

US CORAL REEF TASK FORCE

St. Thomas, USVI, October 24, 2006

Workshop on Tools for Responding to Major Injury Events in Coral Reefs

THE APPLICATION OF HABITAT EQUIVALENCY ANALYSIS IN PLANNED AND UNPLANNED INJURY EVENTS IN THE PACIFIC ISLANDS

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PACIFIC EVOLUTION OF MITIGATION ON CORAL REEFS

- 1. US Coral Reef National Action Plan: Theme - Reduce the Adverse Impacts of Human Activities.**
- 2. Developed informal guidance, protocols, and technical assistance programs to reduce the risks of damage to coral reefs.**
- 3. Assessed the effectiveness of recent coral reef mitigation projects in Puerto Rico, USVI, and Hawaii and provided technical guidance for future mitigation activities related to permitting actions.**
- 4. Established Hawaii Mitigation Working Group.**
- 5. Broadened Group to include American Samoa, CNMI and Guam.**
- 6. Developed Group Coordination and Management Plan.**
- 7. Broadened use of HEA in evaluating mitigation for US Pacific Coral Reefs.**

ASSOCIATED ACTIVITIES

1. **Coral Reef Assessment Workshop - Functions (May? 2004)**
2. **Coral Reef Assessment Workshop - HGM (Aug 2004)**
3. **Coral Reef Assessment Workshop - HEA (Sep 2005)**
4. **Coral Reef Injury Event presentations at Palau CRTF meeting (Oct 2005)**

INJURY EVENT SCENARIOS BASIC DIFFERENCES

- **Planned Event:**
 - Intentional Injury**
 - Mandated Action**
 - Preparation-oriented**
- **Unplanned Event:**
 - Accidental Injury**
 - Unauthorized Action**
 - Response-oriented**



Coral Reef Community

Dominant habitat types include: Coral, Coralline Algae, Sea grass, Macro-algae or Sand, among other habitat types.



Coral Reefs are Geological Structures

Coral reefs are unique in that they are geologic structures built by living communities.



Coral Reef Functions

Coral reef habitats support reproduction and provide food and shelter for a highly diverse assemblage of species.



