Maine Seaweed
History & Today

Presented by the Maine Seaweed Council

Extraordinary resource
Wild Harvest & Farmed

Harvesting seaweed has been a long tradition in Maine

Photo used with permission from Heritage New England Archives

Farmer Loading his Cart with Kelp, Maine, 1882. Emma L. Coleman

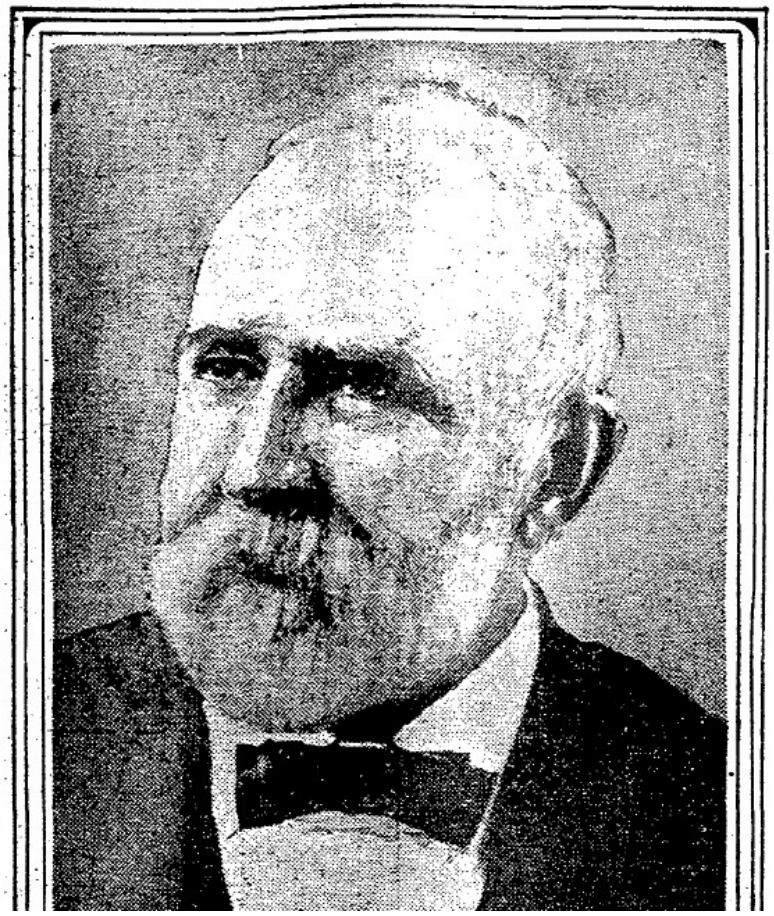
Here's an article from 1907 in the BOSTON HERALD.

Seaweed was being recognized as a valuable fertilizer, feed for livestock & food for the future.

Seaweed "gathering" was hard work!

BOSTON, SUNDAY, JUNE 9, 1907.

LUMBER KING RICHER THAN ROCKEFELLER



COLD LUNCHES AND WET TO THE SKIN

Work for 18 Hours a Day on an Average and Sleep Out of Doors.

HOW WOULD YOU LIKE TO BE A SEAWEED GATHERER?

Farmers in Maine Find the Marine Plant Very Valuable as a Fertilizer.

[Special.]

PORTLAND, Me., June 8, 1907. The calling of gathering seaweed is one of the hardest known in Maine.

The men are wet to the skin all the time. They eat cold lunches. They sleep out of doors. They average to work 18 hours a day.

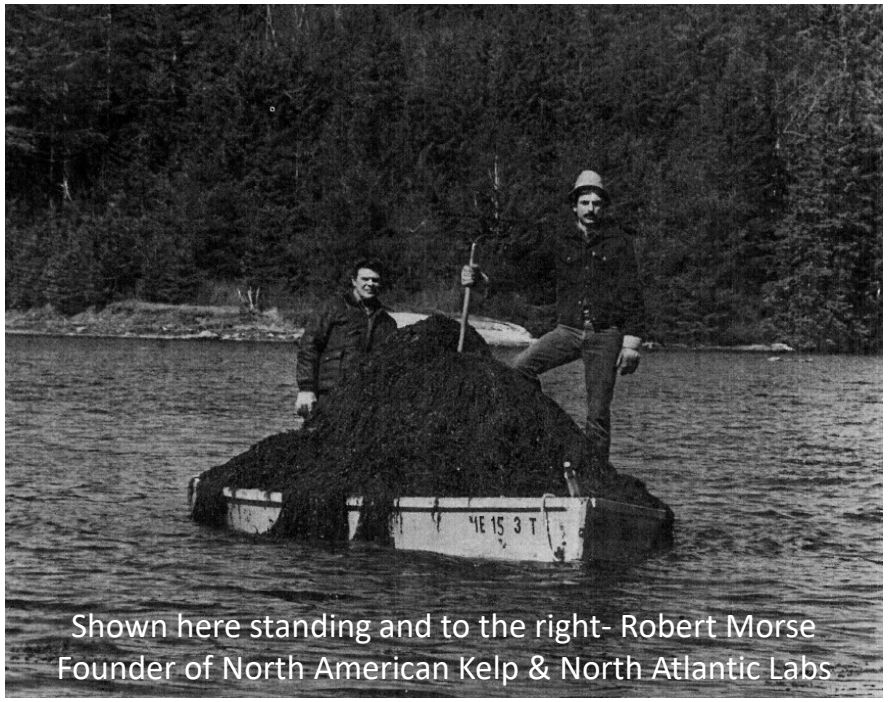
There is an aged and cynical saying, common along the eastern shore, which relates how a merciful farmer always sent his hired men to pull rockweed "when it rained too hard to work out of doors." The exact wording is not nice for refined ears, though the idea conveyed requires no explanatory key.

Before the days when cheap commercial fertilizers were invented, every farmer within four miles of salt water relied upon his spring gathering of seaweed for the dressing to give his potatoes an early start, and for the production of hard and elliptical rutabaga turnips, such as are said to make

By the early 1970s, infrastructure was needed to process rockweed

North American Kelp-Waldoboro Maine

Companies were founded



Shown here standing and to the right- Robert Morse
Founder of North American Kelp & North Atlantic Labs

More Bounty From The Ocean

Common rockweed fertilizes soil, nurtures fruit and is good for what ails cattle. Or so it's claimed. And we may soon be eating it ourselves, if an ambitious young Maine aquaculturist has his way.

