

 **Marine Life Protection Act Initiative** * DRAFT *



Science Advisory Team

**DRAFT Presentation to
California Fish and Game Commission
Dr. Rick Starr, Dr. Mark Carr, Dr. Steve Gaines
25 May 2006**

 **MLPA Science Advisory Team** * DRAFT *

-  SAT Role and Activities
-  Science Guidelines for MPAs
-  Evaluation of MPA Designs

 **What is the SAT?** * DRAFT *

- 18 Members
- Nominated by Organizations
- Appointed by Secretary of California Resources Agency
- Represented Different Expertise:
Fisheries, Marine Ecology, Water Quality, Physical Oceanography, Population Genetics, Marine Resource Economics, Birds and Mammals, Aquaculture





 **Role of the Science Advisory Team** * DRAFT *

- Develop Science Guidelines for Master Plan Framework
- Provide Science to BRTF and CCRSG*
- Inform MPA Packages Proposed by CCRSG
- Evaluate Proposed Network Packages

*CCRSG: Central Coast Regional Stakeholder Group



Goals Established by MLPA

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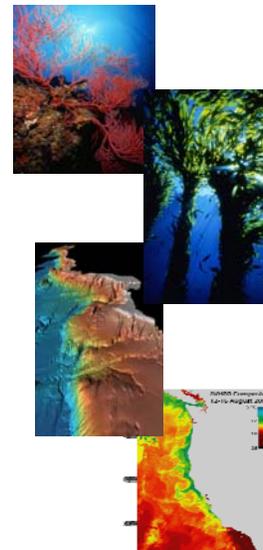
1. To protect the natural diversity and abundance of marine life, and the structure, function and integrity of marine ecosystems.
2. To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted.
3. To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity.
4. To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value.
5. To ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines.
6. To ensure that the state's MPAs are designed and managed, to the extent possible, as a network.



MLPA Goals - Habitats

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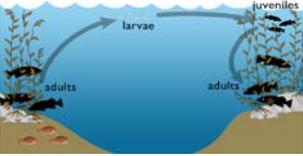
1. To protect the natural diversity and function of **marine ecosystems**.
2. To help sustain and restore **marine life populations**.
3. To improve **recreational, educational, and study opportunities** in areas with minimal human disturbance.
4. To protect representative and unique **marine life habitats**.
5. Clear objectives, effective management, adequate enforcement, sound science.
6. To ensure that MPAs are designed and managed as a **network**.



MLPA Goals - Populations * DRAFT *



1. To protect the natural diversity and function of **marine ecosystems**.
2. To help sustain and restore **marine life populations**.
3. To improve **recreational, educational, and study opportunities** in areas with minimal human disturbance.
4. To protect representative and unique **marine life habitats**.
5. Clear objectives, effective management, adequate enforcement, sound science.
6. To ensure that MPAs are designed and managed as a **network**.



MLPA Goals - Other * DRAFT *



1. To protect the natural diversity and function of **marine ecosystems**.
2. To help sustain and restore **marine life populations**.
3. To improve **recreational, educational, and study opportunities** in areas with minimal human disturbance.
4. To protect representative and unique **marine life habitats**.
5. Clear objectives, effective management, adequate enforcement, sound science.
6. To ensure that MPAs are designed and managed as a **network**.





SAT Guidelines - Goals 1 and 4

* DRAFT *

MLPA Goals:

- 1) Protect natural diversity and function of marine ecosystems*
- 4) Protect representative and unique marine life habitats*

SAT Approach:

- Identified Key Habitats
- Used GIS to Locate Key Habitats and Estimate Area
- Evaluated Habitat Representation in MPAs
- Described Levels of Protection for MPAs

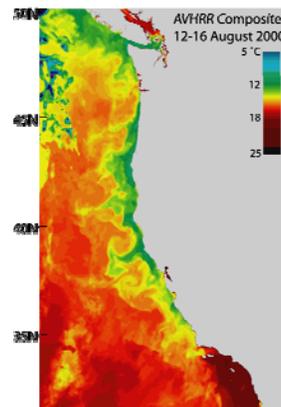
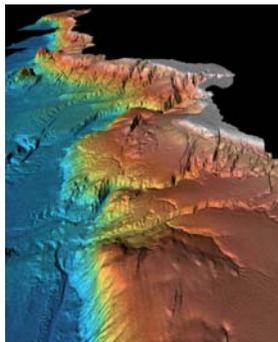


