MARINEGEO:
THE MARINE GLOBAL EARTH OBSERVATORY

UNDERSTANDING HOW COASTAL ECOSYSTEMS WORK – AND HOW TO KEEP THEM WORKING

MarineGEO
THE TENNENBAUM MARINE OBSERVATORIES NETWORK
Smithsonian Institution

MARIA C. MURRAY
PROGRAM MANAGER
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OUTLINE

1. MarineGEO Orientation
2. Program Update
3. Science in Action
4. Upcoming Activities
5. Next Steps

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MARINEGEO CENTRAL QUESTION

How and why are coastal marine ecosystems changing under natural and human influence?

Ecosystem:

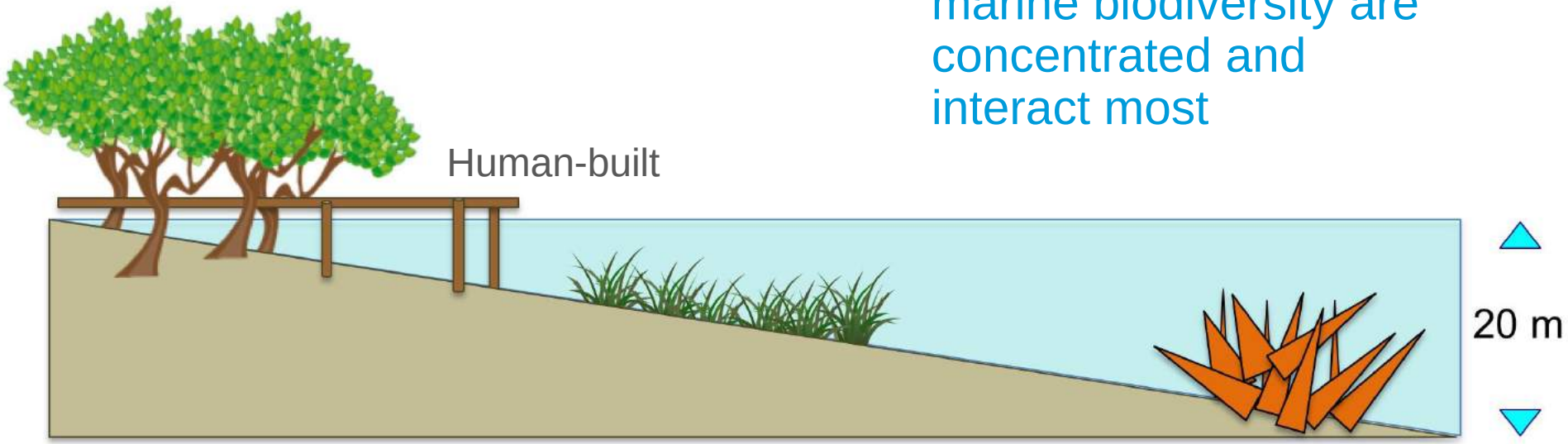
- Structure
- Function
- Biodiversity

Underpinnings:

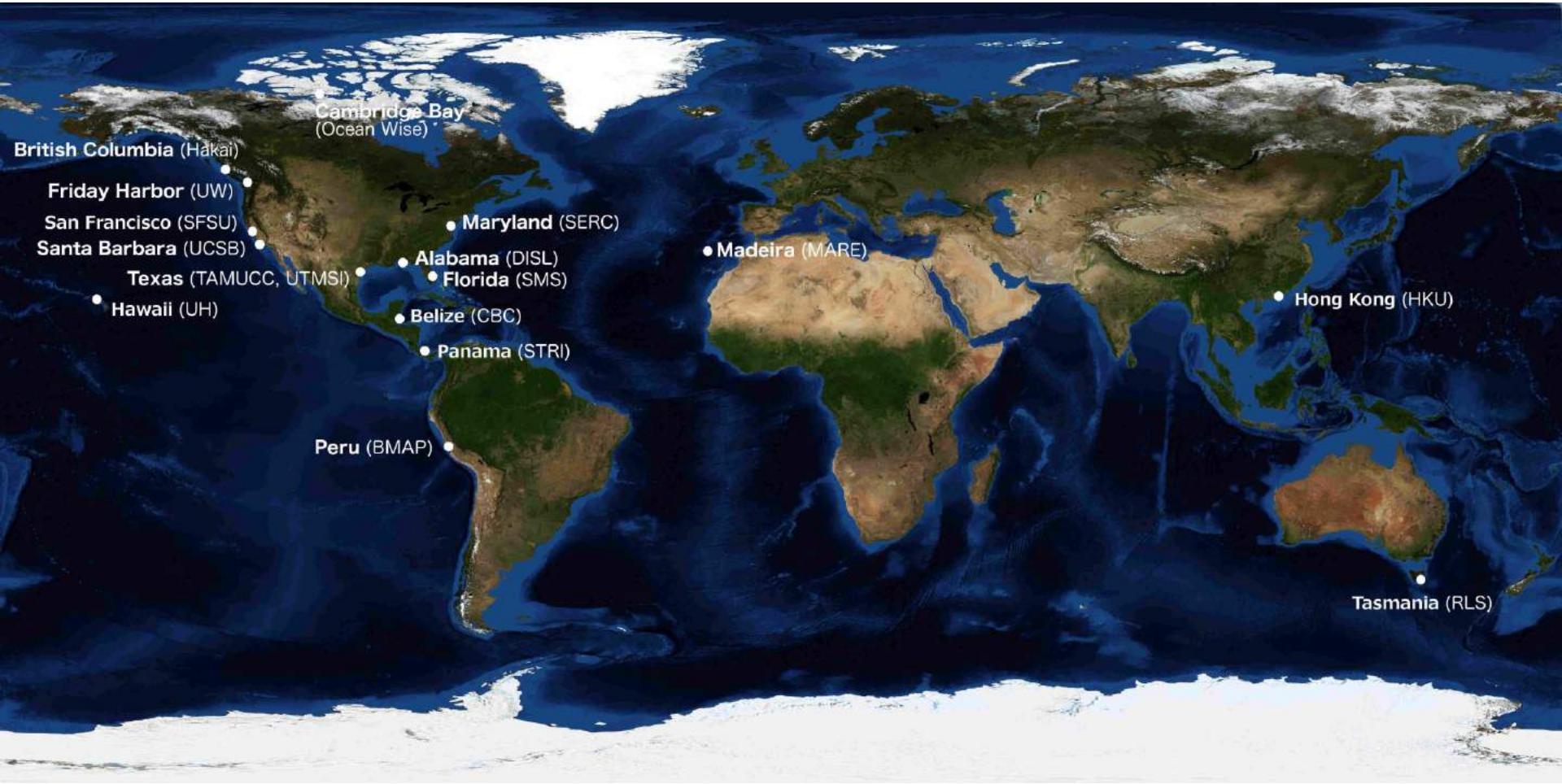
- Environmental forcing factors
- Ecosystem processes
- Experiments

OUR COASTS:
THE MARINEGEO NICHE

Where humans and marine biodiversity are concentrated and interact most



WHERE WE ARE


Cambridge Bay
(Ocean Wise)
British Columbia (Hakai)
Friday Harbor (UW)
San Francisco (SFSU)
Santa Barbara (UCSB)
Texas (TAMUCC, UTMSI)
Hawaii (UH)
Maryland (SERC)
Alabama (DISL)
Florida (SMS)
Belize (CBC)
Panama (STRI)
Peru (BMAP)
Madeira (MARE)
Hong Kong (HKU)
Tasmania (RLS)

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1. MarineGEO Basics
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MarineGEO

Protocols

Edit me

MarineGEO is a global network of partners focused on understanding how coastal marine ecosystems work—and how to keep them working.

We focus on biodiversity as the heart of healthy, productive ecosystems and coastal regions, where marine life and people are concentrated and interact most. MarineGEO marshals the Smithsonian's leadership in discovery and convening power to advance frontiers in knowledge and provide it to policymakers to support innovative management and protection of our oceans.

Project Modules

Project modules are packages that contain complete instructions for deploying experiments, data entry templates and field sheets. Each module contains:

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Seagrass Habitats

Edit me

Quick Start

Seagrass Habitats Survey Design

Beta Version

Background

Seagrasses are a group of >70 species of flowering plants that spend their lives submerged in seawater. Most seagrasses root in shallow sediment bottoms, where sufficient light penetrates to support growth. Seagrasses form the foundation of submerged grassland ecosystems in shallow coastal waters from the equator to high latitudes on all continents except Antarctica. Seagrass meadows are highly productive, provide important habitat for animals, including commercially important fisheries and species of concern, and are important sites of blue carbon storage. Seagrass ecosystems and the services they provide are threatened by a range of interacting human activities.

