Shellfish Aquaculture Workshop
10/15/16
UNCW Center for Marine Science

Sea Grant
North Carolina

Welcome!

What is Sea Grant?

32 locations spanning US coastal waters including the Great Lakes, Alaska, Hawaii, and Puerto Rico

Funded by NOAA and state universities

Sea Grant conducts and supports research and provides information and technology transfer regarding four focus areas:

Healthy Coastal Ecosystems
Resilient Communities and Economies
Environmental Literacy and Workforce Development
Sustainable Fisheries and ***Aquaculture***

- ✓ Basic farming methods and industry update
- ✓ Leasing, siting, and product quality control
- ✓ Overview of UNCW shellfish research
- ✓ Expansion of oyster aquaculture in the Gulf
- ✓ A grower's perspective on oyster farming
- ✓ Oyster culture gear
- ✓ Increasing market value of NC shellfish
- ✓ USDA programs

Aquaculture in North Carolina

- ✓ 15th most productive state in US
- ✓ Farm gate value = $60 million
- ✓ Very diverse industry, mainly freshwater
- ✓ Rainbow trout, hybrid striped bass, catfish, tilapia

- ✓ *Significant room for growth in marine sector*

Marine Aquaculture in North Carolina

Soft shell crabs ***(2.32 million)***

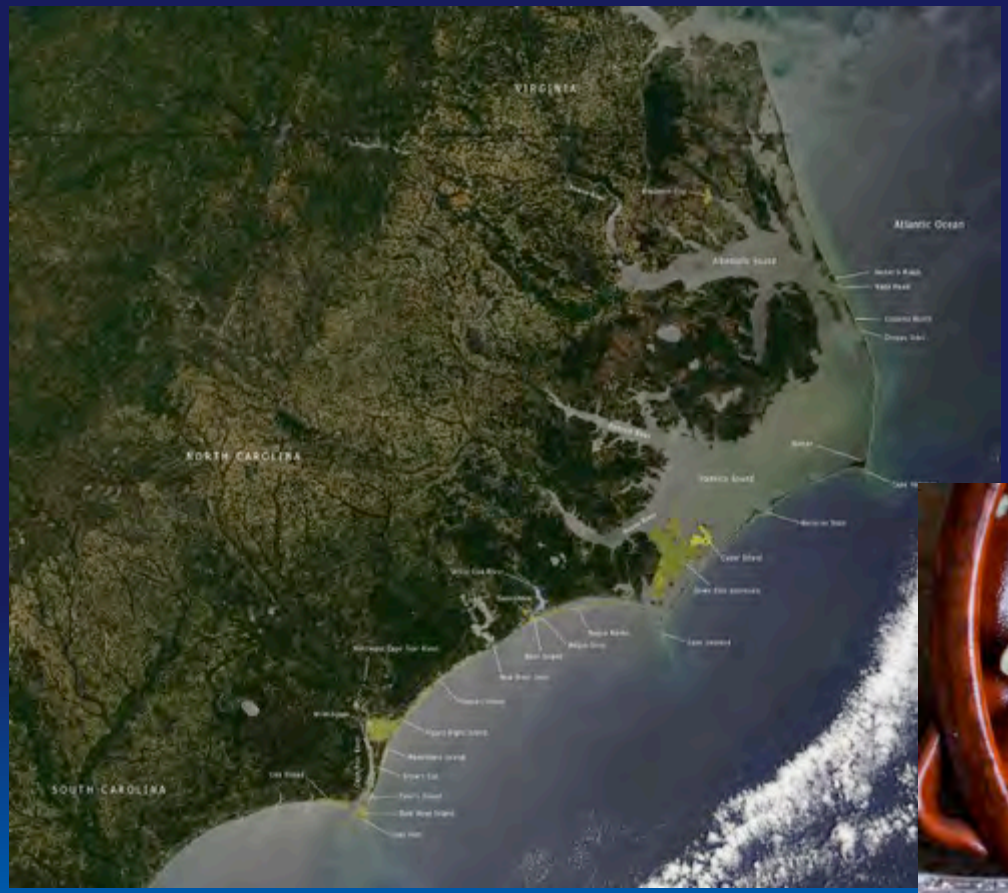
Clams ***(223 K)***

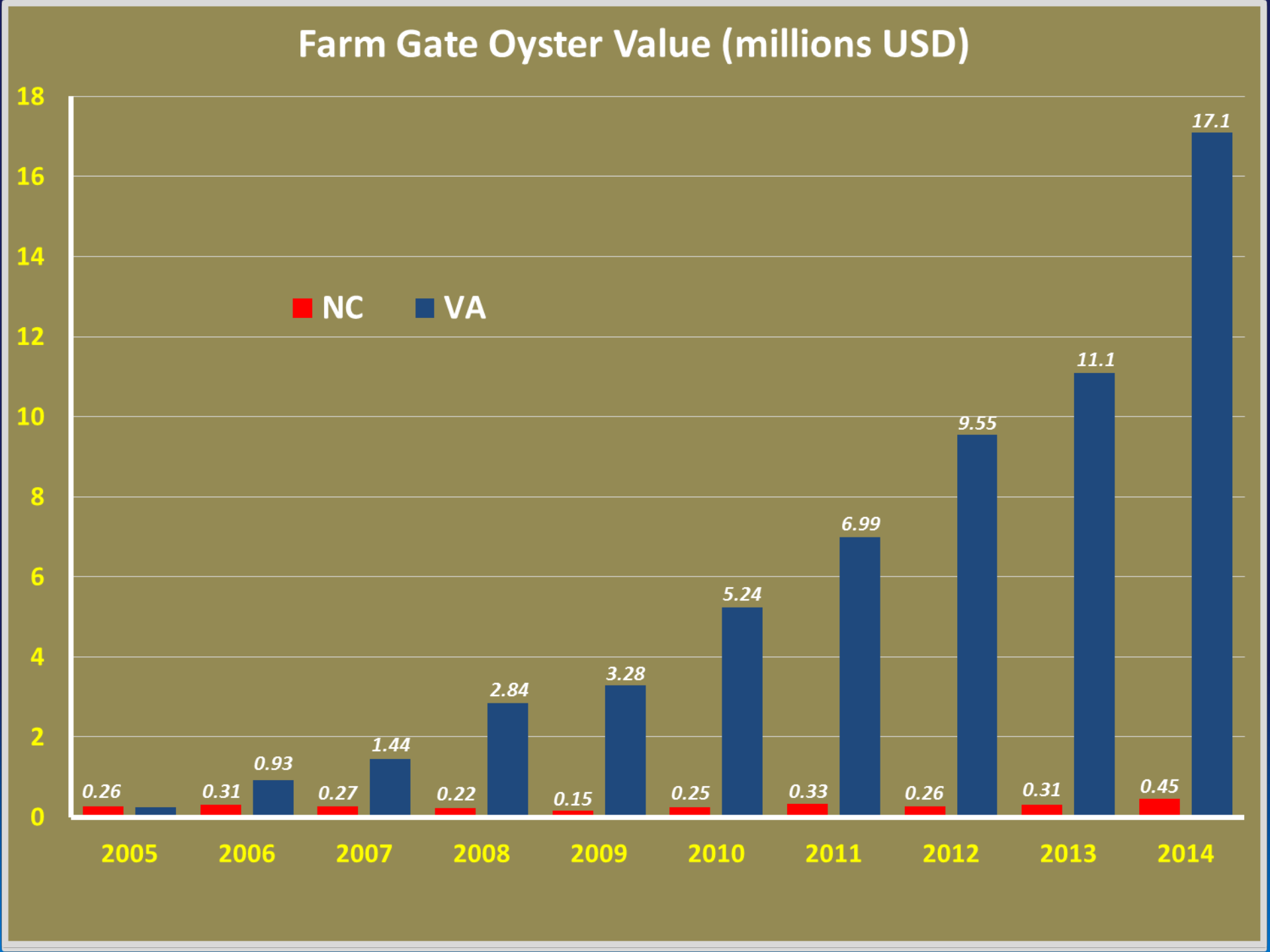
Oysters ***(450 K)***

Finfish and additional crops ***(< 100 K)***

Why the great potential?

