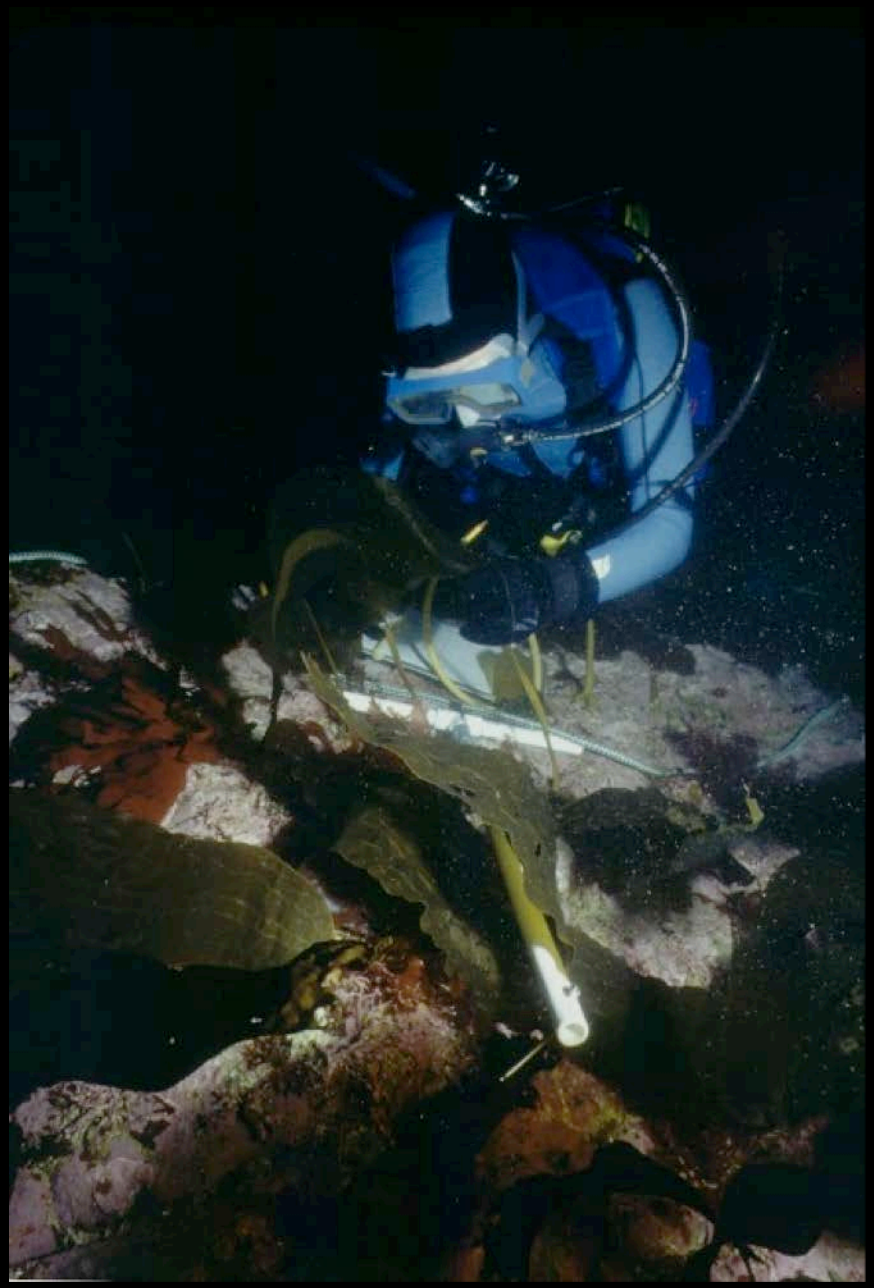
Dr. Heather Spalding

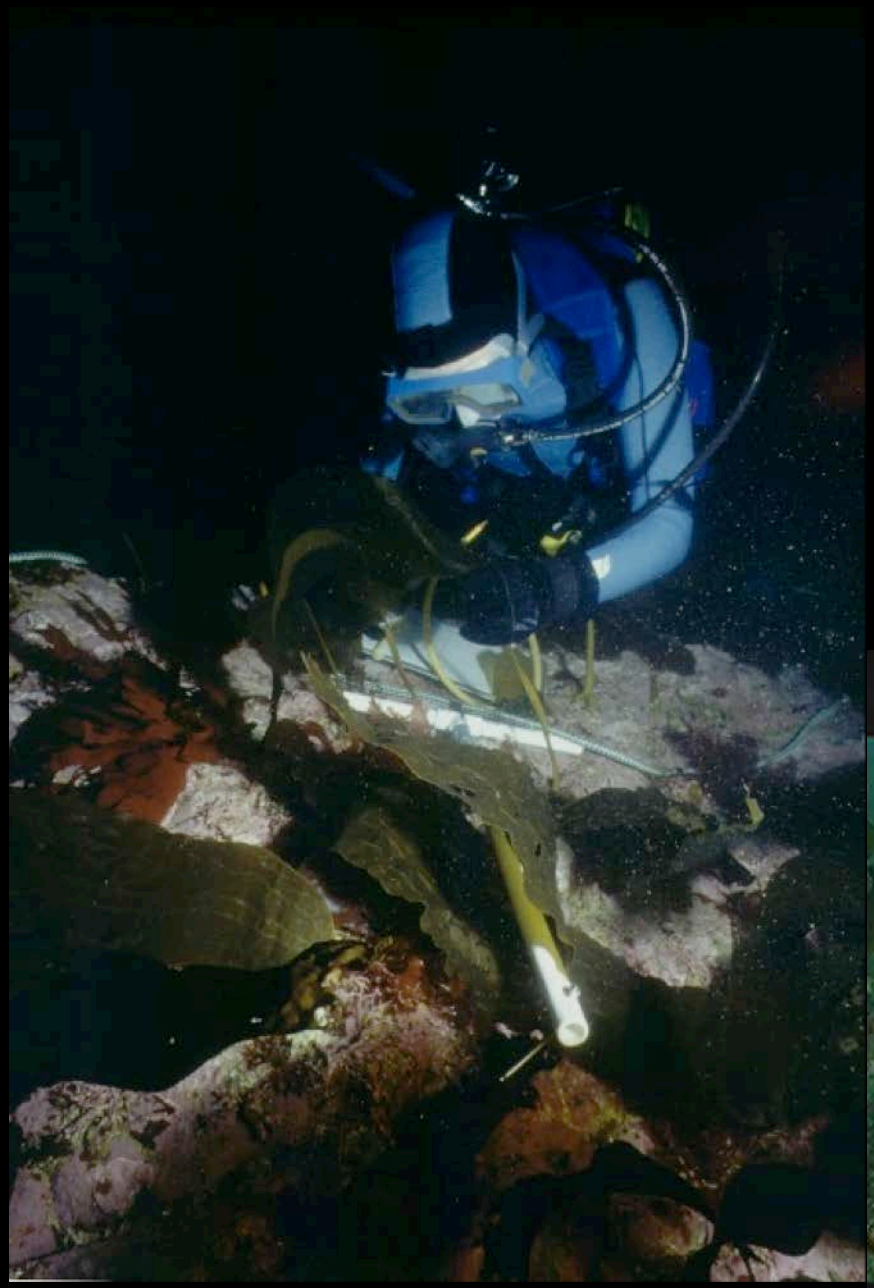
Department of Botany

University of Hawai‘i at Mānoa

Post-doctoral fellow

Artist: Heather Spalding, Age 5



