



# Collaborating to Develop a Regulatory Process for Seaweed Aquaculture in Connecticut

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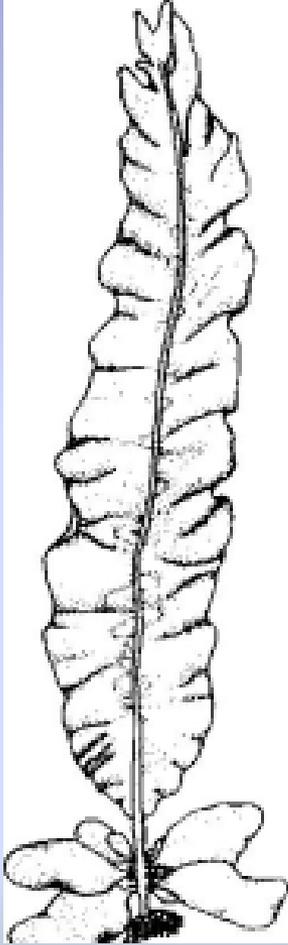
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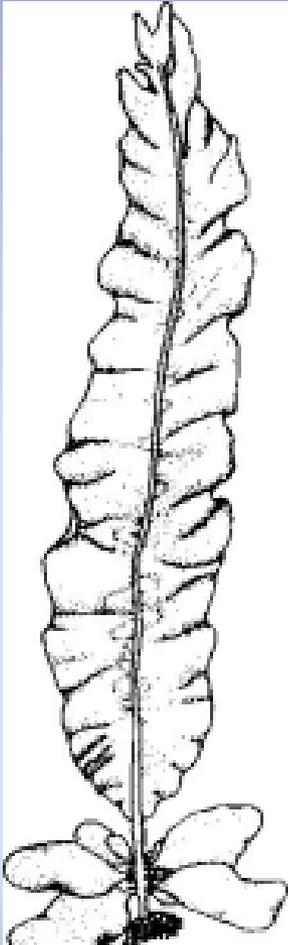


# Presentation Overview



- What are the purposes of seaweed aquaculture?
- Who are the regulatory agencies?
- What are the various aspects of aquaculture regulation?
- What are the major regulatory concerns?
- What is the application process and requirements?
- Acknowledgements
- Questions

# Seaweed Aquaculture Purposes



- Human food source
  - Raw Agricultural Seaweed Commodity
  - Processed Agricultural Seaweed Commodity
- Non-human food uses\*
  - Bioextraction (nutrient removal)
  - Fuel production
  - Fertilizers
  - Pharmaceuticals
  - Cosmetics
  - Fibers for clothing

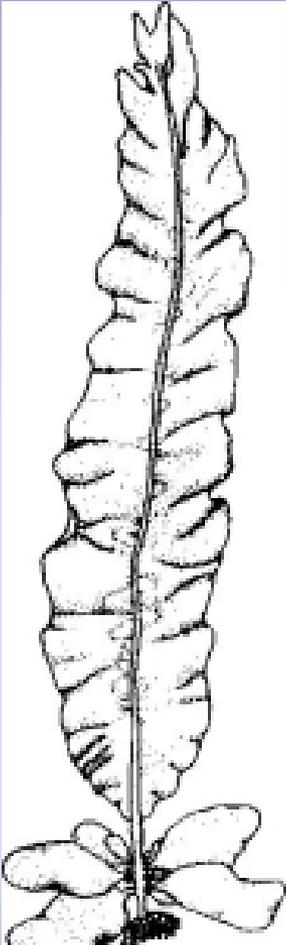
# Regulatory Overview

- All aquaculture activity and associated structures, regardless of product or process, is regulated through a multi-agency review process
- Process mandated through a combination of state statutes and federal law, and also interagency memoranda of understanding
- DA/BA serves as the state aquaculture coordinator and the first point of contact for **all** proposed aquaculture projects

# Regulating Authorities

- Dept. of Agriculture/Bureau of Aquaculture (DA/BA) has exclusive State authority for granting or denying aquaculture permits for marine aquaculture operations, including placement of floating or submerged aquaculture structures, on leases
- The use and placement of structures in tidal waters is regulated cooperatively at the state and federal level with the Dept. of Energy & Environmental Protection (DEEP) and the U.S. Army Corps of Engineers (USACE) with input from EPA, NOAA NMFS and US FWS

# Agencies



- The Connecticut Aquaculture Permitting Workgroup consists of the relevant state and federal regulatory and resource management and planning agencies; role is to develop regulatory guidance and review applications for aquaculture
- Agencies include:
  - CT Department of Agriculture, Bureau of Aquaculture (DA/BA)
  - CT Department of Energy and Environmental Protection (DEEP)
  - U.S. Army Corps of Engineers (USACE)
  - Connecticut Sea Grant, UConn (CTSG) - serves as chair
  - Depending on intent, location, and scope of activity, several local, state, and federal agencies may be involved (DPH, DCP, EPA, NOAA NMFS, USFWS, Coast Guard, Connecticut Historic Commission, shellfish and harbor management commissions, etc.)