Natural Resources and Markets




Farm Gate Oyster Value (millions USD)
18
16
14
12
10
8
6
4
2
0
NC
VA
0.26
0.31
0.93
0.27
1.44
0.22
2.84
0.15
3.28
0.25
5.24
0.33
6.99
0.26
9.55
0.31
11.1
0.45
17.1
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

2015 Farm Gate Shellfish Value (millions USD)

	North Carolina	Virginia
Clams	0.30	32.3
Oysters	0.48	16.0
Total	0.78	48.3

Hard clams

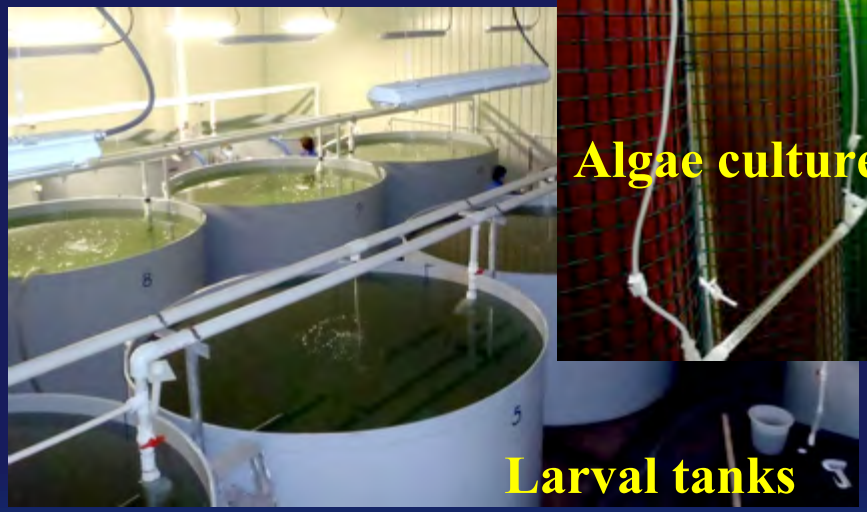
Easter oysters

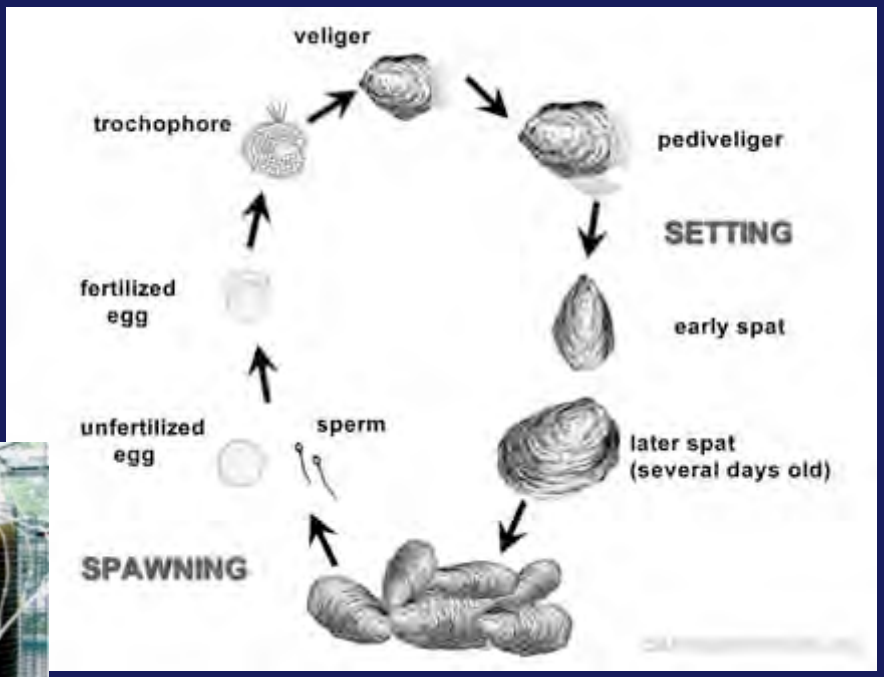
There are 3 phases of shellfish aquaculture

- ✓ **Hatchery**
- ✓ **Nursery**
- ✓ **Growout**

In NC most growers buy advanced seed and bypass the hatchery and initial nursery phases