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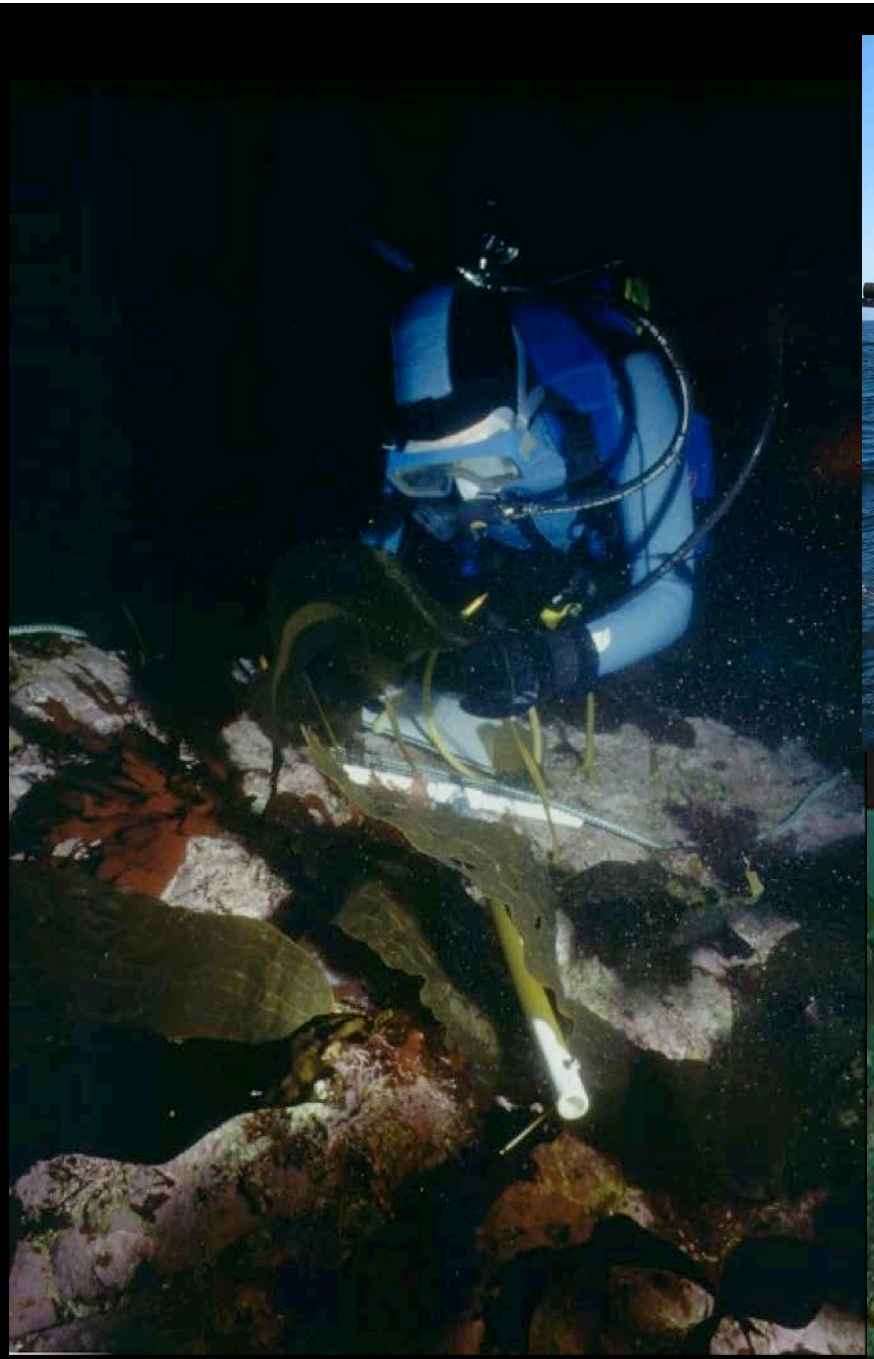


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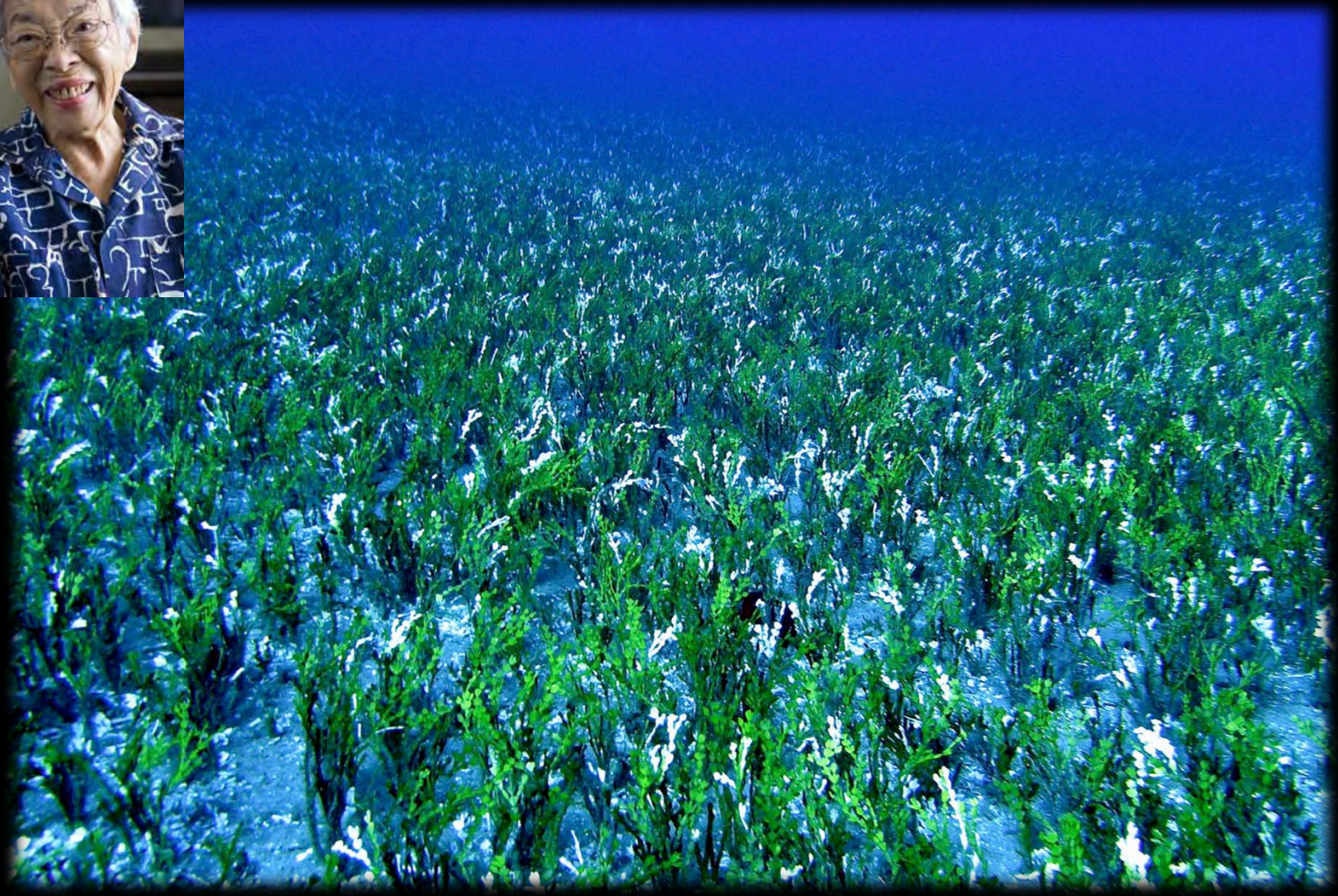
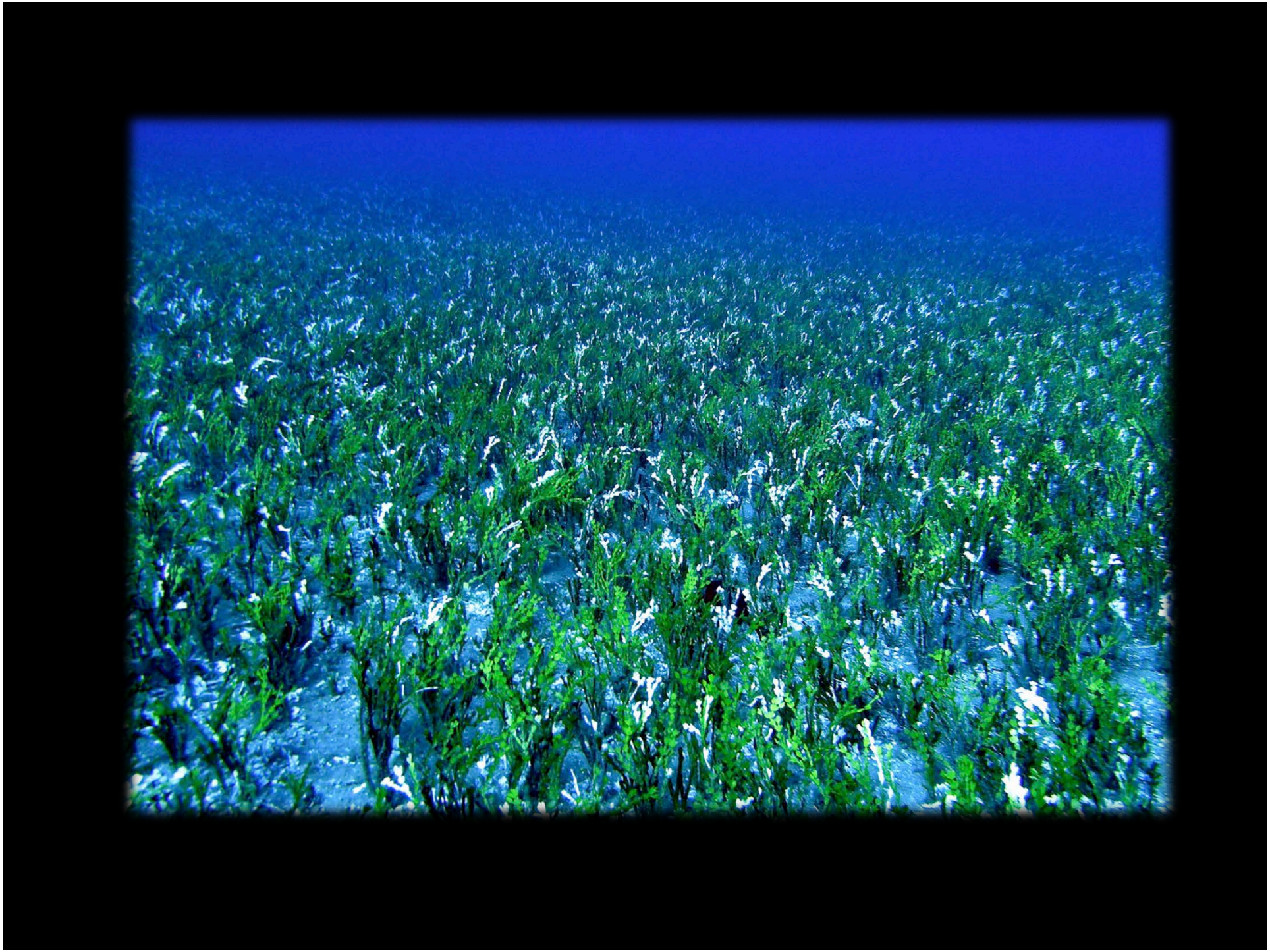


