Commonwealth of Massachusetts

Division of Marine Fisheries

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Boston, Massachusetts 02114
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Ronald Amidon
Commissioner
Mary-Lee King
Deputy Commissioner

8/22/2018

PUBLIC COMMENT PERIOD AND HEARING NOTICE REGARDING PROPOSED SPECIAL PERMIT FOR AN EXPERIMENTAL KELP AQUACULTURE ARRAY IN BUZZARDS BAY NEAR NAUSHON ISLAND IN THE TOWN OF GOSNOLD:

Public Comment period August 22, 2018 – September 12, 2018
Public Hearing September 6, 2018 6pm at The Falmouth Public Library
300 Main Street Falmouth, MA 02540

The Division of Marine Fisheries (DMF) has scheduled a public hearing and comment period to accept public input on a special permit application from Woods Hole Oceanographic Institution for the installation of a novel macroalgae farming array in Buzzards Bay approximately 2 nm SW of Penzance Point in Woods Hole and 0.7 n.m. NW of Naushon Island in the Town of Gosnold. The array is proposed to be deployed in Fall 2018 and removed by June 2021. The array will support sugar kelp (*Saccharina latissima*) growing on longlines suspended between a pair of 33m-wide submerged trusses. Each of the proposed 33 horizontal kelp lines is approximately 66m long and separated by 1m. The lines and the truss frames compose a horizontal "array" and it is moored between two opposing anchors that are placed to align the kelp lines with the prevailing NE/SW tidal currents. The array is proposed to be submerged to a depth of approximately 3m.

DMF will review comments to evaluate stakeholder concerns about the proposed experimental project and to determine if modifications to location, gear marking, and gear design, or other features of the project, may be warranted. Written public comments will be accepted until 5:00 PM on September 12th, and a public hearing will be held on September 6, 2018 at 6pm at The Falmouth Public Library 300 Main Street in Falmouth, Ma 02540. Please address all comments to Director David Pierce. Comments can be sent by e-mail to marine.fish@state.ma.us or by mail to 251 Causeway Street, Suite 400, Boston, MA 02114.

A full copy of the permit application can be found on DMF's website or can be obtained by contacting Jared Silva by phone (617-626-1534) or through e-mail (jared.silva@state.ma.us).

Woods Hole Oceanographic Institution

Scott LIndell, *Research Specialist*

MS #34, 266 Woods Hole Road, Woods Hole, MA 02543
Office/cell: 508 289-1113
slindell@whoi.edu www.whoi.edu

July 26, 2018

Dr. David Pierce, Director
Massachusetts Division of Marine Fisheries
251 Causeway Street, Suite 400
Boston, MA 02114
via email

Dear Dr. Pierce,

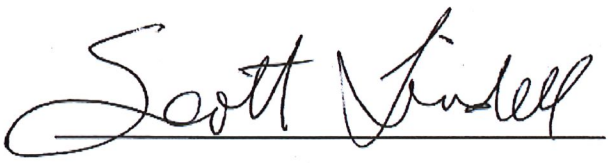
Please accept and review the enclosed materials as an application to pursue a research project involving selective breeding and common garden evaluations on an experimental seaweed farming system in Buzzards Bay. The project is funded by DOE under Agency Award # DE-AR0000915 as part of their ARPA-E MARINER program.

For this three-year project, we seek to demonstrate the commercial utility of seaweed cultivars, and the technical feasibility of a novel farm system design as an enabling technology for the growth of a commercial kelp-farming sector. The proposed system boosts productivity for a given footprint and reduces the risk of entanglement to marine mammals or turtles.

The proposed site in Buzzards Bay is situated just to the SE of the northernmost Weepecket island approximately where ACOE issued me a permit for a fish farming experiment 10 years ago. Other than 6 buoys, the system is fully submerged 3 meters below the surface and is essentially invisible from land. The site is well out of the way of the channel between Naushon and the Weepecket Islands in waters that are seldom navigated due to the proximity to the rocky outcroppings. Our project schedule calls for a September deployment. Contact has been made with NOAA protected species staff.

Attached you will also find materials in support of this application, in particular, information detailing the features that are designed to minimize the risk of entanglements with marine animals.

Sincerely,



Scott Lindell, Principal Investigator

Encl: Technical Project Description and Project Risk Assessment

Proposed Buzzards Bay Kelp Farm Demonstration Project

1. Detailed site plan including latitude and longitude of corners;

We propose the installation of a novel macroalgae farming system near the northern portion of the Weepecket Islands approximating the location where we erected another research project (permit NAE 2008-257) 10 years ago. This 10-acre location is centered around N 41°31'12" W -70°43'54". The site is 2 nm SW of Penzance Point in Woods Hole and is 0.7 n.m. NW of Naushon Island as shown Figure 1 titled "Site Location." More detail on its location is portrayed in Figure 2 titled "Site Detail" and its position with respect to the Weepecket Islands is shown.

