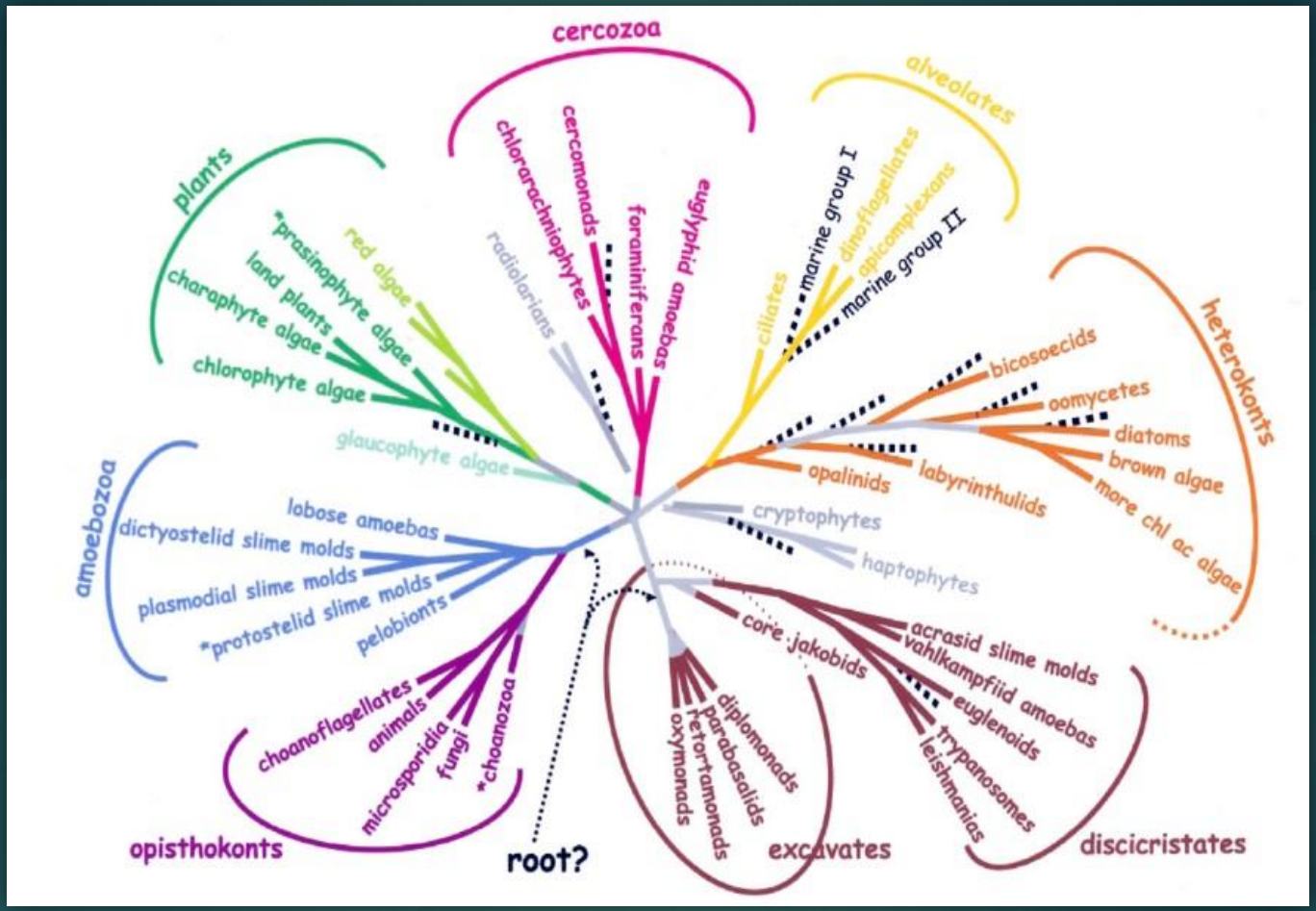
The Macroalgal Herbarium Consortium

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 characterisics

How Are They Being Digitized?