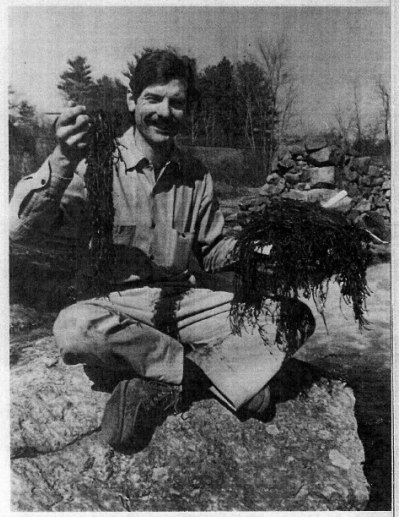
By Anne Weber

Photographs by Norm Gibbons

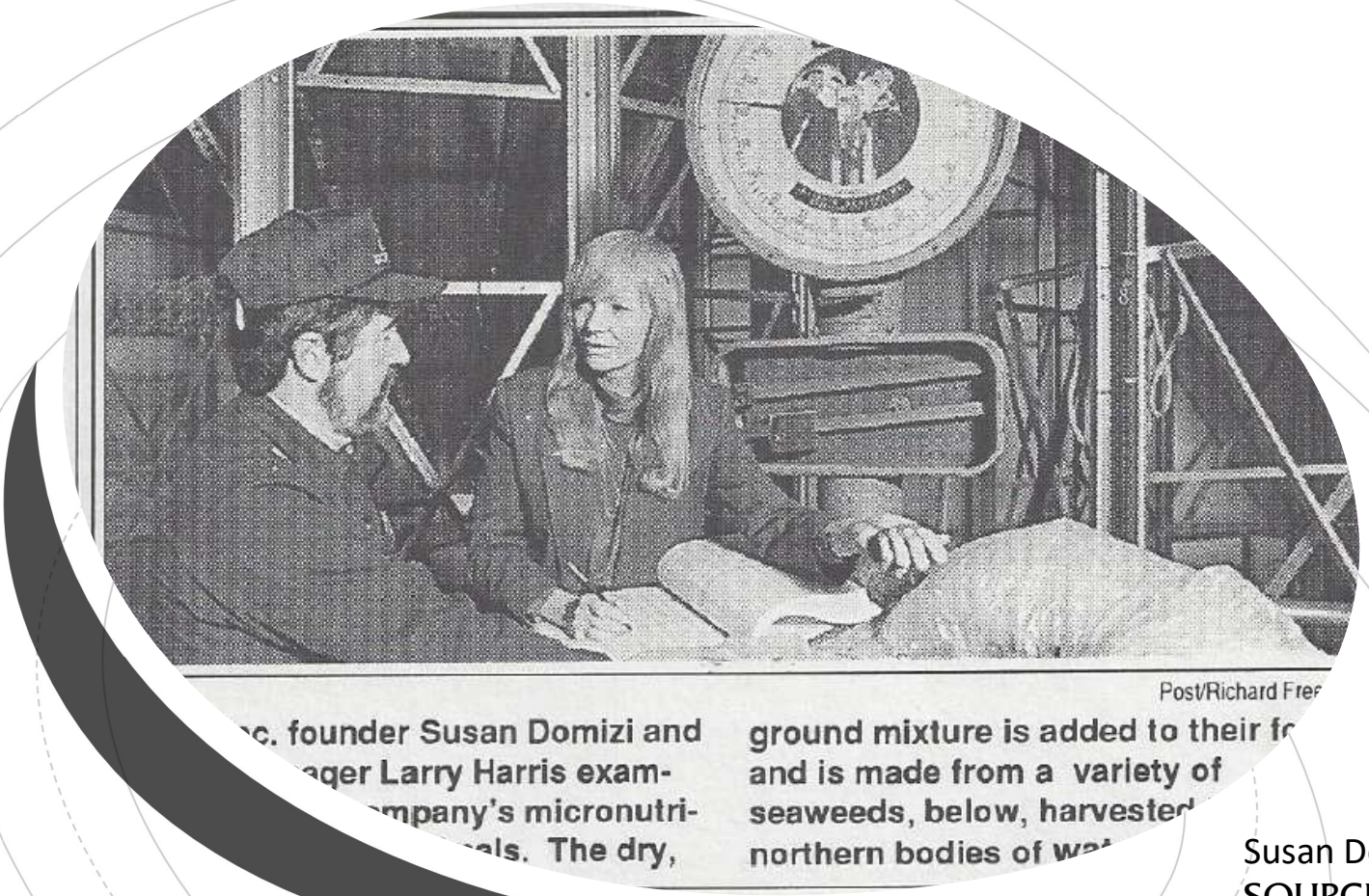
ROCKWEED, that plentiful seaweed commonly used for shore bakes and lobster shipping, may be coming into its own again as a fertilizer, cattle feed, and even as an element in human diet. At least this is the hope of a youthful Boothbay entrepreneur who has reestablished the industry of processing seaweed in Maine.

The virtue of seaweed has long been known to agriculture. In very ancient times it fertilized the fields of Oriental farmers; the Romans used it to feed animals and to grow vegetables. As early as the 12th century its use as manure was referred to in the literature of Norway, England, and France. Even now on the shores of Brittany and Normandy, where seaweed continues to enrich cornfields, one can hear the homely old expression, "point de vraic, point de hangard" (no seaweed, no corn).

In America, the first factory to process seaweed for agricultural use opened in Boothbay in 1870, and its produce was used exclusively in the tobacco fields of Connecticut. Today, again in Boothbay, 30-year-old Robert Morse heads a firm, Atlantic Laboratories, that manufactures a seaweed meal (Sea Life) and a seaweed extract (Sea Crop), the latter used as a foliar



Rockweed entrepreneur Robert Morse foresees the day when humans will turn to seaweed for food, although not necessarily in the raw form he brandishes above. Opposite: Morse and employee Hen Townsend bring in a freshly harvested three-ton load of rockweed.



Post/Richard Free

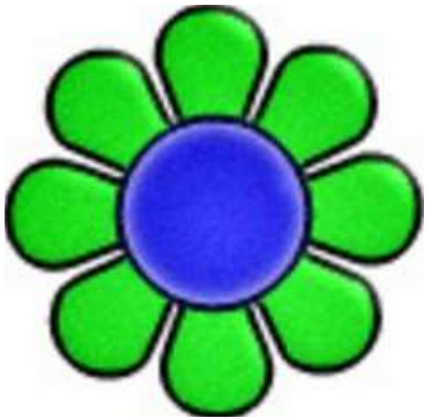
...c. founder Susan Domizi and ...ager Larry Harris exam- ...mpany's micronutri- ...als. The dry, ground mixture is added to their fo... and is made from a variety of seaweeds, below, harvested ... northern bodies of wa...

& Jobs Created

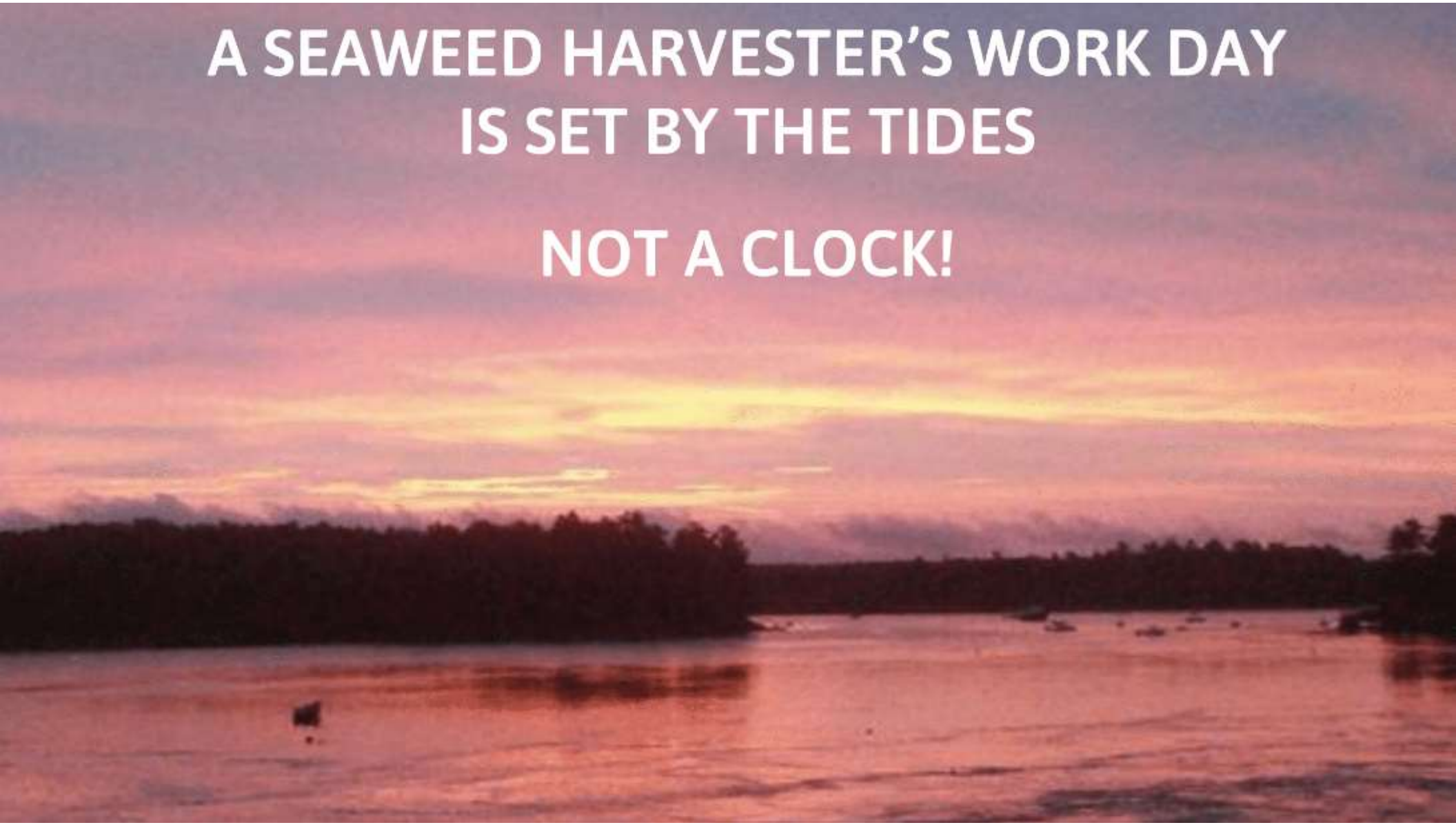
Susan Domizi-Founder & CEO
SOURCE micronutrients