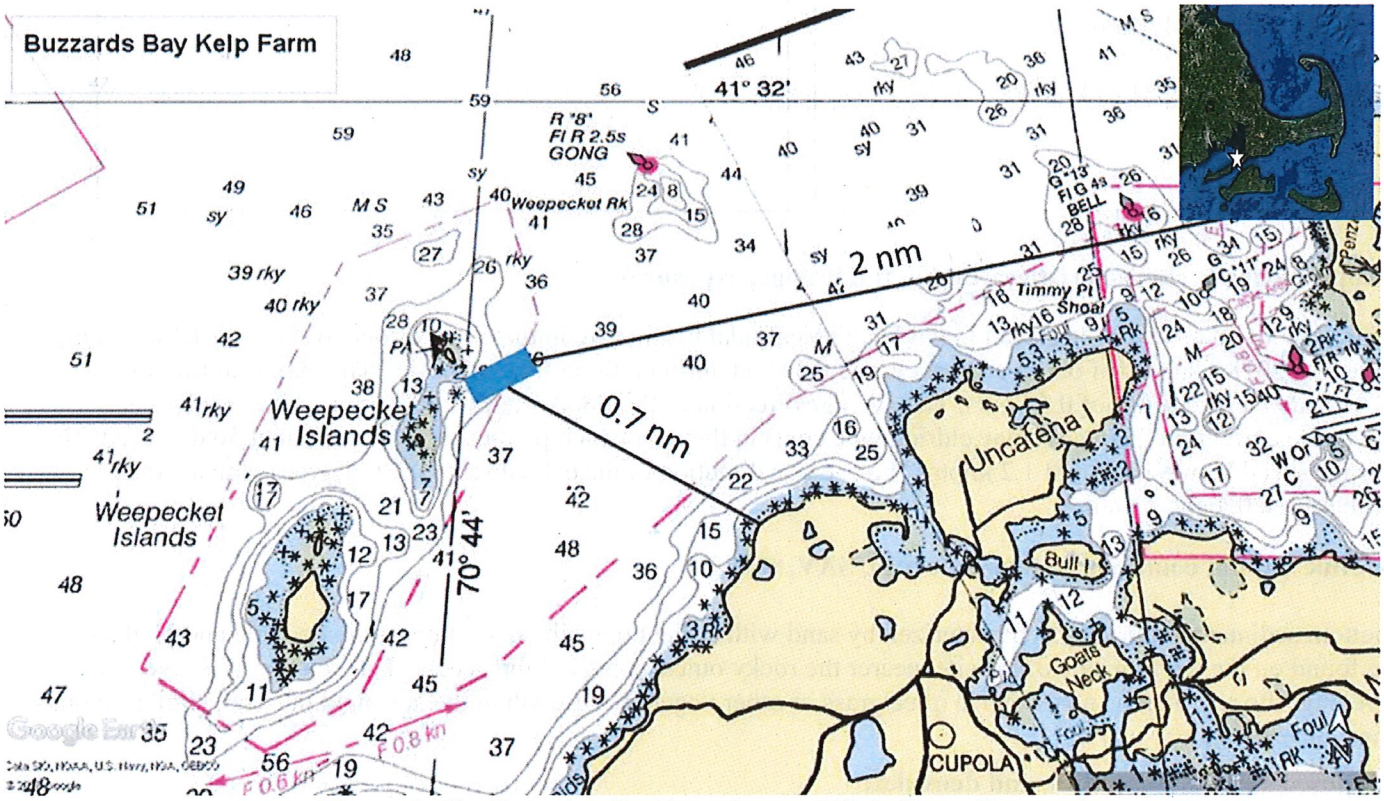


Figure 1. Site Location for Experimental Kelp Farm Research

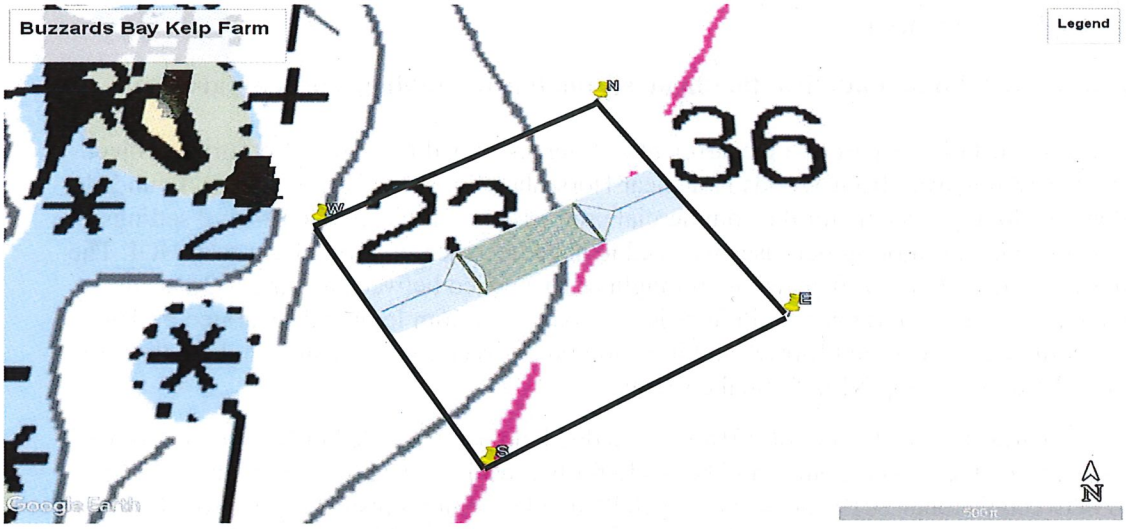


Figure 2. Site Detail for Experimental Kelp Farm Research

Coordinates for the site corners:	Anchor coordinates (approximate):
N: 41°31'17.51"N, - 70°43'51.36"W	NE: 41°31'15.12"N, - 70°43'49.43"W
E: 41°31'11.86"N, - 70°43'46.74"W	SW: 41°31'11.94"N, - 70°43'56.81"W
S: 41°31'8.44"N, -70°43'54.09"W	
W: 41°31'14.12"N, - 70°43'58.58"W	

2. Geophysical site characteristics; (depth, tidal range, exposure)

The site is about 10 meters deep (mean low tide). Typical tidal heights are in the range of one to six feet (0.3 to 1.8 m). On June 7th, 2018 a survey of ocean currents was conducted during a flood tide at the site. The max flood was 1.4 knots with an average speed of 0.6 knots. The average direction of the flood tide was 50 degrees. These values are similar to the current predictions (www.eldridgetide.com) in the area which predicts a flood current at 50 degrees with an average speed between 0.6 and 1.2 knots. The average direction of the ebb current is 230 degrees with average speeds between 0.4 and 1 knots

3. Benthic habitat conditions; (sediment type, SAV, rocks?)

The bottom sediment at the site is characterized by sand with a fine grain silt cover. Intermittent cobble and boulders can be found on the western side of the site, nearer the rocky outcroppings of the Weepecket Islands. We have surveyed the site and there is no evidence of eelgrass or other vegetative growth in the surrounding sand, similar to our findings 10 years ago.

4. Proposed species, quantities, and densities;

Our project calls for cultivating sugar kelp, *Saccharina latissima*, a native species throughout New England. We plan to plant "seedstring" on 33 parallel lines that are each 66 m long separated by 1 meter. Final harvest densities are estimated to be 100 to 200 sporophytes per meter.