Algae 4 - Matt.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

Sign in

Cut Copy Format Painter Paste Clipboard

Calibri 11 Font

Wrap Text Merge & Center Alignment

General Number

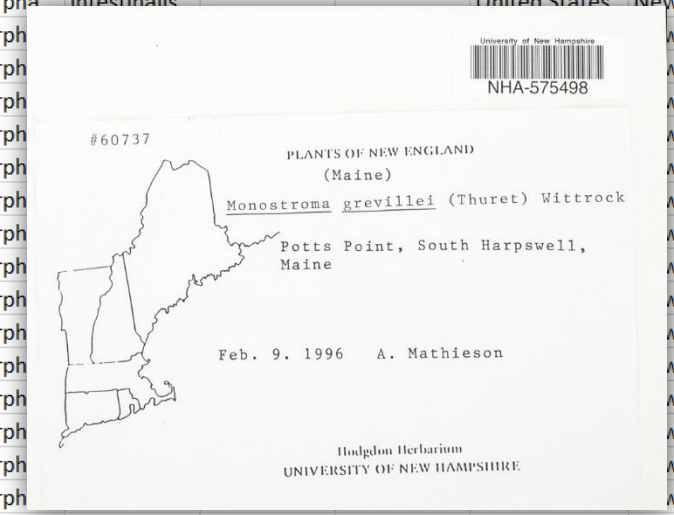
Conditional Formatting Format as Table Cell Styles Styles

Insert Delete Format Cells

AutoSum Fill Clear Sort & Filter Find & Select Editing

A575 NHA-568704

	A	B	C	D	E	F	G	H	I	J	K
1	dbpk	accessionNumber	genus	specific epith	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	Enteromorph					w Hampshire	Rockingham	Matt	
29	NHA-566813	16033	Enteromorph					w Hampshire	Rockingham	Matt	
30	NHA-566814	16068	Enteromorph					w Hampshire	Rockingham	Matt	
31	NHA-566815	16053	Enteromorph					w Hampshire	Rockingham	Matt	
32	NHA-566816	9745	Enteromorph					w Hampshire	Rockingham	Matt	
33	NHA-566817	9744	Enteromorph					w Hampshire	Rockingham	Matt	
34	NHA-566818	9747	Enteromorph					w Hampshire	Rockingham	Matt	
35	NHA-566819		Enteromorph					w Hampshire	Strafford	Matt	
36	NHA-566820		Enteromorph					w Hampshire	Strafford	Matt	
37	NHA-566821	5534	Enteromorph					w Hampshire	Strafford	Matt	
38	NHA-566822	3270	Enteromorph					w Hampshire	Strafford	Matt	
39	NHA-566823		Enteromorph					w Hampshire	Strafford	Matt	
40	NHA-566824	12149	Enteromorph					w Hampshire	Strafford	Matt	
41	NHA-566825	11330	Enteromorph					w Hampshire	Strafford	Matt	
42	NHA-566826	6832	Enteromorph					w 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	

