



PAPAHĀNAUMOKUĀKEA

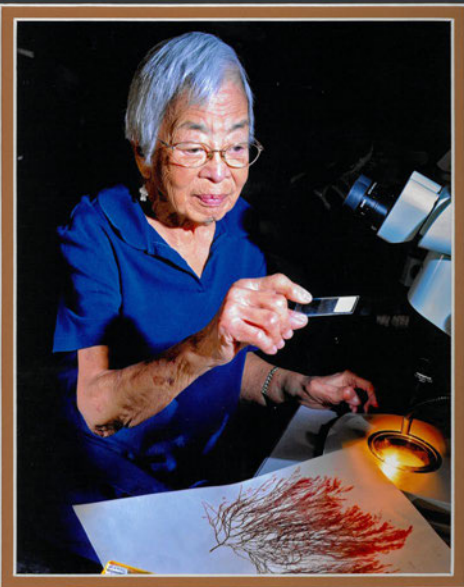
Marine National Monument & World Heritage Site

2019 PMNN Research Recap

Randy Kosaki

NWHI CRER Reserve Advisory Council Meeting
9 January 2020





Dr. Isabella "Izzie" Abbott

JUNE 20, 1919 – OCTOBER 28, 2010

"EAT LIMU, LOVE YOUR STUDENTS, BE HAPPY" – IZZIE

RESPONSIBLE FOR THE NAMING OF NOAA SHIP HĪĀLAKAI,
"EMBRACING PATHWAYS TO THE SEA",
IN LOVING MEMORY FROM A GRATEFUL CREW.

PHOTO BY J. CRITES FOR UNIV. OF HAWAII MALAMALAMA MAGAZINE.

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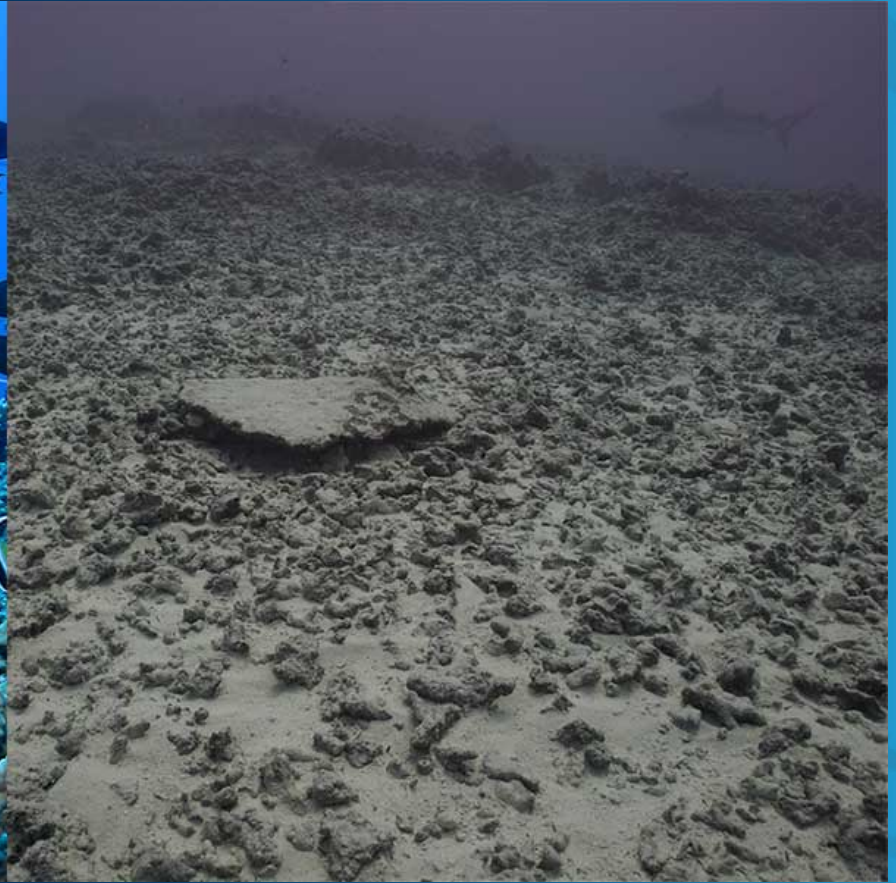
NOAA Ship *Rainier*