5. Proposed physical structures; (anchors), lines (length, diameter, floating or sinking), corner markers)

The macroalgae farming array to be installed is part of a Department of Energy-funded MARINER program project. Previously the array was installed 18 nm away from Woods Hole near Horseshoe Shoals as part of a NOAA-funded Phase 2 SBIR project aimed at developing systems for the commercial production of seaweeds in offshore settings. We've determined that for research and monitoring purposes we need to have the research farm closer to WHOI. The array will support sugar kelp (*Saccharina latissima*) growing on longlines suspended between a pair of 33m-wide submerged trusses. Each of the proposed 33 horizontal kelp lines is approximately 66m long and separated by 1m. The lines and the truss frames compose a horizontal "array" and it is moored between two opposing anchors that are placed to align the kelp lines with the prevailing NE/SW tidal currents.

The array will be deployed at the earliest in September of 2018 with seeded kelp ideally added in late October or early November. The crop will grow during the cooler months and be ready for harvest in late May or early June of 2019. The process will be repeated between October 2019 and May/June 2020, and based upon results, again from October 2020 to June 2021. This is a 3-year research project and will terminate in June 2021 at which time we intend to remove the system unless further research is warranted and funded, or it is adopted by a responsible academic or commercial interest.

The array will be submerged to a depth of approximately 3m, and supported by four truss-supporting corner "pencil" buoys and marked by lighted mooring buoys. Each of the two mooring buoys also support a radar reflector and a flashing light in compliance with US Coast Guard requirements. We had problems with the integrity of plastic buoys on the installed array in Nantucket Sound last winter, and we will be using a new steel design that is more robust. We can also install corner buoys marking the entire aquaculture lease if deemed appropriate. We only intend to use 2 acres of the 10-acre lease this first year pending further funding for other research that may require additional use of the lease next year.

One of the design goals of this array is to reduce or eliminate the risk of protected species entanglement by having no small-diameter slack lines. Every element is pretensioned during deployment. That pretension varies slightly during tidal fluctuations but never approaches zero. This configuration produces a rigid tensioned structure that makes it highly unlikely any entanglements will occur. All grow-lines are connected by 1,400 lbs weak links, and will be removed between harvest and replanting (June – October).

More details and figures are contained in the ACOE application

6. Detailed operational plan (species, density, deployment dates, harvest dates, sources);

Our research plan calls for production of 144 families to be planted in November. The structure and plants will be evaluated frequently by observations from a boat:

- once per week for a month after initial structure installation (Sept/Oct)
- once a week after initial seedstring planting (Nov/Dec)
- then every two weeks thereafter until April 15th
- then once a week until final harvest by June 15th

A 24' to 32' service craft will be used for the installation of the seeded grow lines. This will be a brief process that will also occur at slack low water. During the kelp growing season, we will visit the site using either a 32' lobster boat (F/V Divergence) or a 24' center console (WHOI's R/V Calanus) depending on the tasks to be performed and the weather.

We have collected germplasm from a dozen sites from NY, CT, RI, MA, NH and ME. Hatcheries at the University of Connecticut and WHOI will provide bio-secure seedstock.

7. Anticipated habitat degradation issues and plan to minimize

Habitat degradation is not typically associated with seaweed aquaculture. Buzzards Bay has a eutrophication problem that seaweed aquaculture could conceivable take advantage of and possibly help remediate. Part of our research in conjunction with WHOI's AUV team is to document any environmental changes around and within the farm such as fish and invertebrate assemblages.

8. Disposal plan for culls and gear; (Compost, land-fill)

The project calls for periods of intensive sampling and all material will be taken off site for further evaluation. We have commercial partners (GreenWave and affiliate farmers) who will make use of the harvest not necessary for scientific purposes; they have markets for different qualities of seaweed from food to fertilizer.

9. Evidence of application for Army Corps of Engineers Section 10 Permit.

Our application has been issued File number NAE-2018-01668.

10. Authorization from harbormaster or Cht 91 license for structures (anchors)

Letters from Town of Gosnold Board of Selectmen and Harbor Committee are forthcoming. Hearings and approval were granted 7/13 and 7/21/18 respectively.

11. Local approvals and any other supporting documentation.

See Appendix

Appendix

Proposed Buzzards Bay Kelp Farm Demonstration Project Impact Assessment

Site Proposal

We propose the installation of a novel macroalgae farming system near the northern portion of the Weepecket Islands approximating the location where we erected another research project (permit NAE 2008-257) 10 years ago. This 10-acre location is centered around N 41°31'12" W -70°43'54". The site is about 30 feet deep (mean low tide) and about 100 feet from the margin of a sub-tidal rocky outcropping The bottom substrate of the site is bare sand with some fine silt on top. We have SCUBA'd on the site and there is no evidence of eelgrass or other vegetative growth in the surrounding sand. The site is 2 n.m. SW of Penzance Point in Woods Hole and is 0.7 n.m. NW of Naushon Island as shown Figure 1 titled "Site Location." More detail on its location is portrayed in Figure 2 titled "Site Detail" and its position with respect to the Weepecket Islands is shown.

The macroalgae farming array system to be installed is part of a Department of Energy-funded MARINER program project. Previously the system was installed 18 n.m. away from Woods Hole near Horseshoe Shoals as part of a NOAA-funded Phase 2 SBIR project aimed at developing systems for the commercial production of seaweeds in offshore settings. We've determined that for research and monitoring purposes we need to have the research farm closer to WHOI. The system will support aquacultured sugar kelp (*Saccharina latissima*) growing on longlines suspended between a pair of 33m-wide submerged trusses. Each of the proposed 33 horizontal kelp lines is approximately 66m long and separated by 1m. The lines and the truss frames compose a horizontal "array" and it is moored between two opposing anchors that are placed to align the kelp lines with the prevailing NE/SW tidal currents as shown in the attached Figure 3 titled, "Initial installation", and Figure 4 titled, "Growline installation".

The system will be deployed at the earliest in September of 2018 with seeded kelp ideally added in late October or early November. The crop will grow during the cooler months and be ready for harvest in May or early June of 2018. The process will be repeated between October 2019 and May/June 2019, and based upon results, again from October 2020 to June 2021. This is a 3-year research project and will terminate in June 2021 at which time we intend to remove the system.