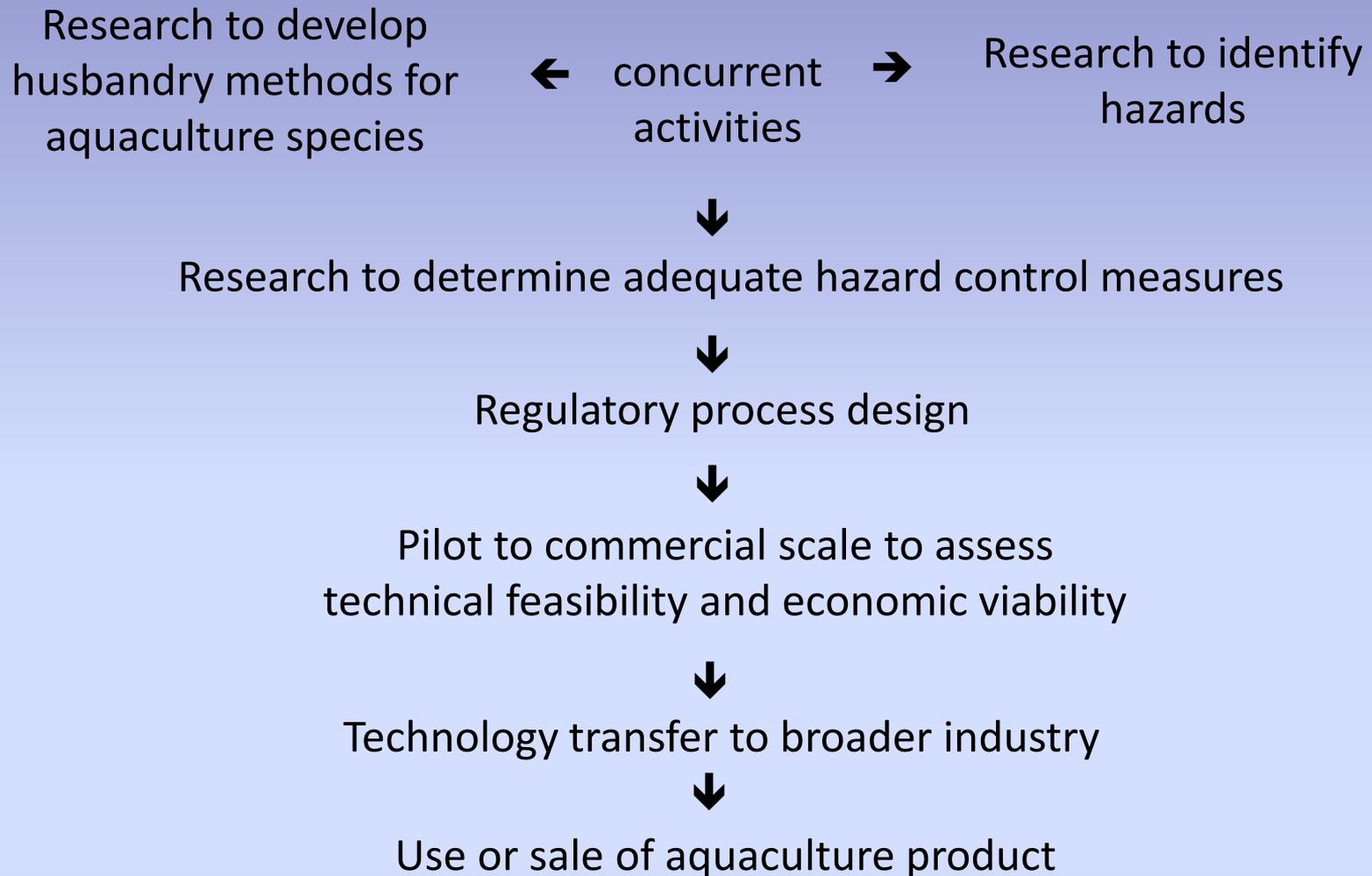
# Permits

- State license for growing area
- Federal permit for structures
- State permit for structures and/or coastal zone management consistency certification
- Wholesale license to manufacture food
- Seaweed producer license (use driven)
  - Processed seaweed commodity
  - Raw agricultural seaweed commodity
  - Non-food seaweed production – including product disposition license
- Certificate for aquaculture operations