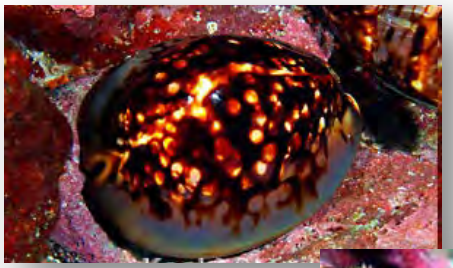


Present: Postdoctoral fellow, Department of Botany

Common Intertidal Invertebrates – Ewa Beach

Echinometra mathaei

Echinometra oblonga



Cypraea mauritiana
-darker brown, humped, no lines on edge

Cypraea caputserpentis
-lighter brown,edge w/ lines

Holothuria atra

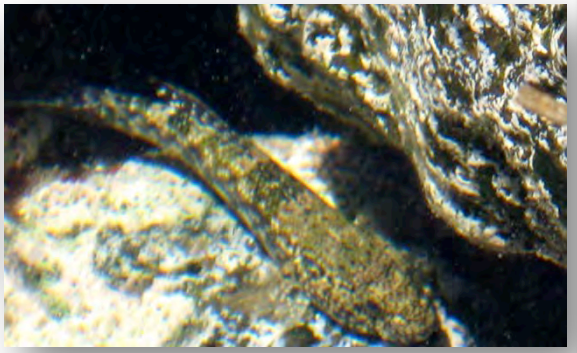
Holothuria cinerascens

Pocillopora meandrina

Intertidal Fishes – **Residents**, **Partial Residents**, and **Transients**

Istiblennius zebra

Blenniella gibifrons



***Bathygobius* spp.**

Cirripectes vanderbilti

***Cirripectes* spp.**

Kellogella oligolepis

***Thalassoma* spp.**

Acanthurus triostegus

Invertebrates and fish can be delicate and/or dangerous – be careful!

- Leave animals in the water to reduce stress
- Do not poke or squeeze animals, like sea cucumbers
- Do not pick up cone shells
- Do not reach into holes or wear shiny jewelry
- Wear appropriate footwear to prevent falling

Dangerous

Delicate

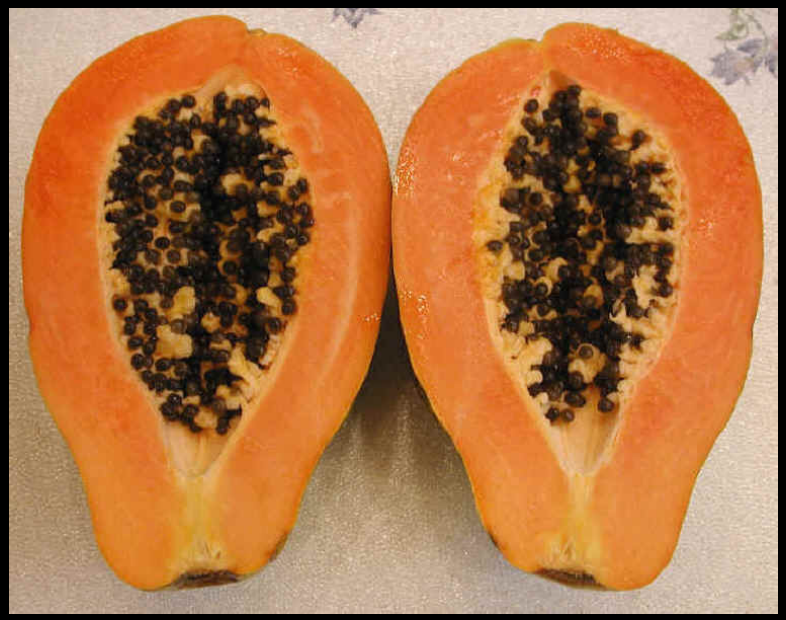
What is an alga, anyway?

