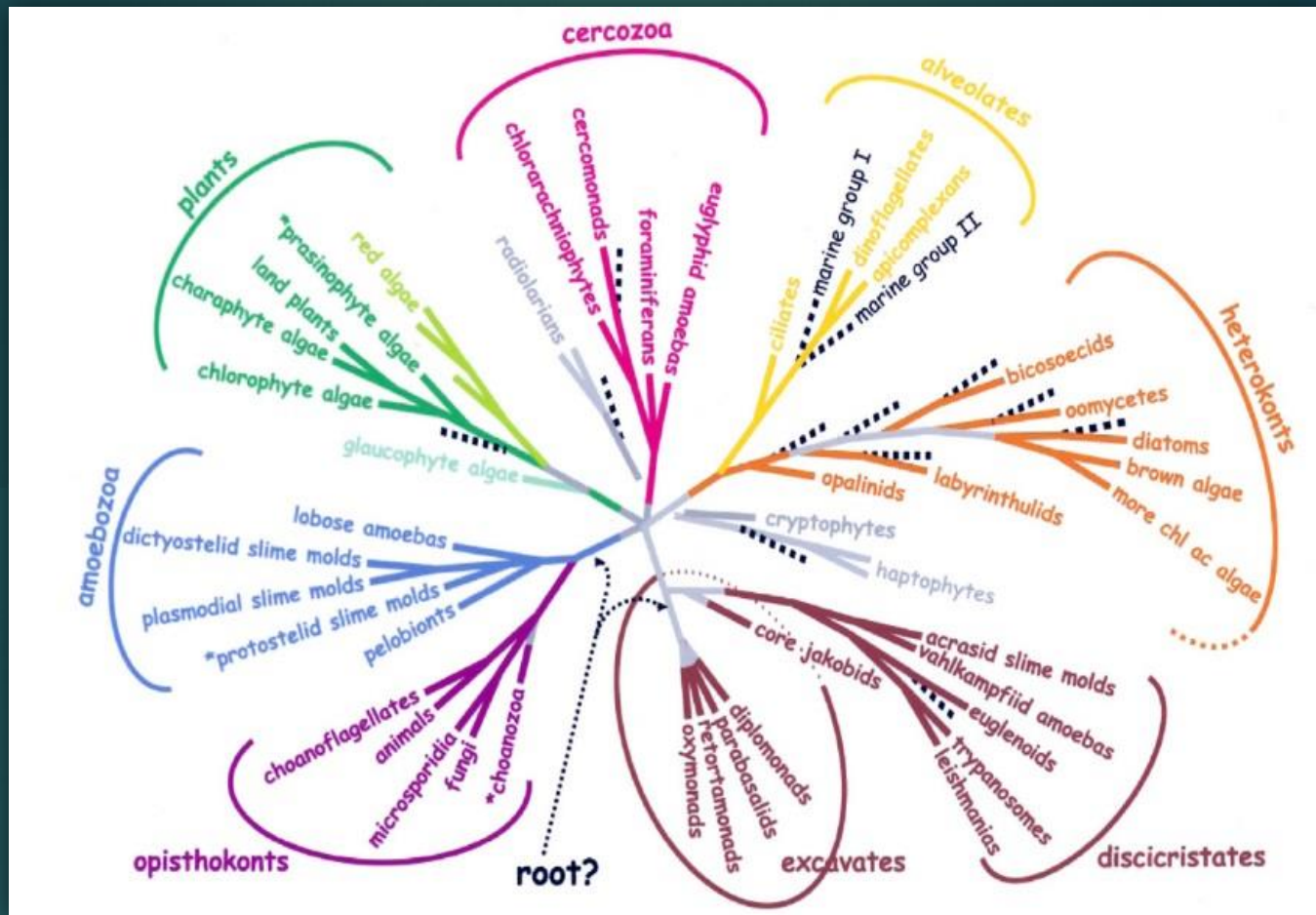


The Macroalgal Herbarium Consortium

ACCESSING 150 YEARS OF
SPECIMEN DATA TO
UNDERSTAND CHANGES IN THE
MARINE/AQUATIC
ENVIRONMENT



What are Macroalgae?