Hurricane Walaka Damage at FFS



Invasive Algae at Pearl & Hermes Reef

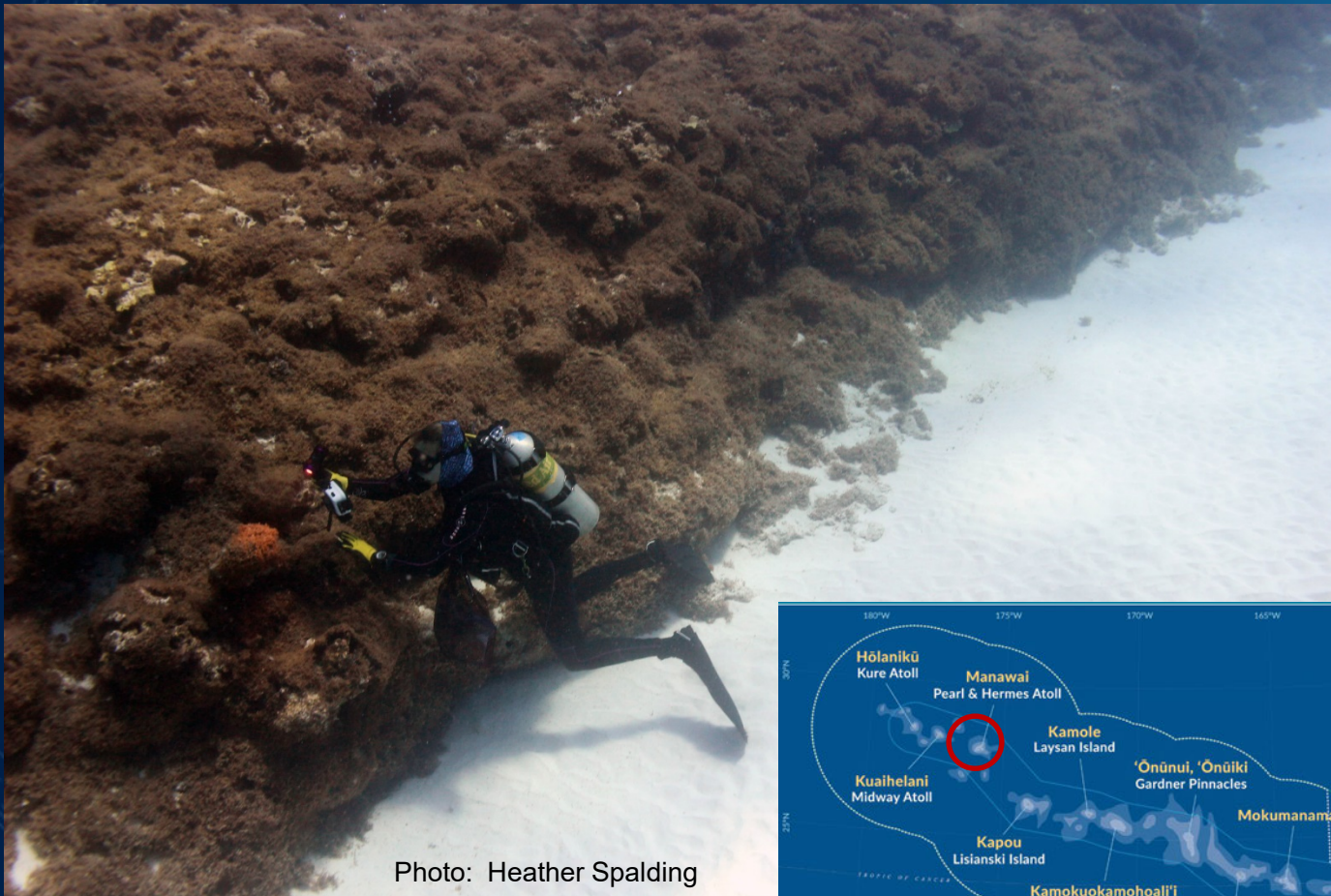
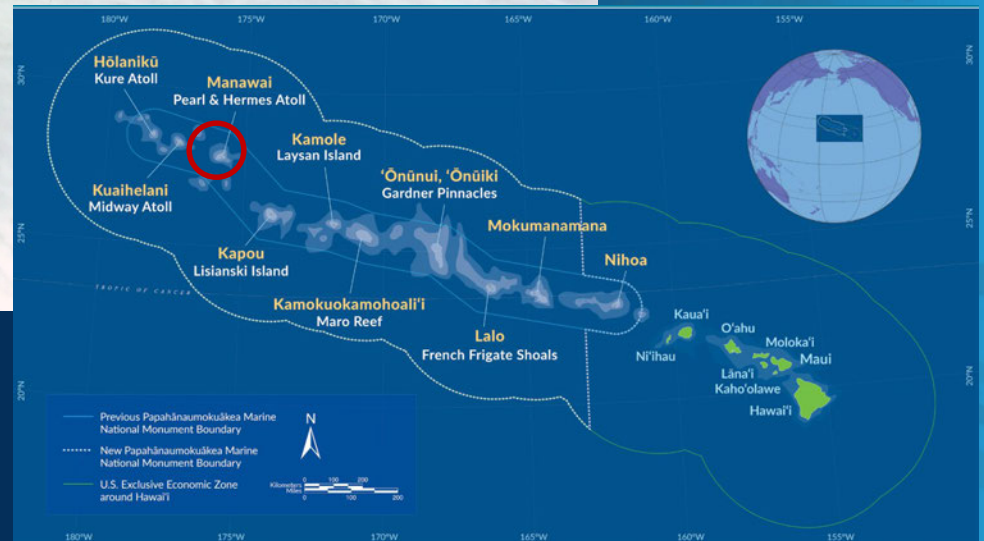