- **Is it pond scum? ……YES!**
- **Is it that slimy green stuff on the inside of your aquarium? ……YES!**
- **Is it seaweed? ……YES!**
- **Is it *limu*? ……YES!**
- **Is it moss? ……NO!**
- **Is it nori? ……YES!**
- **Is it phytoplankton? ……YES!**
- **Is it a plant? ……Sorta, Kinda, not really, but it depends on who you talk to**

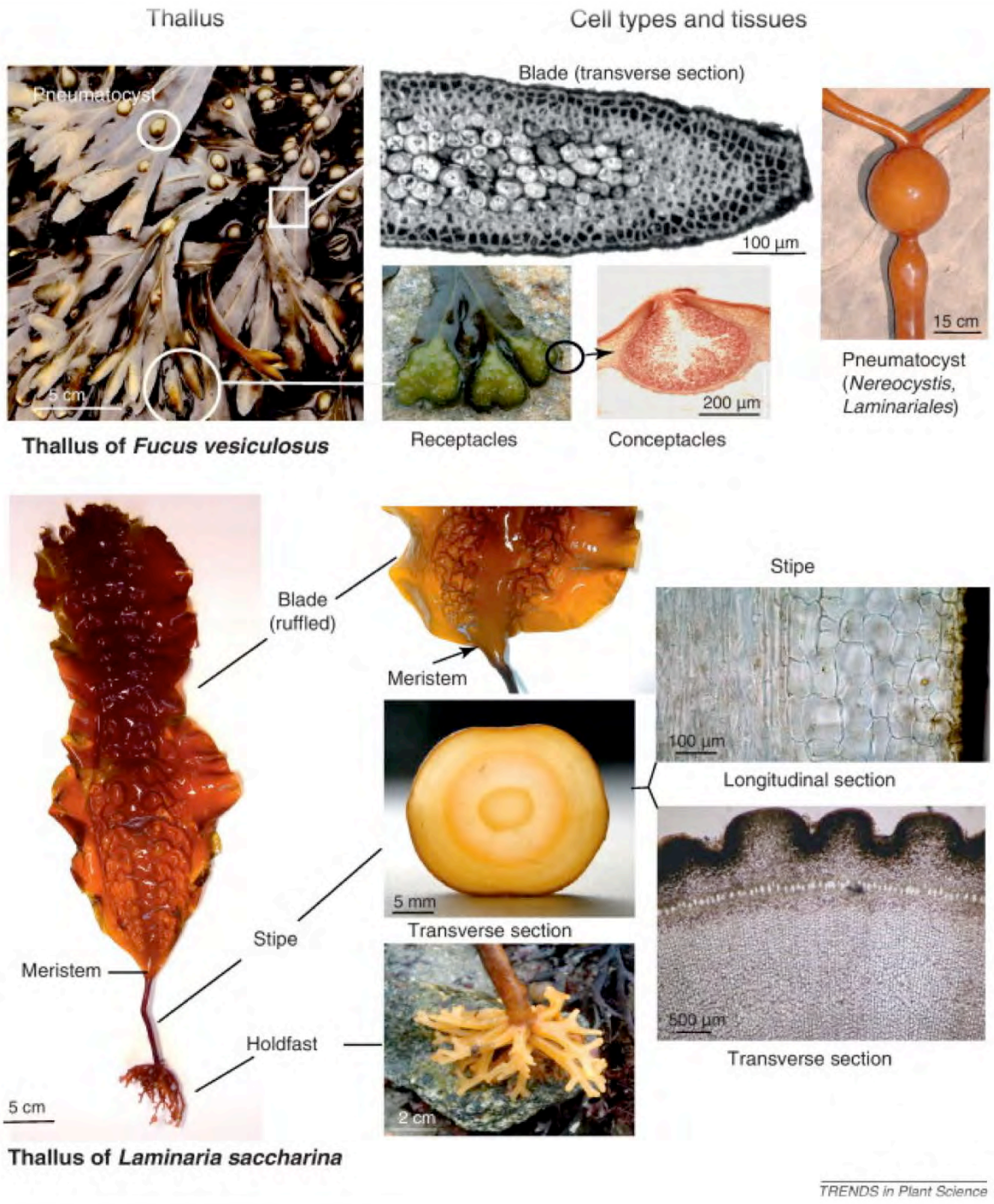
Marine algae

- Unlike terrestrial plants, marine algae have <u>NO</u> vascular material (like xylem and phloem)

Unlike terrestrial plants, marine algae have NO flowers, seeds, or pollinators

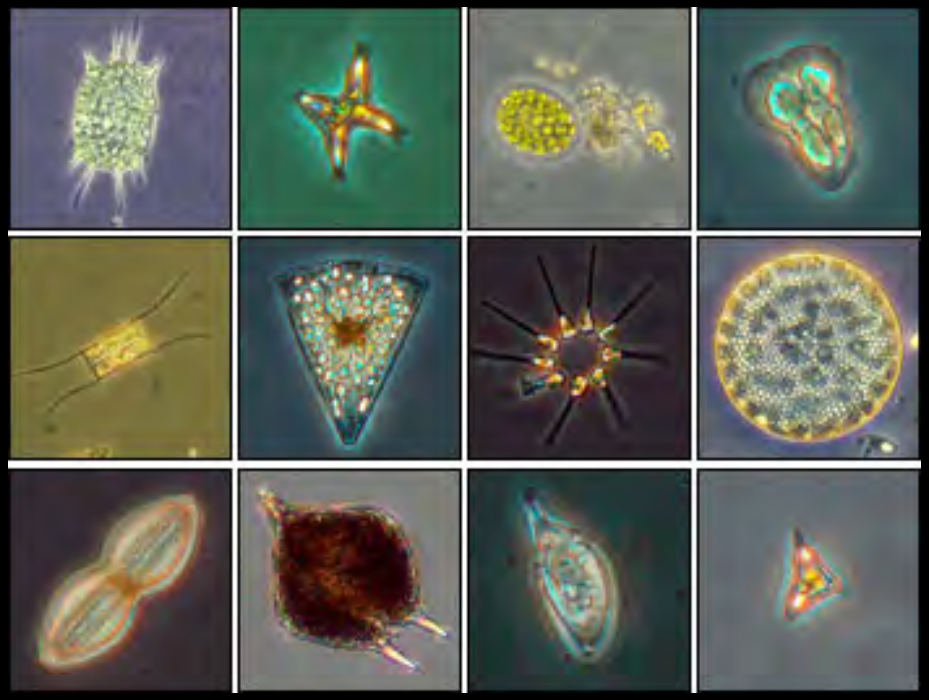


Unlike terrestrial plants, marine algae have NO high level of specialized organ differentiation



Marine algae have developed other structures specialized for living in seawater.

Range in size from tiny microscopic life to giant ocean kelps over a hundred feet long!



Algae live in the driest deserts, the coldest tundras, and all types of waters.

How to speak like a Phycologist…

- “phykos” = Greek for “alga”
- Phycology = study of algae
- Phycologist = someone who studies algae

How to speak like a Phycologist…

- **“phykos” = Greek for “alga”**
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Every Phycologist’s Pet Peeve:

- “Alga” is singular
- “Algae” is plural
- “Algaes” do not exist!!!

Three main “divisions” of marine algae:

- **Chlorophyta – green algae**
- **Rhodophyta – red algae**
- **Phaeophyceae – brown algae**



Common Chlorophyta in Hawai‘i

Cladophora/Cladophorpsis

Ulva (Limu pālahalaha)