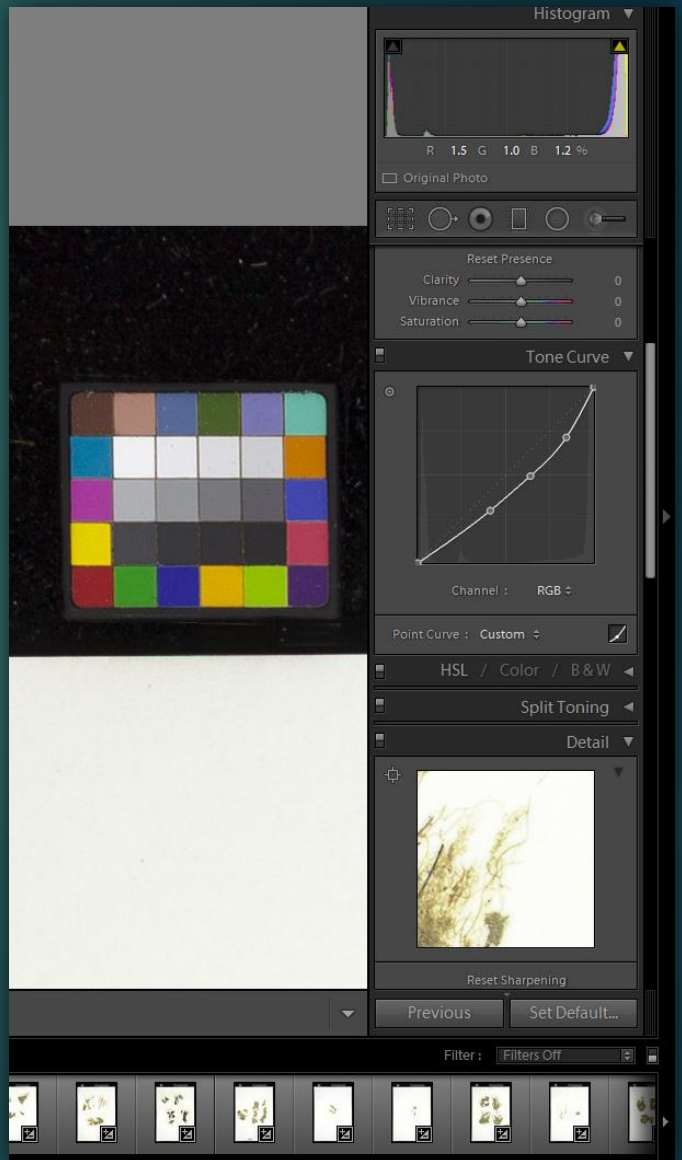


Sheet1 Sheet2 Sheet3

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)



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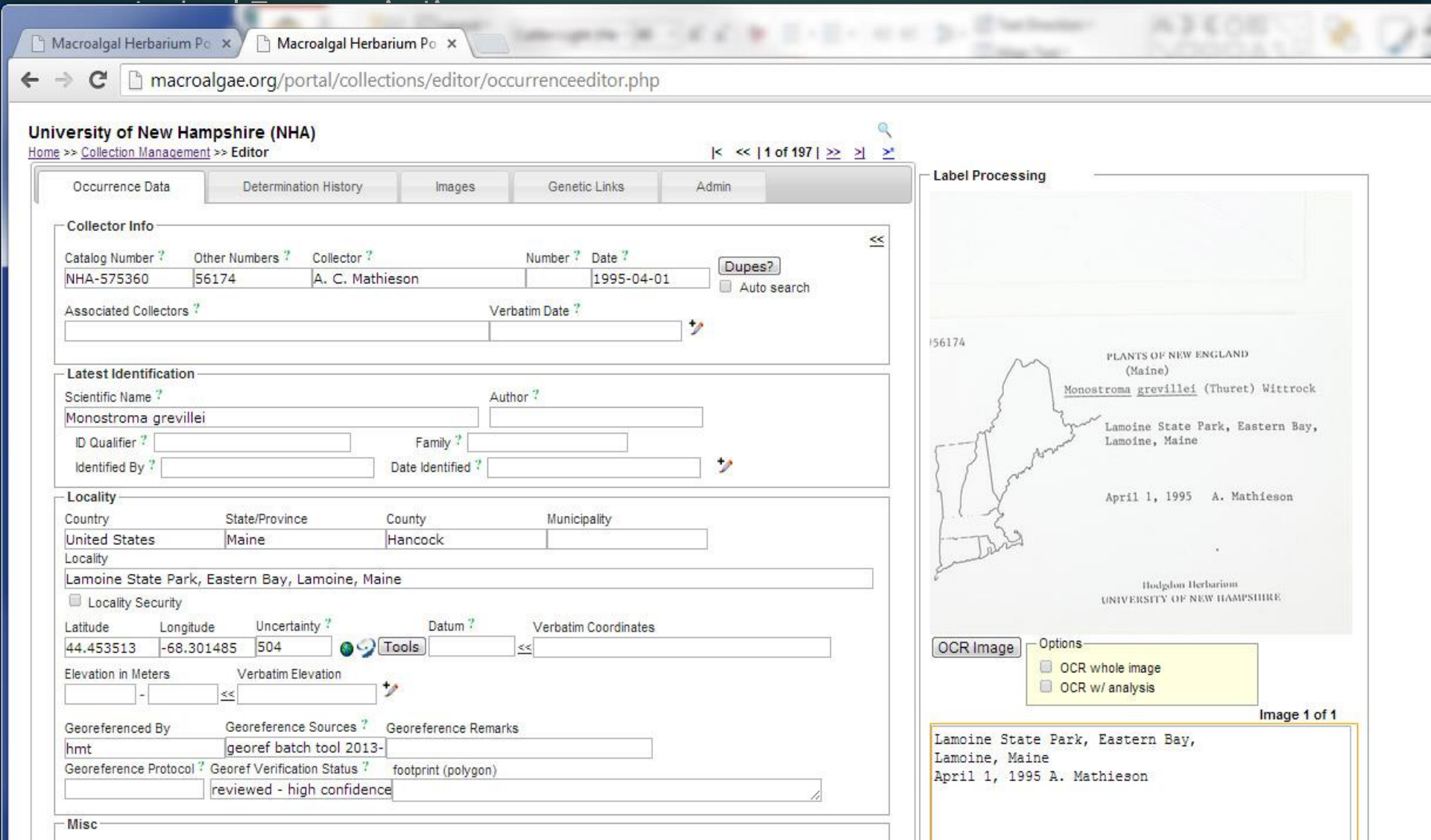