Photo: Heather Spalding



PHA Invasive Alga Working Group

- **Jon Martinez, Ph.D.** (ONMS)
- Randy Kosaki, Ph.D. (ONMS)
- **Brian Hauk, M.S.** (ONMS)
- Dan Polhemus, Ph.D. (USFWS)
- Kauaoa Fraiola, Ph.D. (USFWS)
- **Ryan Okano, Ph.D.** (DLNR)
- **Kim Peyton, Ph.D.** (DLNR)
- **Kim Fuller** (DLNR)
- **Jules Kuo, M.S.** (DLNR)
- Bernardo Vargas-Angel, Ph.D. (NMFS PIFSC)
- **Celia Smith, Ph.D.** (UH Mānoa)

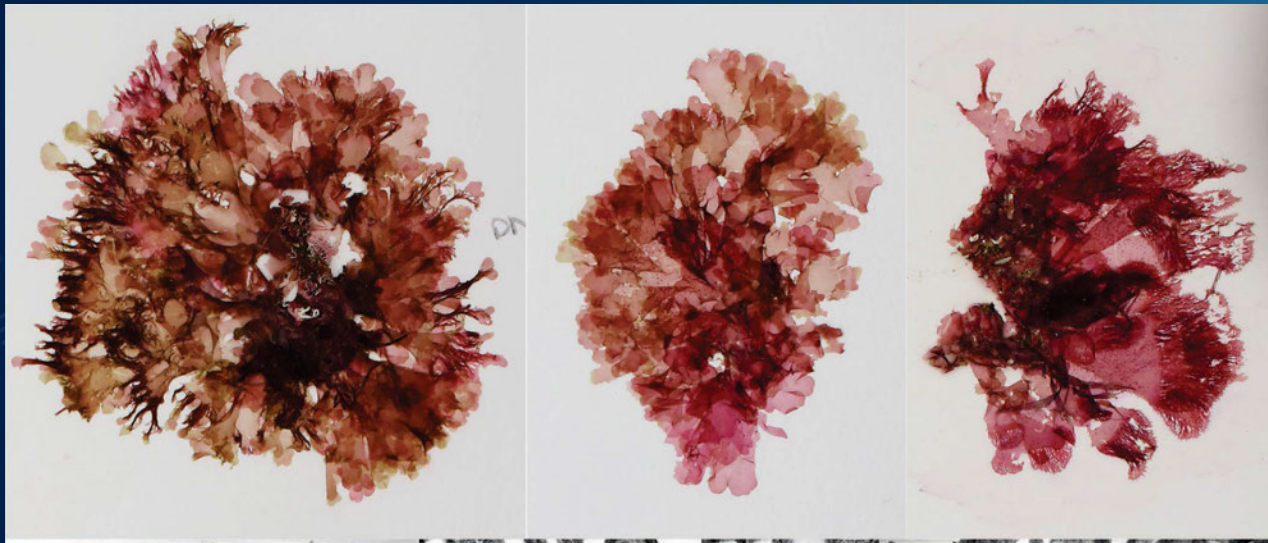
Priority Research Items and Information Gaps