The seaweed industry wasn't just about "Rockweed"!

Shep Erhart (Founder of Maine Coast Sea Vegetables) harvesting wild sugar kelp with baby Seraphina- *circa 1975*

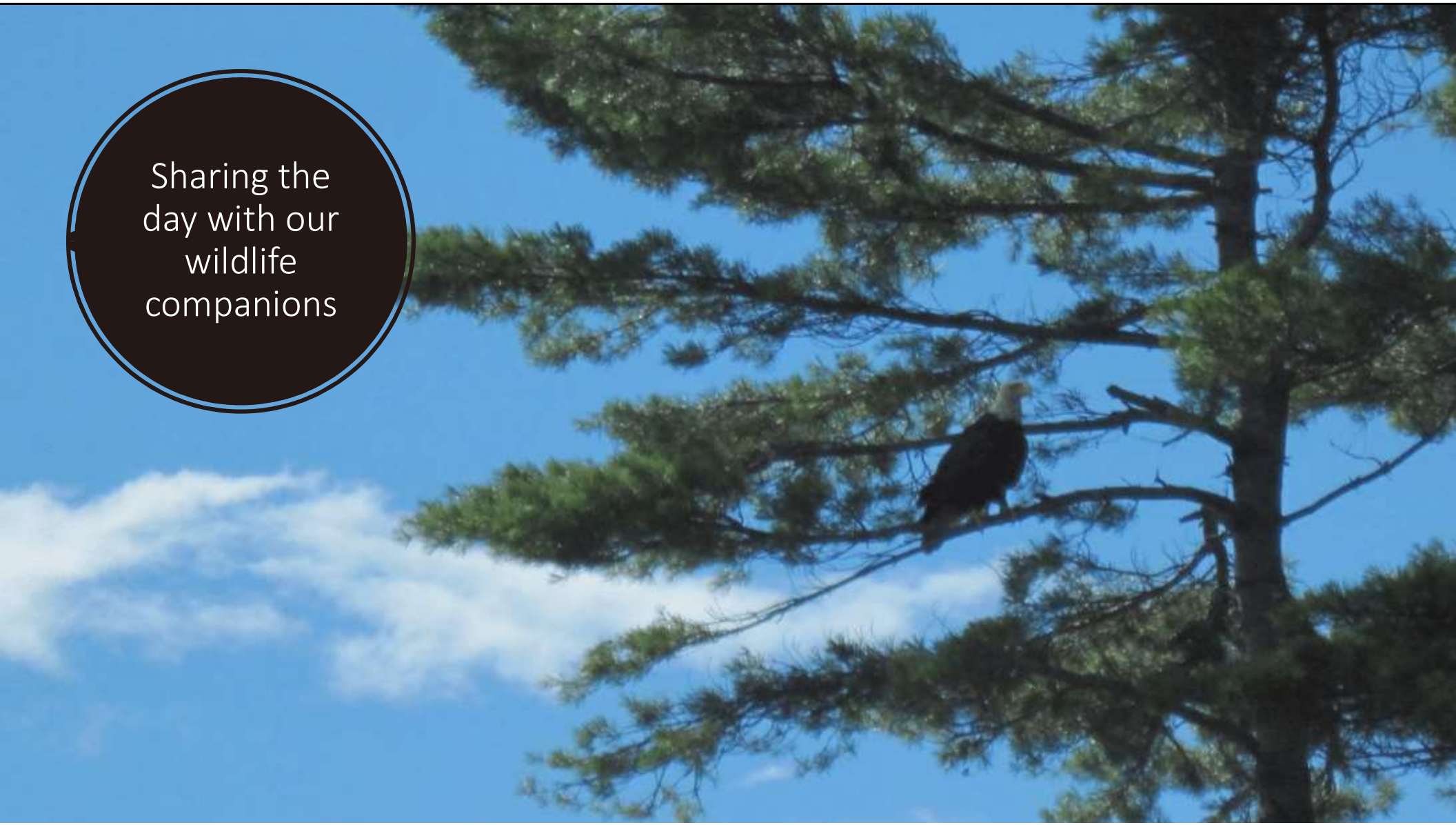


These 1970's companies paved the way for today's seaweed markets and good Maine jobs.


A SEAWEED HARVESTER'S WORK DAY
IS SET BY THE TIDES
NOT A CLOCK!

STARTING OUT EARLY


HEADING HOME LATE


Sharing the
day with our
wildlife
companions


… and curious friends…


H-2 and the Cormorant
08/19/2019

There are many types of seaweed in Maine.

Shown here is *Ulva* often called Sea Lettuce & *Palmaria* often called Dulse.