The array system will be submerged to a depth of approximately 3m, supported by four corner buoys and marked by lighted mooring buoys. The truss-supporting corner buoys are shown in the attached Figure 8. These buoys act as radar reflectors and support a flashing light in compliance with US Coast Guard requirements. We had problems with the integrity of plastic buoys on the installed array in Nantucket Sound last winter, and this new steel design is bolted directly to the truss frame, and is very unlikely to fail. We can also install corner buoys marking the entire aquaculture lease if deemed appropriate.

Site profile

The bottom sediment at the site is characterized by sand with a fine grain silt cover. Intermittent cobble and boulders can be found on the western side of the site, nearer the rocky outcroppings of the Weepecket Islands. Typical tidal heights are in the range of one to six feet (0.3 to 1.8 m). On June 7th, 2018 a current survey was conducted during a flood tide at the site. The max flood was 1.4 knots with an average speed of 0.6 knots. The average direction of the flood tide was 50 degrees. These values are similar to the current predictions in the area which predicts a flood current at 50 degrees with an average speed between 0.6 and 1.2 knots. The average direction of

the ebb current is 230 degrees with average speeds between 0.4 and 1 knots.

Array Description

The major components of the project deployment include the following:

- Kelp growlines
- Growline extensions
- Catenary lines
- 33m-long trusses
- Lighted truss end buoys
- Array framing lines
- Mooring bridles
- Mooring buoys
- Mooring lines
- Mooring chain
- 8,000 lb. Navy stockless anchors (2)

Kelp growlines – These lines will be 3/8" Polysteel "Esterpro" sink rope, 66m long with C-link quick connects spliced into each end. The 3-strand rope has a breaking strength of 3,720 pounds and the C-link a breaking strength of 1,400 pounds. Shortly after deployment they are mated spirally to seed line bearing the sugar kelp seedlings.

Growline extensions – These lines accommodate the curvature of the catenary line, allowing uniform length in the growlines. A C-link pair allows for the easy insertion and removal of growlines, as well as weak-link compliance. These lines of varying length are of 3/8" Tenex, a polyester, 12-strand braid with a breaking strength of 5,200 lbs.

Catenary lines – The catenary lines will be 1" Tenex 12-strand braided polyester with a breaking strength of 42,700 pounds. This line will take a parabolic shape with 33 extension lines of appropriate length spliced in. The detail of this catenary line, extension line, and growline arrangement is shown in the attached Figure 6, "Rigging Detail."

33m-long trusses (Figures 5 and 6) – The ends of the catenary lines are connected to the outer ends of the welded steel trusses. The truss is assembled from three sections as shown in the attached Figure 7, "33m Truss Detail." The truss X-section is composed of a 4-foot square arrangement of 4" x 4" HSS square tubing with braces and diagonals of 3" round steel tubing. These fabrications are of welded, hollow steel members and designed to be between 1,800 and 2,200 pounds negatively buoyant when submerged in seawater.

Truss end buoys (Figure 8) – The ends of the trusses are supported by cylindrical steel buoys that provide 2,460 pounds of buoyancy. These buoys are 13' high and will sit with 3' of freeboard placing the truss 10' below the sea surface. The buoys are connected directly to the trusses with no vertical line or chain required. These will be fitted with USCG-compliant lights and act as radar reflectors.

Array framing lines – The distance between the two trusses will be controlled by a pair of framing lines that are 66m long and made of ¾" Tenex 12-strand braided polyester with a breaking strength of 22,400 pounds

Mooring bridles – The mooring bridles will be of 1" Tenex 12-strand braided polyester with a breaking strength of 42,700 pounds. These lines will take a 45° angle and converge at a point

54' ahead of the truss where the mooring line and the mooring buoy are connected.
Mooring buoys – The mooring buoys are smaller than the truss buoys, and provide sufficient buoyance to support the vertical component of the mooring loads.

Mooring lines – The mooring lines will be of 1 ½" Tenex 12-strand braided polyester with a breaking strength of 81,700 pounds and of a length to provide a 3:1 scope ratio.

Mooring chain – A half shot (45') of 1 ½" open-link anchor chain will connect the mooring line to the anchor, providing a desirable shock-absorbing feature and an ability to maintain pretension over the range of tides.

Navy stockless anchors (Figure 5) – An 8,000-lb Navy stockless anchor will be used at each end of the system. In the sandy bottom of the site and once embedded, this will provide between 50,000 and 70,000 pounds of holding power.

Vessel usage

Following the successful installation in Nantucket Sound last year, we will again utilize W. S. Shultz Company in Woods Hole. This company has extensive experience in marine projects. Utilizing their barge/crane capabilities, we anticipate a streamlined process of installing the anchors, mooring lines and trusses based on this recent experience.

During system installation, there will be one 80' x 40' steel barge with a crane aboard. This barge will be towed and maneuvered by a 48' tug. We will also have a 40' service craft and a 24' skiff and a dive team on site during the one-day installation process centered at slack low water. This work will occur ideally in September 2018 or as soon thereafter when permitted

A 24' to 32' service craft will be used for the installation of the seeded grow lines. This will be a brief process that will also occur at slack low water.

During the kelp growing season, we will visit the site using either a 32' lobster boat (F/V Divergence) or a 24' runabout (WHOI's R/V Calanus) depending on the tasks to be performed and the weather. These visits will occur at a minimum of two-week intervals.

Fishing Activity In Area

This site is occasionally used by fishermen setting mobile trap gear (conch and lobster) though those fisheries are mostly dormant during the winter when the kelp grows and the system is actively in use. Though the system supports 2 km of kelp grow line, the area encompassed by the horizontal array is compact and approximately 1 acre thus minimizing conflicts with fishing activities.

Impacts to Protected Species

Protected species such as whales and turtles may transit through this area. Whales are rarely seen since it is not a productive feeding area. The turtle species, (loggerhead, Kemp's Ridley, leatherback, and green) actively feed and inhabit the area seasonally, and sometimes become entangled in surface buoy lines connected to traps and fishing gear.

One of the design goals of this array system is to reduce or eliminate that risk by having no small-diameter slack lines. Every element is pretensioned during deployment. That pretension varies slightly during tidal fluctuations but never approaches zero. This configuration produces a rigid tensioned structure that makes it highly unlikely any entanglements will occur.