- Test eDNA as a tool to detect *Chondria* at neighboring reefs and MHI
- Use remote sensing (satellite imagery) to characterize distribution
- Conduct focused surveys for *Chondria* at Midway and Kure
- Assess efficacy of BMPs (bleach disinfection, etc.)
- Conduct pilot studies of removal plots
- Conduct baseline assessments in MHI for this species
- What factors restrict its abundance in the lagoon?
- Research into possible nutrient enrichment as a causal factor (upwelling?)
- Characterize herbivory by fish and invertebrates on *Chondria*
- Follow up on historical specimens and data held by NMFS PIFSC
- Continue 3D photogrammetry to document changes in benthic cover

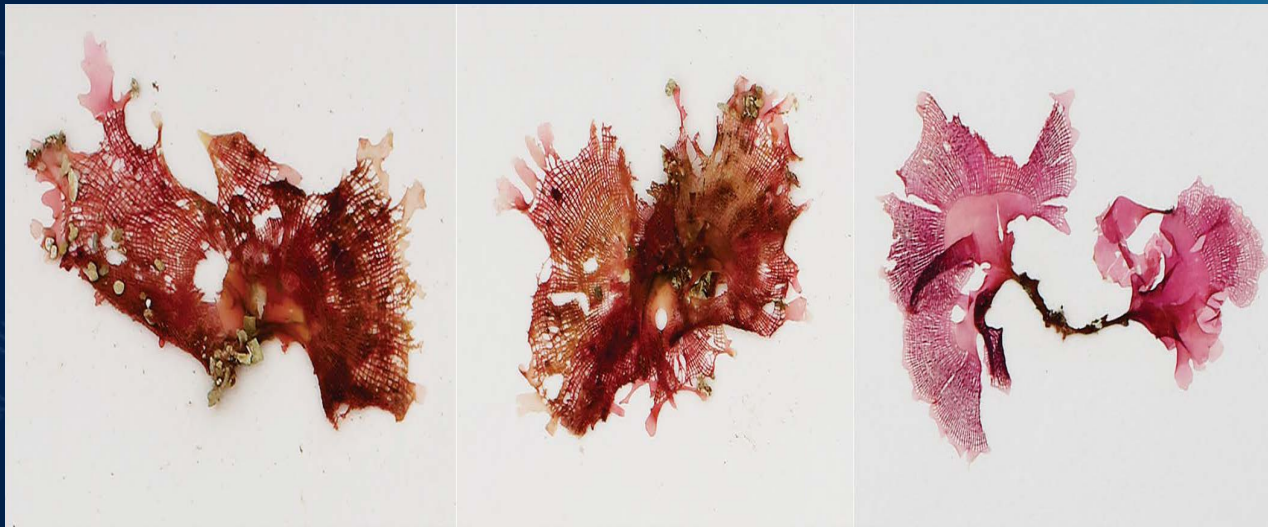
Research Currently Underway on *Chondria*