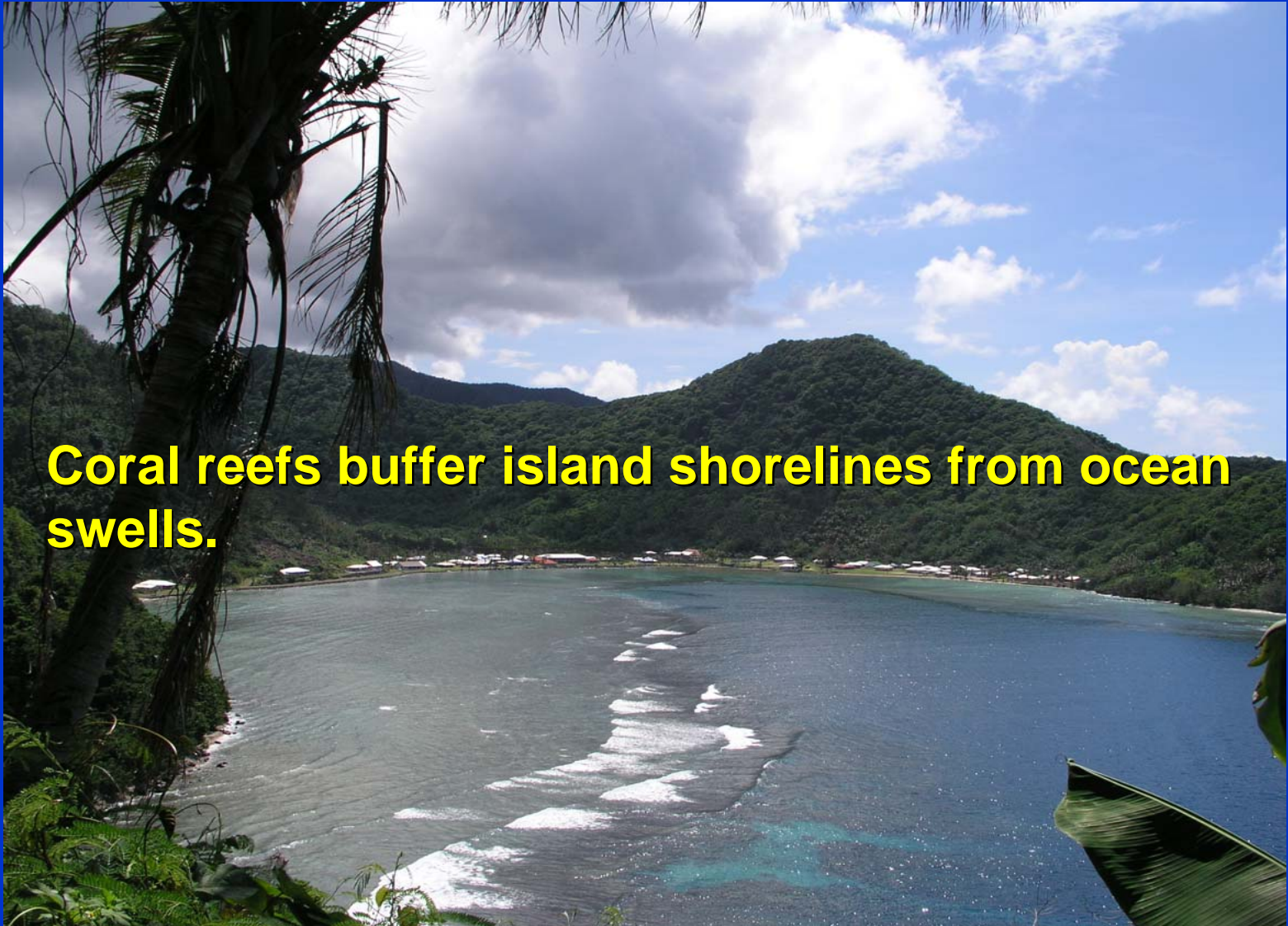
Other Ecological Functions

Healthy coral reefs also interact with pelagic and land species through complex predator, prey, or symbiotic relationships, or life history functions.



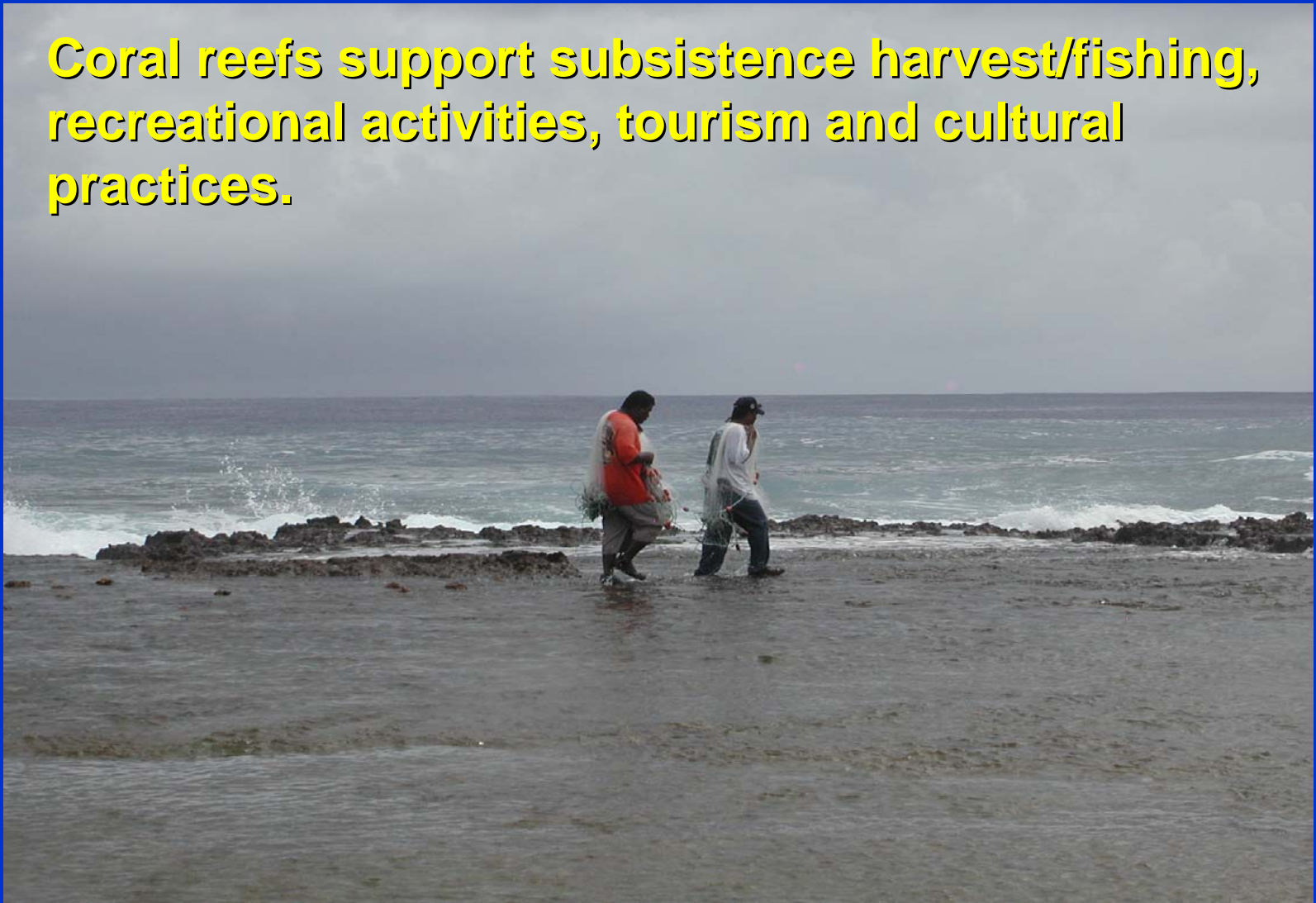
Services

Coral reefs buffer island shorelines from ocean swells.



