SHELLFISH AQUACULTURE
BEST MANAGEMENT PRACTICES

LOCAL STAKEHOLDERS MEETING

29 MAY 2018
SANTA BARBARA, CA
SHELLFISH HISTORY IN CA

OYSTER CULTURE IN CALIFORNIA GOES BACK TO EARLY STATEHOOD (OYSTER ACT 1851)

VARIOUS REGIONS IN NORTHERN & SOUTHERN CALIFORNIA LONG HISTORIES & LEGACIES OF SHELLFISH CULTURE
Change is Constant

Technology
Ocean Conditions

Market & Business
Neighbors & Society

Anticipate Change

&

Adaptively Manage
BEST MANAGEMENT PRACTICES

MANY REGULATORY ADVANTAGES:

OPERATIONS
GROWER BUY-IN

FLEXIBILITY
ADAPTABLE

PROPOSED BY MANY

ALL WITH INTERESTS & RESPONSIBILITIES
Best Management Practices for the Shellfish Culture Industry in Southeastern Massachusetts

Version 09-04a

Developed by:
Massachusetts shellfish growers
in collaboration with the SouthEastern Massachusetts Aquaculture Center
with support provided by the Massachusetts Department of Agricultural Resources and the USDA Risk Management Agency

Compiled & Edited by:
Dale F. Leavitt
SEMAC & Roger Williams University
Bristol, RI 02809
Shellfish Aquaculture BMPs must balance Seafood Demand, Business Enterprise, and Public Trust Tidelands with commitment.
STANDARDIZED LEASE TEMPLATE AND REGULATORY COMPLIANCE

SPECIFIC BMPs IN LEASES LESS FLEXIBLE WITH DRAWN-OUT IMPLEMENTATION

REQUIREMENT TO ADHERE TO BMP PLANS REQ’D BY A NEW REGULATION WOULD HAVE COVERAGE IN LEASE REQUIREMENTS (INCORP. BY REFERENCE, LEASE SEC. 30) UPON PROMULGATION OF NEW REGULATION
Proposed best practices for Tomales Bay Oyster Farmers

1. Each grower must collect oyster debris generated on the lease. Proper procedures include:
   a. Unique bag color
   b. Unique wire color

2. Have staff positions rotate all tasks:

3. Growers must strive to:
   a. Regularly educate staff on the importance of minimizing debris.
   b. Growers must strive to reduce debris.

4. Replace litter-makers:
   a. Copper wire:

5. Prohibit the use of:
   a. Birds peck and:
   b. Use crab buoys

6. Prohibit the current:
   a. All bags must be:

7. Prohibit tools from:
   a. Surrounding the fencepost drive
   b. Gates
   c. Water bottles
   d. PVC pipes

8. If an idea does not work:
   a. No messes left on

9. At a minimum, more than twice a month:
   a. Walk shoreline areas

10. Update leases so they are accurate:
    a. General maintenance

---

PROPOSED BEST PRACTICES F

**TOMALES BAY SHELLFISH FARMS**

1. Growers shall implement:
   a. A regular environmental stewardship
   b. Marine debris minimization
   c. Local and agency regulations

2. All vessels shall be equipped:
   a. With grappling equipment
   b. For immediate retrieval of debris

3. Growers shall participate:
   a. In the bi-weekly summary of marine debris collected
   b. In the bi-weekly summary of marine debris collected

4. Growers shall conduct:
   a. Regular inspections
   b. At least two inspections per year

5. Growers shall ensure:
   a. All oyster debris is collected
   b. Regular maintenance of the fences

---

Once adopted, the following list of Best Management Practices (BMPs) for Tomales Bay Oyster Farmers shall be in compliance with the following:

1. Growers shall swim:
   a. Regularly
   b. And prevent debris from floating:

2. Growers shall train all employees:
   a. On proper handling of marine debris
   b. And reporting:

3. Growers shall continually improve:
   a. Oyster culture methods
   b. For zero-loss operations

4. Growers shall replace:
   a. Single use items
   b. With more durable items

5. Growers shall not:
   a. Use single use items
   b. Pack debris:

6. Growers shall:
   a. Securely remove on a frequency:
   b. To ensure that debris:

7. Growers shall remove:
   a. On a frequency:
   b. To ensure:

8. Growers shall remove:
   a. In a timely manner:
   b. To ensure:

9. Growers shall patrol:
   a. At least twice a month:
   b. For debris:

10. Growers shall:
    a. Collect debris:
    b. And report:

---

The Department of Fish and Wildlife defines "growers" as the person who:

The term "oyster" is defined as any species of oyster.

The term "staff" is defined as any person who:

For intertidal leases, patrols shall be conducted:

Environmental Action Group
415-663-4512

---

Tolames Bay BMP: 2017.07.07 ver. 1.2
Different Methods
Past - Now - Future
BMP Plans – Today’s Goal

Specific BMPs

Core Elements

Recommendations

What core elements of shellfish aquaculture best management practices should comprise BMP Plans?

commercial shellfish aquaculture = business enterprises, operated in public waters - held in the public trust by the regulating agencies
BMP Plans – Today’s Goal

Need for Best Management Practices – Which Ones?

• Minimize pollution and/or environmental impacts
• Safeguard environment and guide sustainable shellfish production
• Adaptively manage with consistency and reasonable predictability
• Acknowledge multiple uses and users of state waters
BEST MANAGEMENT PRACTICES

‘Do Things This Way’
(“Operational or Design Details”)

VS.