PIs: Dr. Heather Spalding (CoC), Dr. Alison Sherwood (UH)

- Primary support is \$100k of FY18 PMNM-NFWF funds
- Identification to species level
 - Good DNA extraction and sequencing
 - No “hits” on GenBank
 - Continuing with morphologically based taxonomy
- Stable Isotopes, % N
 - N15 values may indicate nutrient enrichment from local sources
 - % N values may indicate nutrient enrichment via upwelling
- Population Genetics and Ploidy (number of chromosomes in a cell)
 - 5 sites sampled intensively
 - Samples taken every 1-2 m along a 25 m transect
 - Will determine if invasion is the result of single or multiple introductions
 - Will characterize the reproductive status of the population



Martensia tsudae

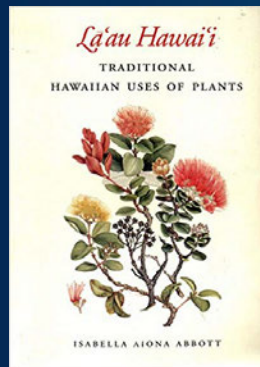
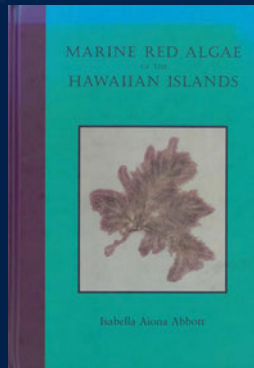
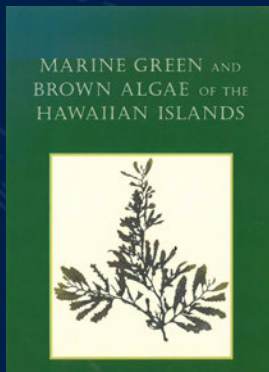


Martensia hawaiiensis



Photo: Alison Sherwood/UH

Martensia abbotiae



Sherwood AR, Lin SM, Wade RM, Spalding HL, Smith CM, Kosaki RK. 2019. Characterization of *Martensia* (*Delesseriaceae*; Rhodophyta) from shallow and mesophotic habitats in the Hawaiian Islands: description of four new species. *European Journal of Phycology*. DOI: [10.1080/09670262.2019.1668062](https://doi.org/10.1080/09670262.2019.1668062)

Photo: G. McFall/NOAA



Naming Committee:

Wally Ito

Pam Fujii

Lei Wann

Pelika Andrade

Kanoe Morishige

Solomon Kaho'ohalahala

Kalani Quiocho

Martensia lauhiekoeloa

(French Frigate Shoals, 165 ft.)

lau (noun; literally, leaf)

hie (adj.; attractive, dignified, noble)

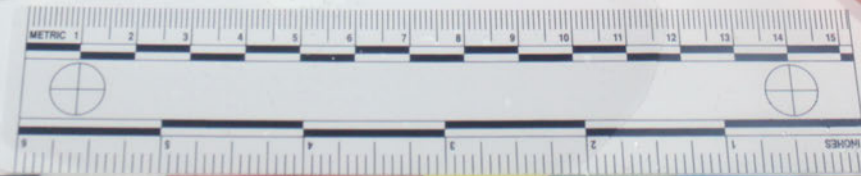
koelo (verb; literally, to stream, flutter wave; to trail behind, as the train of a *holokū* gown)

Sherwood AR, Lin SM, Wade RM, Spalding HL, Smith CM, Kosaki RK. 2019. Characterization of *Martensia* (*Delesseriaceae*; Rhodophyta) from shallow and mesophotic habitats in the Hawaiian Islands: description of four new species. European Journal of Phycology.