They come in a variety of colors and shapes

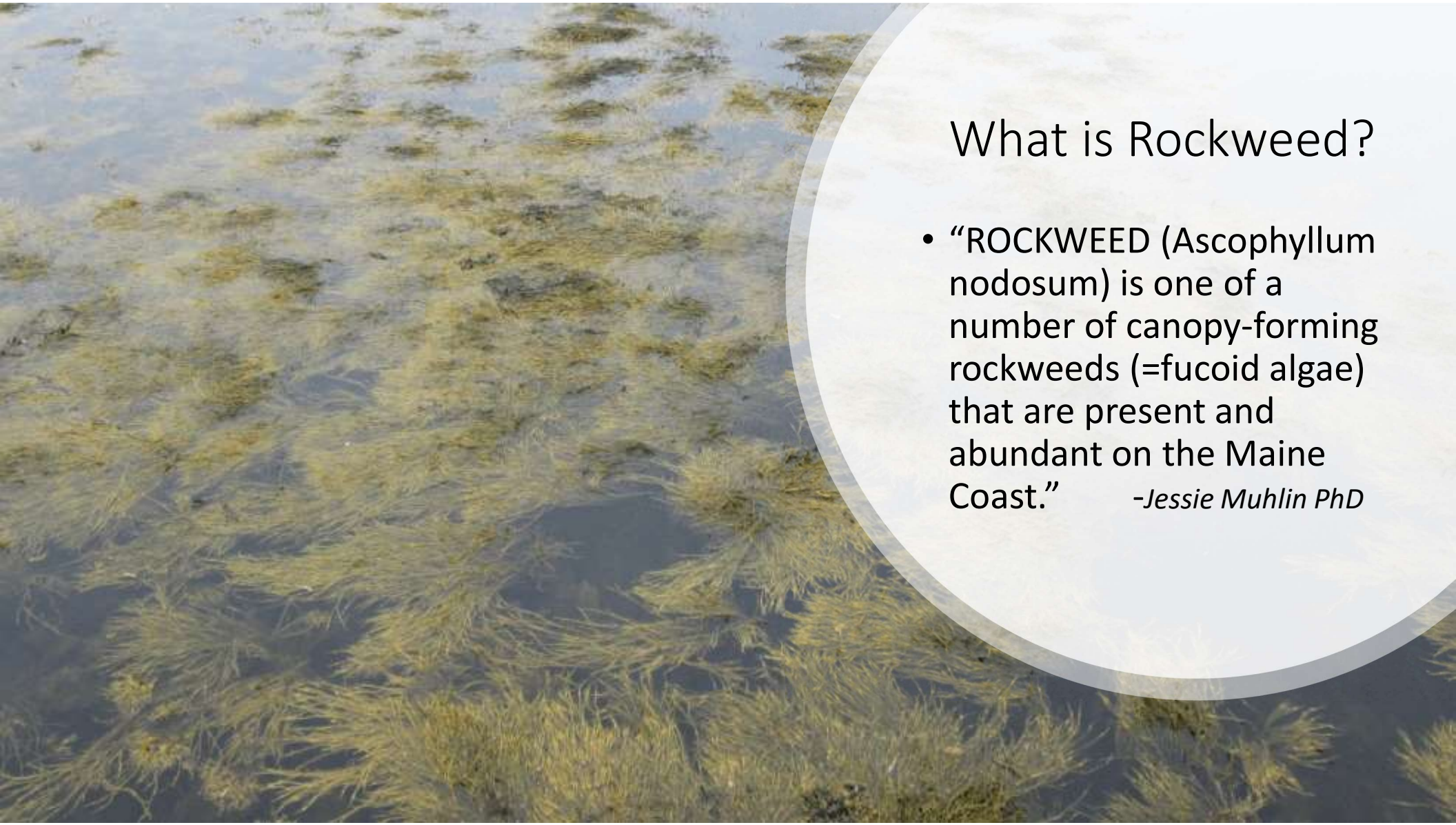
- Above photo of Laver or Nori
- Below photo of Chondrus or Irish Moss

There are several varieties of **kelp**.

Sugar kelp, Skinny kelp, Horsetail kelp and Winged kelp
to name a few…


There are too many
types of
Fucus
to mention by name!

And the most abundant along Maine’s coast is Ascophyllum nodosum (aka Rockweed)!



What is Rockweed?

- “ROCKWEED (Ascophyllum nodosum) is one of a number of canopy-forming rockweeds (=fucoid algae) that are present and abundant on the Maine Coast.” -*Jessie Muhlin PhD*

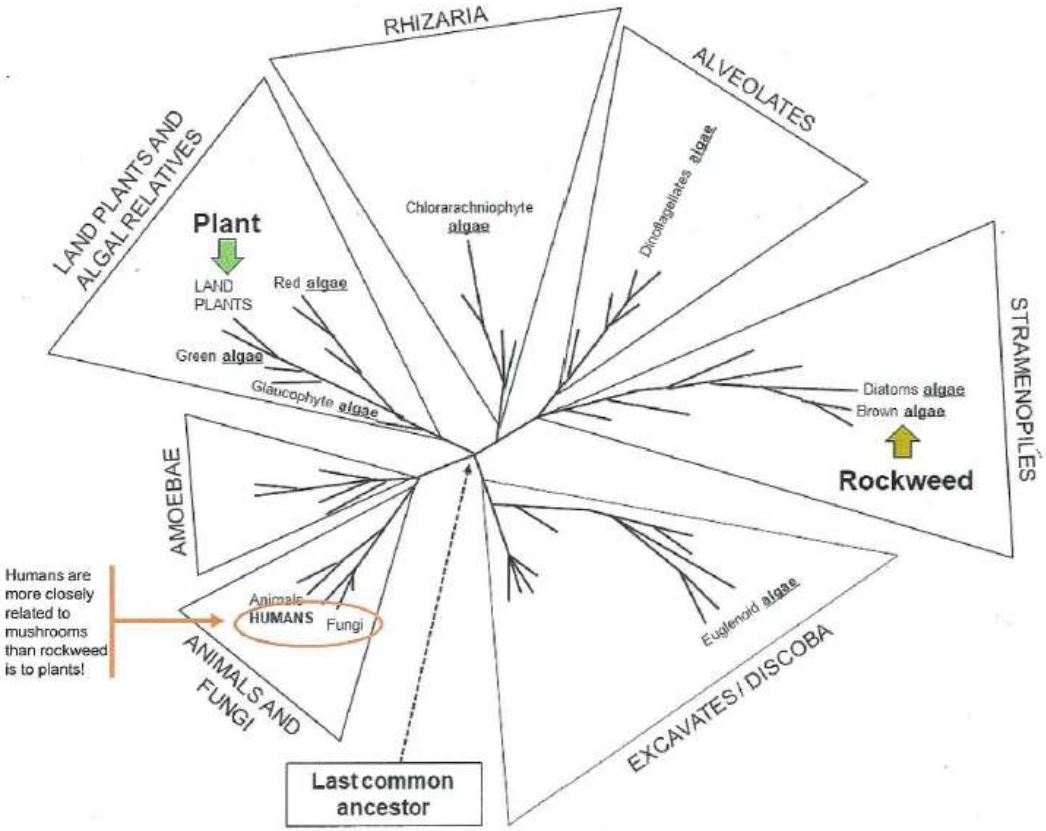
Rockweeds are brown algae.

Contrary to popular belief they are not plants.

They are marine organisms.

Rockweed is not a plant

Rockweeds are brown algae. Contrary to belief, they are **not plants.** The brown algae belong to the Stramenopile supergroup. Plants evolved from a green algal ancestor and are in the Archaeplastida supergroup.



The current evolutionary "tree of life," based on many molecular DNA analyses, shows the genetic relationships among all complex-celled ("eukaryotic") organisms. Seven Supergroups are highlighted within triangles. Organisms called "algae" (underlined) were thought to be closely related until molecular analyses decades ago showed their different origins; the specific lack of relationship between plants and rockweeds is indicated by arrows. Graphic modified with permission from: Algae (3rd Edition) 2016. L. Graham, J. Graham, L. Wilcox, and M. Cook, LJLM Press.