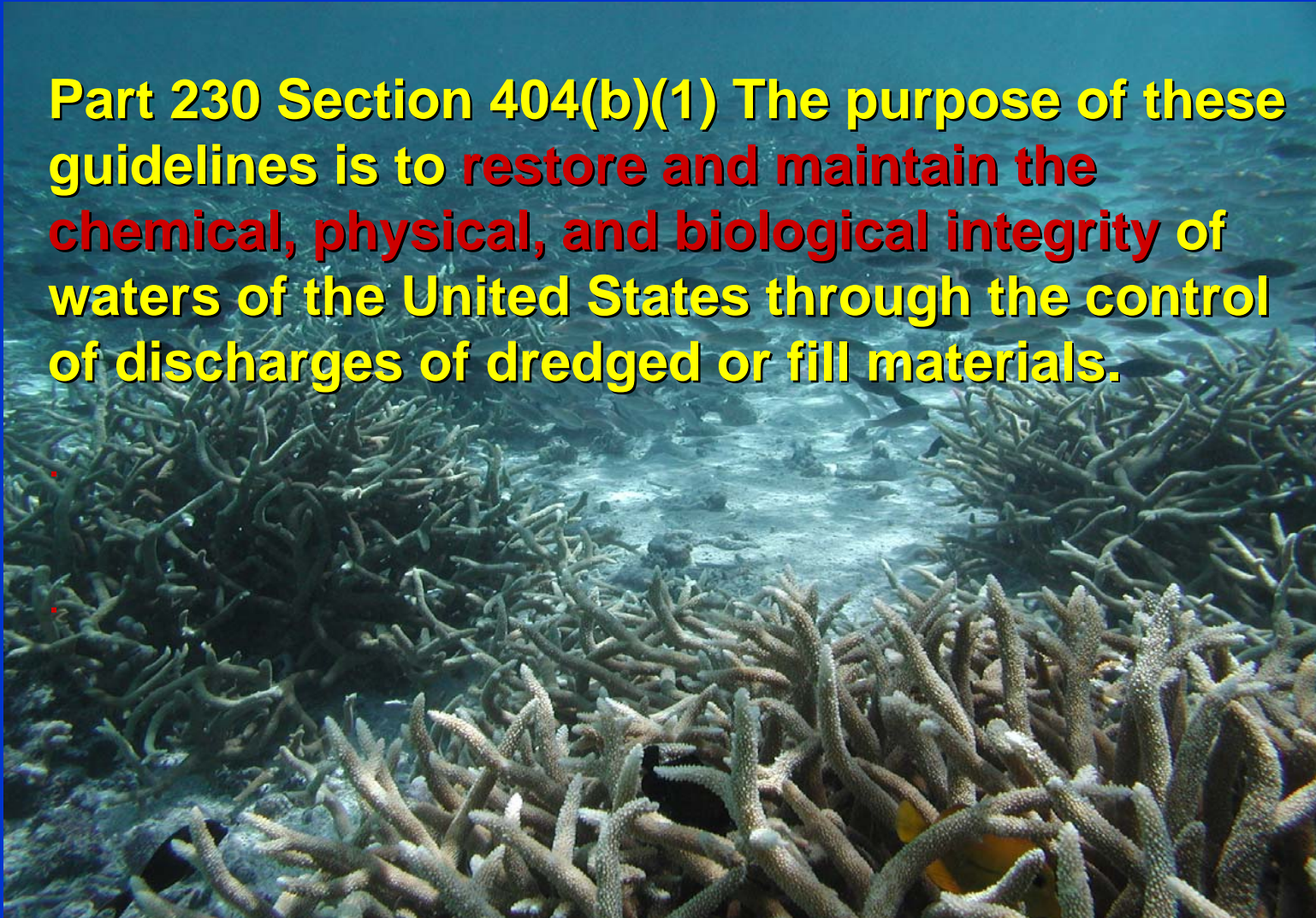
Services

Coral reefs support subsistence harvest/fishing, recreational activities, tourism and cultural practices.



Authorities and Regulatory Framework: Clean Water Act

Part 230 Section 404(b)(1) The purpose of these guidelines is to **restore and maintain the chemical, physical, and biological integrity** of waters of the United States through the control of discharges of dredged or fill materials.



Authorities and Regulatory Framework: Clean Water Act

Coral reefs are designated as Special Aquatic Sites.