Eukaryota Tree of Life (Bauldauf 2003)

What are Macroalgae?

Rhodophyta (Red Algae) - 6,300 species in 10 orders

Chlorophyta (Green Algae) - 4,300 species in 15 orders

Charophyta - 3,500 species in 8 orders

Phaeophyta (Brown Algae) - 2,000 species in 18 orders



Why Are They Important?

- ▶ Foundation of aquatic ecosystems – provide food, shelter and substrate for other organisms
- ▶ Maintain nutrient balance in aquatic ecosystem and produce oxygen
- ▶ \$7.4 billion industry as human food, phycocolloids, pharmaceuticals
- ▶ Sensitive indicator of environmental changes in aquatic ecosystems



How Many Specimens Are There in US Herbaria?



- ▶ 1.2 Million in collections ranging from 100 specimens to 200,000.
- ▶ Project goal is to digitize (image, database, georeference) all of them.

Where Are The Specimens?



What Information Do They Contain?

- ▶ Label Information
 - ▶ Taxonomic determinations and annotations, collector(s), collection date, locality, habitat, depth, associated species, etc.
- ▶ Specimen
 - ▶ Gross, morphological characteristics, reproductive status, general condition.
 - ▶ DNA
 - ▶ Cellular characteristics



How Are They Being Digitized?

Algae 4 - Matt.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

Clipboard Font Alignment Number Styles Cells Editing

A575 NHA-568704

	A	B	C	D	E	F	G	H	I	J	K
	dbpk	accessionNumber	genus	specific epithet	taxonRank	infraspecific	country	stateProvince	county	recordEnteredBy	
24	NHA-566808	15946	Enteromorpha	intestinalis			United States	New Hampshire	Rockingham	Matt	
25	NHA-566809	16026	Enteromorpha	intestinalis			United States	New Hampshire	Rockingham	Matt	
26	NHA-566810	15996	Enteromorpha	intestinalis			United States	New Hampshire	Rockingham	Matt	
27	NHA-566811	15985	Enteromorpha	intestinalis			United States	New Hampshire	Rockingham	Matt	
28	NHA-566812	16103	Enteromorpha					New Hampshire	Rockingham	Matt	
29	NHA-566813	16033	Enteromorpha					New Hampshire	Rockingham	Matt	
30	NHA-566814	16068	Enteromorpha					New Hampshire	Rockingham	Matt	
31	NHA-566815	16053	Enteromorpha					New Hampshire	Rockingham	Matt	
32	NHA-566816	9745	Enteromorpha					New Hampshire	Rockingham	Matt	
33	NHA-566817	9744	Enteromorpha					New Hampshire	Rockingham	Matt	
34	NHA-566818	9747	Enteromorpha					New Hampshire	Rockingham	Matt	
35	NHA-566819		Enteromorpha					New Hampshire	Strafford	Matt	
36	NHA-566820		Enteromorpha					New Hampshire	Strafford	Matt	
37	NHA-566821	5534	Enteromorpha					New Hampshire	Strafford	Matt	
38	NHA-566822	3270	Enteromorpha					New Hampshire	Strafford	Matt	
39	NHA-566823		Enteromorpha					New Hampshire	Strafford	Matt	
40	NHA-566824	12149	Enteromorpha					New Hampshire	Strafford	Matt	
41	NHA-566825	11330	Enteromorpha					New Hampshire	Strafford	Matt	
42	NHA-566826	6832	Enteromorpha					New Hampshire	Strafford	Matt	
43	NHA-566827	12310	Enteromorpha	intestinalis			United States	New Hampshire	Strafford	Matt	
44	NHA-566828	12150	Enteromorpha	intestinalis			United States	New Hampshire	Strafford	Matt	
45	NHA-566829	15234	Enteromorpha	intestinalis			United States	New Hampshire	Strafford	Matt	
46	NHA-566830	15236	Enteromorpha	intestinalis			United States	New Hampshire	Strafford	Matt	

University of New Hampshire
NHA-575498

#60737

PLANTS OF NEW ENGLAND
(Maine)