# Regulatory Aspects

- Proposed process covers three major aspects of seaweed culture
  - Site selection
  - Production
  - Harvesting, processing and transport
- Why is there regulation associated with these aspects?
- Because hazards are potentially introduced at these various steps in the aquaculture operation

# Ideal Commercialization Process for Aquaculture

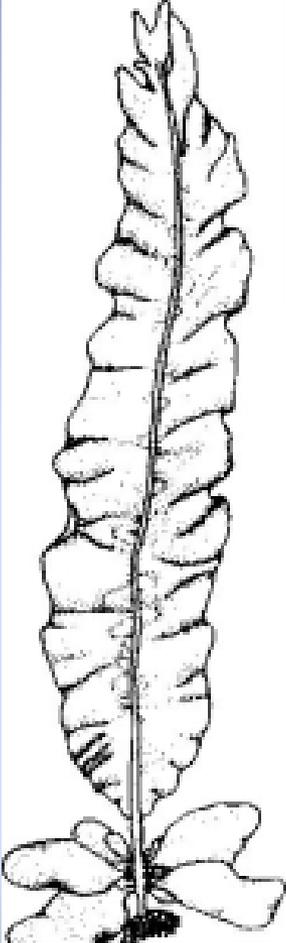


\*Steps taken out of order can hamper development of new aquaculture industries\*

# Aquaculture Hazards

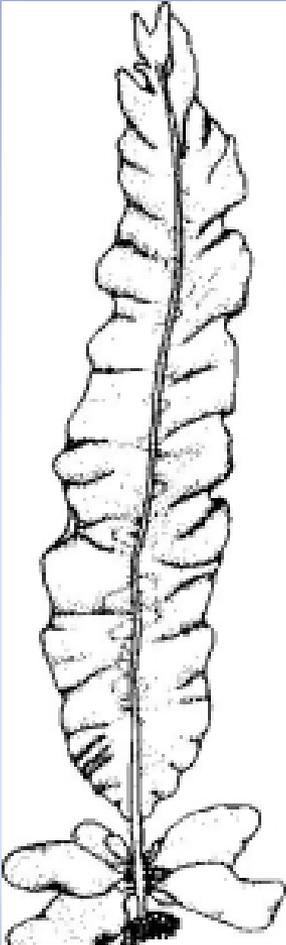
- Identifying hazards provides the agencies and industry with improved knowledge and confidence in the site selection process, production techniques, and harvesting, processing and transport methods, ensuring that hazards can be controlled and all types of risk minimized

# Site Hazards



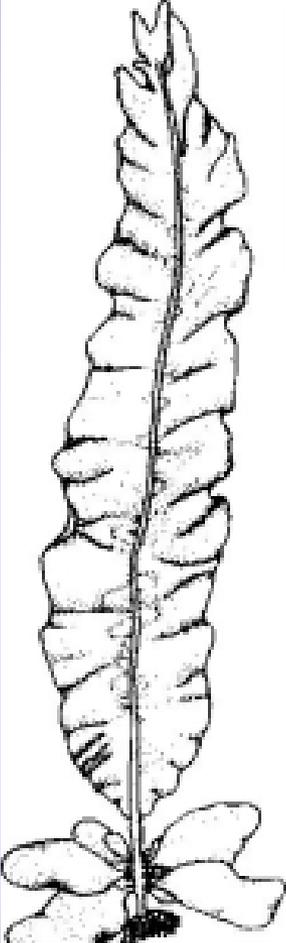
- Any proposed aquaculture activity may present site hazards:
  - Affect navigation (e.g. shipping)
  - Affect recreational activity (e.g. sailing)
  - Affect commercial activity (e.g. fishing)
  - Affect environment (e.g. threatened habitats, species)
- Resource management and regulatory agencies are charged with eliminating or minimizing adverse effects of aquaculture activity
- Recognizing the value of various types of aquaculture, agencies also work to achieve a balance of uses in Long Island Sound