Authorities and Regulatory Framework: Fish and Wildlife Coordination Act

FWCA (16 USC (661-667)...and make mitigation and enhancement recommendations to the involved federal agency for any project that would **modify a water body.**



Authorities and Regulatory Framework: Regulatory Review Period

CWA Permit Projects:
Nationwide: 10 Days
Individual: 30 Days

Civil Works Projects:
Months to Years

**NEPA Projects: 30 Days to Several Months to
Years.**



Resource Agency Partners in the Pacific Region

Local:

Guam: DAWR, GEPA, CRM

CNMI: DFW, DEQ, CRM

American Samoa: DMWR, ASEPA, CRM

State of Hawaii: DAR, DOH, CZM

Federal:

USFWS

NMFS

USEPA

NOAA DARRP

ACOE

NPS

International:

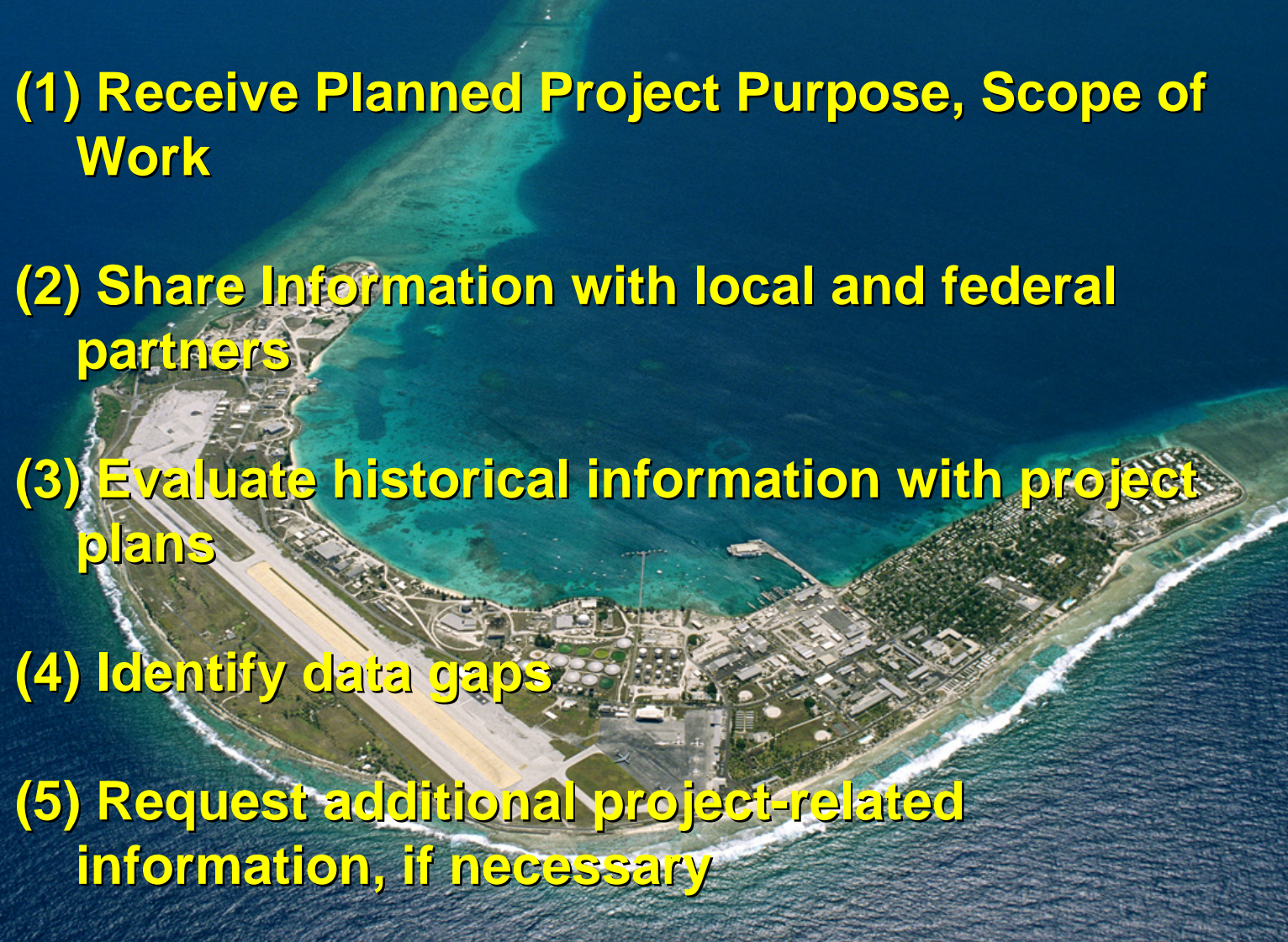
Republic of the Marshall Islands

Federated States of Micronesia


Republic of Palau.



General Project Planning Process

- (1) Receive Planned Project Purpose, Scope of Work**
 - (2) Share Information with local and federal partners**
 - (3) Evaluate historical information with project plans**
 - (4) Identify data gaps**
 - (5) Request additional project-related information, if necessary**
- 
- An aerial photograph of a coastal town and airport. The town is built on a narrow strip of land, with a large airport runway and taxiway on the left. The water is a mix of deep blue and shallow turquoise, with white waves crashing against the shore. The town features various buildings, roads, and green spaces. The overall scene is a detailed view of a coastal community and its infrastructure.