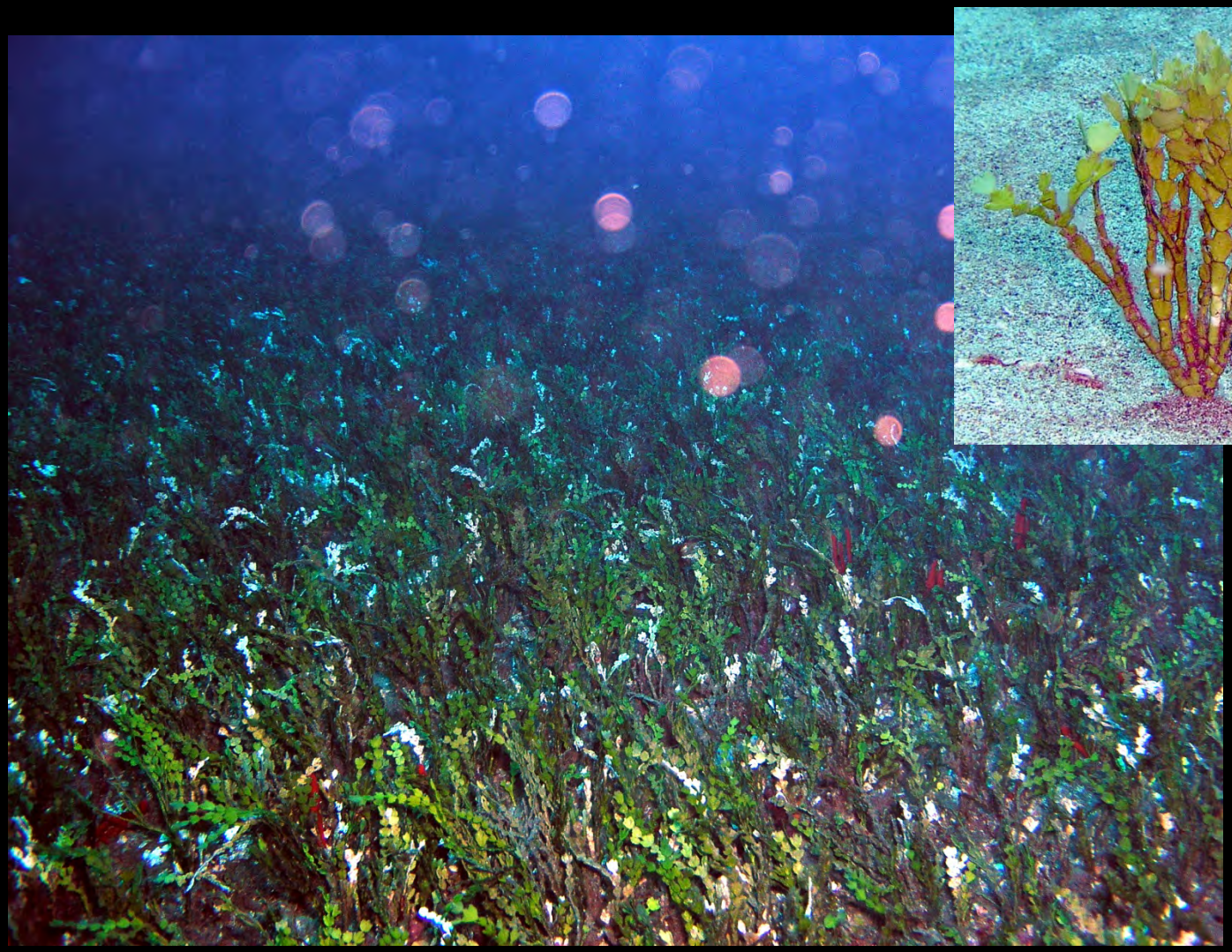
Halimeda discoidea

Codium (Limu wāwae‘iole)

Caulerpa

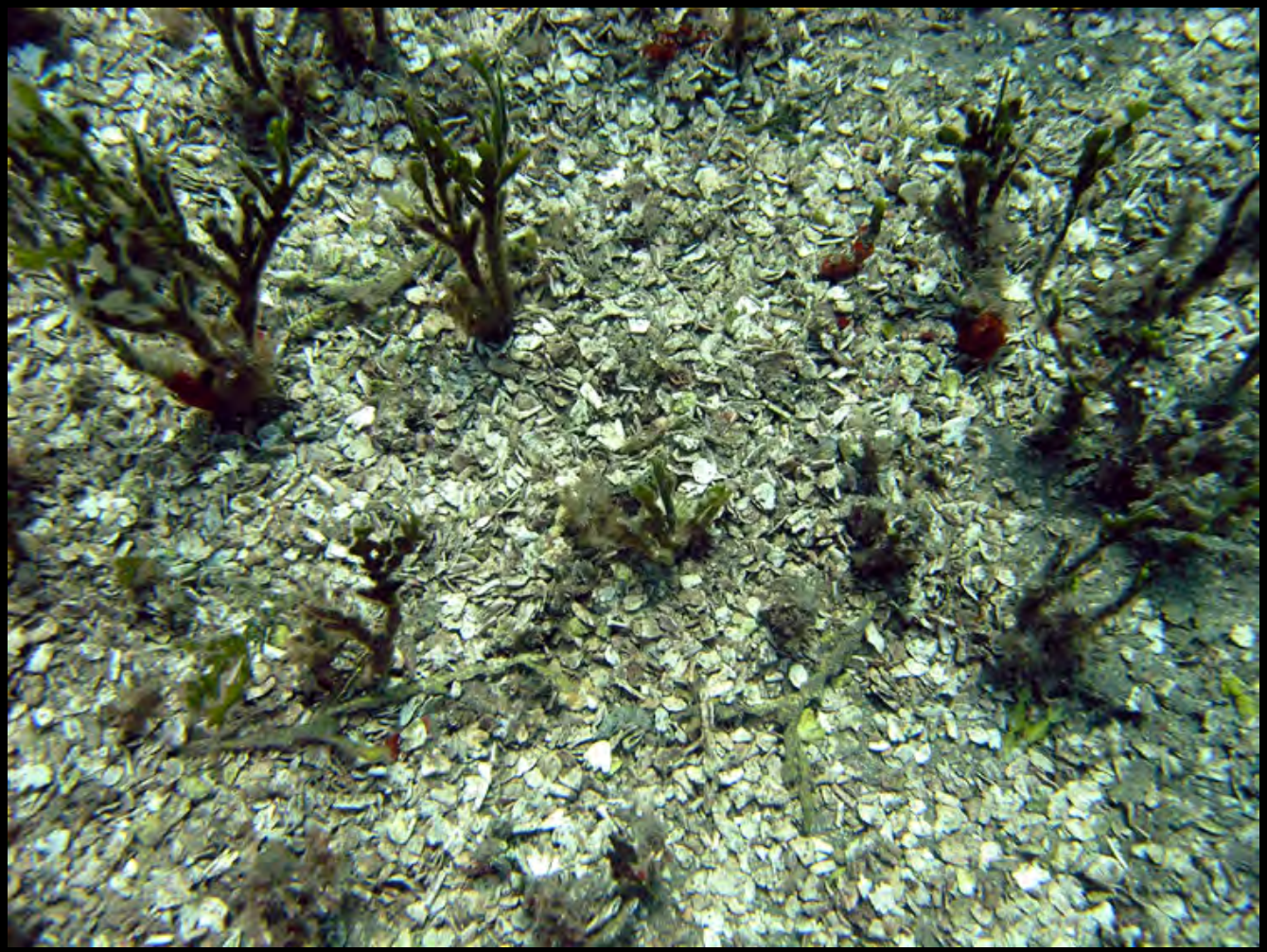
Neomeris

Halimeda meadows in Hawai‘i



***Halimeda kanaloana* meadow at 100 feet, Maui**

Halimeda makes sand when it dies, and can produce up to 40% of the sand on Hawaii's beaches.



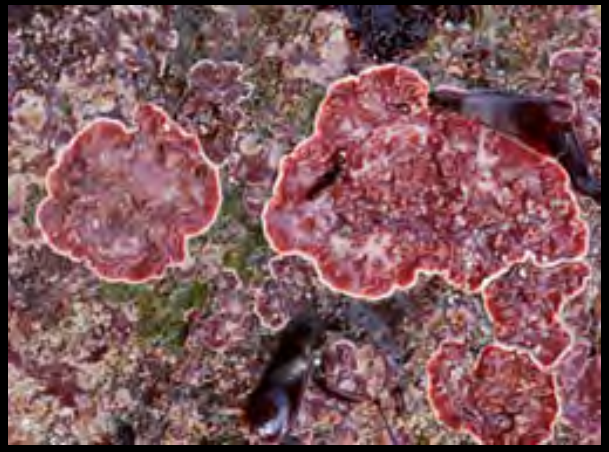
Common Rhodophyta in Hawaii

Ahnfeltiopsis (Limu ʻaki ʻaki)

Laurencia (Limu maneʻoneʻo)

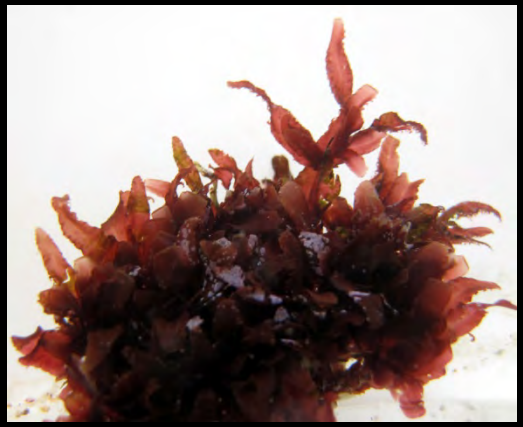
Asparagopsis (Limu kohu)

Crustose Coralline Algae



Gracilaria coronopifolia (Limu manauea)

Amansia



Protected alga:
Reproductive *Gracilaria coronopifolia* *(Limu manauea)*

- Only pick the upright branches of plants without bumps, and leave the holdfast attachment on the rock

- Leave reproductive *limu manauea* with bumps (no picking)

Common Phaeophyceae in Hawai‘i

Dictyopteris (Limu lipoa)

Dictyota

Turbinaria

Sargassum (Limu kala)

Colpomenia

Padina

Giant kelp forests are composed of different species of brown algae in cold, temperate waters.