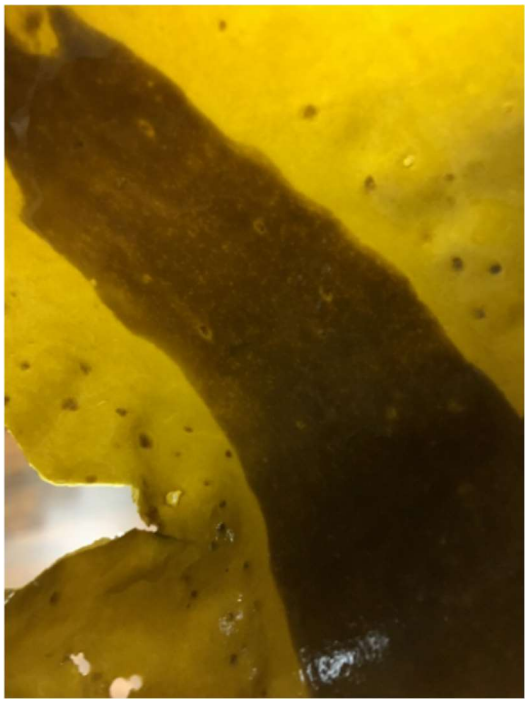
Rockweed is a marine organism

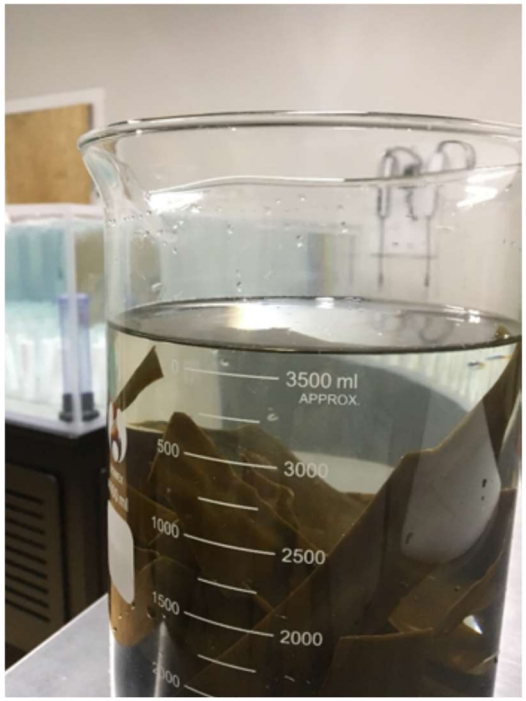
Some seaweed can be farmed.

- Mariculture is a specialized branch of aquaculture involving the cultivation of marine organisms for food and other products.

Kelp is the most commonly farmed seaweed in Maine.

Shown here, Linnette Erhart drying wild Saccharina in 1975 with some help from daughter Seraphina.





Aquaculture begins at the Lab

This is ripe Sugar Kelp sorus being prepped for release and in a beaker.

Once the sporophytes have attached to the spool it's time to SEED THE FARM.




Kelp grows rapidly over the cold Winter months.

These 2 week old sporophytes will mature by Spring!

Other seaweed like Rockweed is primarily wild harvest

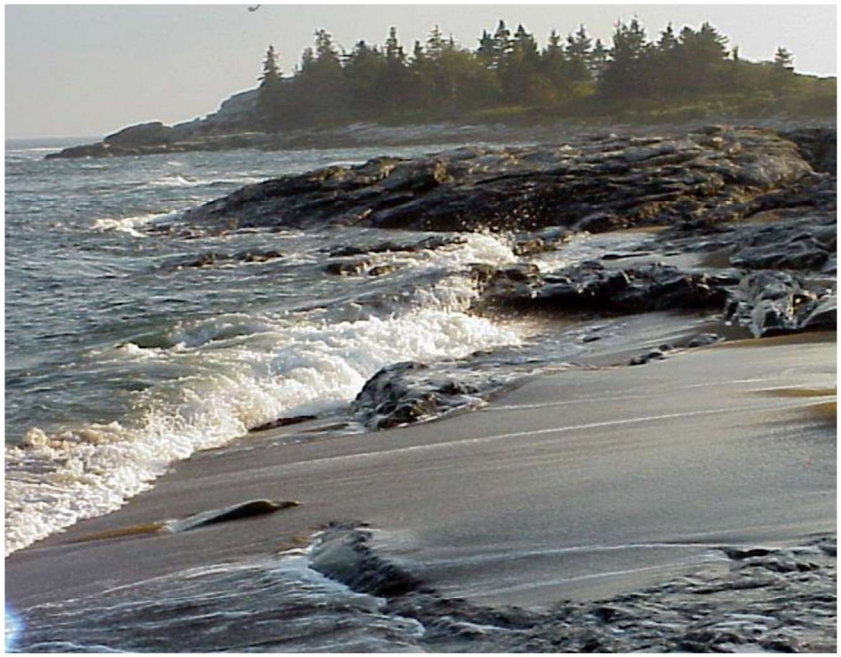
Farmed or wild, there are many uses for seaweed.

As a World Food Supply
Nutritional Supplements
Bio-stimulants
Fertilizers
Pharmaceuticals
Nutraceuticals
Cosmetics
Skin care
& Art


Here are some locally grown potatoes using
SEAWEED BIOSTIMULANTS


Seaweed extract
increased the yield by
3000 potatoes per acre
with no additional
fertilizer or pesticides.

A natural product from the sea…
More potatoes.



Seaweed also provides essential micronutrients for people & animals.

These horses enjoy their seaweed

Every product we make contains the legendary SOURCE micronutrients ESSENTIAL TO THRIVE!

Find us on Facebook

Original Nuggets Hoof Senior Weight For Dogs For You!

And word in the barn is getting around!

Seaweed nourishes Champions

And our BEST FRIENDS!

'Mandy' as a puppy and as a 12 year old Great-Grandmother!

Ocean's Balance®

Seaweed comes in a variety of consumer friendly options:

Whole dried
Sprinkles
Flakes
Powder &
Puree
just to name a few

It makes for Great snacks and seasonings!

Maine Coast Sea Vegetables®

Everyone benefits from good nutrition

Plants, Pets & People

Seaweed is often used in High Quality Natural Skin Care

Maine companies are committed to formulating and producing products that are safe, healthy and made with no harmful chemical additives.


Planet Botanicals
SEAWEED AND SHEA BUTTER HAND CREAM
NOURISHING
3.4 FL OZ (100mL)
HAND HARVESTED SEAWEED VOYAGER BAG
MADE IN WESTBROOK, MAINE USA
Planet Botanicals
HAND HARVESTED SEAWEED BODY WASH LEMON BLOSSOM
100% NATURAL
8 FL OZ / 240 ML
Planet Botanicals
HAND HARVESTED SEAWEED BAR SOAP
LEMON FLOWER BLOSSOM
100% HANDMADE
4.2 OZ / 120G
Planet Botanicals
HAND HARVESTED SEAWEED BODY CREAM
MAINE SEAWEED PRODUCT

Seaweed can be the subject of beautiful ART!