General Project Planning Process: Coordination

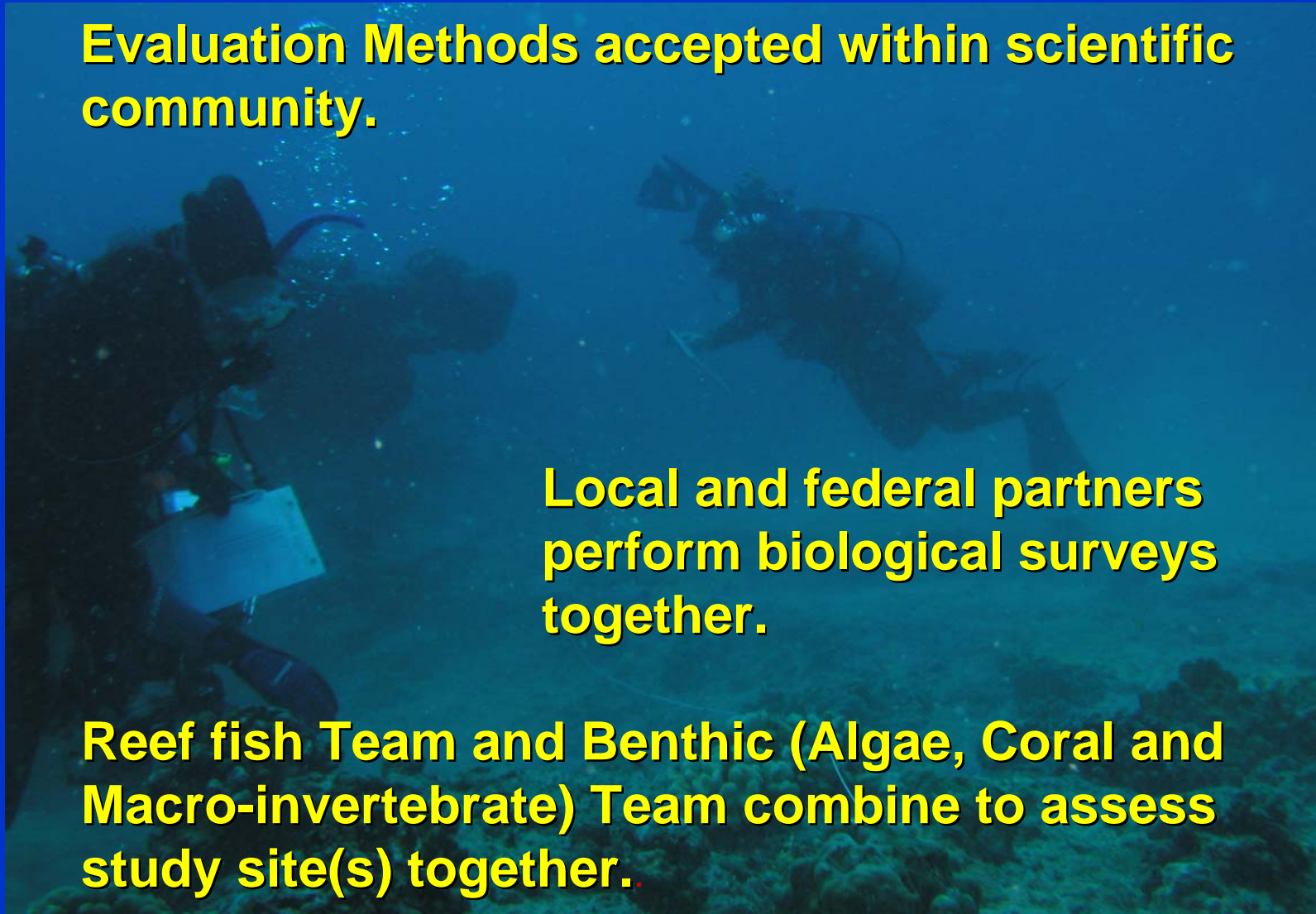
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- (6) Plan biological assessment survey, if necessary and time allows
- (7) Coordinate and conduct biological assessment with partners
- (8) Coordinate development of Draft Impact Assessment and HEA Report
- (9) Transmit draft report to Federal Agency
- (10) Collect formal comment and finalize the report

General Planning Process: Establishing Baseline Conditions - Methods

Evaluation Methods accepted within scientific community.

Local and federal partners perform biological surveys together.

Reef fish Team and Benthic (Algae, Coral and Macro-invertebrate) Team combine to assess study site(s) together.