In tropical waters, such as Hawai‘i, we have beds of *Sargassum*.

Algae, or *limu*, are culturally important in Hawai‘i

Limu kala is important culturally, such as in ho‘oponopono.

Sargassum, or *Limu kala*

https://de-de.facebook.com/video/video.php?v=10200351051608526

Marine algae can be invasive and have a negative effect on the marine environment

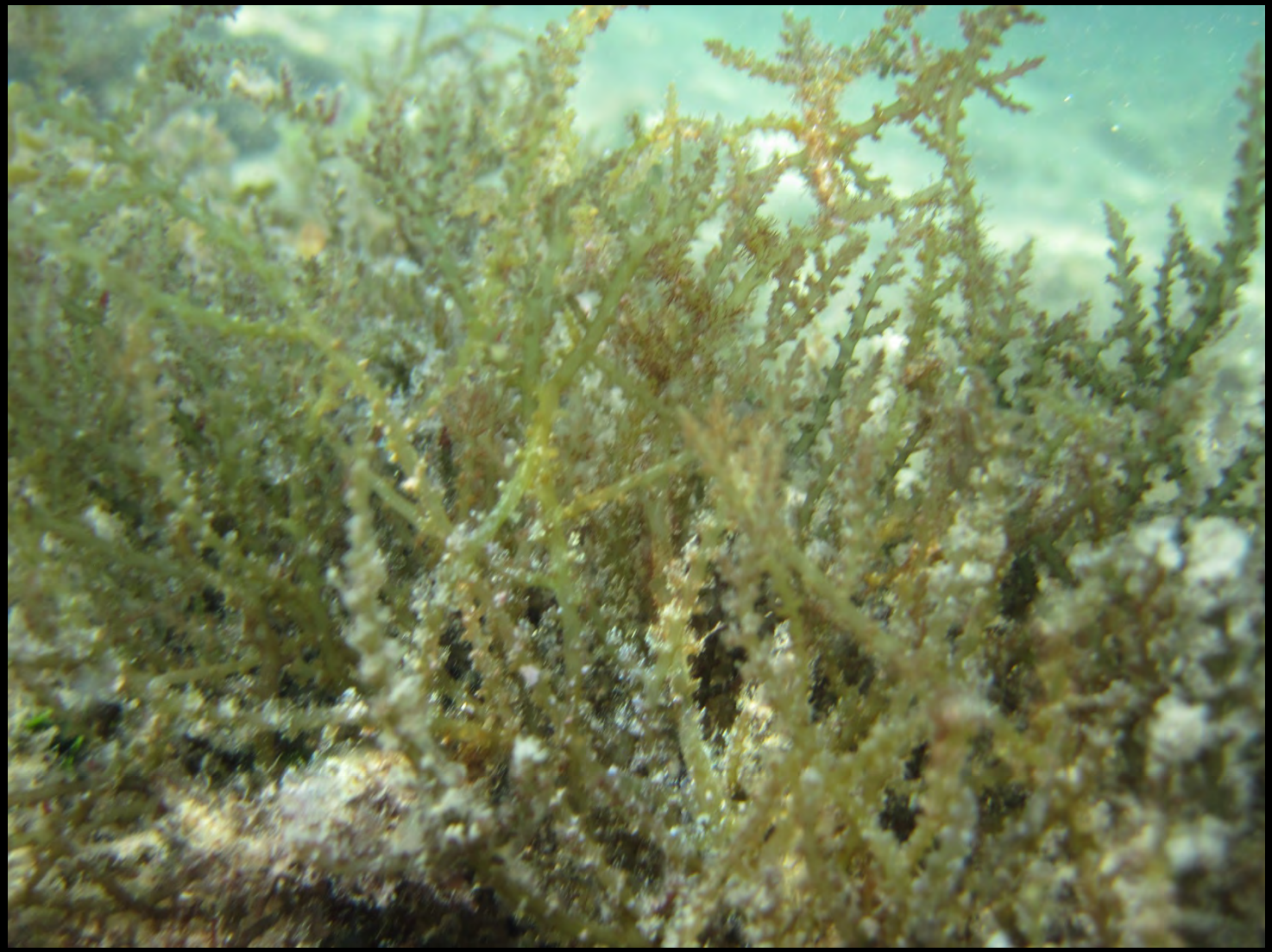
Introduced, Invasive Algae:

The red algae *Kappaphycus* and *Eucheuma* overgrowing coral in Kane‘ohe Bay

Introduced, Invasive Alga:
The red alga *Gracilaria salicornia (*Gorilla ogo)

Introduced, Invasive Alga:

The red alga *Acanthophora spicifera (*Spiny weed)



Invasive Alga:

The green alga *Avrainvillea sp. (*Leather mudweed)

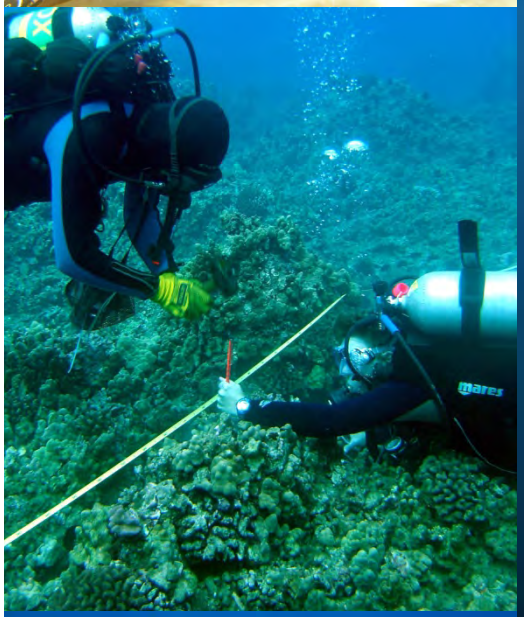
Brostoff 1981, Peyton 2009

Invasive Alga:
The red alga *Hypnea musciformis* (Hookweed)

Invasive algae stimulate Fibropapillomatosis (tumors) in Hawaiian green turtles by sequestering high levels of the amino acid arginine in eutrophied waters.