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Core Modules

Module	Essential Ocean Variable (GOOS)
 Seagrass Density	Community composition; ecosystem structure
 Seagrass Shoots	Ecosystem structure; ecosystem function
 Predation Assay	Ecosystem function

Recommended Modules

Module	Essential Ocean Variable (GOOS)
 Fish Seines	Species populations; species trits; community composition

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Seagrass Density

Edit me

Beta Version

Quick Start

- Seagrass Density Protocol
- Seagrass Density Field Datasheet
- Seagrass Density Data Spreadsheet

Measured Parameters

- Percent cover of each species (in 5% bins of 0.25 m^2)
- Macroinvertebrate abundance (number 0.25 m^{-2}) and approximate size (cm)
- Grazing scars (present/absent)
- Shoot density (number 0.0625 m^{-2})

CREATING A ROADMAP

Our charge

- Strategic plan
- Science plan
- Partnership plan
- Implementation working groups

MarineGEO

(Draft) MarineGEO Strategic Plan

Years 2020-2025

v 0.1.1

Mission

[*Insert from MarineGEO mission statement after it is finalized*]

Vision

[*Insert from MarineGEO vision statement after it is finalized*]

GOAL I: Establish a transformative research program

Objectives

A. Center MarineGEO research around a backbone of core, long-term observations of biodiversity, ecosystem function, and environmental forcing factors.
B. Conduct collaborative research projects and experiments focused on addressing MarineGEO priorities and answering big questions.
C. Build a sense of major discovery and breakthrough-research by fostering macroecological science.

Our community

- 22 participants
- 10 sites
- 6 countries
- 4 continents

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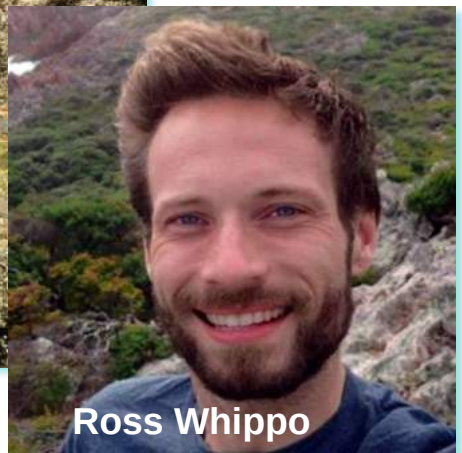
PROJECT BITEMAP

How do global-scale gradients constrain fish predation?

Standardized predation assays
- 25 squidpops
- Seagrass and unvegetated habitats

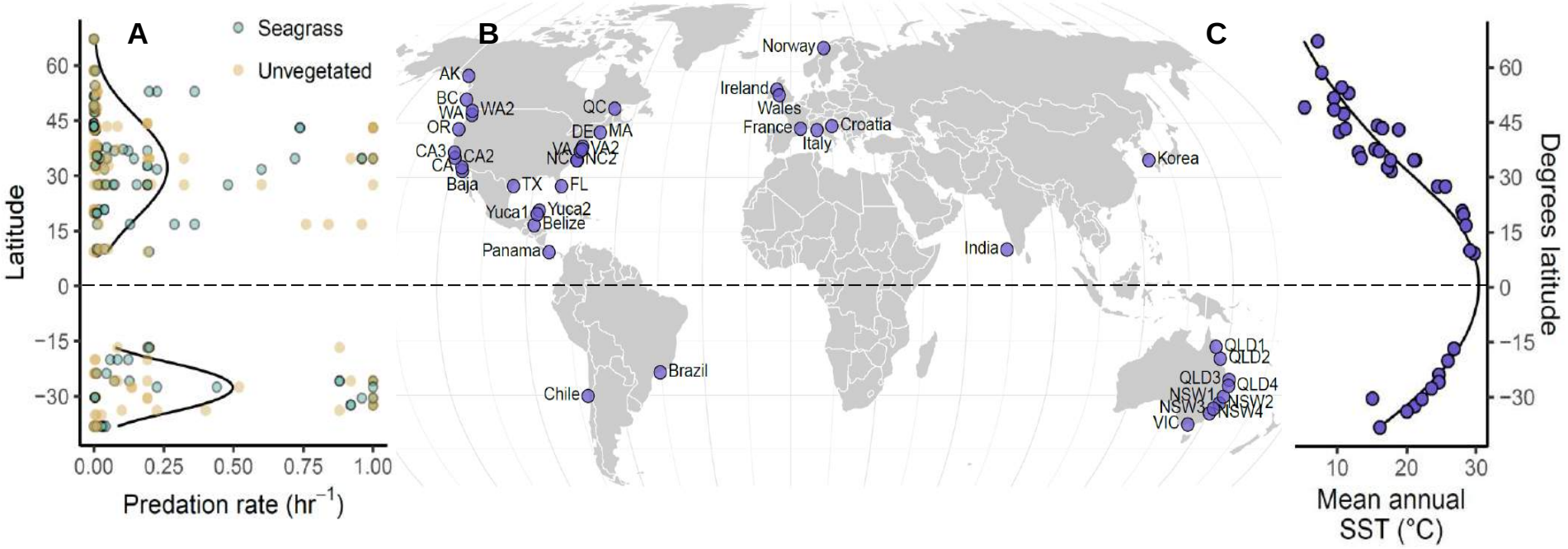
Standardized predator surveys
- Seining
- Predator:
  - Density
  - Size
  - Biomass
  - Diversity

