North Carolina
Aquaculture Development Conference
New Bern, NC

Aquaculture and Fisheries:
Shared Threats and
Shared Opportunities

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Executive Director, East Coast Shellfish Growers Association

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Shellfish Aquaculture by State percent of total East Coast $154 million farm gate

- VA 34%
- FL 14.4%
- MA 10.1%
- CT 25%
- NY 8%
- RI 3.2%
- NJ 2.6%
- NC 0.4%
- SC 0.2%
- GA 0%
- MA 0%
- MD 1%
- DE 0%
Industry Snapshot

- ~1300 farms from Maine to Florida
- Primarily small farmers with less than 10 employees
- Collectively harvest $155M
  - 60% clams, 39% oysters
  - Production growing 5-10% / yr
  - Oyster production doubled in 5 yrs
Millions of Oysters Sold by Virginia Growers
In 2014 the cultured oyster passed the hard clam to become the top-value seafood product landed from Rhode Island state waters.
Celebrate the Bivalve
Primative
500 million years old
Critical food for the survival of large brained primates
Shellfish feeding

SHELLFISH
VACUUM CLEANERS OF THE SEA
by K.T. Pirquet
The Ultimate in Sustainable Seafood

Well managed.
Caught or farmed responsibly.
No feeds or antibiotics.
No fertilizers

BEST CHOICES

- Arctic Char (farmed)
- Bass: Striped (US hook & line, farmed)
- Catfish (US)
- Clams, Mussels, Oysters
- Cod: Atlantic (imported, hook & line)
- Crab: Dungeness & Stone
- Croaker: Atlantic (non-trawl)
- Haddock (US hook & line)
- Halibut: Pacific (US)
- Lobster: Spiny (CA, FL & Mexico)
- Salmon (AK)
- Scallops (farmed)
- Squid: Longfin (US)
- Swordfish (Canada & US harpoon, troll, pole)
- Tilapia (Ecuador & US)
- Trout: Rainbow (US farmed)
- Tuna: Albacore/White canned (Canada & US troll, pole)
- Tuna: Skipjack/Light canned (US troll, pole)
- Tuna: Yellowfin (US troll, pole)
Good food – Good for you too

- High in protein
- Low in fat
- High in heart-healthy omega-3 fatty acids
- Good source of vitamin B_{12} & minerals (Iron, Zinc)

Weight Watchers New PointsPlus Power Foods
Bivalves with Benefits

- Sustainable seafood
- Green jobs
- Nutritious & delicious
- Cultural icon
- Ecosystem services to boot!
  - Remove nutrients - Stabilize sediments
  - Provide habitat - Reduce turbidity
Ecosystem Services

- Nitrogen removal at harvest
  - Each oyster and clam contains about 0.3-0.5g N
  - Harvest 5 million oysters – remove ~1.5 tons N

- Essential fish habitat
  - Vertical structure
    - nooks and crannies
  - Enhances survival of juvenile fish
To maximize ecosystem services

1) Maximize the biomass and harvest
   – every clam or oyster that is removed will yield a small benefit
To maximize ecosystem services

1) Maximize the biomass and harvest
   every clam or oyster that is removed will yield a small benefit

2) But we must ensure that harvest is sustainable - year after year
Keys to sustainable harvest:

- Wild harvest can be too efficient, stocks can become depleted, harvests dwindle
  - Harvest controls (gear restrictions, bag limits, minimum sizes, limit licenses, days, seasons)
  - Stock enhancement (hatcheries, seeding, spread cultch, predator control)

- Farmers replant seed following harvest
Comments from Roger Bing
VP of Protein Purchasing for Darden

Speaking at Managing our Nations Fisheries III

Washington DC, May 2013
Fiscal 2013 projected sales over $8 billion

Own and operate over 2,000 restaurants

Employ over 185,000 people who serve more than 400 million meals annually

The 28th largest private employer in America

On the Fortune Top 100 Companies to work for in the USA
From The Headlines

Impending Crisis: Earth to Run Out of Food by 2050?