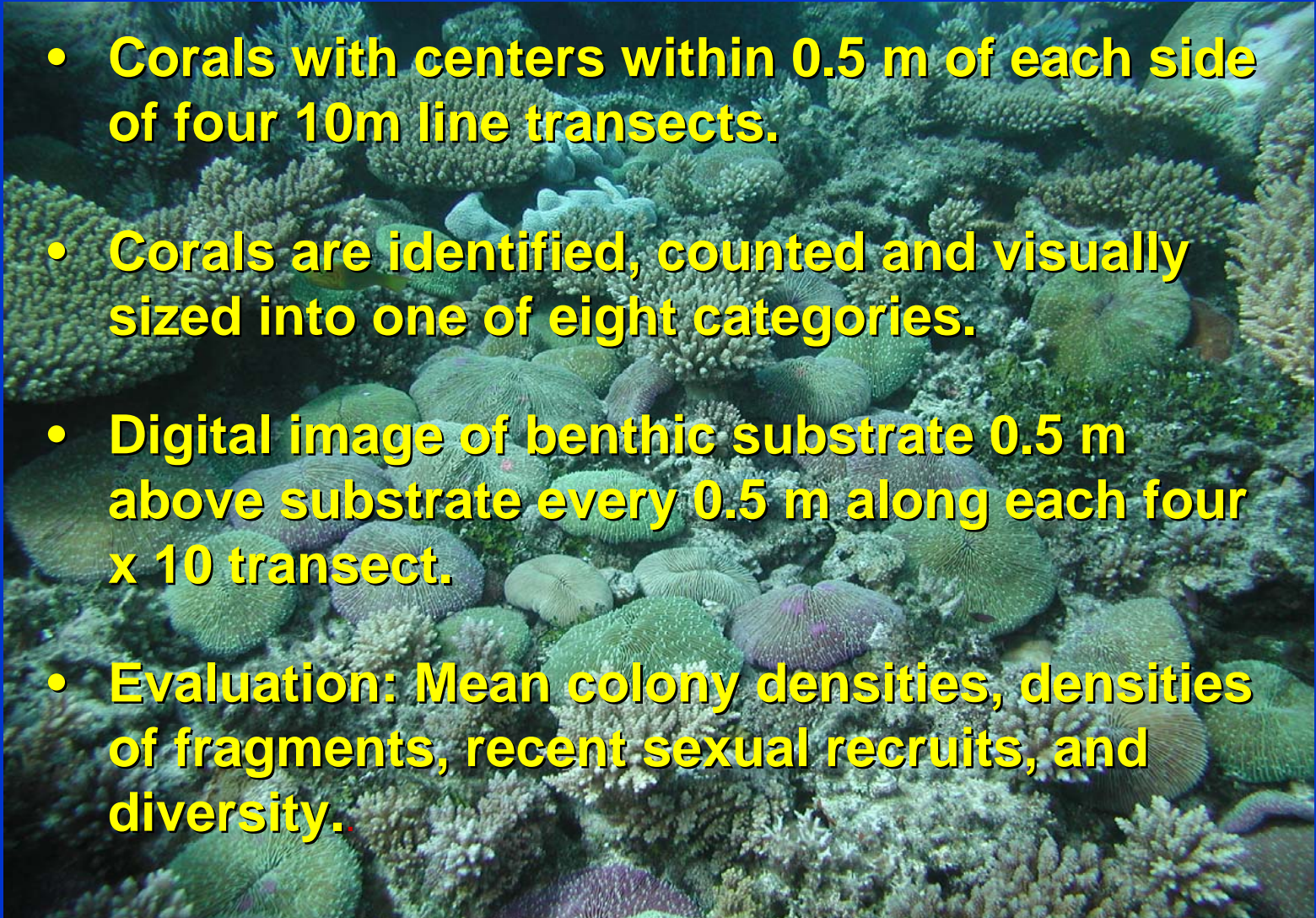
General Planning Process: Establishing Baseline Conditions – Reef Fish Survey Methods

- Deploy 2 x 25m belt transects
- Data collected within 25m x 4m wide area
- GPS 0m mark of first transect and 25m mark of second transect
- Density estimates of all fishes >10cm Total Length sized by one of 5 categories, **swim out**
- <10cm TL on **swim back**
- Reef fish identified to species