Monostroma grevillei (Thuret) Wittrock

Potts Point, South Harpswell,
Maine

Feb. 9. 1996 A. Mathieson

Hodgdon Herbarium
UNIVERSITY OF NEW HAMPSHIRE

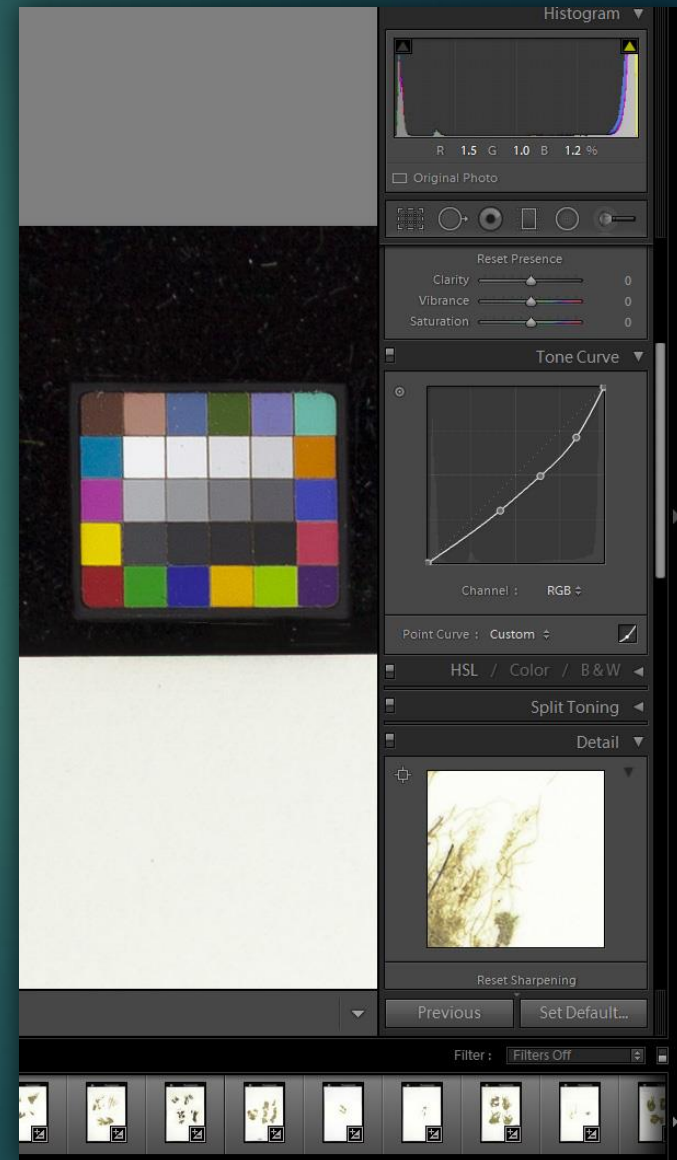
Sheet1 Sheet2 Sheet3

READY 120%

How Are They Being Digitized?

► Imaging

- Lightbox/copystand
- 21 to 36 megapixel camera
- Camera Control Software
- Adobe Lightroom (white balance, tone curve adjustment, jpg & dng export)



How Are They Being Digitized?

Macroalgal Herbarium Po x Macroalgal Herbarium Po x

← → ↻ macroalgae.org/portal/collections/editor/occurrenceeditor.php

University of New Hampshire (NHA)

Home >> Collection Management >> Editor

< << | 1 of 197 | >> >

Occurrence Data

Determination History

Images

Genetic Links

Admin

Collector Info

Catalog Number ? Other Numbers ? Collector ? Number ? Date ?

NHA-575360 56174 A. C. Mathieson 1995-04-01

Dupes? ☐ Auto search

Associated Collectors ? Verbatim Date ?

Latest Identification

Scientific Name ? Author ?

Monostroma grevillei

ID Qualifier ? Family ?

Identified By ? Date Identified ?