SAT Guidelines - Goals 1 and 4

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Identified Key Habitats Using:

- Bottom Type and Depth Categories
- Biogenic Habitats
- Oceanographic Features



SAT Guidelines - Goals 1 and 4 * DRAFT *

Key Marine Habitats

<p><u>Seafloor Habitats</u></p> <ul style="list-style-type: none">• Rocky reefs• Intertidal zones• Sandy or soft ocean bottoms• Underwater pinnacles• Submarine canyons	<p><u>Depth Zones</u></p> <ul style="list-style-type: none">• Intertidal• Intertidal to 30 m• 30 to 100 m• 100 to 200 m• 200 m and deeper
<p><u>Biogenic Habitats</u></p> <ul style="list-style-type: none">• Kelp forests• Seagrass beds	<p><u>Oceanographic Habitats</u></p> <ul style="list-style-type: none">• Upwelling areas• Freshwater plumes• Retention zones

SAT Guidelines - Goals 1 and 4 * DRAFT *

Used GIS to Locate Habitats

- Identified Geographic Distribution
- Estimated Total Area

Substrate and Depth:
North Central Coast Study Region
Marine Life Protection Act

SAT Guidelines - Goals 1 and 4 * DRAFT *

MLPA Central Coast Study Area by Region

The map shows the Central Coast of California divided into several sub-regions, each with specific geographic markers. From north to south, the sub-regions are: Pajaro Point to Pigeon Pt; Pigeon Pt to Capitola; Capitola to Monterey Breakwater; Monterey Breakwater to Point Sur; Point Sur to San Martin; San Martin to Pt Estero; Pt Estero to Santa Maria River; and Santa Maria River to Point Conception. Key locations marked include Pajaro Point, Pigeon Pt, Capitola, Monterey Breakwater, Point Sur, San Martin, Pt Estero, Santa Maria River, and Point Conception. A scale bar at the bottom indicates 0, 25, 50, and 100 Nautical Miles.

Evaluated Habitat Representation

- Identified Sub-Regions
- Estimated Areas of Each Habitat Type Across Sub-Regions *

*Compared available to protected habitats.

SAT Guidelines - Goals 1 and 4 * DRAFT *

Identified Levels of Protection

- **High Protection**
 - **State Marine Reserve (SMR):** No take
 - **State Marine Conservation Area (SMCA):** no take except salmon and coastal pelagics in water depth >50m
- **Moderate Protection**
 - **SMCA** - no take except salmon and pelagic fishes (>50m deep), squid, crab, spot prawn, and giant kelp (by hand)
- **Low Protection**
 - **SMCA:** allows various forms of commercial and recreational fishing and mechanical kelp harvesting
 - **State Marine Park (SMP):** allows various forms of recreational fishing



SAT Guidelines - Goals 2 and 6 * DRAFT *

MLPA Goals:

- 2) To help sustain and restore marine life populations***
- 6) To ensure that MPAs are designed and managed as a network***

SAT Approach:

- Estimated MPA Sizes
- Estimated Spacing Between MPAs
- Evaluated Interactions Between MPA Size and Spacing



SAT Guidelines - Goals 2 and 6 * DRAFT *

Why is MPA Size Important?

- To Protect Number and Size of Individuals
- To Protect Sufficient Habitat Area

SAT Approach:

- Used Adult Movement to Determine Guidelines for MPA Size

How Far Do Adult Animals Move?