# Production Hazards



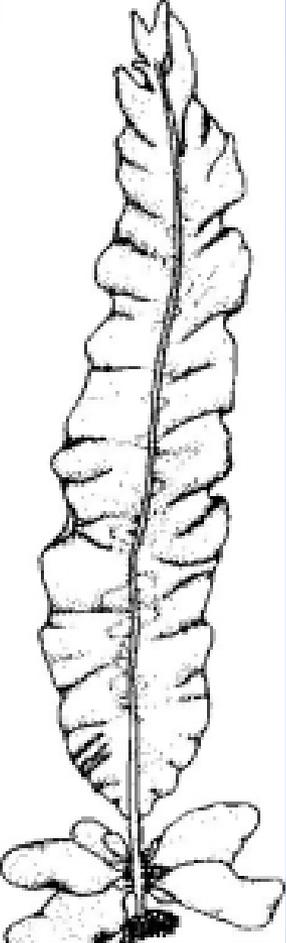
- Production hazards are those that affect the target organism or the aquaculture operation
- These hazards are important to understand, and in context with the final fate of the aquaculture product (e.g. human food use, fuel, fertilizer)
  - predators
  - disease
  - biofouling organisms
  - invasive species
  - operational (e.g. transfer stress, water changes)
  - environmental (e.g. temperature, HAB, climate)

# Harvest, Production and Transport Hazards



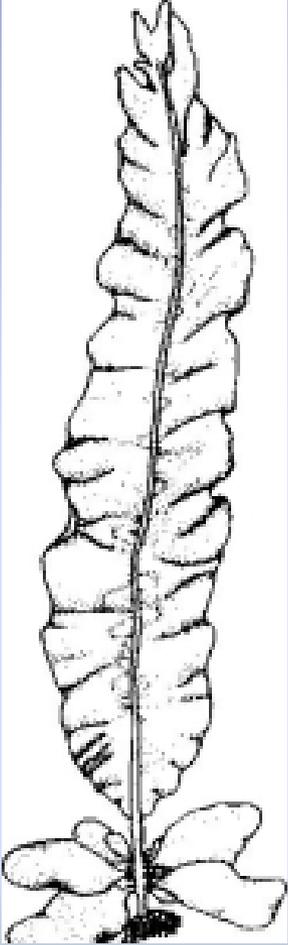
- These potential hazards are only introduced when the product is removed from its cultivation environment, and the product is disposed of or sold for some purpose:
  - Affect human health (e.g. presence and/or introduction of contaminants, pathogens)
  - Affect environment (e.g. disposal of contaminated product, use of product in fertilizers)
- Not a “hazard” per se, but the agencies must also ensure weights and measures compliance, other standards

# Site Selection



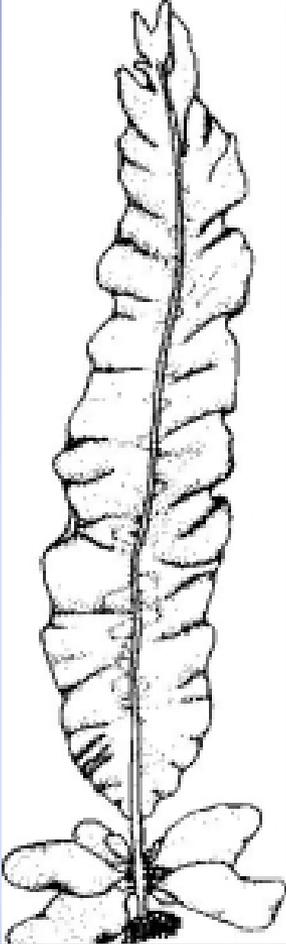
- Intent of project
- Location of activity
- Use of cultivation gear, buoyancy and anchorage
- Use of marker buoys

# Location of Activity



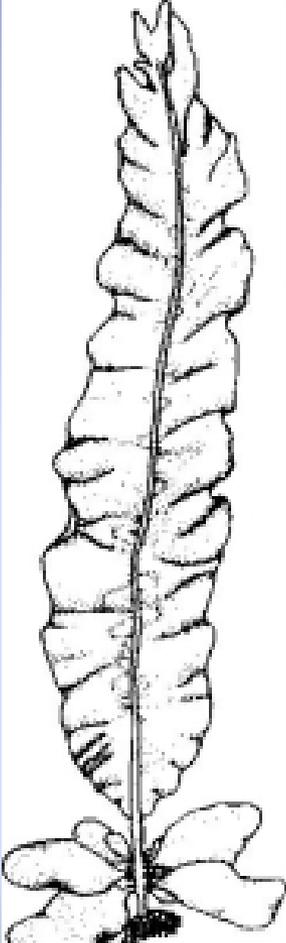
- It may be possible for different types of aquaculture activity to coexist on one site making position of gear in the water column are critical to project design
- Existing uses, whether commercial or recreational, take precedence
- Aquaculture activity can not pose adverse effect to protected or threatened species
- Activity can not be sited within 25 feet of a submerged aquatic vegetation (SAV) area
- Seaweed production may occur in approved, conditional or restricted classification areas based on fate of final product (see product types)