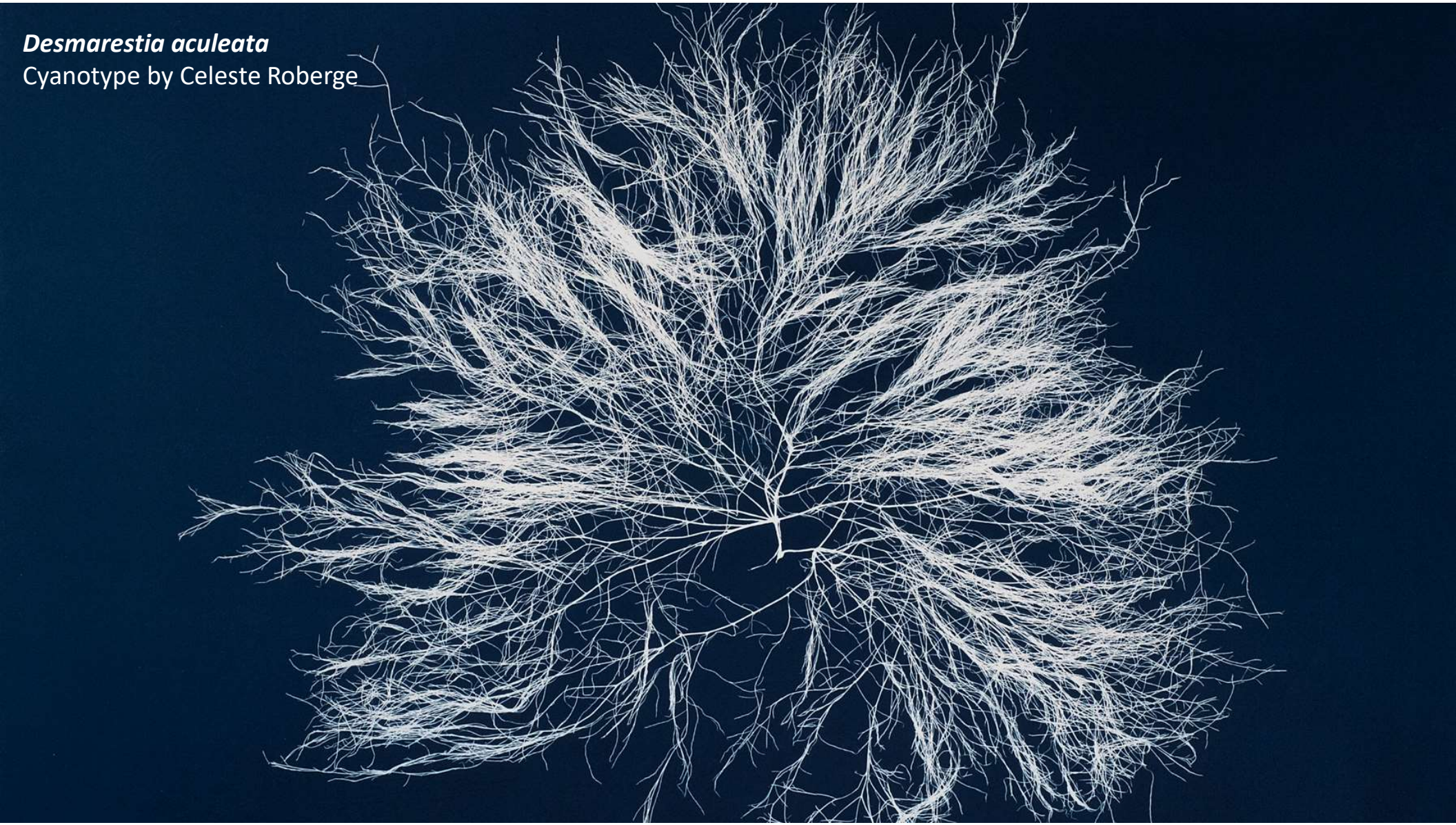
"Time Lines 01"

Archival pigment print by Celeste Roberge.

“Meeting While Walking Under the Sea”

Collage with seaweeds and textiles by Celeste Roberge.

Seaweed Boat. Archival pigment print by Celeste Roberge


Desmarestia aculeata
Cyanotype by Celeste Roberge

Here are some of Maine's Seaweed Companies…

These 4 seaweed companies were started in the 1970's and are still in business today, harvesting in the same bays.

MAINE COAST SEA VEGETABLES

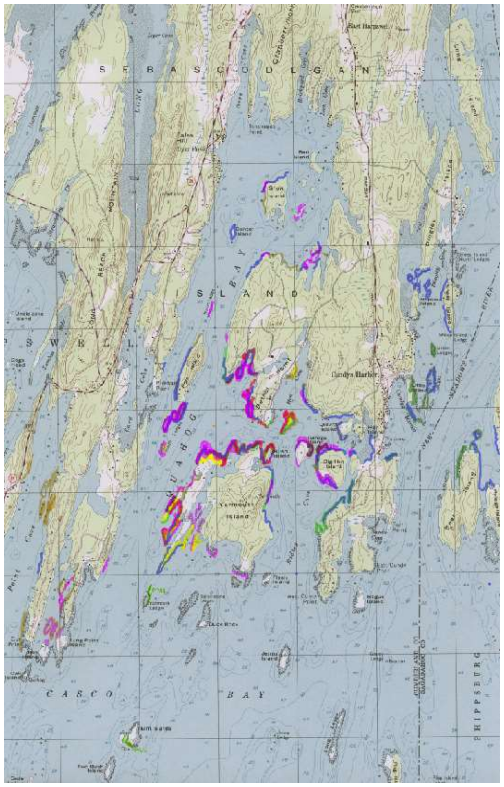
Hancock, ME www.seaveg.com

Ocean Organics

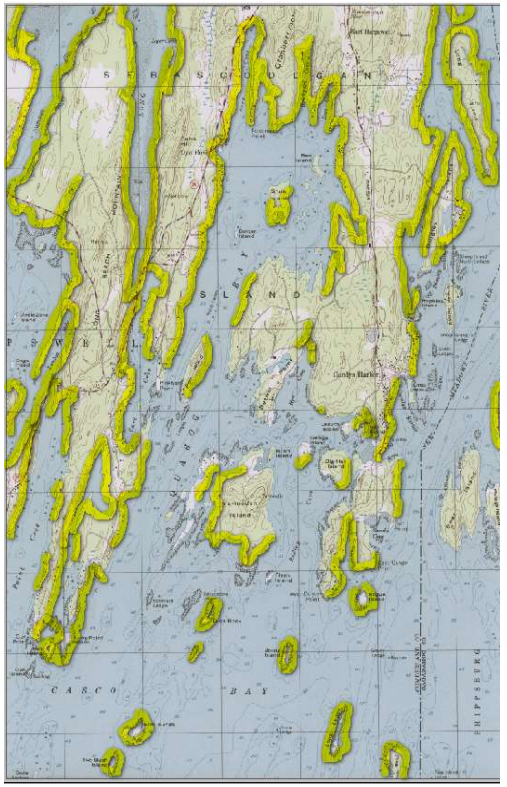
By rotating the seaweed beds, a small geographic location can regenerate rockweed year after year.

Dr. Jill Fegley's Study sites
2002-2005

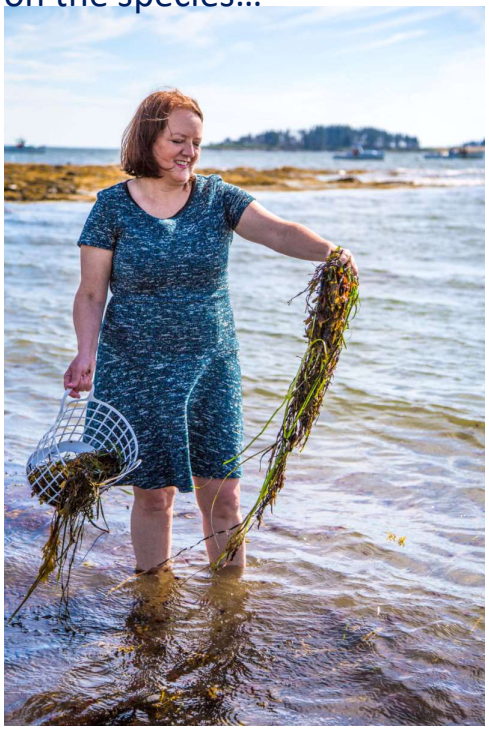
AREAS HARVESTED
2008-2018



AREAS NOT HARVESTED
2008-2018



There are several methods of harvesting seaweed depending on the species…



HAND GATHERING

RAKING

USING A KNIFE

MECHANICAL

Regardless of method, care should be taken.

When hand harvesting it’s important not to cut too much or pull off the holdfast.