0 – 1 km	1 – 10 km	10 – 100 km	100 – 1000 km	> 1000 km
Invertebrates Abalone Mussel Octopus Sea Star Snail Urchin Rockfishes Blk. & Yellow China Gopher Kelp Other Fishes Gobie Sculpin * Seasonal Migration	Rockfishes Black Brown Copper Greenspotted Olive Vermilion Other Fishes Cabezon Ca. Halibut Lingcod 	Invertebrates Dung. Crab* Rockfishes Bocaccio Canary Yellowtail Widow Other Fishes Anchovy Herring Sardine Birds Gulls Cormorants Mammals Harbor Seal Otter	Fishes Big Skate Pacific Halibut Sablefish* Salmonids* Sturgeon Whiting* Birds Gulls* Mammals Porpoises Sea Lions*	Invertebrates Jumbo Squid* Fishes Sharks* Tunas* Turtles* Birds Albatross* Pelican* Shearwater* Shorebirds* Terns* Mammals Dolphins Sea Lions* Whales*

How Big Should an MPA Be?

0 – 1 km	1 – 10 km	10 – 100 km	100 – 1000 km	> 1000 km
Invertebrates Abalone Mussel Octopus Sea Star Snail Urchin Rockfishes Blk. & Yellow China Gopher Kelp Other Fishes Gobie Sculpin * Seasonal Migration	Rockfishes Black Brown Copper Greenspotted Olive Vermilion Other Fishes Cabezon Ca. Halibut Lingcod 	Invertebrates Dung. Crab* Rockfishes Bocaccio Canary Yellowtail Widow Other Fishes Anchovy Herring Sardine Birds Gulls Cormorants Mammals Harbor Seal Otter	Fishes Big Skate Pacific Halibut Sablefish* Salmonids* Sturgeon Whiting* Birds Gulls* Mammals Porpoises Sea Lions*	Invertebrates Jumbo Squid* Fishes Sharks* Tunas* Turtles* Birds Albatross* Pelican* Shearwater* Shorebirds* Terns* Mammals Dolphins Sea Lions* Whales*

Limited Benefit

Preferable Size Benefits Many More Species				
0 – 1 km	1 – 10 km	10 – 100 km	100 – 1000 km	> 1000 km
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* Seasonal Migration				



SAT Guidelines - Goals 2 and 6

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MPA Size Guidelines

- Alongshore span of 5 - 10 km (3 - 6 miles)
- Preferably 10 - 20 km (6 - 12 miles)
- Extend from the intertidal zone to deep waters (3 miles offshore)



SAT Guidelines - Goals 2 and 6

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Why is Spacing Between MPAs Important?

- Network Depends on Spacing
- Appropriate Spacing
 - Provides Opportunities for Young (Larvae) to Settle in MPAs
 - Increases Sustainable Populations

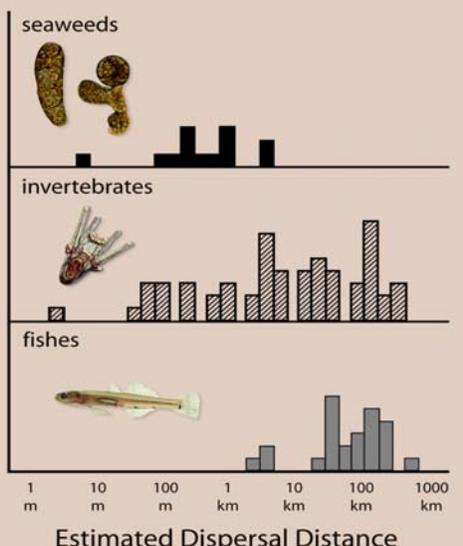
SAT Approach:

- Used Larval Dispersal to Determine Guidelines for MPA Spacing

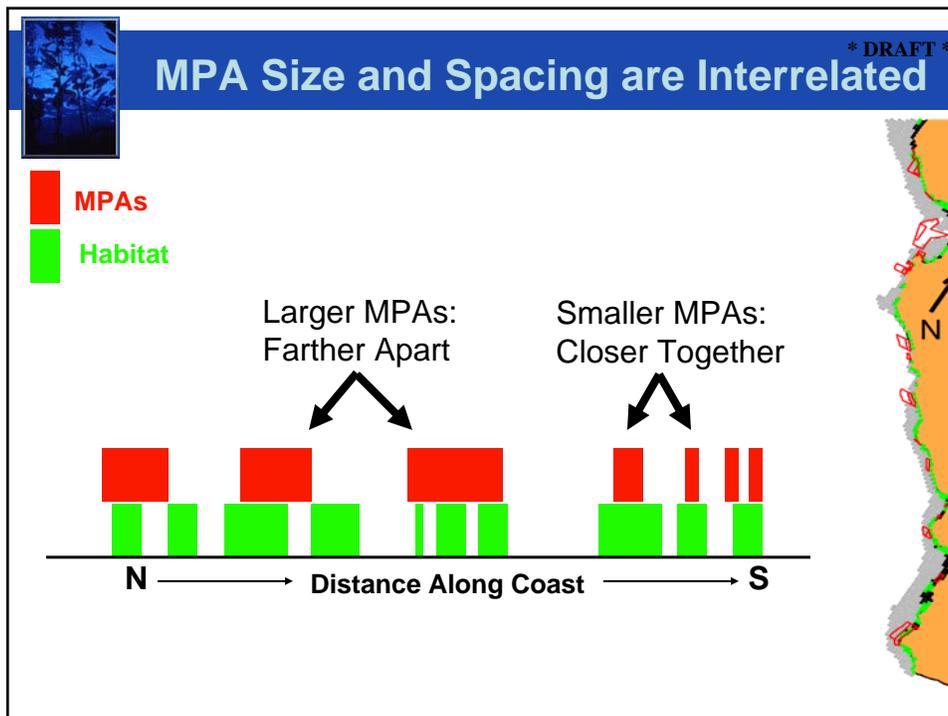
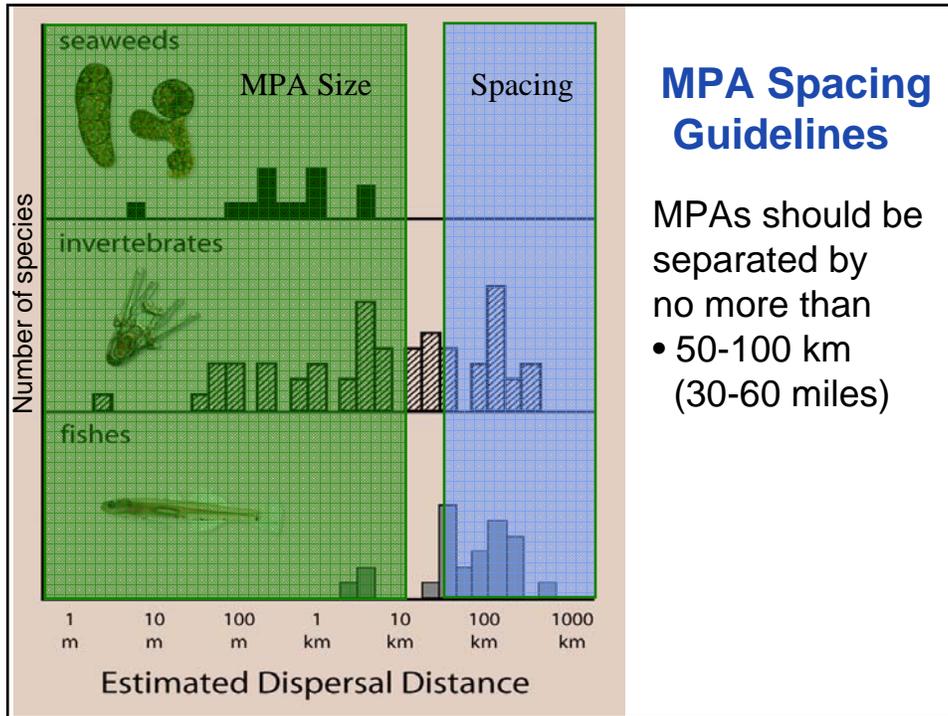


Larval Dispersal Distances

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Estimated Dispersal Distance