# Intent of Project



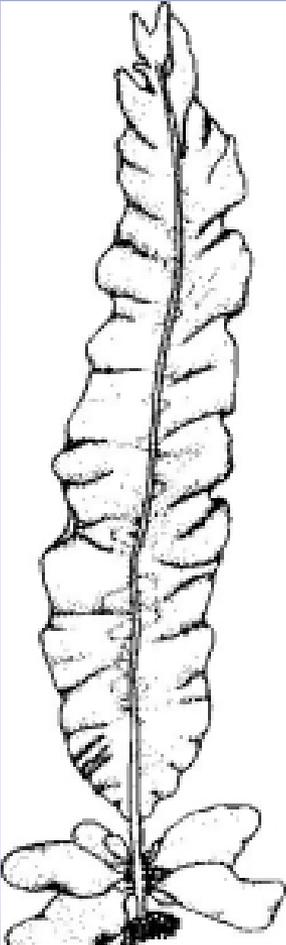
- Depending on the fate of the product, certain licenses and permits may be required from different agencies
  - Will the product be disposed of?
  - Will the product be placed back in the environment as fertilizer or fuel?
- For non-commercial (e.g. research) projects, the final product must be discarded, or a pre-determine agreement with regulatory agencies must be made (if allowable) at first application
- Experimental permits for placing structures in the marine environment do not exist in Connecticut; all gear applications go through the same local-state-federal review process as the potential impact types are the same

# Intent of Project



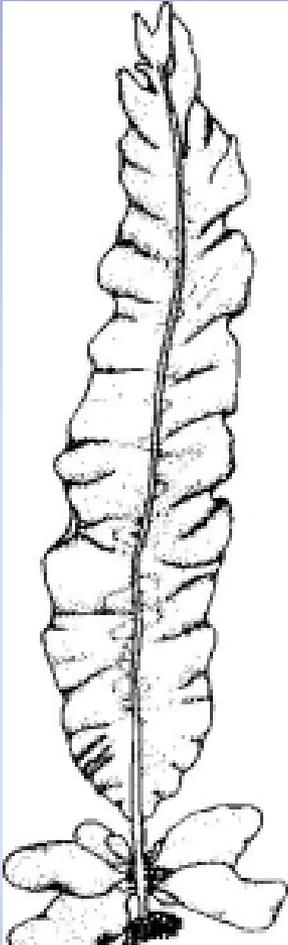
- Projects for other than human food source:
  - considered under a different review process as the final product necessitates a different regulatory review process and agencies
  - may be allowed to occur in areas of impaired water quality where activity for intent of human food source would be disallowed

# Use of Cultivation Gear, Buoyancy Control and Anchorage



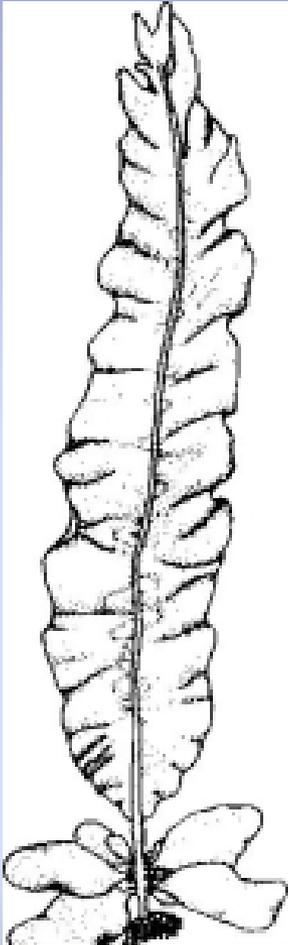
- Cultivation Gear
  - Long lines are a relatively new type of gear to LIS; highly visible; present increased potential for use conflicts; increased exposure to elements
  - Surface long lines are not required
- Buoyancy Control
  - As product grows, weight increases and proper buoyancy control is required; product quality potentially effected when in contact with sea bottom (appearance, predation, taste)