Van Houtan et al. 2014

Deep Thoughts on Mesophotic Ecosystems in Hawai‘i



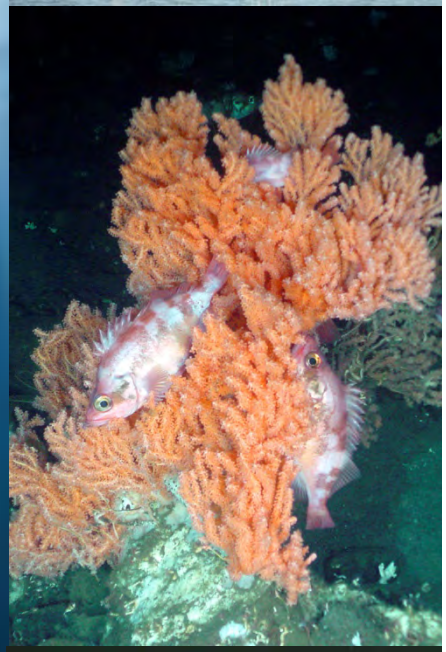
< 30 m

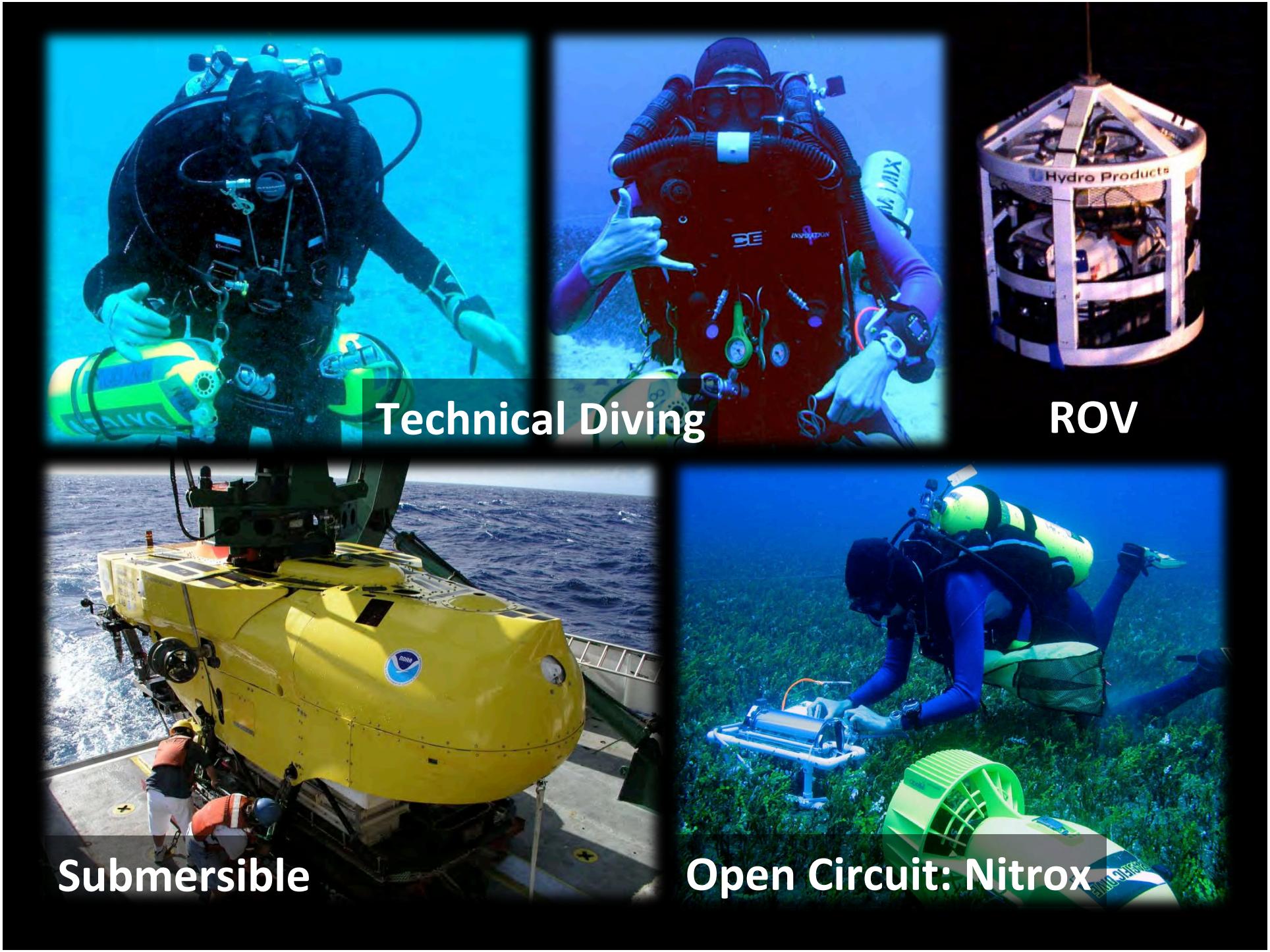
Mesophotic Ecosystem

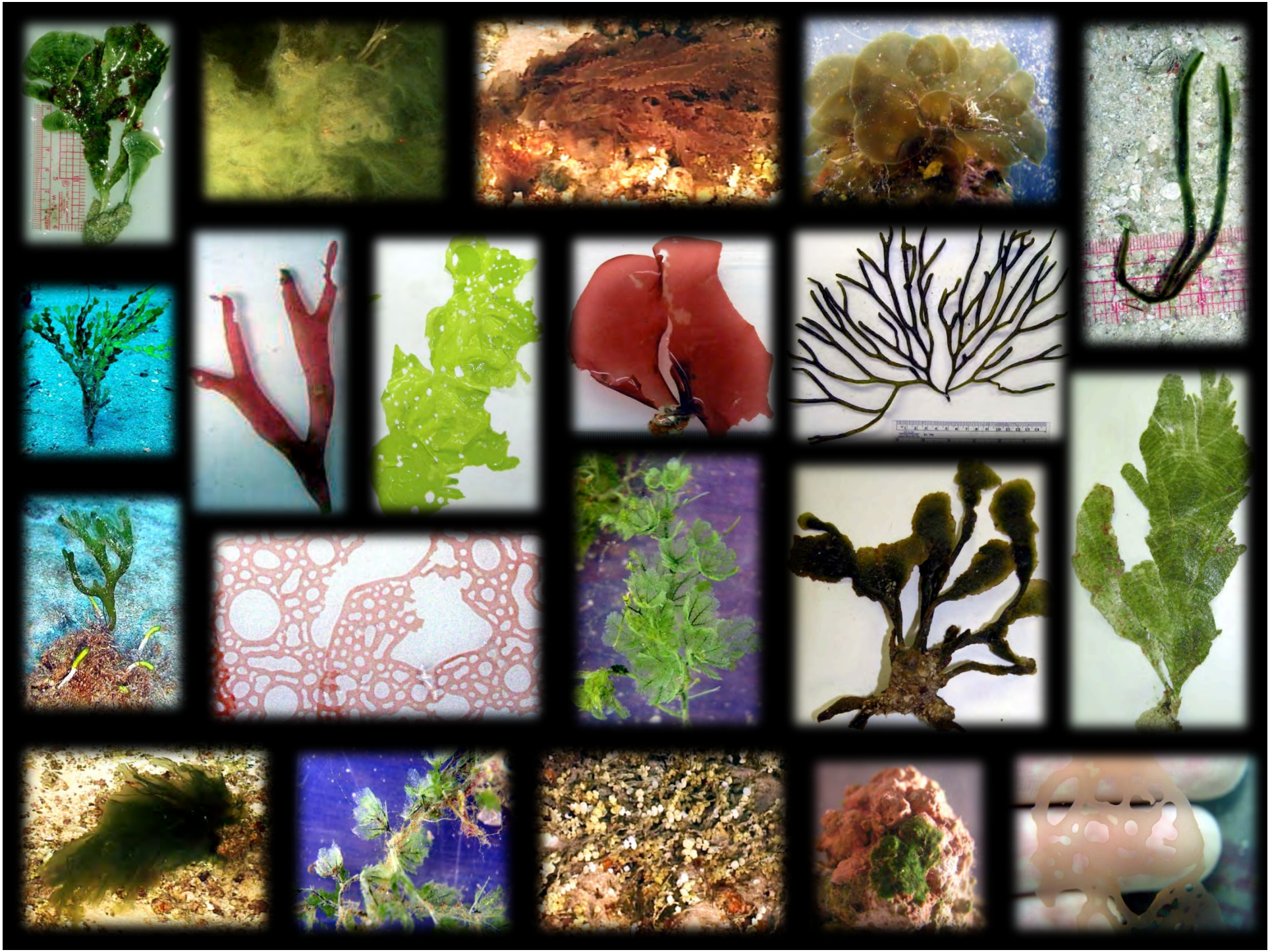
"Light dependent communities of corals and other organisms from ~30 – 150 m depths"

