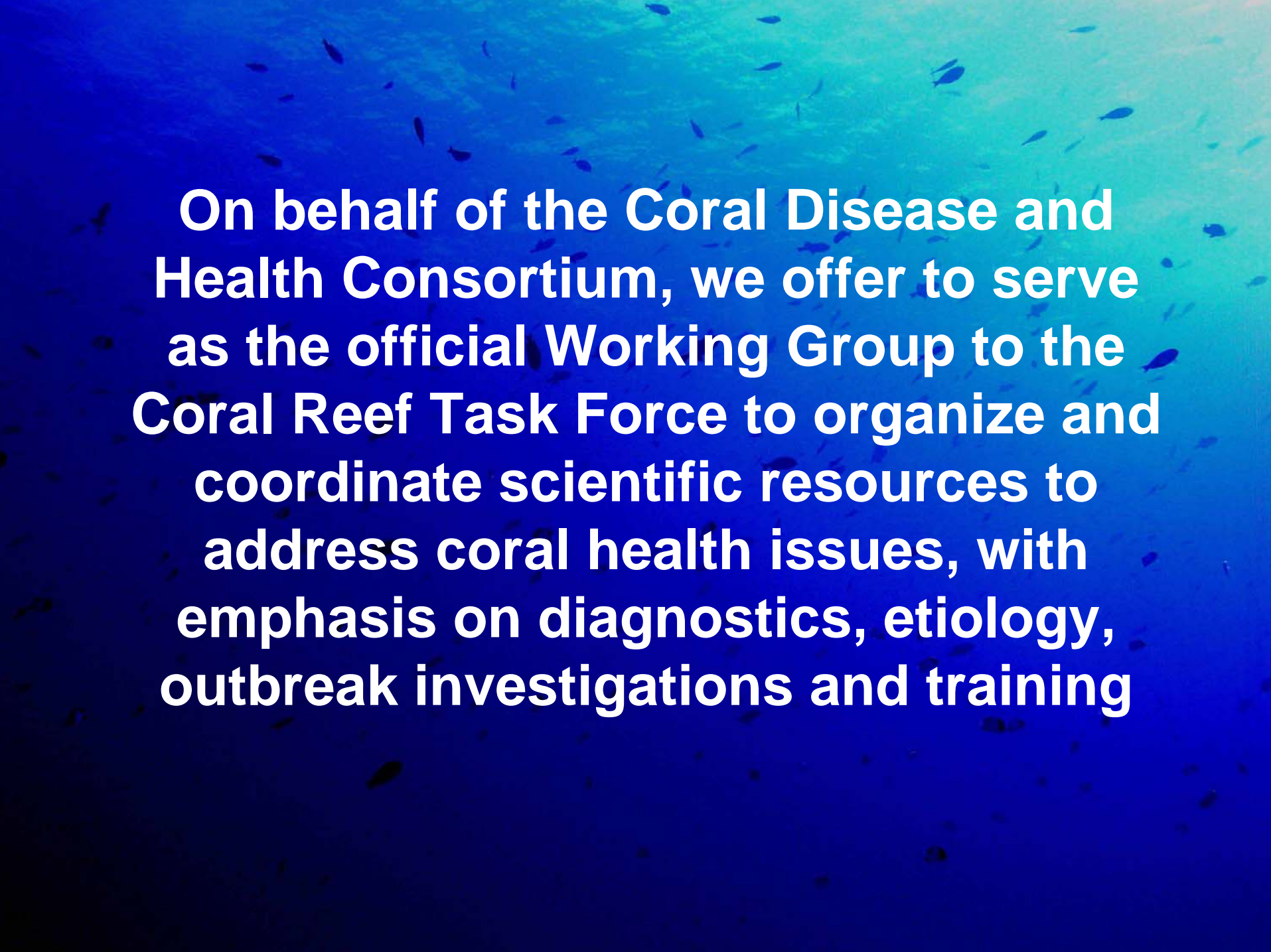
- **Develop advanced degree programs in coral pathology** (e.g., Master's degree)
- **Provide continuing education in specialty topics for professionals** (e.g., disease identification for resource managers; disease investigation methods; environmental forensics)
- **Provide Fellowships for Career Development or Cross-specialty Training**