DOI: [10.1080/09670262.2019.1668062](https://doi.org/10.1080/09670262.2019.1668062)

Photo: D. Wagner/NOAA

Sample code: NWHI-253
Cruise: *R/V Hi'ialakai HA-14-05*
Date: Sep-15-2014 Depth: 84 m
Location: Lisianski
Latitude: 25°55.619'N
Longitude: 173°3.294'W
Collector: R. Kosaki & B. Hauk
Preservation: Frozen



Psaromenia laulamaula

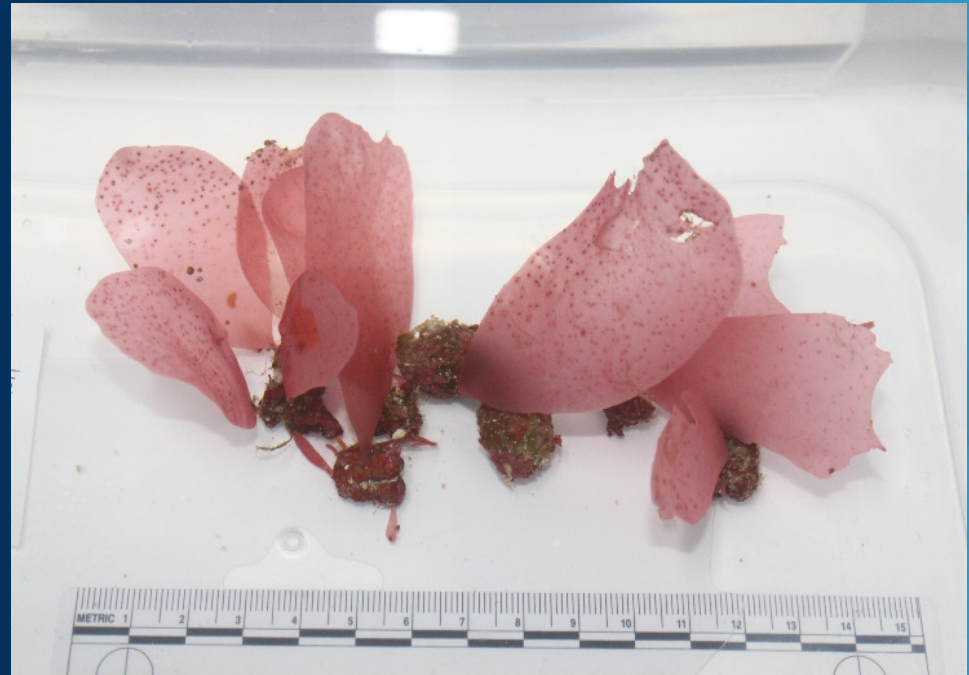
(Lisianski, 280 ft.)

manuscript in preparation



lama
(ebony tree, *Diospyros* spp.)

lau (leaf)
lama (endemic ebony tree)
'ula (red)

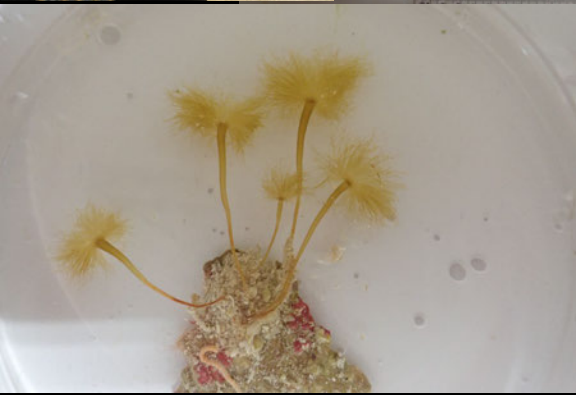
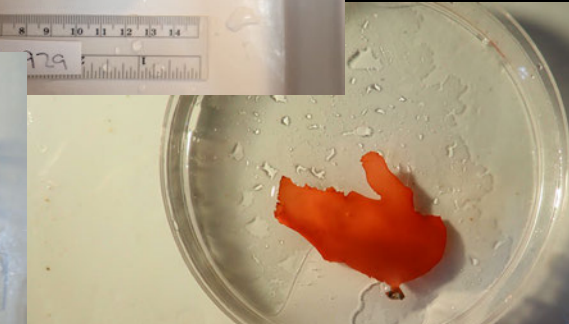


P. laulamaula



Next up for a name: *Leomenia* sp. ???