Locality

Country	State/Province	County	Municipality
United States	Maine	Hancock	

Locality

Lamoine State Park, Eastern Bay, Lamoine, Maine

☐ Locality Security

Latitude Longitude Uncertainty ? Datum ? Verbatim Coordinates

44.453513 -68.301485 504 Tools <<

Elevation in Meters Verbatim Elevation

~ <<

Georeferenced By Georeference Sources ? Georeference Remarks

hmt georef batch tool 2013-

Georeference Protocol ? Georef Verification Status ? footprint (polygon)

reviewed - high confidence

Misc

Label Processing

156174

PLANTS OF NEW ENGLAND
(Maine)

Monostroma grevillei (Thuret) Wittrock

Lamoine State Park, Eastern Bay,
Lamoine, Maine

April 1, 1995 A. Mathieson

Hodgdon Herbarium
UNIVERSITY OF NEW HAMPSHIRE

OCR Image Options

☐ OCR whole image

☐ OCR w/ analysis

Image 1 of 1

Lamoine State Park, Eastern Bay,
Lamoine, Maine

April 1, 1995 A. Mathieson

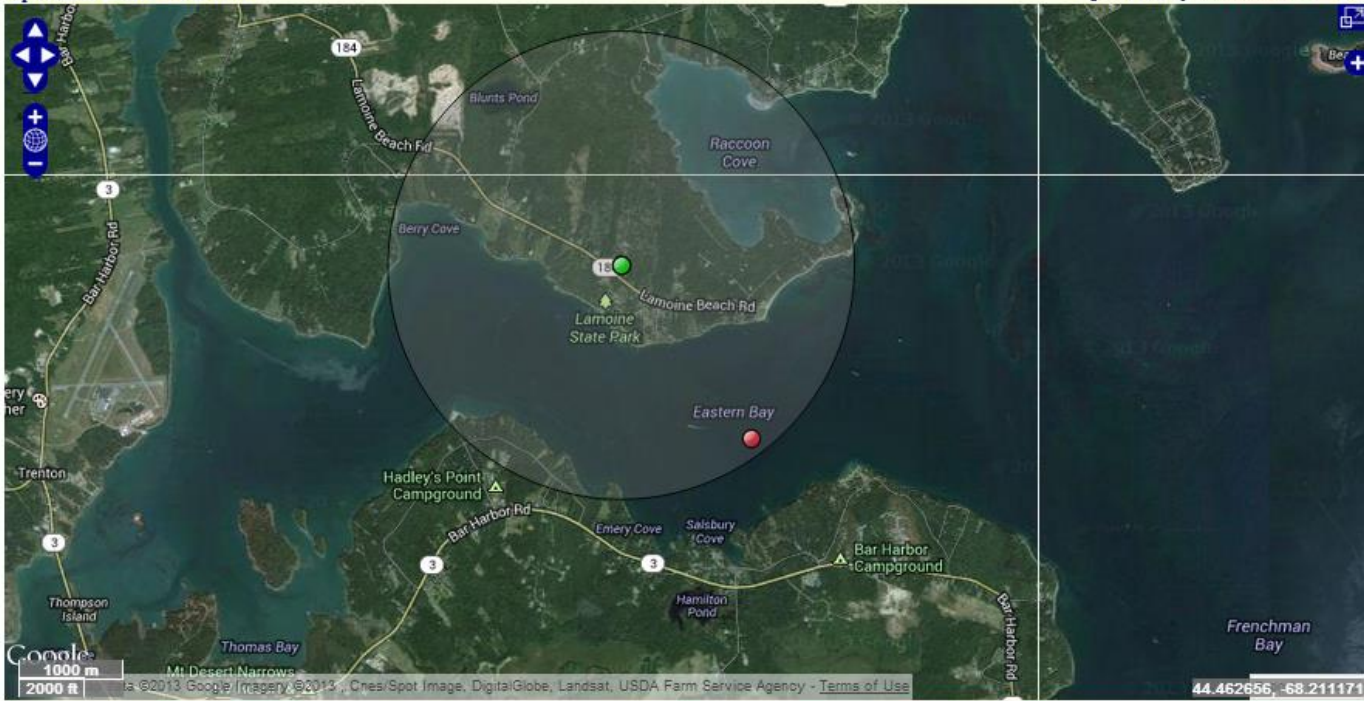
How Are They Being Digitized?

