Production Work Group Session 1: Big-Picture Challenges & Opportunities (red font)

Lack of information/guidance about farm economics

- Estimating investment
- Scaling farms appropriately for markets
- Lease consolidation--what's the risk?

Inefficiencies

- Mechanization
- Remote management
- Optimizing space utilization

Seed Stock

- Availability (facility bottleneck)
- Cost (e.g. 20% of ROI)
- Supplying remote growers
- Understanding propagation techniques
- Reliance on wild seed stock Seed bank?
- Sourcing sori
    - Geography & genetics--what's important for diversity? Genetic diversity study
    - Science-based BMPs
    - Wild strains don't necessarily perform well in farm setting
    - What's the potential for selective breeding? Desired traits: site-specific stocks; high performance; temperature resilience (see Quigley & Brawley)

Site Selection

- Lack of standards and guidance
- NOAA 'National AquaMapper' too high level & doesn't take key social factors into account; Greenwave workbook better? Freely available?
- Test strings for site evaluation (e.g. LPA license)
- Maine: number of LPAs exceeding management capacity (perception that DMR has "lost control")
- Conflict with user groups (real & perceived; seasonality makes it possible to co-exist)

Regulators

- Agencies lack capacity to process & manage
- Lack of agency "ownership"
- Misinformed
    - Need first-hand exposure to farming (spend a week on a farm)
    - Industry advisory board for USACE
- Expert review of farm applications (e.g. NOAA engineer)
- Multi-state industry stakeholder groups to address regional inconsistencies

Gear & Operations

- Alternatives to ‘one-size-fits-all’ approach (design “typologies”)
- ‘Nimble’ gear--easy to deploy/recover
- Gear failure
- Practicality of integrating seaweed into existing shellfish operations
- Industrial safety

Public Relations
- Misperceptions
- Lack of social license (farmers need to be able to communicate their ‘why’ and public benefits of farming)
- Insufficient government-funded industry support
- Improved practices for ‘lighter footprint’ (to reduce NIMBYism)

Monitoring capabilities (added during Session 2)
- Options to gain better data
- Shared or individual use
- WA state: ORCA buoy; Live Ocean; IOOS/NANOOS. Also NOAA NCCOS (funding & apps/tools)
- Are HABs a seaweed issue?
- Can seaweeds help with HABs? (Stonybrook/NYSG study)
- Automated monitoring of site

Climate Change! (added during Session 2)

<u>Challenges--Card Tally</u>
- Seed Availability/Cost (7)
- Site Selection & Cost Evaluation (6)
- User Group Conflicts/Public Buy-in (5)
- Sorus Sourcing (4)
- Market Type/Availability (4)
- Regulation or Permitting (3)
- Line Sources/Enrichment/Gear Challenges (3)
- Processors/Infrastructure (2)
- Labor (2)
- Where to sell (1)
- Tech Support--Best Practices (1)
- Efficient Use of Space (1)
- Limited Harvest Season (1)
- Farm Production/Ecosystem Services Balance (1)
- Funding (1)
- Changing Environment (1)

Production Work Group Session 2: Identifying Priorities, Goals & Objectives

Dot voting exercise to prioritize Short-term/Long-term Goals

Short-term

- Seed Stock Availability (5) + Seed costs (4) + String Alternatives (3) = 12
- Lack of Site Selection Standards (3)
- Deployment/Recovery of gear (5) + Inefficiencies of production (5) = 10
- Integrating with Shellfish (5)
- Industrial Safety (2)
- Monitoring capabilities (4)
- Lack of social license (4) + Nimbyism (1) = 5
- Actionable monitoring (4)
- Lack of ownership by agencies (4)
- Gov't funding (3)

Long-term

- Climate Change (13)
- Real + perceived user group conflicts (12)
- Selective Breeding (5)
- Can seaweeds help with HABs (4)
- Farm Economics (3)
- Alternative to "one-size-fits-all" approach (3)
- Reliance on wild seed (2)
- Monitoring (2)
- Agencies lack capacity (2)
- Automated monitoring (2)
- NOAA Aquamapper (1)
- Actionable monitoring (1)

Top Short- and Long-term Goals & Objectives (S=short-term; M=medium; L=long)

Goal: Improve Seed Stock Supply

Objective: Increase *number* of facilities - Short-term
Objective: Increase *capacity* of facilities - Medium-term
Objective: Workforce development - Medium- to Long-term
Objective: Communicating with growers (look to shellfish seed model) - ?

Goal: Develop and Deploy Monitoring

Objective: Integrate with existing information delivery platform (e.g. NANOOS)
Task #1: Identify monitoring priorities - S
Task #2: Identify programs/platforms to disseminate monitoring data - M

Goal: Improve Guidance for Site Selection/Farm Design

Objective: Disseminate beta version of GreenWave workbook (question: how transferrable is the content? Is it appropriate for all seaweed-farming regions?) - Super-short (e.g. next week)

Task: 30-minute workbook training webinar for Production Work Group, who will provide feedback on beta version.

Objective: Standarding industry nomenclature & procedures (growers-->regulators) - S

Objective: *Compile?* farm infrastructure guidance - M

Goal: Gear & Operation…?

Objective/Goal: Improve efficiency

Objective/Task: develop anti-fouling BMPs to extend harvest season - ?

Goal: Make Permitting as painless as possible!

Objective: Export Maine "one-stop-shop" process - M-L

Task: Sea Grant-facilitated grower/regulator 'workshop'

Goal: Increase resilience/adaptation climate change

Objective: Fund/advocate for research

Goal: Reduce conflicts with User Groups

Objective: Identify economic & environmental benefits

Goals chosen as priority:

Goal: Improve Seed Stock Supply

Objective: Identify *number* of nursery facilities and share list with growers - S

Task: gather current commercial suppliers to share and make a list similar to East Coast Shellfish Growers Assn (ECSGA) hatchery list

Objective: Increase *capacity* of facilities - M

Task: evaluate current training videos available

Objective: Workforce development - M-L

Task; identify existing opportunities and capacity

Objective: Further research and develop seed supply - M-L

Task: Advocate for funding for seaweed seed supply issues

Goal: Improve Guidance for Site Selection/Farm Design

Objective: Disseminate GreenWave workbook (beta version) - Super-short (next week)

Task: 30-minute training webinar for Production Work Group

Task: Evaluate GreenWave workbook

Objective: Standarding industry nomenclature & procedures (growers-->regulators) - S

Task: review current nomenclature used to describe gear and operations and suggest a standardized system of nomenclature for clarity

Objective: Compile updated farm infrastructure guidance - M

Task: Find funding to update seaweed handbooks such as those produced by CTSG and Ocean Approved with most up to date practices for sharing through the seaweed hub

Goal: Improve Efficiency of Gear & Operations

Objective: Develop technology or methodology to improve efficiency of farms - M

Task: Setup a searchable electronic platform to share current research results and allow for discussion to improve ability of farms and researchers to learn from one another

Workgroup process

Bimonthly web/phone based meetings

More frequent electronic communication as necessary or as info becomes available

Work Plan - List of Tasks

Task: gather current commercial suppliers to share and make a list similar to East Coast Shellfish Growers Assn.hatchery list

Task: evaluate current training videos available

Task; identify existing opportunities and capacity

Task: Advocate for funding for seaweed seed supply issues

Task: 30-minute training webinar for Production Work Group

Task: Evaluate GreenWave workbook

Task: review current nomenclature used to describe gear and operations and suggest a standardized system of nomenclature for clarity

Task: Setup a searchable electronic platform to share current research results and allow for discussion to improve ability of farms and researchers to learn from one another