Any sightings of whales or turtles will be recorded and submitted to the proper authorities to comply with state or federal statutes. The site will be visited at least every other week while longlines are deployed.

Invasive species monitoring and prevention

The kelp seed lines will be from spores from the species *Saccharina latissima* (sugar kelp) endemic to New England waters. The seed will come from biosecure hatcheries operated by University of Connecticut and WHOI. The longlines will be consistently monitored for the presence of invasive organisms and general biofouling during routine visits to the site.

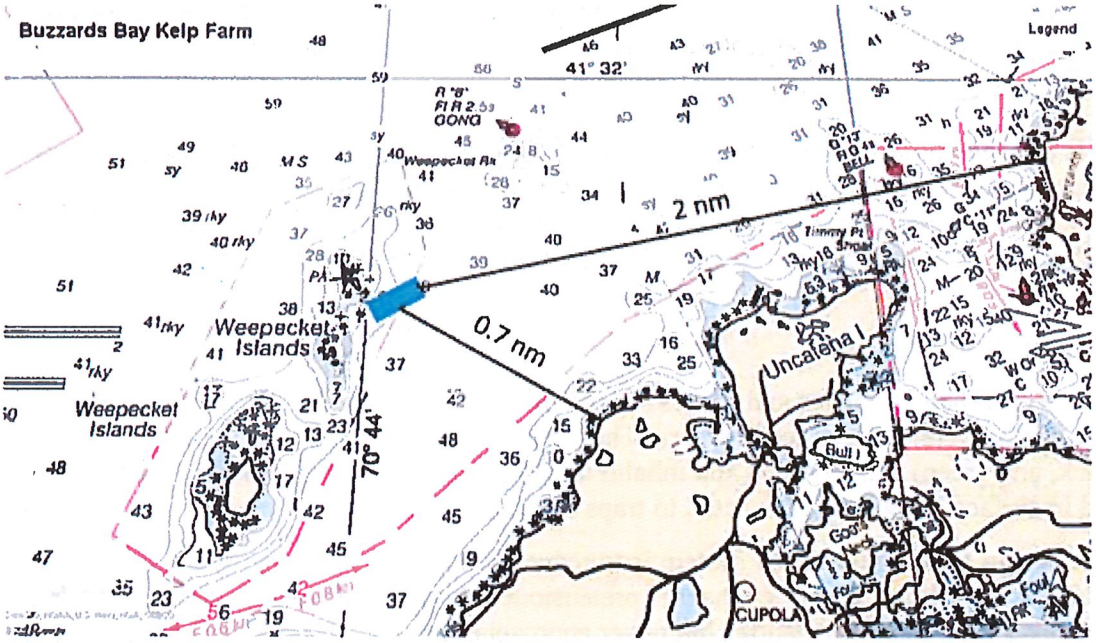
Federal Consistency

To comply with the federal consistency requirement of the CZMA (16 U.S.C. § 1456) that federal actions that have reasonably foreseeable effects on any land or water use or natural resources of a state coastal zone must be consistent with the enforceable policies of the federally approved coastal management program for that state, we will submit a copy of this report to the Massachusetts Office of Coastal Zone Management for their review.

Decommissioning Plan

The project plan includes the decommissioning of the system. In the event it becomes advantageous to the sponsor or other government-funded projects to keep the deployment in place, we would seek an extension of any issued permits from the ACOE.

Figure 1. Site Location for Experimental Kelp Farm Research



Growline installation

Figure 4

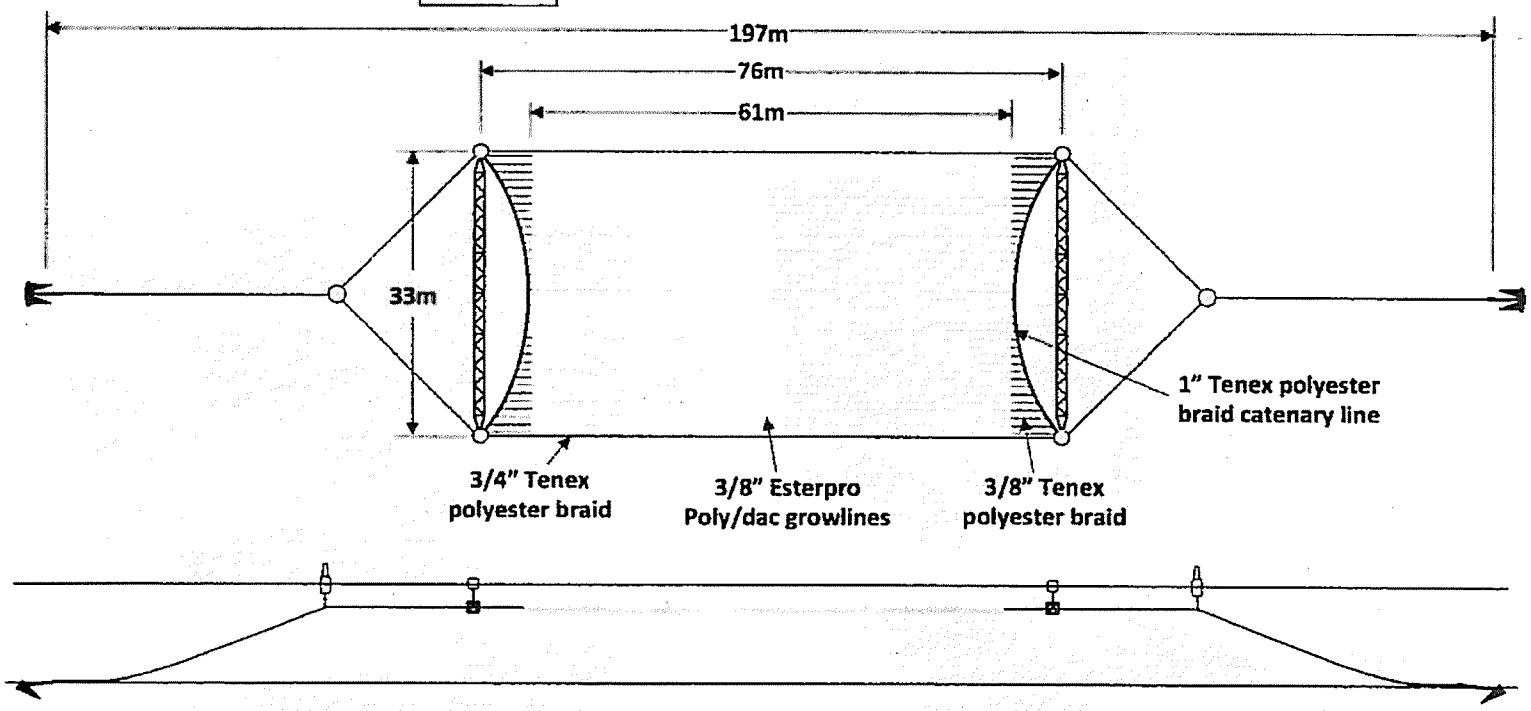


Figure 5. Kelp Farm System Components

Anchors, and original buoys

& 30 m long trusses (in pieces)