Consequences of No Action

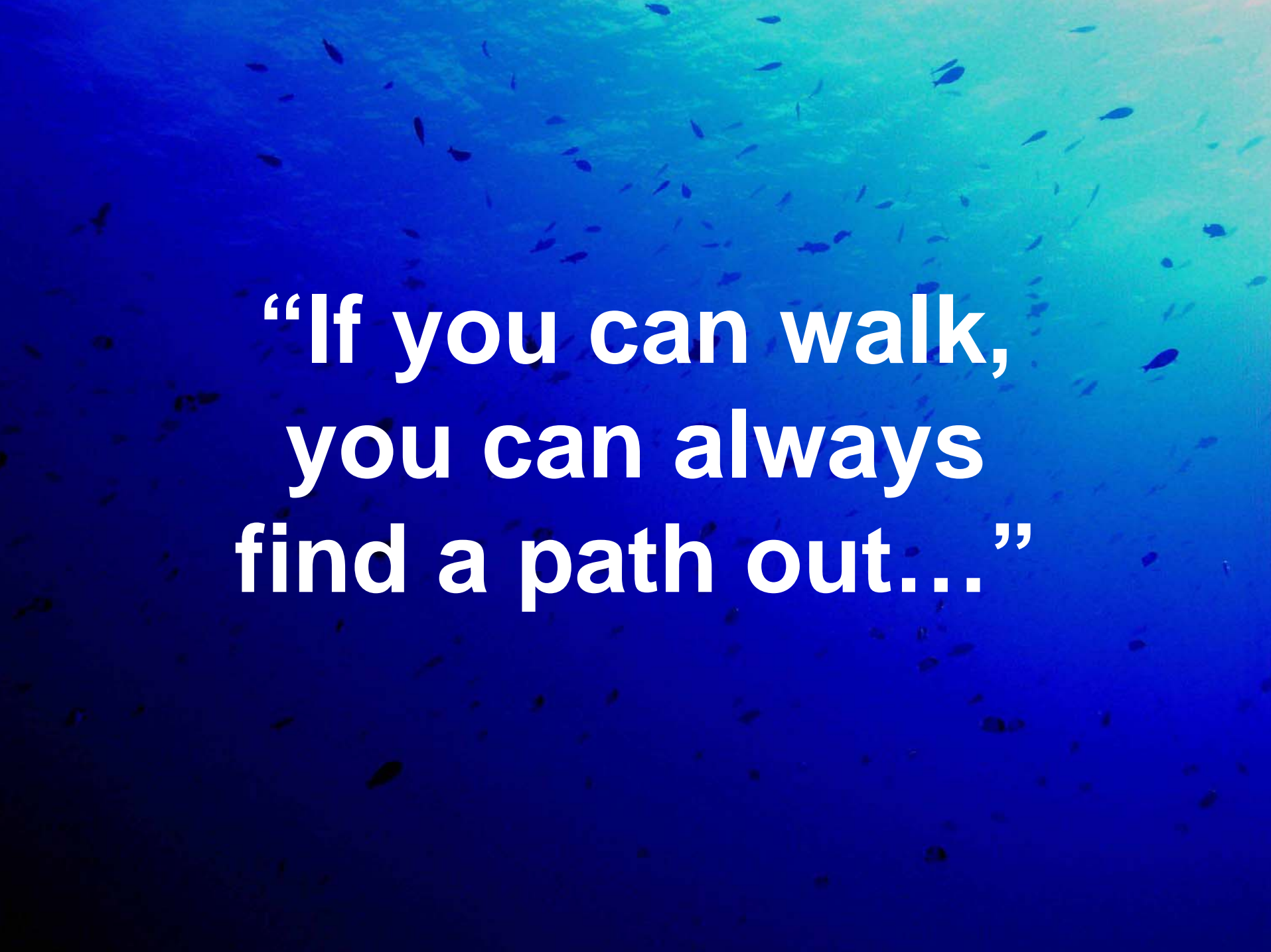
- Left with nothing but a Guessing Game for managing coral health
- Unable to determine the root causes and thus unable to mitigate effectively
- Our ocean environment will grow sicker
- Increased risk of sick people
- Economic loss

“We have an incredibly important message, if this ecosystem dies, if this ecosystem is otherwise perturbed to an extent that it cannot recover, not only does it spell potential disaster for this spaceship we call Earth, but there is no less than 80 emerging economies, nations that are entirely or nearly entirely dependent on coral reef ecosystems whether it be for the economy or for the subsistence....this is an incredible opportunity, this is an incredible moment”

Gary Ostrander, Univ Hawaii



On behalf of the Coral Disease and Health Consortium, we offer to serve as the official Working Group to the Coral Reef Task Force to organize and coordinate scientific resources to address coral health issues, with emphasis on diagnostics, etiology, outbreak investigations and training

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**“If you can walk,
you can always
find a path out...”**