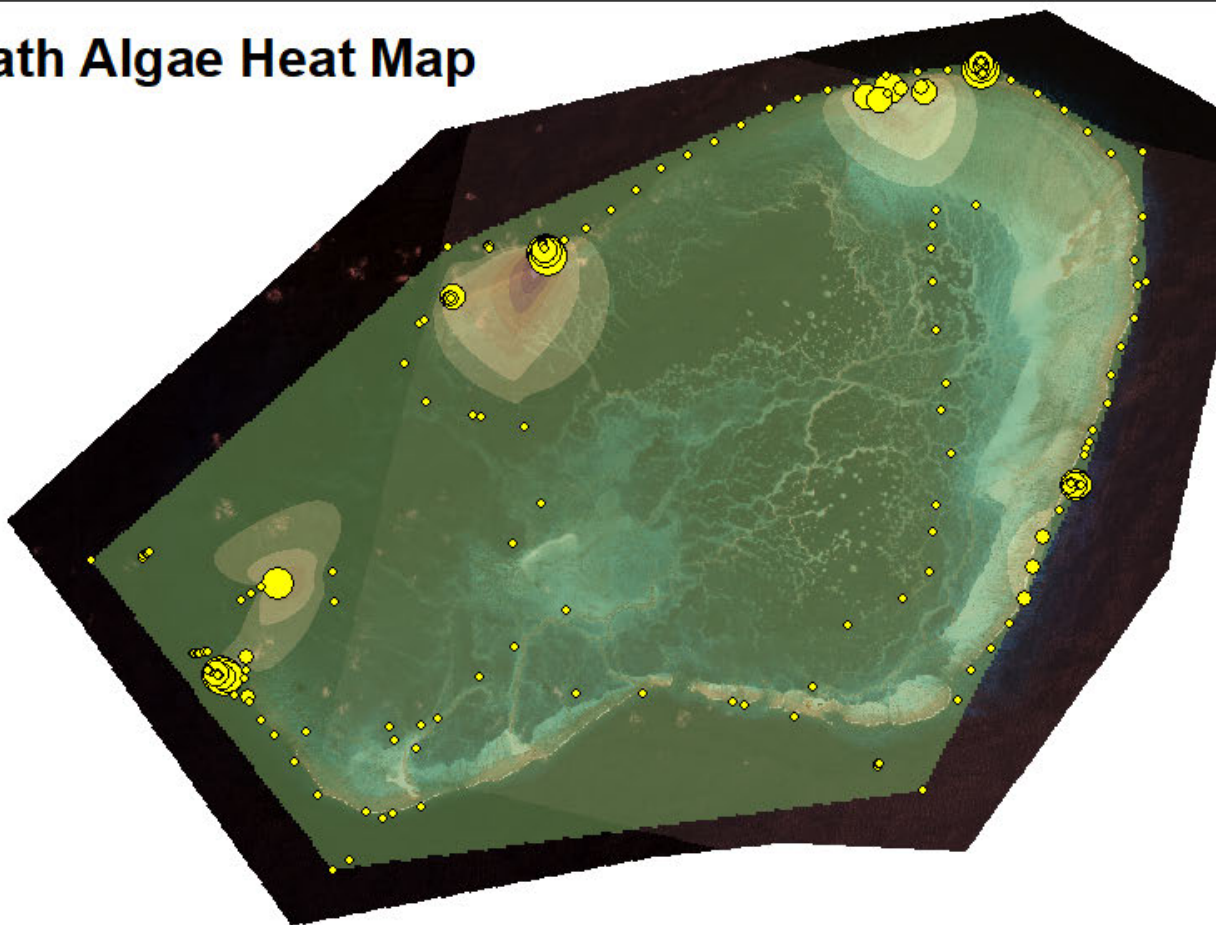
(Lisianski, 280 ft.)





Happy Holidays from PMNM!

Death Algae Heat Map



Percent Cover

- ◆ 0 - 7
- 8 - 20
- 21 - 35
- 36 - 45
- 46 - 95