A mechanical harvester must be properly designed.

This one Is NOT!

Anyone know why?

DAMAGING DESIGN

of the NORWEGIAN HARVESTER

used in CANADA in the 1980's.

NEVER USED IN MAINE!

Correctly designed mechanical harvesters

- Superior design because of a horizonal v. downward cutting head.
- Designed to cut at a certain height to protect the resource.
- Prevents over harvesting.
- Virtually eliminates “by-catch” through sound and vibration.
- Eliminates hold-fast removal.
- Improved designs reduce noise and run more efficiently.


All cut seaweed is captured into a net on the back.


Mother Nature harvests too!
• Storm cast can produce rolls of rockweed along Maine's shores.
Oct. 2019 by Tim Sheehan

Seaweed can be trapped in ice and pulled out

- We are witness to the resiliency of rockweed to continue regenerating year after year.
- Even the huge biomass that Mother Nature removes and the much smaller amounts removed by commercial harvesting still leaves enough to release new spores which attach to those same ledges and continue to reproduce.

-Reference Vadas paper & DMR

SO LET'S TALK SCIENCE!

SCIENCE & INDUSTRY

The essential partnership

for the future of the resource

Seaweed attaches itself by a holdfast.

This is not a root because it takes in no nutrients.

Nutrients come from the surrounding ocean.

- By leaving the hold fast and a current cutting height of 16”, rockweed can regenerate year after year.
- All other fisheries take the entire organism.
- Seaweed harvesters leave the original organism to reproduce.

Ground-Truthing the cutting height!

Susan Domizi-Founder of SOURCE

The holdfast of Ascophyllum typically supports numerous short fronds (suppressed by light limitation) in addition to the tall fronds.

When the taller fronds are broken or removed, regeneration of the canopy usually occurs by growth of these basal shoots and formation of new, lateral branches from the cut fonds.

(Baardseth, 1995, 1970, Keser et al., 1981)

Did you know this is a male?

Greenish yellow; when mature, **male** receptacles have lots of little **orange dots.**

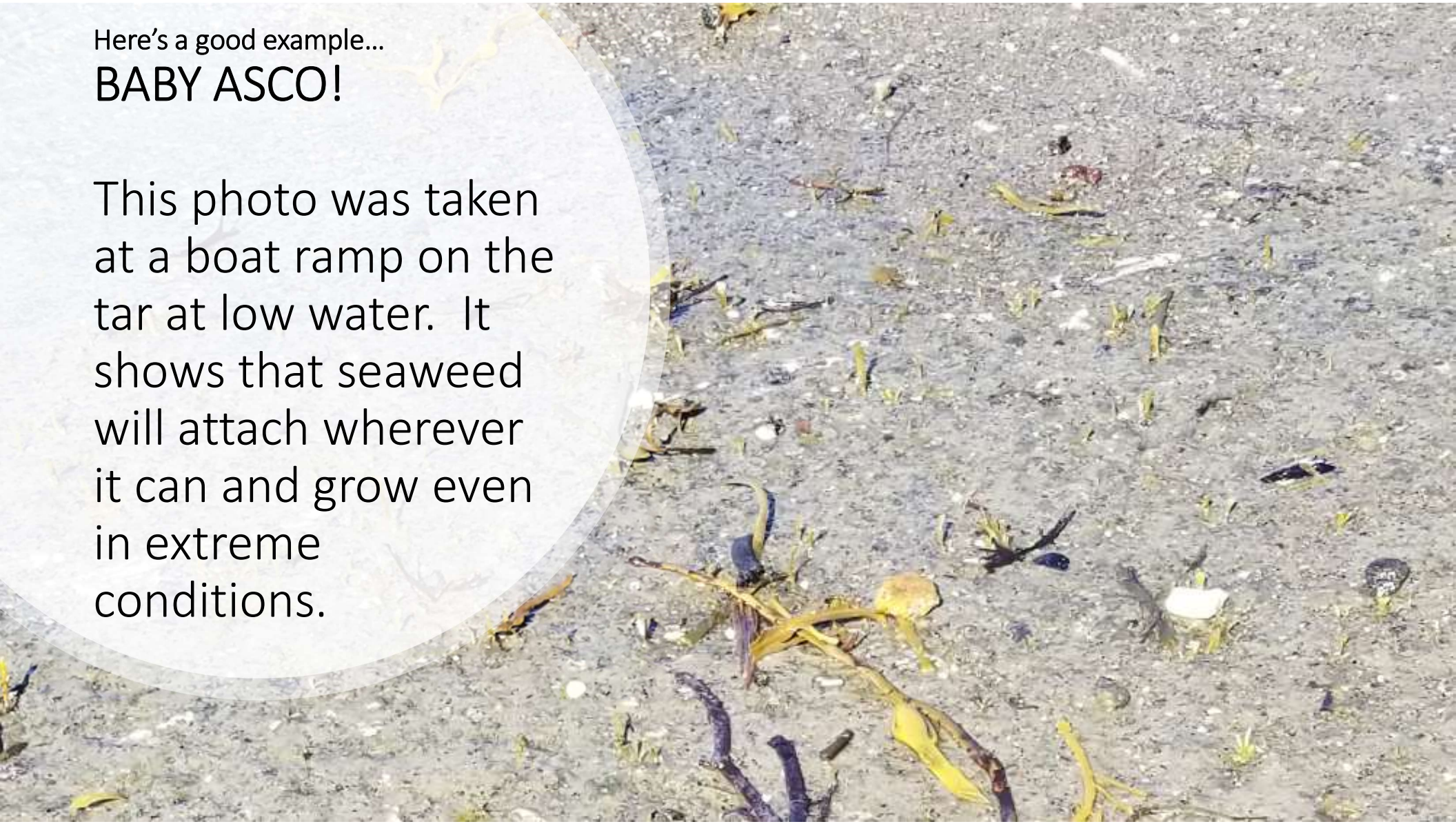
Darker Green; when mature, **female** receptacles have **green dots.**

- The reproductive receptacles contain sperm (in males) and eggs (in females). Spring water temperature corresponds with the beginning, peak, and end of when eggs and sperm are released into the water for external reproduction.

Here's a good example…

BABY ASCO!

This photo was taken at a boat ramp on the tar at low water. It shows that seaweed will attach wherever it can and grow even in extreme conditions.




Good Harvest practices lead to New growth and lush habitat
20 / 21

Like counting rings on a tree trunk to estimate the age of the tree, the distance between air bladders on rockweed indicates how much it grows each year. In some cases 8-9”!

Research has been going on for decades

In a letter written by Commissioner Keliher…

STATE OF MAINE
DEPARTMENT OF MARINE RESOURCES
21 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0021

JANET T. MILLS
GOVERNOR

PATRICK C. KELIHER
COMMISSIONER

October 17, 2019

"…Maine's [seaweed] fishery has been ongoing since the 1970's and the Department [of Marine Resources] is not aware of any scientific research that has documented a deleterious or irreversible impact on Maine's marine ecosystem from rockweed harvesting."

2014 published research

By Aimee Phillippi, Kieu Tran & Allison Perna

Abstract…

“Sediments and smaller invertebrates were mostly unaffected by canopy removal in both the experimentally and commercially harvested sites.”

Volume 461, December 2014, Pages 53-60

A Study Concluded in 2004 shows an average turnover rate for Rockweed to be every 2 years. This varies of course per region.