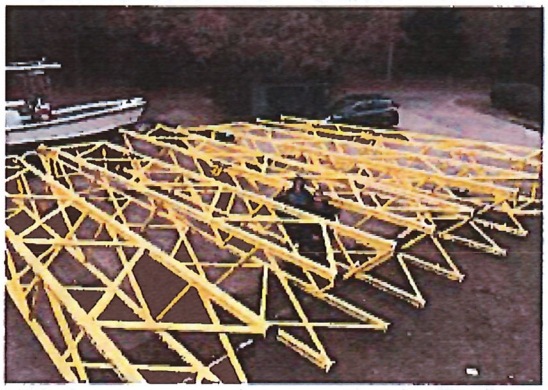


Figure 6. Deployment in Nantucket Sound 2017

Trusses on WHOI dock

Steel buoys for 2018

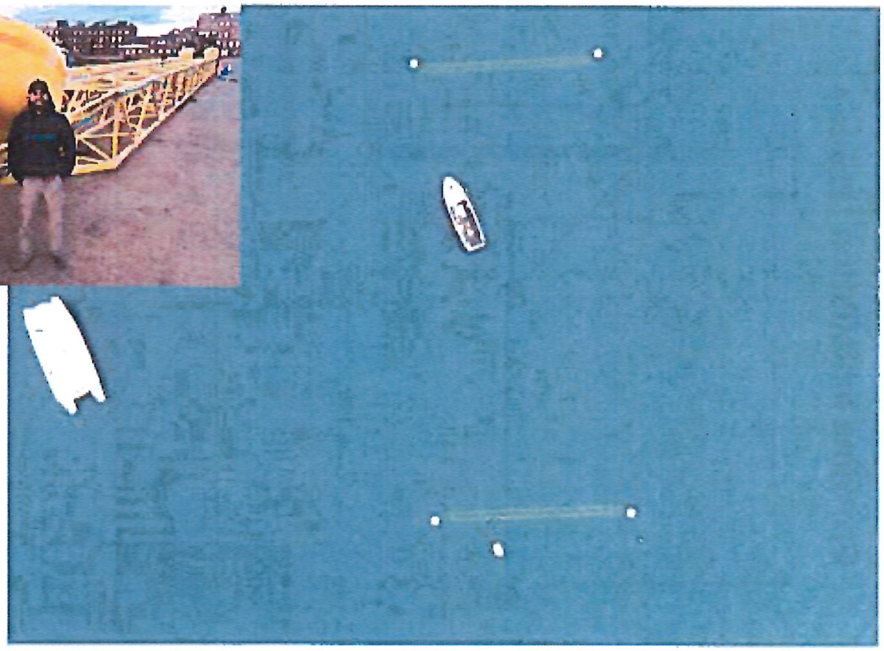
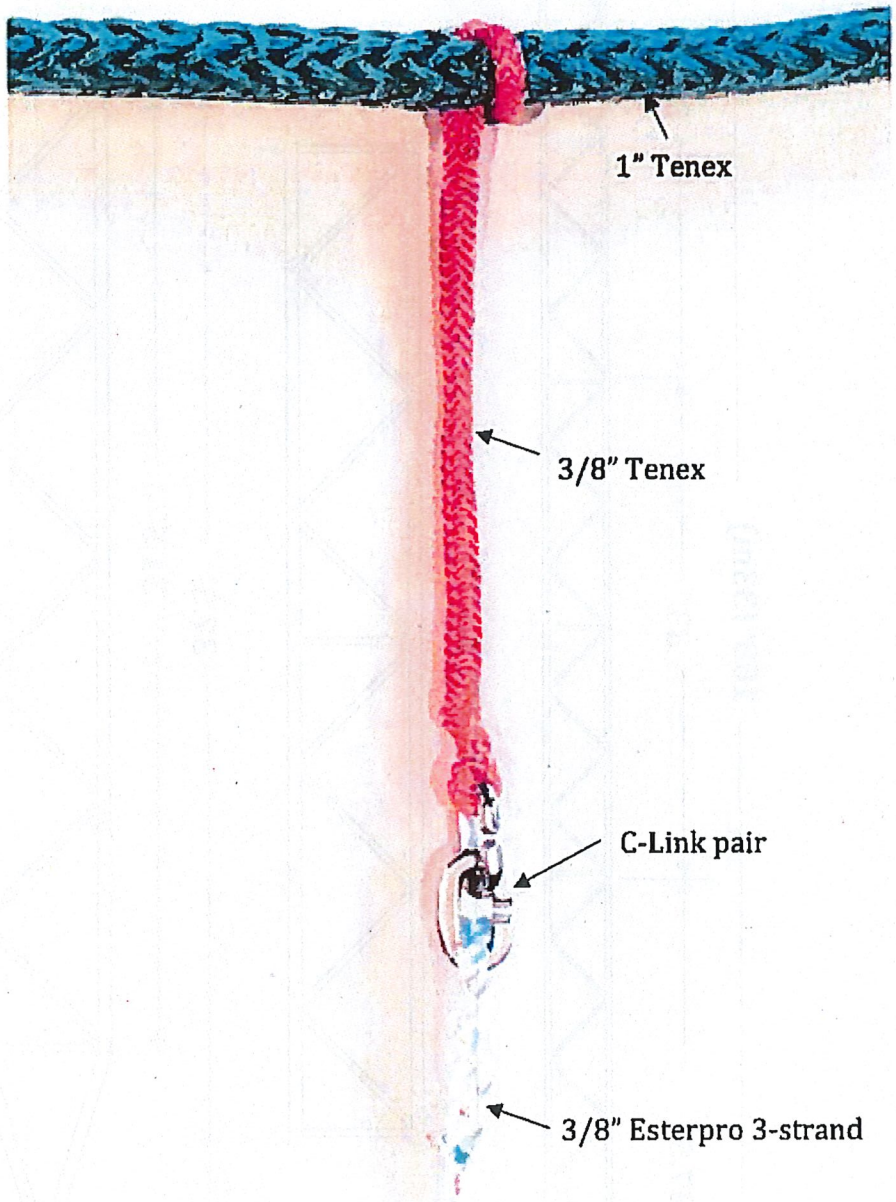


Figure 7. Rigging Detail

This is a detail of the intersections of the catenary line, extension line, and growline.