 **SAT Evaluation Process** * DRAFT *

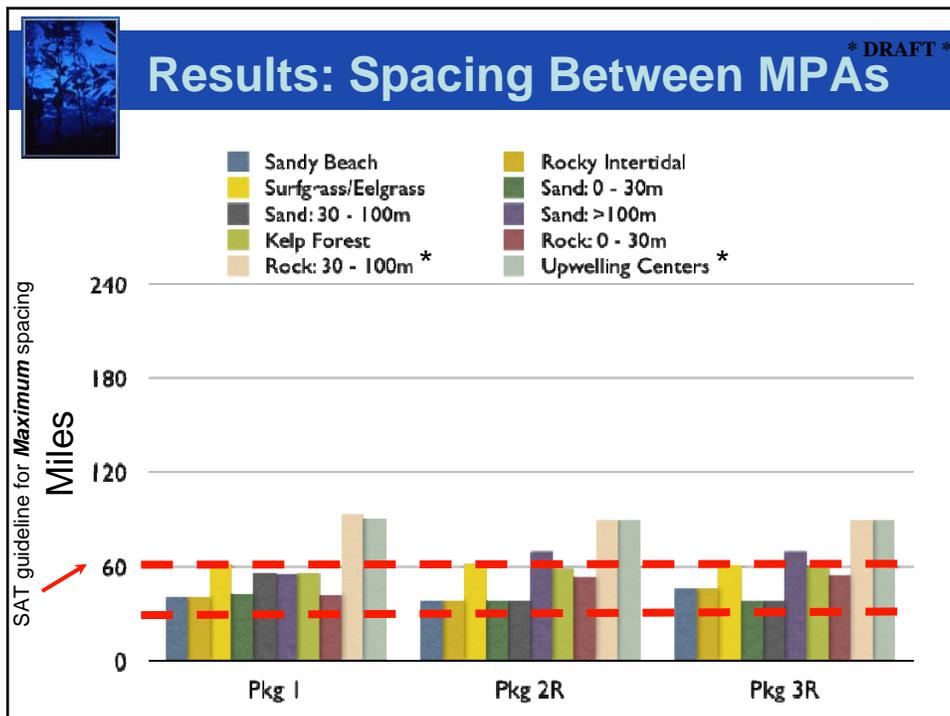
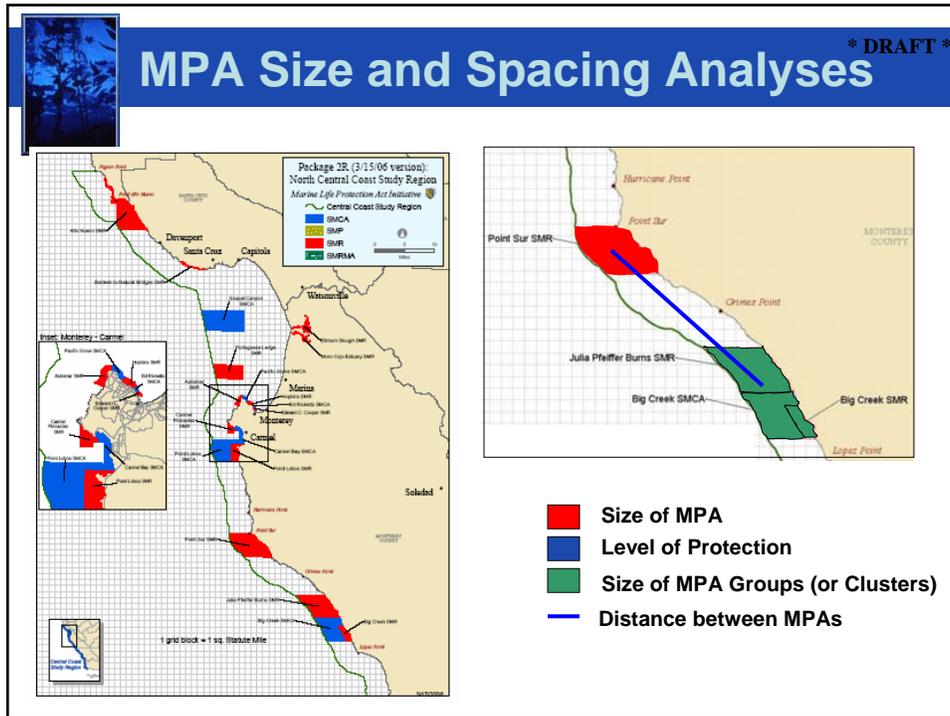
Based on MLPA Goals and MPF Guidelines