GEOLocate Tool - Google Chrome

macroalgae.org/portal/collections/georef/geolocate.php?country=United%20States&state=Maine&county=Hancock&locality=Lamoine%20Stat

2 possible locations found.

powered by: GEOLocate



Google 1000 m 2000 ft

© 2013 Google, Imagery © 2013, Cnes/Spot Image, DigitalGlobe, Landsat, USDA Farm Service Agency - Terms of Use

44.462856, -68.211171

Workbench 2 possible locations found

Georeference Options Draw polygon Place marker Measure

Locality String: Lamoine State Park, Eastern Bay, Lamoine, Maine

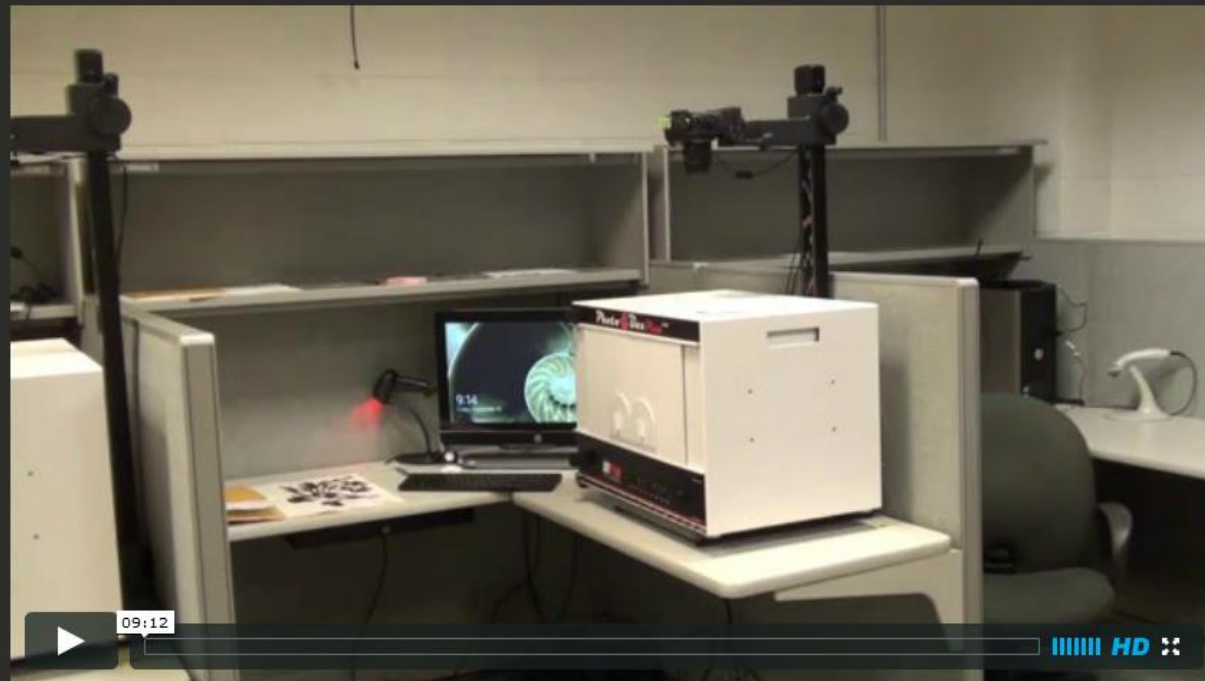
Country: UNITED STATES OF AMERICA latitude: 44.45722 longitude: -68.29861 uncertainty: 2289 m error polygon

State: Maine 44.45722 -68.29861 2289 Unavailable

County: Hancock

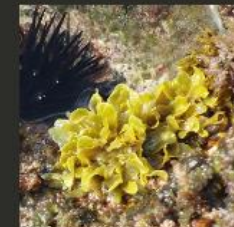
Save To Your Application

How are digitizers being trained?



Imaging Station Setup

Demonstrates how to assemble the Imaging Stations for the Macroalgal Digitization Project. This is a rough-cut - titles and narration will be added later.



Clip Info / Download

How Is The Data Being Disseminated?