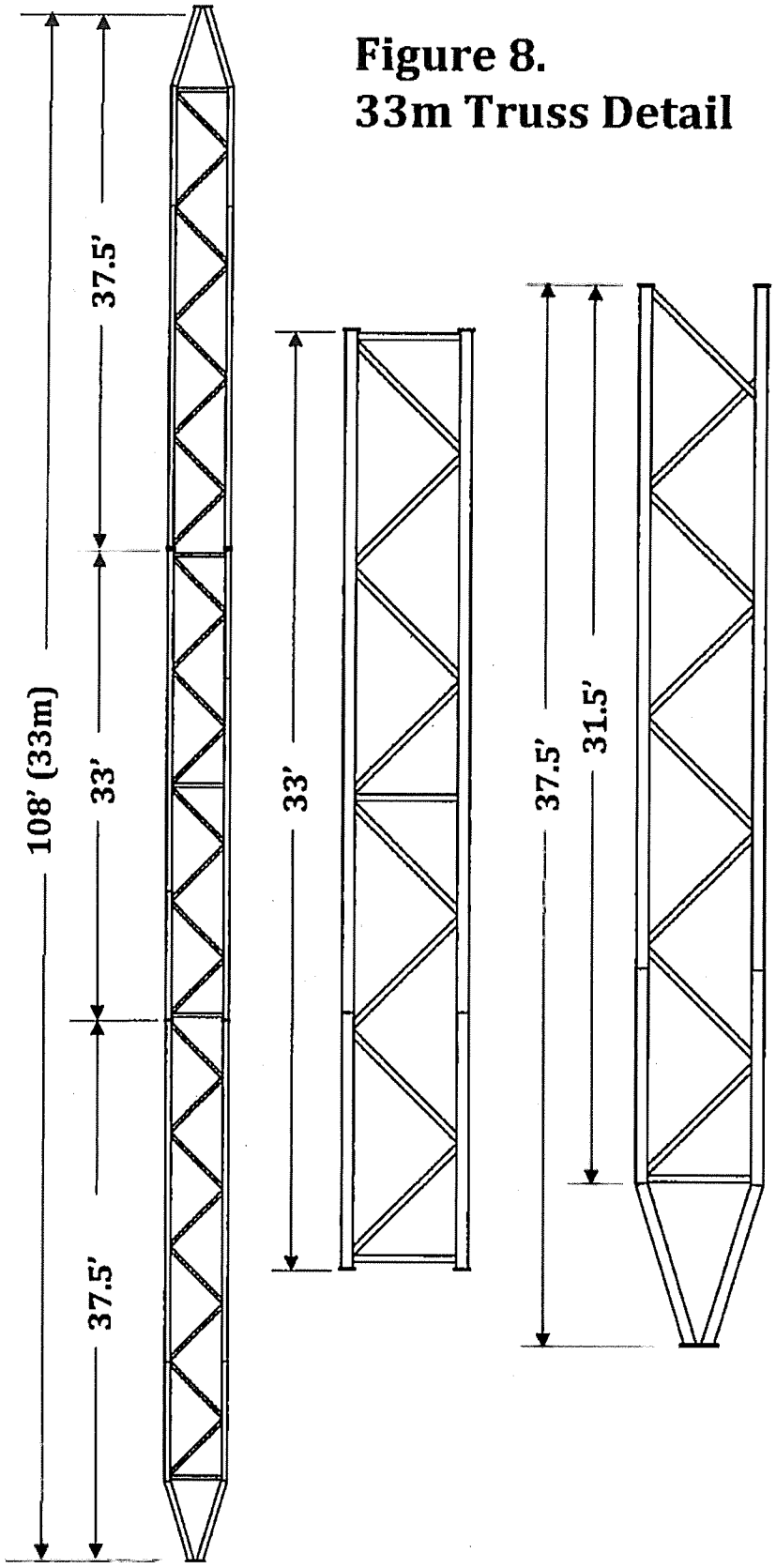
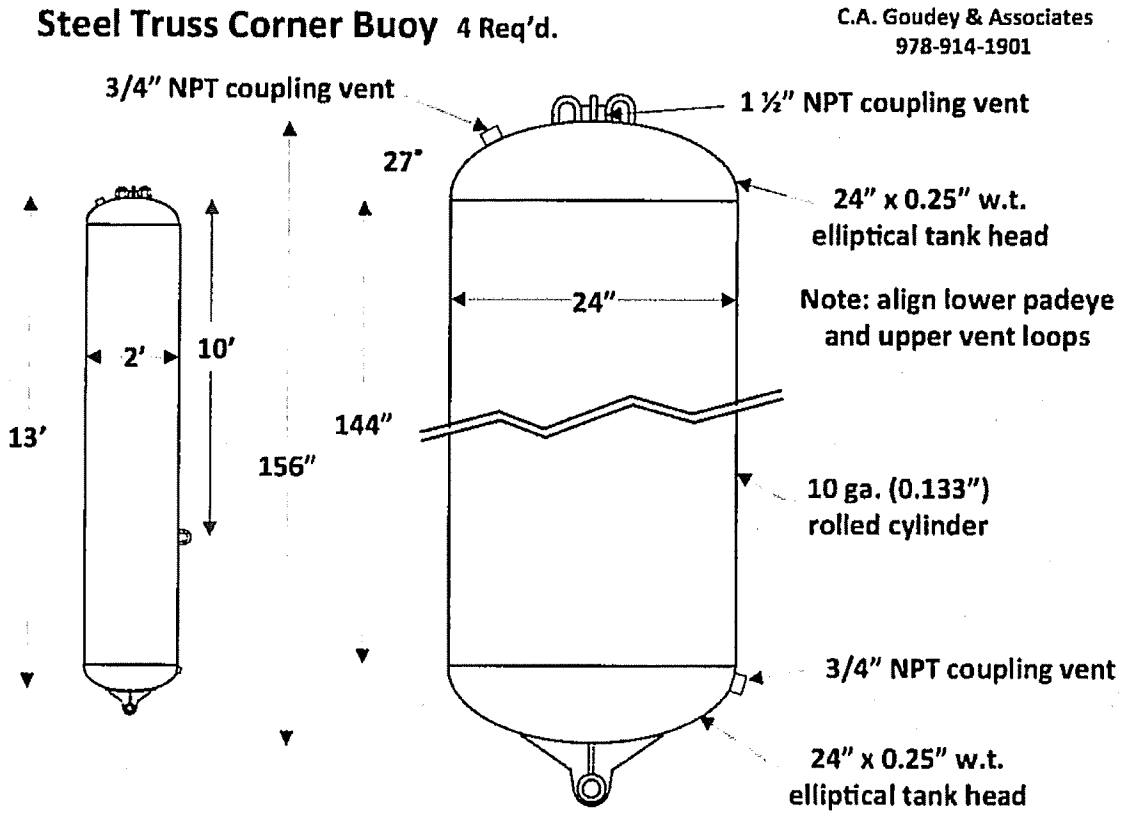