Hatchery phase

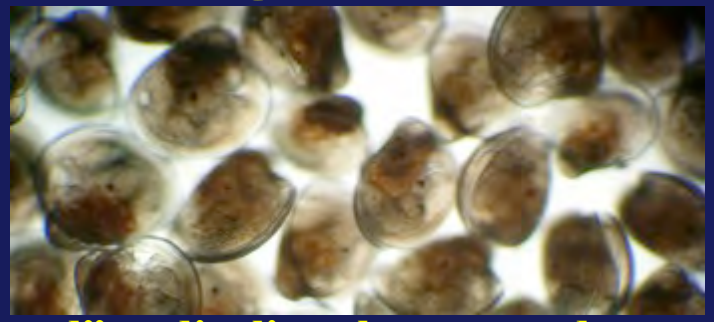




Veliger stage

- ✓ Broodstock induced to spawn
- ✓ Eggs hatch and larvae fed cultured algae
- ✓ Larvae sieved and restocked regularly
- ✓ Very labor intensive and specialized skills involved

Setting



"eyed" pediveliger larvae ready to set

1.5 million late stage oyster larvae

- ✓ Setting = free swimming to sedentary life
- ✓ Clam larvae don't require substrate
- ✓ Oyster larvae can be set on shell/other substrate for clump oysters

OR set on microcultch for single seed

Nursery phase

- ✓ Clam spat and single spat oysters raised using land based or floating upweller systems
- ✓ When of appropriate size, seed are ready for planting/stocking
- ✓ Spat on shell/substrate oysters planted about a week after setting


Land based upweller

Upweller tanks


Floating upweller


Oyster seed ready for growout phase

Growout phase - clams

- ✓ Seed stocked into mesh bags on bottom or directly on bottom and covered with protective netting
- ✓ About two years required to produce 2” market clam
- ✓ Marketed whole, some interest in value added

Oyster growout: bottom culture

- ✓ Spat on shell/substrate stocked directly on bottom
- ✓ One to three years to market
- ✓ Harvested by dredging primarily for shucked market

Oyster spat attached to adult oyster shell

15 months later

Clumped oysters produced by bottom culture

Oyster dredging

Shucked meats

Oyster growout: water column culture

- ✓ Allows production of single oysters for half shell market
- ✓ Seed stocked into various off bottom, floating, or suspended gear types, culled and graded regularly to adjust density
- ✓ Harvest at one to two years