 **Evaluation – Goals 1 and 4** * DRAFT *

Key Questions for Each Proposed Package:

1. How Well are Key Habitat Types Represented in Proposed MPA Packages?
2. What are the Proposed Levels of Protection for these Habitat Types?
3. How Well are Habitats and Levels of Protection Distributed Across the Study Region?





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Results: Size of High Protection MPAs

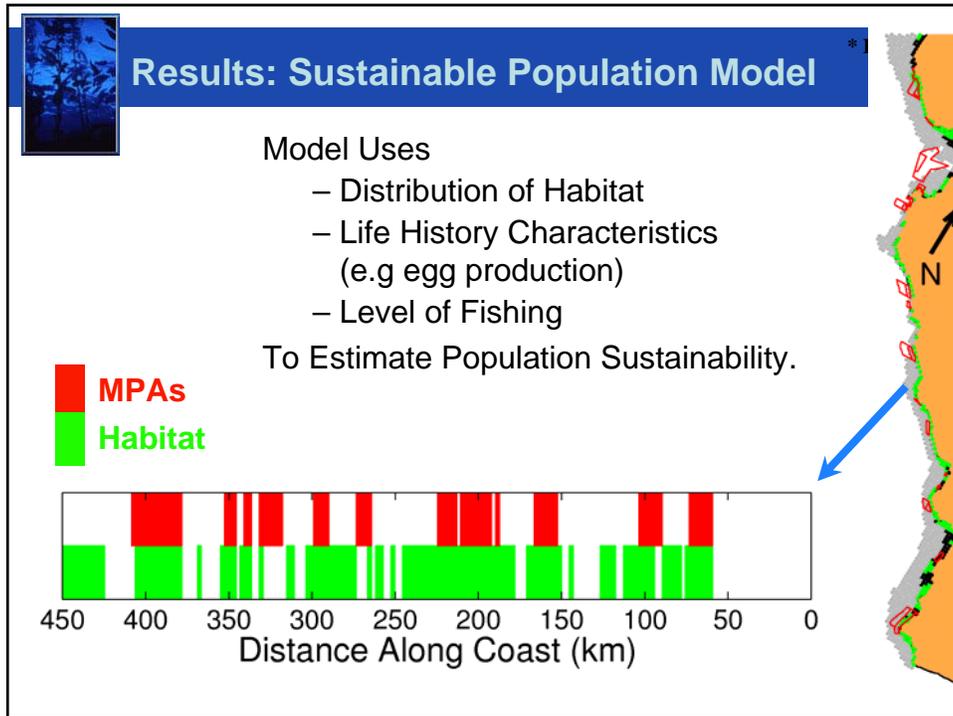
Pkg	# of MPA Clusters	Below Minimum	At Minimum	Preferable Size
1	13	54%	31%	15%
2R	14	36%	14%	50%
3R	14	28%	22%	50%



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Results: Number of Protected Patches

Pkg	Sand Beach	Rocky Intertidal	Surfgrass / Eelgrass	Sand, 0-30	Sand, 30-100	Sand, >100	Rock, 0-30	Rock, 30-100	Kelp	Upwelling	Shallow Canyon	Deep Canyon	Average
1	4	4	2	2	4	3	3	2	3	2	1	2	2.6
2R	7	7	4	7	8	4	4	3	3	5	3	4	4.9
3R	7	7	4	6	8	4	4	3	3	5	2	3	4.7



Future Directions

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- Monitoring and Evaluation
- Improved Baseline Data
- New Analytical Tools
- Integration of MPAs and Other Management

A photograph showing several fish, likely snappers or groupers, swimming in a clear, shallow reef environment. The fish are yellowish-brown with white stripes. The background shows a diverse coral reef structure.