PROJECT BITEMAP



Whalen et al., *submitted*

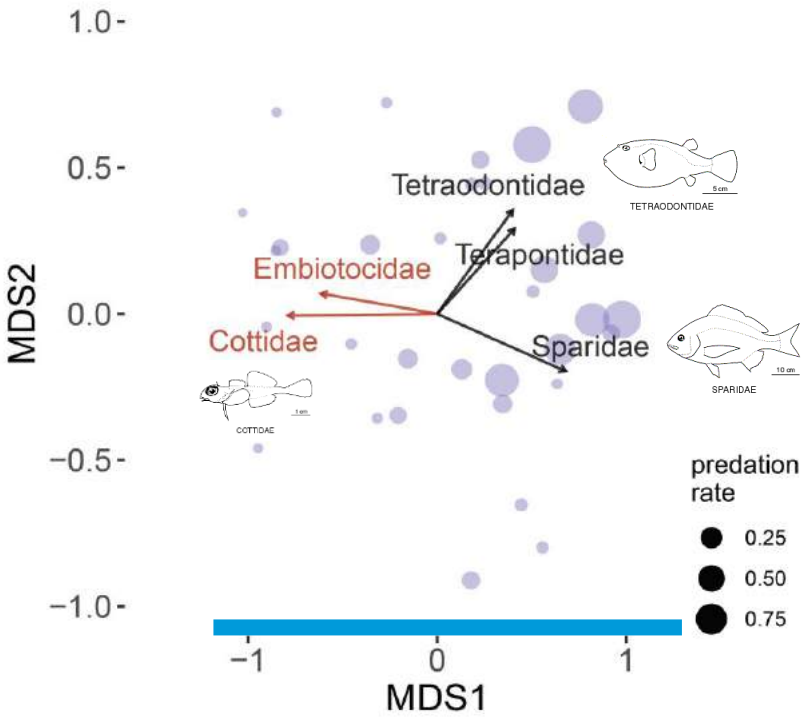
PROJECT BITEMAP

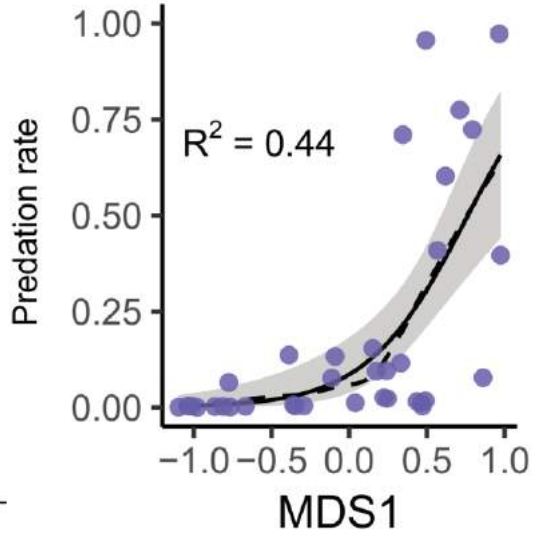


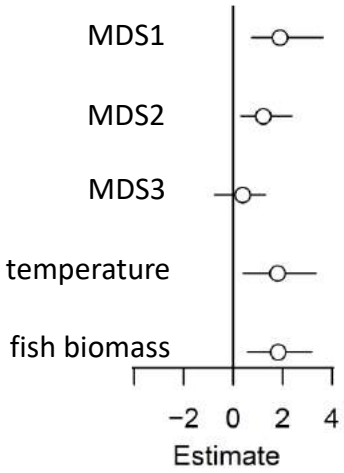
Whalen et al., *submitted*