Off bottom cage

Floating bags

Longline culture system

Not for the weekend warrior

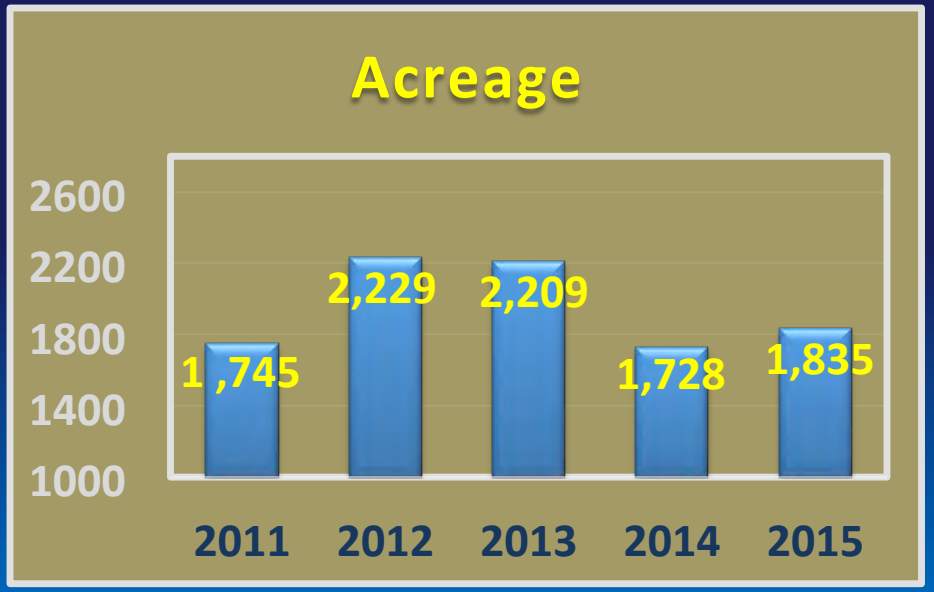
Premium NC farmed oysters

Benefits of shellfish aquaculture

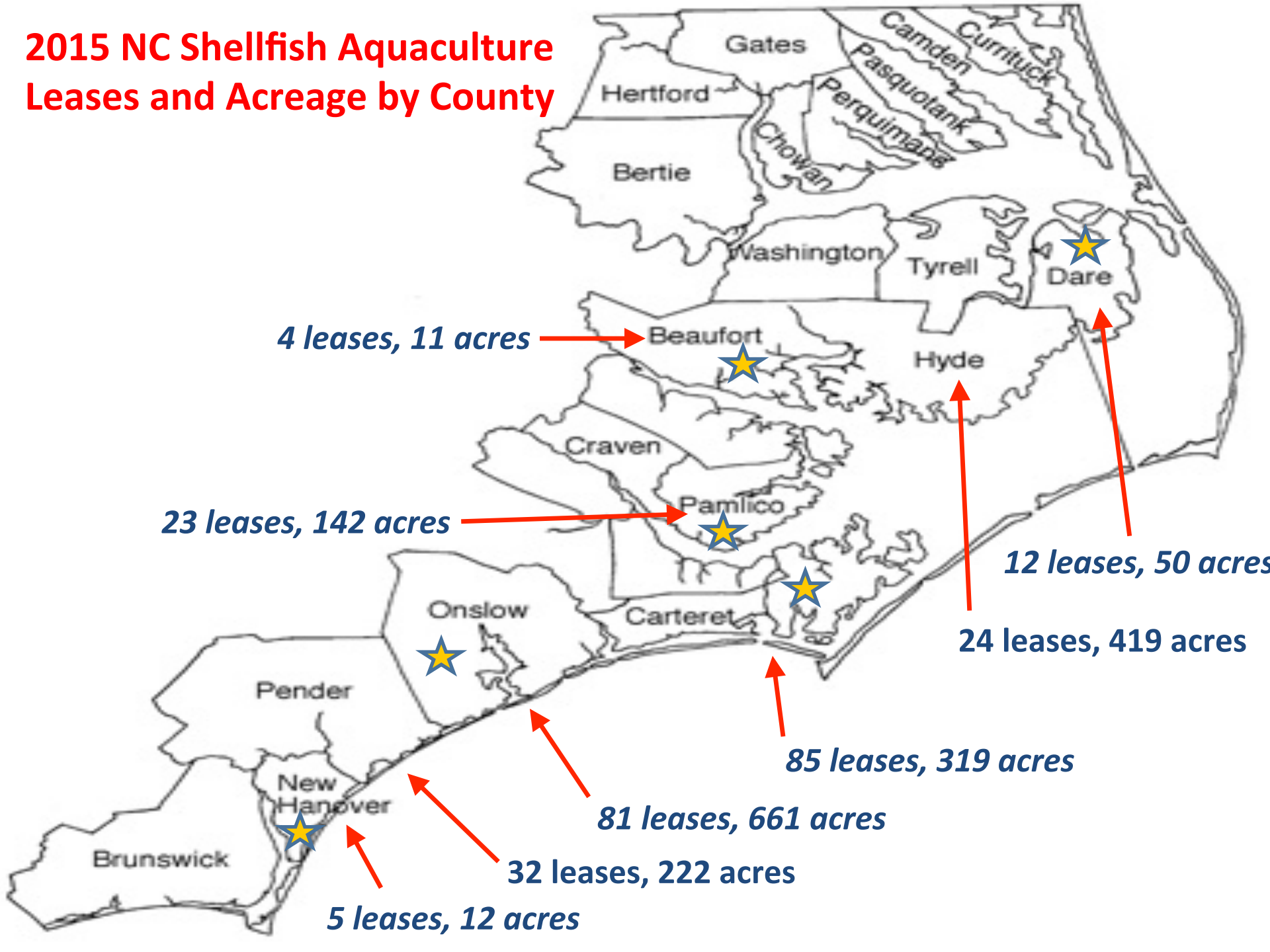
- ✓ Creates jobs and economic opportunities for coastal communities
- ✓ Produces high quality, locally sourced seafood
- ✓ Shellfish filter the water improving its quality
- ✓ Shellfish farms attract and provide habitat for sea life