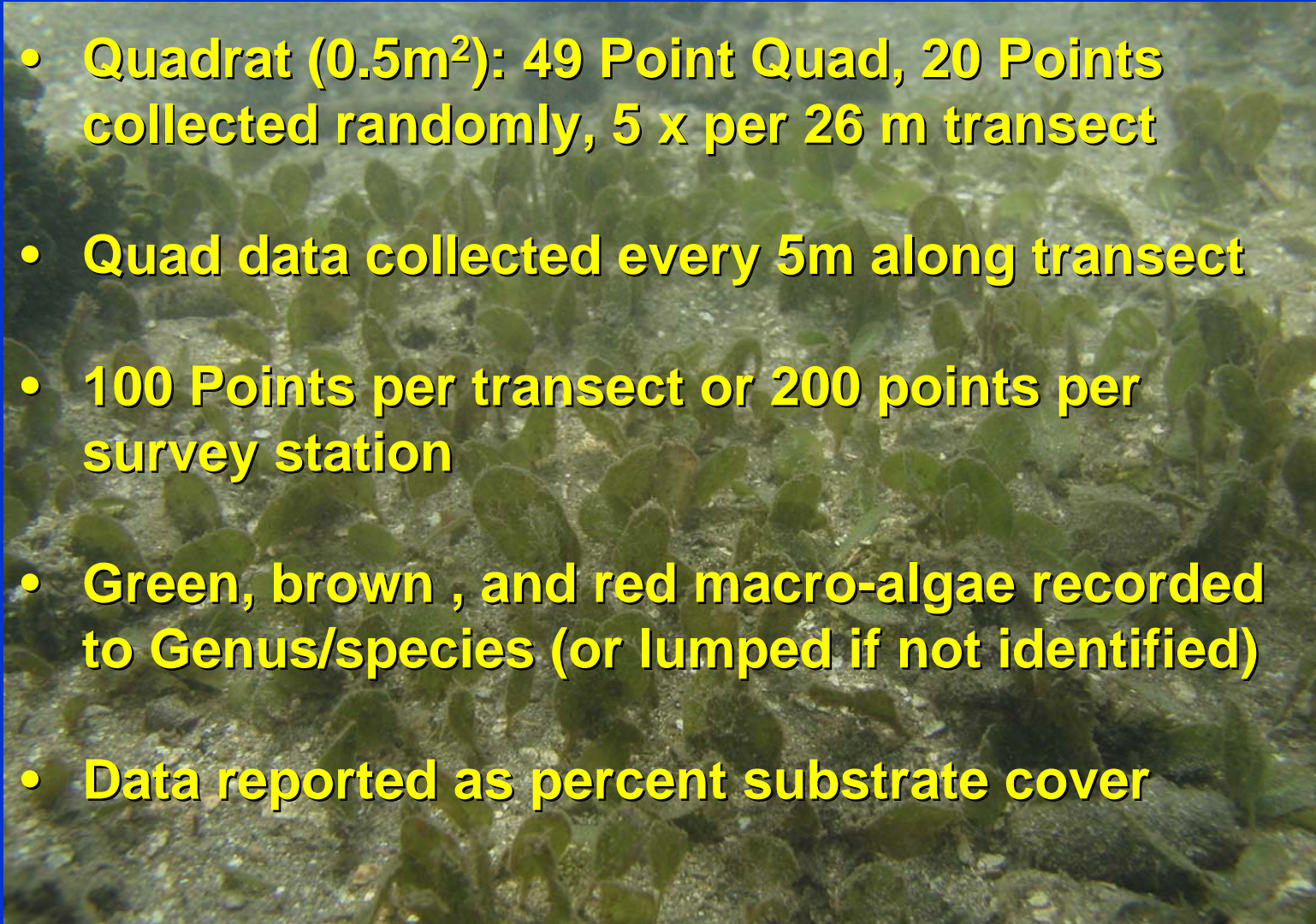
General Planning Process: Establishing Baseline Conditions – Coral Survey Methods

- Corals with centers within 0.5 m of each side of four 10m line transects.
- Corals are identified, counted and visually sized into one of eight categories.
- Digital image of benthic substrate 0.5 m above substrate every 0.5 m along each four x 10 transect.
- Evaluation: Mean colony densities, densities of fragments, recent sexual recruits, and diversity.



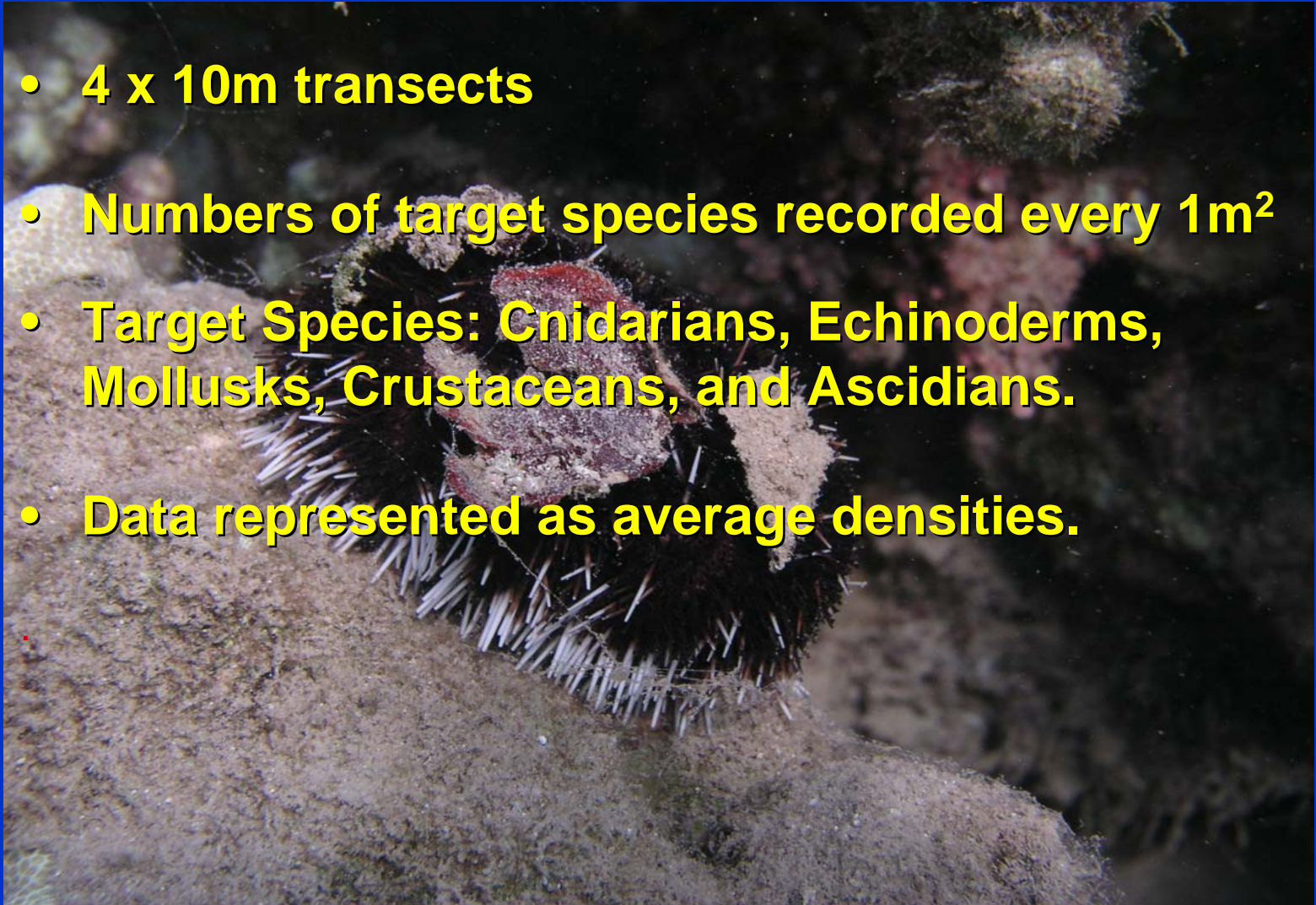
General Planning Process: Establishing Baseline Conditions – Marine Plant Survey Methods