PROJECT BITEMAP

Predator composition determines predation intensity



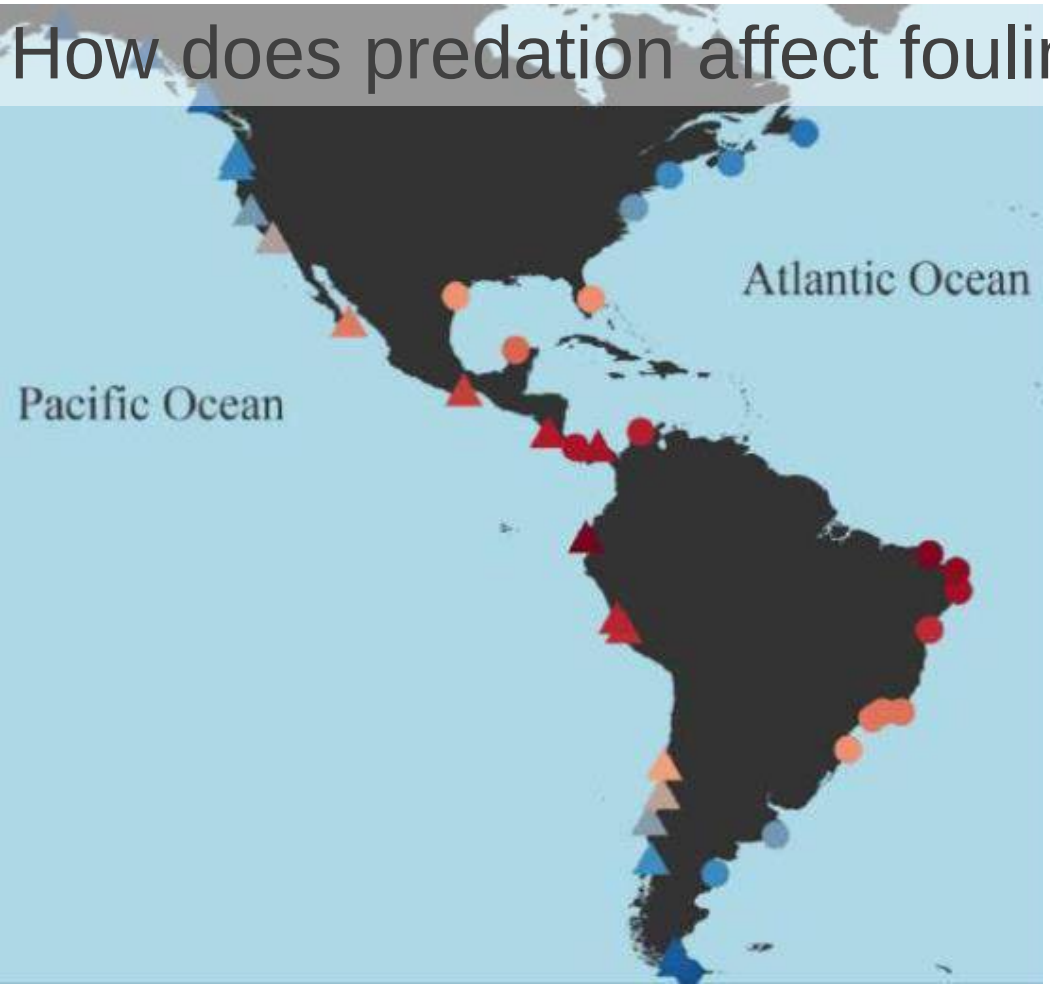




Whalen et al., *in prep*

PROJECT PANAMEX

How does predation affect fouling community processes?