- ▶ Macroalgae.org specimen data portal (Symbiota)

The screenshot shows a web browser window with the address bar displaying `macroalgae.org/portal/collections/misc/collprofiles.php?collid=1`. The page features a large banner image of a rocky coastline with the title "Macroalgal Herbarium Portal" overlaid. On the left, a sidebar contains navigation links: "Macroalgal Herbarium Portal Homepage", "Search Collections", "Flora Projects", "Dynamic Checklist", "Dynamic Key", "Image Library", "Welcome Chris Neefus!", "My Profile", "Logout", and "Sitemap". The main content area is titled "University of New Hampshire (NHA)" and provides detailed information about the herbarium's history, specialty, contact, and management. It also includes a "Collection Statistics" section with a bulleted list of specimen counts and an "Extra Statistics" section with links to show family and geographic distributions.

Macroalgal Herbarium Portal

Macroalgal Herbarium Portal Homepage

- [Search Collections](#)
- [Flora Projects](#)
- [Dynamic Checklist](#)
- [Dynamic Key](#)
- [Image Library](#)

Welcome Chris Neefus!

- [My Profile](#)
- [Logout](#)
- [Sitemap](#)

University of New Hampshire (NHA)

Historical ties with Dartmouth College (HNH) when the Agricultural College shared facilities. NHA founded with a nucleus of 1500 HNH specimens.

Specialty: Vascular plants and marine algae of New Hampshire; Maine; coastal New England; Newfoundland; Bay of Fundy; Crimea, Siberia; aquatic flora of northeastern U.S., Costa Rica, and Bolivia. **Date Founded:** 1892

Contact: Arthur Mathieson, Curator of Marine Algae (arthur<at>cisunix.unh.edu)

Home Page: <http://www.unh.edu/herbarium/>

Management: Data snapshot of central database

Last Update: 15 November 2013

Global Unique Identifier: a881deae-b462-48a6-9d02-0234bfc80a3c

Collection Statistics

- 13321 specimens
- 1% georeferenced
- 59% with images
- 0 families
- 0 genera
- 0 species

Extra Statistics

- [Show Family Distribution](#)
- [Show Geographic Distribution](#)

[Full Specimen List](#)

What Are The Broader Impacts of the Project?

- ▶ Undergraduate and Graduate Student Participation
 - ▶ Digitization: Imaging, Transcription, Georeferencing
 - ▶ Research Opportunities
- ▶ Internships at NY Botanical Garden and Field Museum
 - ▶ Under-represented groups in STEM
- ▶ Exhibits and Programs
 - ▶ Field Museum
(650,000 visitors)
 - ▶ Bishop Museum
(450,000 visitors)



The Macroalgae Consortium

The Bishop Museum (BISH)
Brooklyn Botanic Garden (BKL)
Brown University (BRU)
Butler University (BUT)
Duke University (DUKE)
Field Museum of Natural History (F)
Florida Museum of Nat. History (FLAS)
Harvard University (FH)
Hopkins Marine Station (GMS) The
Humboldt State University (HSC)
Louisiana State University (LSU)
Miami University (MU)
Michigan State University (MSC)
Mote Marine Laboratory (MOT)
Nat. Tropical Botanical Garden (PTGB)
New York Botanical Garden (NY)
New York State Museum (NYS)
Oregon State University (OSC)
Rutgers University (CHRB)
San Diego Nat. Hist. Museum (SD)
Texas A&M University (TAES)
Univ of North Carolina Wilmington (WNC)
Univ. of Alaska Museum (ALA)
Univ. of Texas Marine Science Institute

University of Alabama (UNA)
University of Alaska SE (ALAJ)
University of California (DAV)
University of California (IRVC)
University of California (UC)
University of California (UCSB)
University of Connecticut (CONN)
University of Guam Marine Lab (GUAM)
University of Hawaii (HAW)
University of Massachusetts (MASS)
University of Michigan (MICH)
University of New Hampshire (NHA)
University of North Carolina (NCU)
University of Rhode Island (KIRI)
University of South Carolina (USCH)
University of South Florida (USF)
University of Texas Pan Am. (PAUH)
University of Utah (UT)
University of Vermont (VT)
University of Washington (WTU)
West Virginia University (WVA)
Yale University (YU)
Youngstown State University (YUO)