Hinderstein 2010

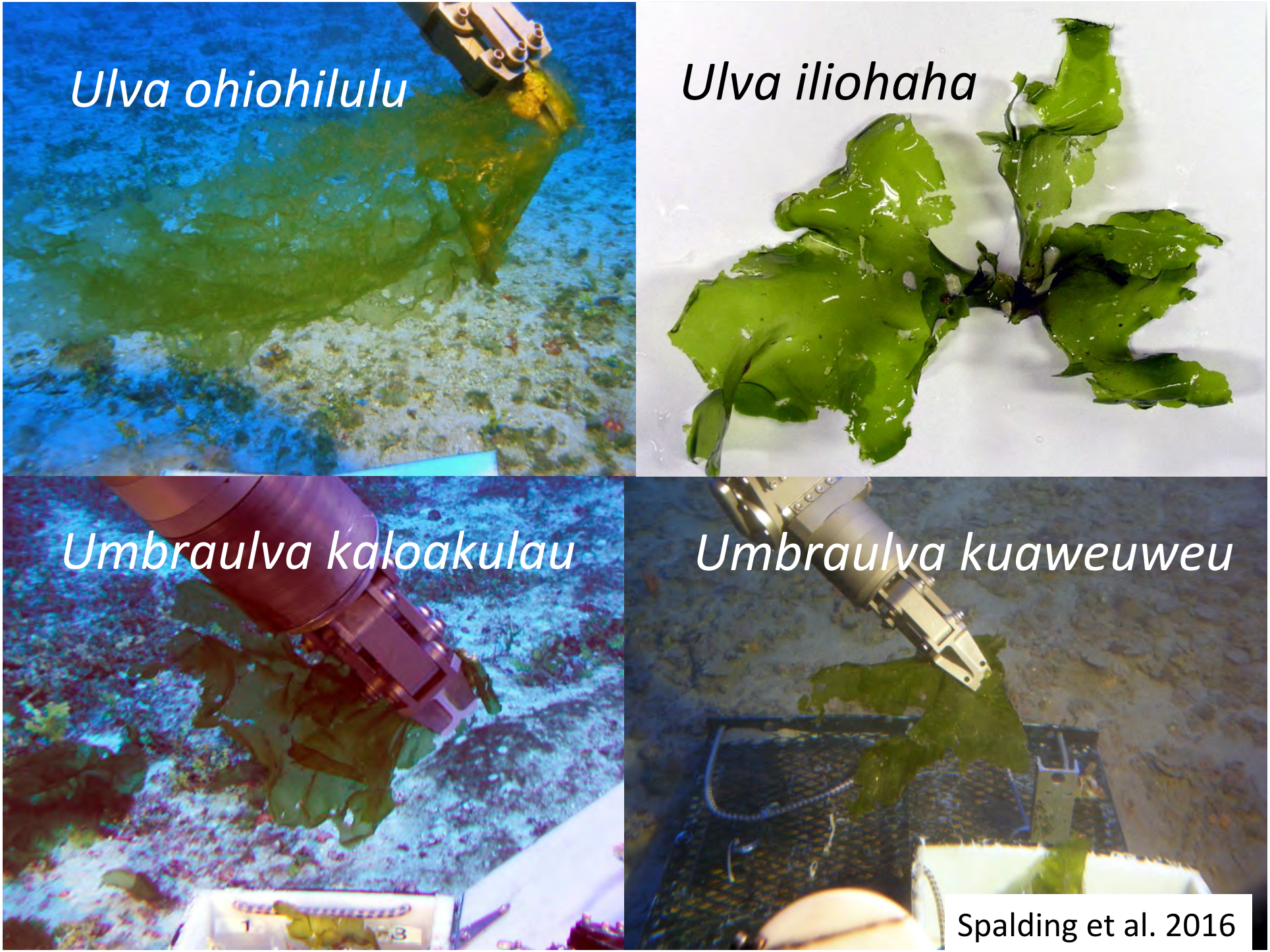
> 150 m

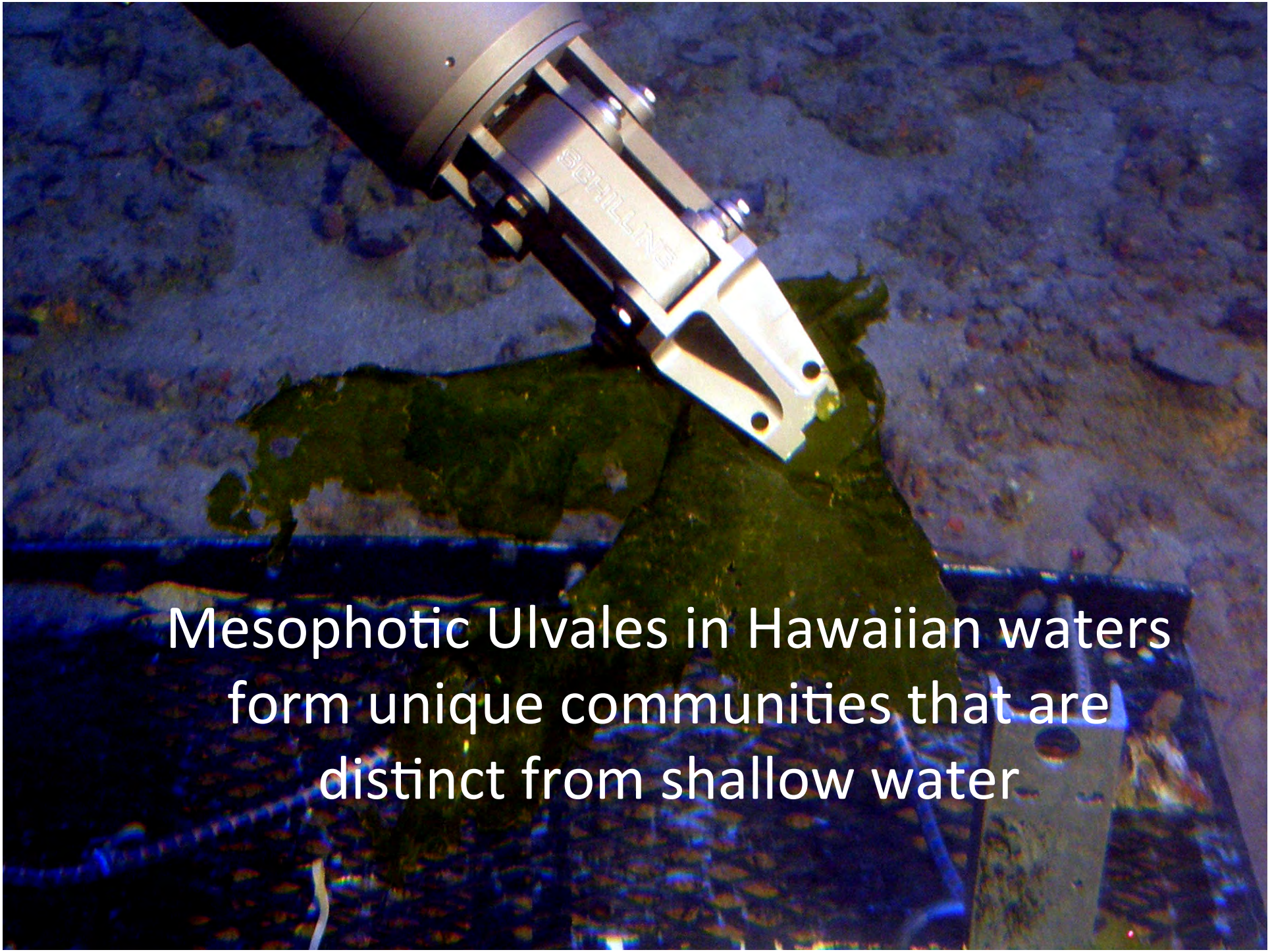



Technical Diving
ROV
Hydro Products
Submersible
Open Circuit: Nitrox




81 species of macroalgae
~40 % New Species or New Records for Hawai‘i


Ulva ohiohilulu
Ulva iliohaha
Umbraulva kaloakulau
Umbraulva kuaweuweu
Spalding et al. 2016


Mesophotic Ulvales in Hawaiian waters form unique communities that are distinct from shallow water