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Environmental Research Center

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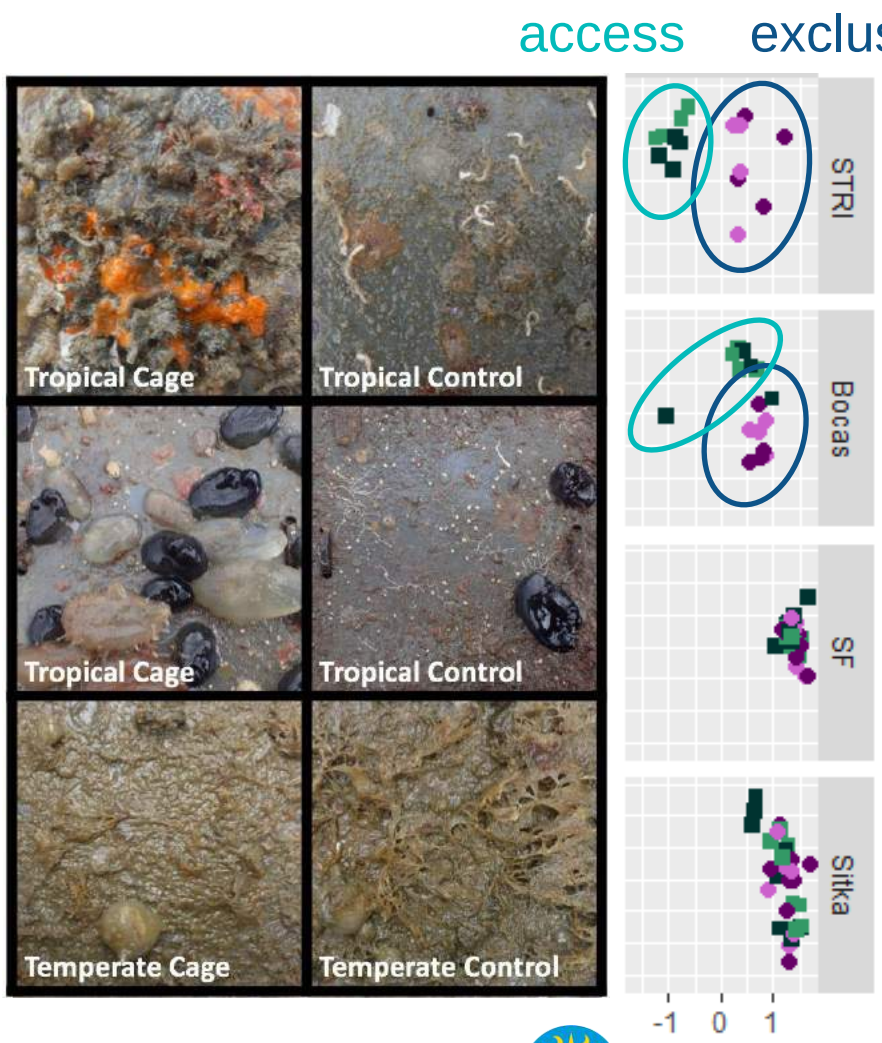
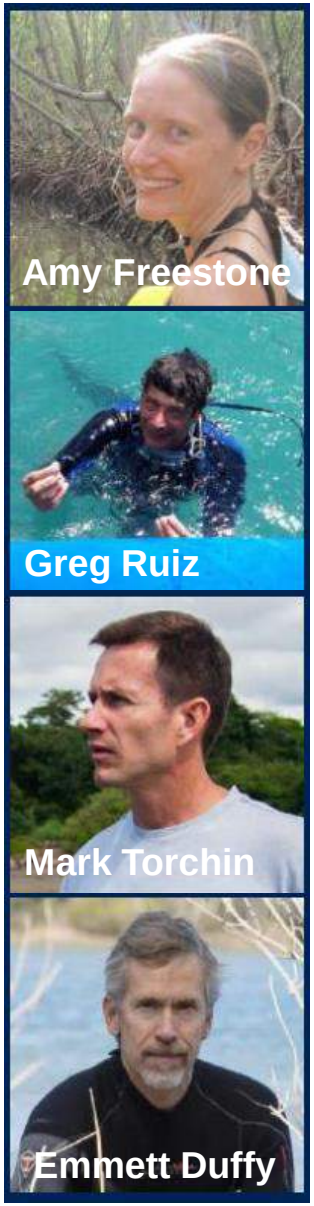
PROJECT PANAMEX