2015 North Carolina Shellfish Aquaculture Status
Leases and Acreage

266 Leases (+ 14.2%) **1,835 Acres (+ 6.2%)**

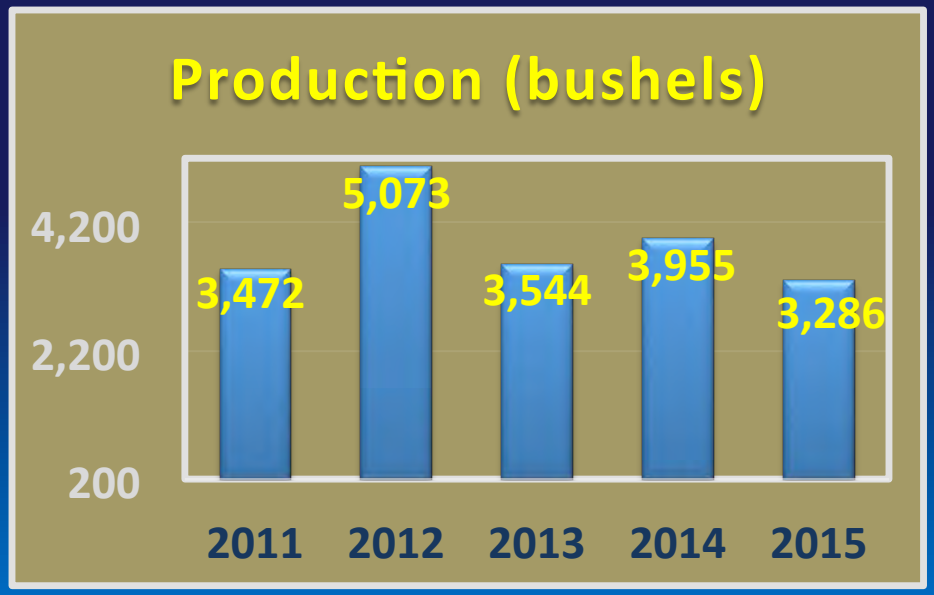


2015 NC Shellfish Aquaculture Leases and Acreage by County



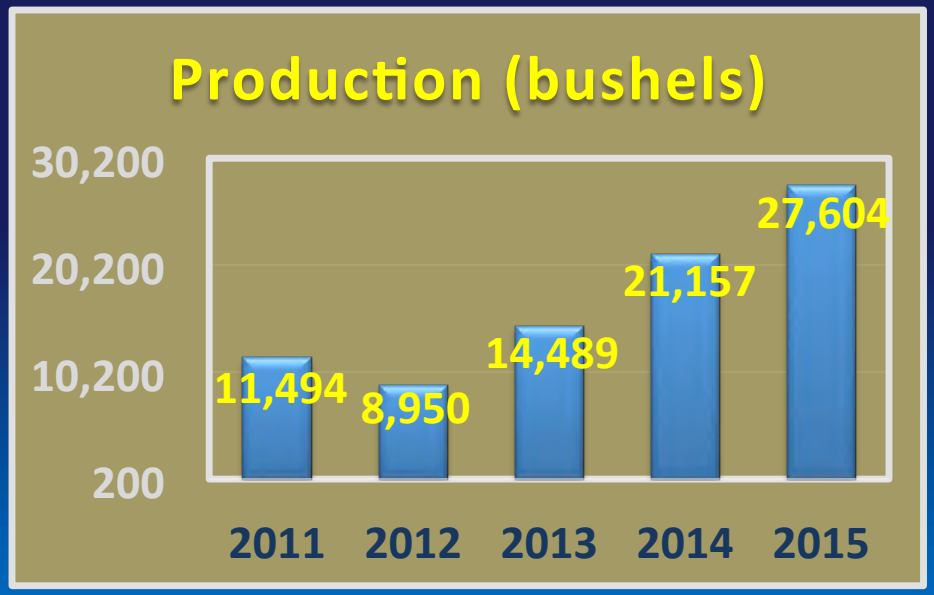
2015 North Carolina Shellfish Aquaculture Status
Clam Production and Farm-Gate Value