- **Quadrat (0.5m²): 49 Point Quad, 20 Points collected randomly, 5 x per 26 m transect**
- **Quad data collected every 5m along transect**
- **100 Points per transect or 200 points per survey station**
- **Green, brown , and red macro-algae recorded to Genus/species (or lumped if not identified)**
- **Data reported as percent substrate cover**



General Planning Process: Establishing Baseline Conditions – Macro-invertebrate Survey Methods

- 4 x 10m transects
- Numbers of target species recorded every 1m²
- Target Species: Cnidarians, Echinoderms, Mollusks, Crustaceans, and Ascidians.
- Data represented as average densities.



General Planning Process: Post-Construction Biological Assessment

(12) Post Construction Biological Assessments are critical to determine:

- a. If ACTUAL construction-related impacts are equal to ANTICIPATED construction impacts.**
- b. If PLANNED mitigation is commensurate with ACTUAL project-related impacts. If not, mitigation should be RE-SCALED to appropriately offset lost functions.**



Impact Evaluation and HEA Analysis Factors

FILL = Area of Direct/Permanent Loss of Habitat

WHAT are the FUNCTIONS that will be lost?

How MUCH are we loosing and for how LONG?



Impact Evaluation and HEA Analysis Factors

Dredging = Direct/Permanent alteration of Habitat

WHAT are the FUNCTIONS that will be lost and replaced?

How MUCH are we loosing and for how LONG?



Impact Evaluation and HEA Analysis Factors

Construction-related damage (e.g., anchors and anchor chains) = Direct/Temporary Loss

WHAT are the FUNCTIONS that will be lost?

How MUCH are we loosing and for how LONG?



Impact Evaluation and HEA Analysis Factors

Dredging-related suspended sediments and Sedimentation = Indirect/Temporary Loss

WHAT are the FUNCTIONS that will be lost?

How MUCH are we loosing and for how LONG?



Impact Evaluation and HEA Analysis Factors

Construction-related release of petroleum products or other contaminants = Indirect/Permanent or Temporary Loss

WHAT are the FUNCTIONS that will be lost?

How MUCH are we loosing and for how LONG?



Developing Mitigation Using HEA

Quantitative Based Scaling vs. Best Professional Guess

- **Accuracy**
- **Time Efficient**
- **Mitigation funding will be discharged in a more informed manner to offset losses**

Developing Mitigation Using HEA

Relative Productivity:

Equating functions lost with functions we hope to restore will, among other factors, drive scaling

Relative Risk of Successful Restoration:

Will also play a critical role in determining the size (e.g., 1:1, 2:1, 5:1) of a mitigation project

Developing Mitigation Using HEA

Success criteria:

Reaching stated recovery goals will determine whether the mitigation project has satisfied commitments to off-set anticipated lost functions or whether further mitigation action will need to be implemented.

Recommendations

- **Strengthen partnerships (people) and capacity (skills) for all jurisdictions throughout Pacific region.**
- **Coordinate early and consistently during the planning process.**
- **Develop and refine Survey Methods and HEA over time.**