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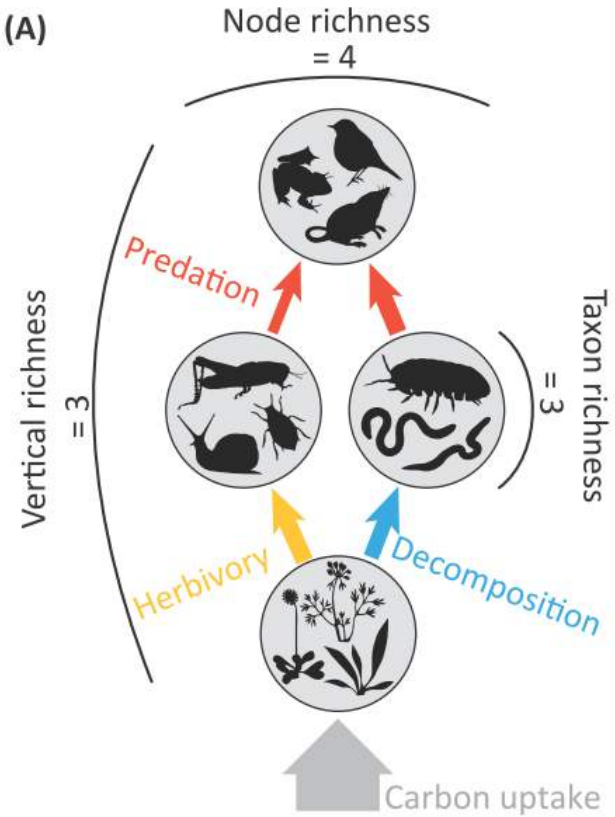
2019 SEAGRASS CAMPAIGN

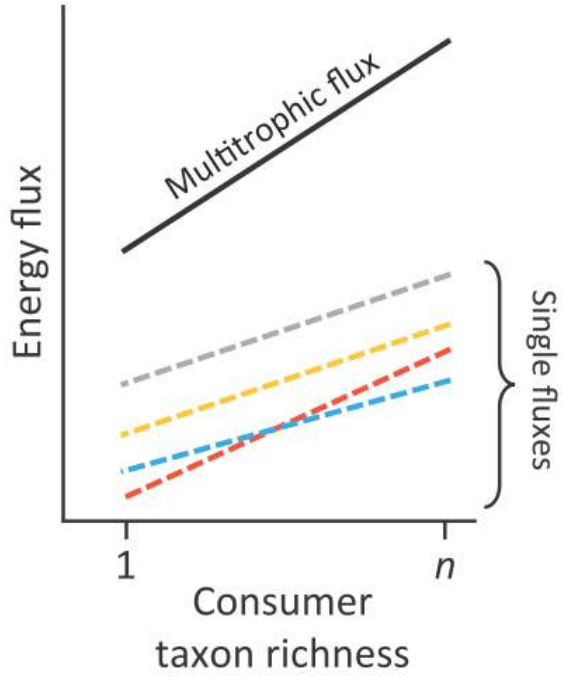
Food webs and energy fluxes

- Coordinated survey
- >70 participants on 6 continents

2019 SEAGRASS CAMPAIGN

- Describe seagrass food webs
- Compute energy fluxes
- Relate to biodiversity





Barnes et al. 2018 Trends Ecol Evol

BIOBLITZ: TEXAS LAGUNA MADRE

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CHALLENGES WE FACE

- Limited resources
- Scope & direction
- Network growth
- Communication
- Data management

COMMON INTERESTS & TOUCHPOINTS

Common Interests

- Coordinated observation network
- Data systems and portals
- Research relevant to society and issues global change
- Funding and sustainability
- Balancing rigor, standardization, and ease of implementation

Touchpoints

- Barcode and collections libraries and eDNA
- Protocol and data sharing
- Experiments
- Remote sensing and groundtruthing

THE SMITHSONIAN'S MARINEGEO

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Ideas for collaboration?