PERFORMANCE STANDARDS

‘Desired Outcome’ or ‘End Result’
(“Themes” or “Categories”)

15
BEST MANAGEMENT PRACTICES
EXAMPLE CORE ELEMENTS

• Site selection and access

• Materials, Operations, and Maintenance
  Robust designs
  Operational discipline

• Maintenance of environmental quality
  Habitat, Water quality, Species

• Disease prevention and management - biosecurity
BEST MANAGEMENT PRACTICES
LESSONS FROM ELSEWHERE
APPLIED HERE IN SB CHANNEL

UCSB student team funded and focused on this topic
PROCESS JUST BEGINNING

JULY 2017
PUBLIC STAKEHOLDERS MEETING (TOMALES BAY)
+ MARINE RESOURCES COMMITTEE (F&G COMMISSION SUB-CMTE)

29 MAY 2018 (SANTA BARBARA)
PUBLIC STAKEHOLDERS MEETING

JULY 2018
MARINE RESOURCES COMMITTEE (SAN CLEMENTE)

INITIAL STATEMENT OF REASONS (ISOR)
= BEGINNING OF FORMAL PROCESS

WRITTEN COMMENTS
BEST MANAGEMENT PRACTICES
LESSONS FROM ELSEWHERE
APPLIED HERE IN SB CHANNEL

UCSB student team funded and focused on this topic
California Offshore Aquaculture Project (COSAP)
About COSAP
Creating an information hub for offshore shellfish farming in the Santa Barbara Channel
Today's Outline

1) an overview BMPs
2) what we’ve learned from stakeholder interviews
3) takeaways from the BMP literature
4) a few, key areas of scientific literature as it relates to management decisions
5) and what we’re planning to contribute by the end of the year
What Are BMPs?

"Best Management Practices (BMPs) are general overarching principles and specific procedures used to guide the day-to-day operation of aquaculture businesses to improve production while preserving the environment."

- NOAA
Methods

Understanding
Permitting
developing permitting guidance report for state and federal compliance

Stakeholder
Interviews
10 interviews across state and federal government, associations, farmers and scientists

Literature Review
Dissected 5 papers for shellfish BMPs and identified 12 common categories
Permitting & Stakeholder Review

Public

BMPs

Agencies

Farmers
Mining the literature

**What is offshore aquaculture?**


**Public & Community**


**Water Column**


**Fisheries Interactions**


**Benthic Environments**


**Plastic Interactions & Impacts**


**Exploring Nearshore Shellfish Farming**

TAKEAWAYS FROM BMP REPORTS

Identified BMP categories

1. Water Quality
2. Site selection
3. Disease prevention and containment
4. Substrate impact
5. Fouling and predator control
6. Seed sourcing
7. Marine debris
8. Good neighbor
9. Gear maintenance
10. Employee hiring guidelines
11. Fuel spills prevention and plan
12. Buoys and Markers/ Light
substrate impact

- organic matter is likely to fall on the seafloor (Ferriera et al. 2007; Price & Morris, 2013)
- impacts are complex, in small amounts it can be positive, in large amounts negative
- if any problem, most likely to occur in shallow, sheltered bays
- there are low risks of significant organic enrichment in well-managed marine farms, especially in areas of high current and depth (Lovatelli et al. 2013)
There are no global estimates of the amount of plastic waste generated by the fisheries and aquaculture sector. (FAO 2017)

Losses from fisheries and aquaculture are regularly reported in surveys of marine debris

- on beaches (Browne et al., 2015a; Nelms et al., 2017; Slip and Burton, 1991)
- floating on surface waters (Cózar et al., 2014; Thiel et al., 2003)
- located on the seafloor (Iñiguez, Coneza and Fullana, 2016)
To date there are no reported or published accounts of harmful interactions between protected species at any pilot scale or commercial farms in the offshore waters of the U.S. EEZ waters. (NOAA 2017)

However, there are BMPs that can help prevent negative interactions with wildlife.
Our Website

COSAP
California Offshore Shellfish Aquaculture Project
A guide to permitting, management, and science for farmers and community

STATE OF THE INDUSTRY
What does offshore farming look like around the globe?
Read More

PERMITTING PROCESS
Who needs what? How do you get that permit legally?
Read More

BEST MANAGEMENT PRACTICES
What does it mean to be the best and how do you get there?
Read More

RESOURCES
Where's the data?
Read More

sbcosap.wix.com
The permitting process for aquaculture certification involves several Local, State, and Federal agencies. Without the proper guidance and tools, this process can be arduous, time consuming, and costly. Fortunately, we’ve done all the research and networking necessary to lessen confusion and help keep your waters clear.

These pages were put together to help guide and inform prospective offshore shellfish aquaculture farmers in the Santa Barbara Channel. Compiled is a list of all necessary permits required and the sponsoring agencies attached to these regulations.
Resources and Research

Here you’ll find a number of scientific literature sources that relate to farming management decisions. This list is growing and changing as science evolves, but it can serve as a foundation of knowledge for folks looking to understand offshore shellfish farming.

These pages are organized into different categories that reflect several branches of aquaculture. All of the literature we have used is peer-reviewed and reputable. Click on the categories below to learn more about each subject.

- Water Column
- Benthic Environment
- Public & Community
thanks to

w/ support from

w/ photos by
MARCO MAZZA