Figure 8.
33m Truss Detail

Figure 9.


Steel Truss Corner Buoy 4 Req'd.
C.A. Goudey & Associates
978-914-1901
3/4" NPT coupling vent
1 ½" NPT coupling vent
27°
24" x 0.25" w.t.
elliptical tank head
24"
Note: align lower padeye
and upper vent loops
2'
10'
13'
144"
156"
10 ga. (0.133")
rolled cylinder
3/4" NPT coupling vent
24" x 0.25" w.t.
elliptical tank head

Historical Notices sent to:

* Wampanoag Tribal Historic Preservation Officer, 20 Black Brook Road, Aquinnah, Massachusetts 02535
* Mashpee Wampanoag Tribe, Tribal Historic Preservation Authority, P.O. Box 1048, Mashpee, MA 02649
* Narragansett Tribal Historic Preservation Office, P.O. Box 350, Wyoming, Rhode Island 02898
* Massachusetts Board of Underwater Archaeological Resources, 251 Causeway Street, Suite 800, Boston, Massachusetts 02114

Woods Hole Oceanographic Institution

Scott Lindell, *Research Specialist*
MS #34, 266 Woods Hole Road, Woods Hole, MA 02543
Office/cell: 508 289-1113
slindell@whoi.edu www.whoi.edu

August 2, 2018

Dr. David Pierce, Director
Fisheries Management and Policy
Massachusetts Division of Marine Fisheries
251 Causeway Street, Suite 400
Boston, MA 02114
david.pierce@state.ma.us

Dear Dr. Pierce,

In consideration for granting WHOI permissions for our MARINER seaweed research farming project and associated aquaculture equipment (including two anchors and associated trussed array), I'm writing to assure you that the equipment will be removed at the 3-year termination of the project unless we get further research funding or they are "adopted" by another responsible academic or commercial entity. In any case, further use of the anchors and/or equipment in place after 3 years will likely require a re-application to the local authority, the Town of Gosnold Harbor Committee, for their use and eventual removal, and to the State for a propagation permit on an annual basis..

I trust this letter will serve the purpose of assuring that WHOI will properly decommission the site, or transfer the anchors/equipment in an orderly manner once our research is completed.

Sincerely,

Scott Lindell

Scott Lindell

Approved:

Laurence P Madin

Laurence P. Madin
Deputy Director and Vice President for Research

Cc: Chris Schillachi, DMF Aquaculture and Propagation Project Leader

The COMMONWEALTH OF MASSACHUSETTS
BOARD OF UNDERWATER ARCHAEOLOGICAL RESOURCES
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
251 Causeway Street, Suite 800, Boston, MA 02114-2136
Tel. (617) 626-1200 Fax (617) 626-1240 Web Site: www.mass.gov/orgs/board-of-underwater-archaeological-resources

August 1, 2018

Scott Lindell, Research Specialist
Woods Hole Oceanographic Institution
266 Woods Hole Road
MS# 34
Woods Hole MA 02543

RE: DOE Mariner Experimental Kelp farm System, Weepecket Islands, Gosnold, MA

Dear Mr. Lindell,

The staff of the Massachusetts Board of Underwater Archaeological Resources has reviewed the above referenced SHPO/THPO Notification Form and supporting material submitted by the Woods Hole Oceanographic Institute. We offer the following comments.

The Board has conducted a preliminary review of its files and secondary literature sources to identify known and potential submerged cultural resources in the proposed project area. No record of any underwater archaeological resources was found for the location. Based on the results of this review and the limited nature (anchoring kelp structures) of the proposed project, the Board expects that this project is unlikely to impact submerged cultural resources.

However, the Board notes the area may be generally archaeologically sensitive. The remains of at least one unidentified shipwrecked vessel is located within one mile of your project area. Therefore, should heretofore-unknown submerged or terrestrial cultural resources be encountered during the course of the project, the Board expects that the project's sponsor will take steps to limit adverse affects and notify the Board and the Massachusetts Historical Commission, as well as other appropriate agencies, immediately in accordance with the Board's *Policy Guidance for the Discovery of Unanticipated Archaeological Resources*.

The Board appreciates the opportunity to provide these comments as part of the review process. Should you have any questions regarding this letter, please do not hesitate to contact me at the address above, by email at victor.mastone@state.ma.us, or by telephone at (617) 626-1141.

Sincerely,

Victor T. Mastone
Director

/vtm
Cc: Brona Simon, MHC
Bob Boeri and Steve McKenna, MCZM (via email attachment)
Sean Bowen, MDAR (via email attachment)
Ramona Peters, MWT (via email attachment)
Bettina Washington, WTGH/A (email attachment)