World population may reach 9.2 billion by 2050
Biggest boom expected in developing countries, U.N. report says

UN: farmers must produce 70% more food by 2050 to feed population
A quarter of farmland is highly degraded, according to the first report into the state of the world’s land resources

Global fish consumption hits record high
By Mark Kinver
Science and environment reporter, BBC News

2.4 billion extra people, no more land: how will we feed the world in 2050?
Steve Connor reveals how scientists propose a major policy shift to tackle one of the great challenges of the 21st century

Fish Supply

Assumes:
- Aquaculture follows recent trend
- Capture fisheries remain stationary
  - 211 million tonnes fish in 2030

Is the supply enough to feed future population?

Source: FAO FISHSTAT
Fish Supply-Demand Gaps

- Per capita fish demand in 2030 estimated based on assumptions:
  - GDP per capita projection by IMF
  - Prices unchanged
- Total fish demand in 2030 estimated based on:
  - Estimated per capita demand in 2020.
  - UN population projection in 2030.
- Results:
  - Supply < Demand
    - 51 mt shortage

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<th>Demand 2030</th>
<th>S-D gap 2030</th>
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<td>Africa</td>
<td>11.7</td>
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<td>L.A. &amp; C.</td>
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<td>18.3</td>
<td>-2.1</td>
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<tr>
<td>Northern A.</td>
<td>6.2</td>
<td>12.9</td>
<td>-6.6</td>
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<tr>
<td>Oceania</td>
<td>1.5</td>
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<tr>
<td>World</td>
<td>210.7</td>
<td>261.2</td>
<td>-50.6</td>
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Source: FAO
Bing’s Conclusions

- Predicts a global shortfall of seafood supply on the order of 51 million metric tons in 15 years
- We import 91% of the seafood we consume in the US.
- This is a food security and job security issue. Prices will go up. US consumers will stop eating healthy seafood and switch to cheaper proteins.
“There is really no difference between fishing and aquaculture – they are just two extremes of a spectrum of seafood extraction techniques.”

Roger Bing
Wild vs. Cultured

- Much has been made of the conflict between harvesters and farmers

- There is no bright line separating the two – rather a gradient of management approaches

Friends don’t let friends eat cultured shellfish
Laying cultch on seed beds in Connecticut
Harvesting the cultch with new spat attached
Remote setting of oysters economical for restoration, fisheries enhancement or aquaculture
Islip, NY town hatchery
40 million hard clams a year
Wild vs. Cultured

- There is no bright line separating the two – rather a gradient of management approaches
- Most growers are former fishermen
- The skill sets are similar
- Both demand strong backs and a tolerance for tough working conditions
Fishermen and Farmers

- United by challenges and opportunities
- The only real difference is who owns the shellfish – are they public or private?
- Fisheries managers and farmers both invest in the resource. The main difference being who pays for the investment and who reaps the benefit.
Fishermen and Farmers United by Challenges

- Water quality
- Predators
- Storms
- Disease / parasites
- Sea level rise
- Ocean acidification
- Labor intensive

- Access to commercial dock space
- Regulations
- Cheap imports
- Customers can’t open our products
Fishermen and Farmers United by Opportunities

- Nutrition trends
- Locavore movement
- Omega-3 fatty acids
- Sustainable seafood movement
- Eco-tourism

- Nutrient credit markets
- Carbon credits
- Payments for Ecosystem Services
- Global markets
- Demand projections
Challenges: low-cost imports
Opportunities: Global Markets

- China is now a net seafood importer
- Emerging middle class demands protein
- Demand doubling every 10 years
- Global seafood prices projected to rise 70% in 20 years
- Wealthy Chinese citizens don’t trust Chinese products
Challenges: acidification

1/3 of CO₂ dissolves in seawater and creates carbonic acid.
Acidification

In acidified waters larvae are challenged to form shell, clams won’t dig down in acidified muds “choosing” death by predation over dissolution.
Despite Challenges Optimism Prevails

Fishermen and farmers are optimists by nature

- Opportunities for growth
- Opportunity for innovation
- Opportunity to work on the water, make a living off sustainable, delicious, nutritious shellfish