# Use of Cultivation Gear, Buoyancy Control and Anchorage (cont.)



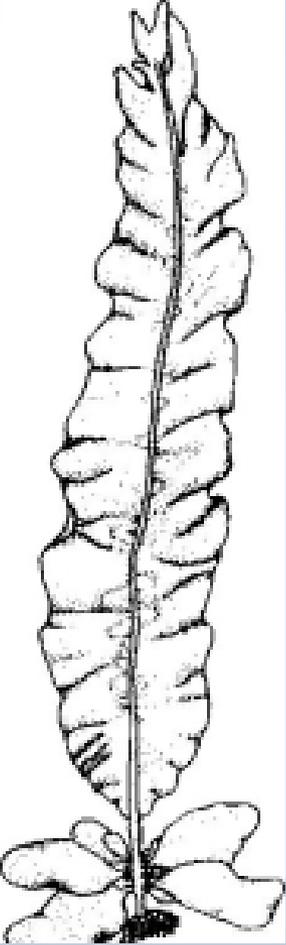
- Anchorage
  - Applicant can propose any anchorage system\*
  - Must determine and demonstrate the tensile strength of the lines, and capability of the anchorage system to withstand the heaviest expected load and full capacity weight of the crop
  - Must provide information to demonstrate that the anchors will remain in place during significant storm events while loaded.
  - Basically, it needs to be secure enough that it will not drift and affect safe navigation
  - It is suggested the producer assumes liability for structures if not properly installed

# Use of Marker Buoys



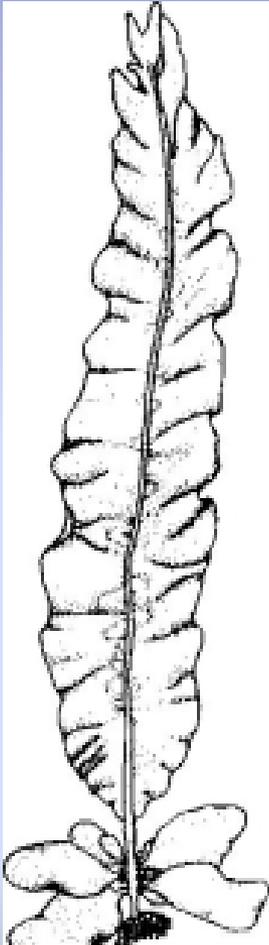
- Marker buoys are required by the CT DEEP Boating Division to inform boaters of presence of “gear area”; agency is careful not to indicate the presence of aquaculture organisms (avoid theft; illness from illegal harvest and consumption)
- One (1) standard informational buoy is required for every 300 feet around the perimeter of the gear area
- Project location is required to be entered into state GIS layer for aquaculture leases and gear areas
- Projects may also have to be included in updated Coast Guard Charts

# Cultivation



- Source of seed
- Final fate of product

# Source of Seed



- Use of non-local seed strains
  - May not be adapted to LIS environment; may perform poorly or effect local strain?
- Use of nonnative species
  - May not be adapted to LIS environment; may perform poorly; may affect predator/prey interactions
- Hitchhiker organisms (pests, predators)
- Diseases of aquatic organisms
- Harmful Algal Blooms (HAB)
- Other toxin or chemical production by target aquaculture organism, or other species associated with target organism

**Use local seed sources / strains!**

# Application Process Overview

Seaweed Grown for  
Non-Food Applications

Application  
Process

Assumptions

Requirements

Seaweed Grown for  
Human Food Use  
Raw Agricultural  
Seaweed Commodity

Application  
Process

Assumptions

Requirements

Seaweed Grown for  
Human Food Use  
Processed Seaweed  
Commodity

Application  
Process

Assumptions

Requirements

# Seaweed Aquaculture for Non-Food Uses

## Assumptions and Requirements:

- Local seed should be utilized
- Final product not intended for human consumption
- Disposition of crop needs to be identified
- Disposition of crop must meet applicable environmental regulations
- Product testing may be required to ensure no adverse environmental effects

# Seaweed Aquaculture for Non-Food Uses

## Application Process:

- ↓ **License for Growing Area**  
CT DA/BA
- ↓ **Gear Permit**  
CT DA/BA, CT DEEP, USACE Programmatic General Permit  
Depending on activity, may trigger other (SDFTW, COP, IP) applications
- ↓ **Marker Buoy Permit**  
CT DEEP Boating Division
- ↓ **Product Disposition Permit** (may be required)  
As applicable; e.g. CT DEEP license for composting facility
- ↓ **Operation Certificate**  
DA/BA Certificate for Aquaculture Seaweed Producer (Non-food Uses)  
application

# Acknowledgements

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