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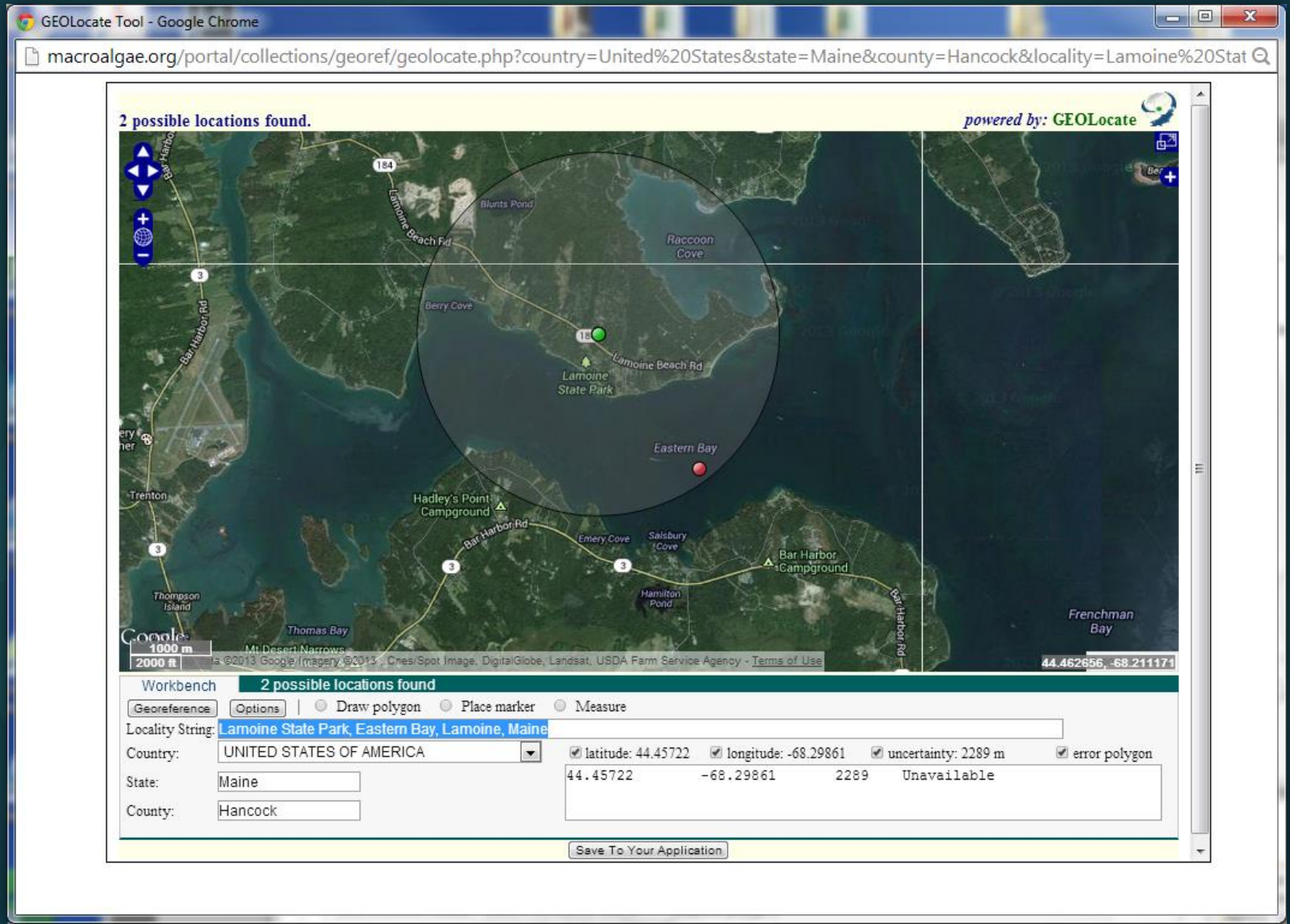
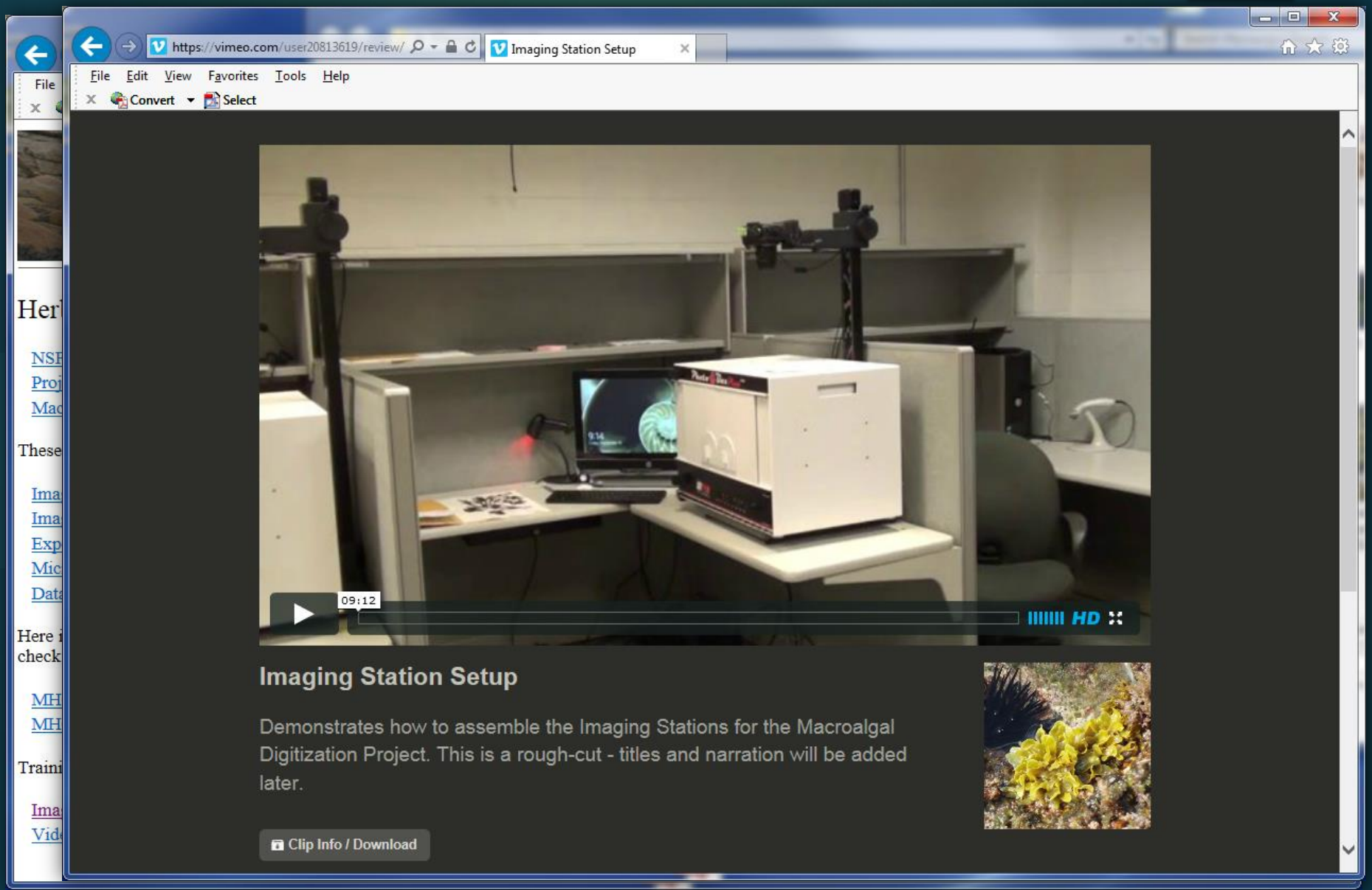