Ecosystem Modeling in Cobscook Bay, Maine: A Boreal, Macrotidal Estuary

2004 *Northeastern Naturalist* 11(Special Issue 2):123–142

Biomass and Productivity of Intertidal Rockweeds (*Ascophyllum nodosum* LeJolis) in Cobscook Bay

Robert L. Vadas, Sr.[1,*], Wesley A. Wright[2], and Brian F. Beal[3]

Turnover rates of *Ascophyllum* ranged from 29 to 71% (mean over all sites = 54%) indicating that the biomass of this alga turns over approximately every two years.

1865 THE UNIVERSITY OF MAINE

MAINE MARITIME ACADEMY

SCHOODIC INSTITUTE
AT ACADIA NATIONAL PARK

Sea Grant
Maine

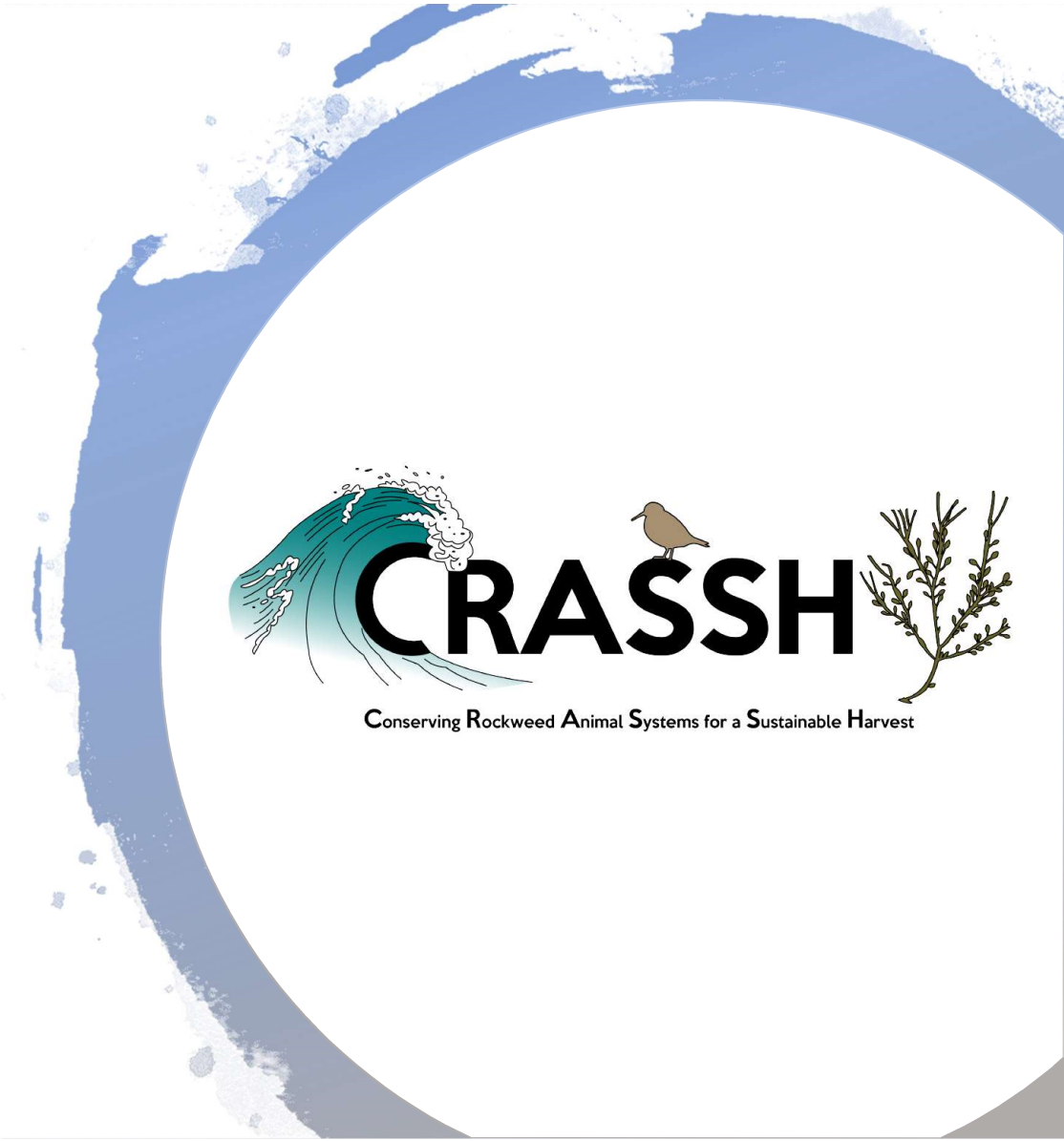
Research continues today

Conserving Rockweed Animal Systems for a Sustainable Harvest

Objective: Assess animal and abiotic responses to rockweed harvest.

Using a Before-After Control-Impact

(BACI) Study Design



Elliot Johnston, researcher seen here with Greg Tobey from SOURCE harvesting one of the CRASSH test sites. July 2019

Hannah Webber from the Schoodic Institute & member of the CRASSH Team doing research on invertebrates living within the seaweed beds.

Selected sites included those harvested last year, 2 years ago, 4 years ago and never harvested.



Dr. Jessica Muhlin (left) & Citizen Scientists

setting up research quadrants

Other research happening now…

Bigelow | Laboratory for Ocean Sciences

- Bigelow Laboratory scientists are collaborating with other organizations in identifying seaweeds for dietary supplements that could reduce methane emission by cattle.

University of New Hampshire

The University of Vermont

Wolfe's Neck Center for Agriculture & the Environment

Colby

IN 1993 THE MAINE SEAWEED COUNCIL WAS FORMED IN AN EFFORT TO SEEK REGULATION & PROTECT THE RESOURCE.

MEMBERSHIP INCLUDES REKNOWNED SCIENTISTS, EDUCATORS, ARTISTS, ENVIRONMENTALISTS, BUSINESS OWNERS, HARVESTERS & INVOLVED CITIZENS.

Maine has some of the most beautiful & nutritious seaweeds.

- The Maine Seaweed Council strives to protect the ecosystems of Maine's marine algae, develop and adhere to sustainable cultivation and harvest practices, promote the use of Maine seaweeds, educate the public, regulators, and elected officials and provide a collaborative forum for its members.

INDUSTRY SEEKS REGULATION!

In an almost unprecedented move, **the Seaweed Industry initiated** strict harvesting guidelines to **self regulate** and **ensure sustainable practices**.

"No one cares more about the resource than those who rely on it to make their living." *A seaweed harvester*


It’s a partnership!

Seaweed Harvesters must be licensed.

Harvesters must record & report each days catch.

THE DEPARTMENT OF MARINE RESOURCES REGULATES SEAWEED HARVESTING.

Rockweed harvesting requires:
-Minimum cutting height of 16”.
-Must leave Lateral branching.

A Seaweed Fisheries Advisory Council to the DMR was implemented in 2019.

Members of Industry, Science, Conservation & the Department of Marine Resources collaborated to create the FISHERIES MANAGEMENT PLAN FOR ROCKWEED

Unfortunately while this extensive plan has not yet been implemented due to the court ruling in Ross v. Acadian Seaplants, LLC. on 3/28/2019, The MSC is committed to upholding the guidelines set forth in this document.

https://www.maine.gov/dmr/science-research/species/rockweed/documents/DMRRockweedFMPJan2014.pdf

Maine Department of Marine Resources

FISHERY MANAGEMENT PLAN FOR ROCKWEED *(Ascophyllum nodosum)*

So what does the future hold?

The Maine Seaweed Council & The Seaweed Fisheries Adv. Council along with researchers, regulators, industry members and caring citizens will continue to support the mission of good harvesting practices for this important fishery.

We hope you will support our efforts.

THANK YOU for letting us share this information.

FOR MORE INFORMATION, VISIT US ONLINE AT

seaweedcouncil.org