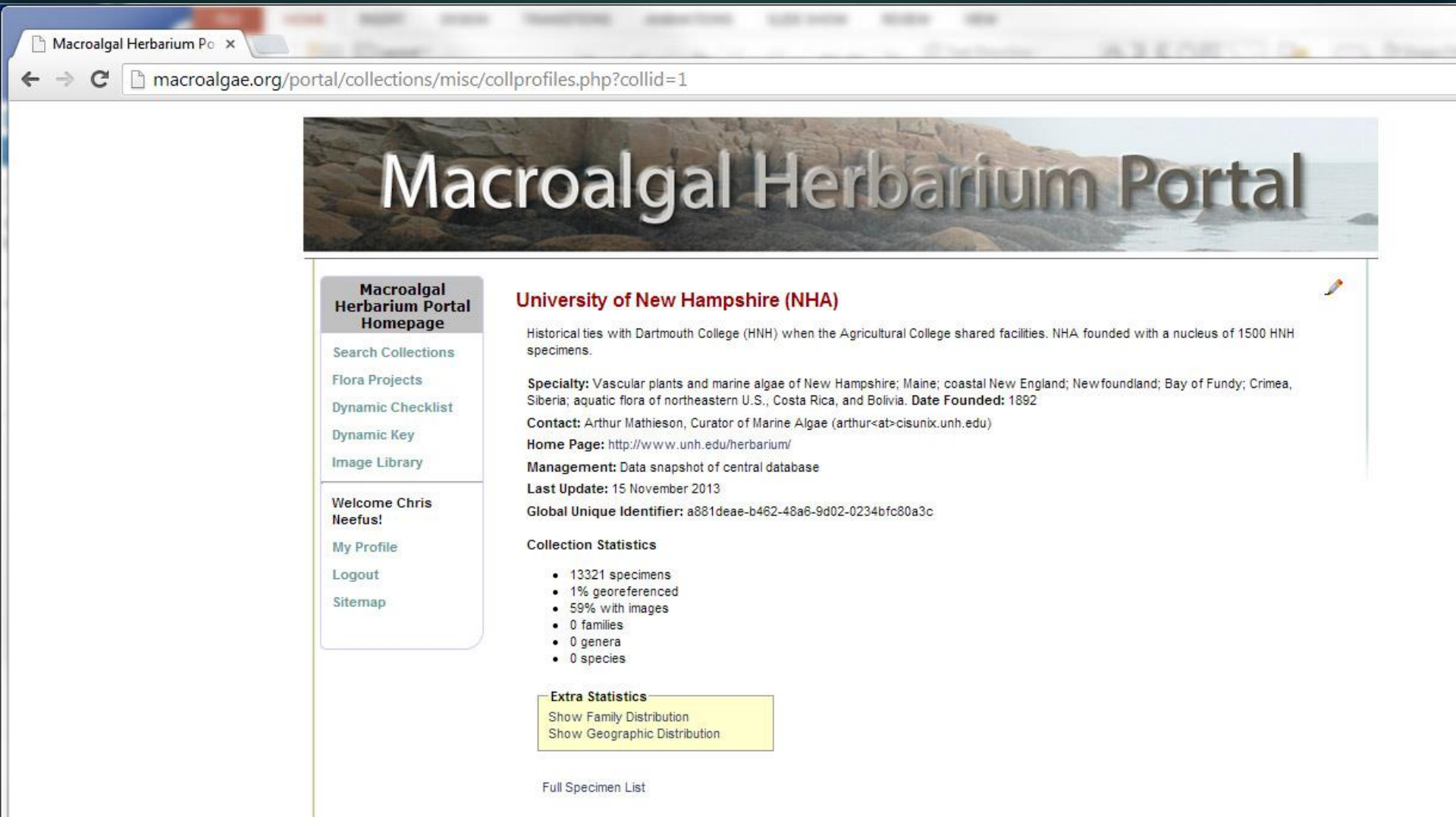


How are digitizers being trained?



How Is The Data Being Disseminated?

- Macroalgae.org specimen data portal (Symbiota)



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)

Photographs by Robert Lücking