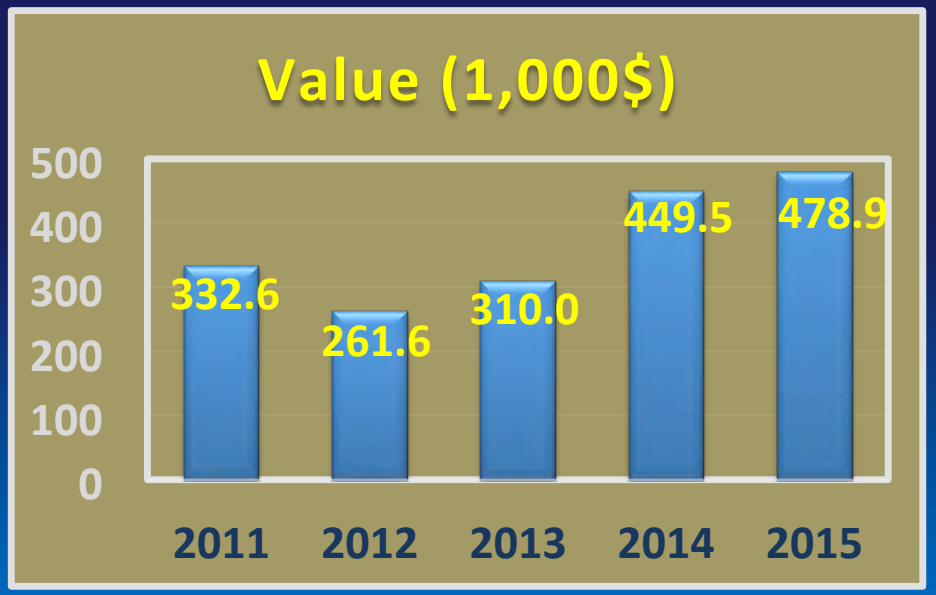
2015 = 3,286 Bushels (- 16.9%) $299,906 (+ 34.4%)



2015 North Carolina Shellfish Aquaculture Status
Oyster Production and Farm-Gate Value

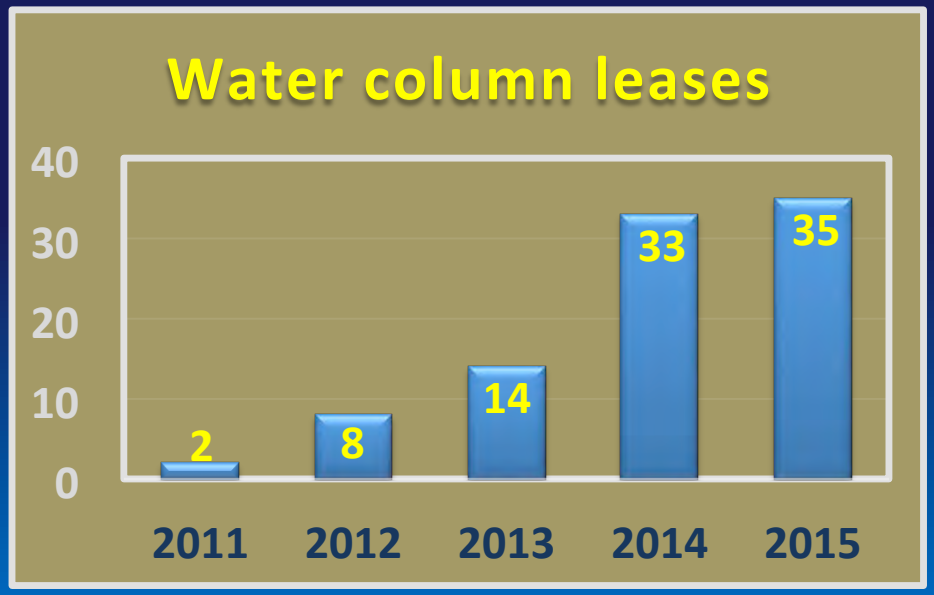
2015 = 27,604 Bushels (+ 30.5%) **$478,856 (+ 6.5%)**

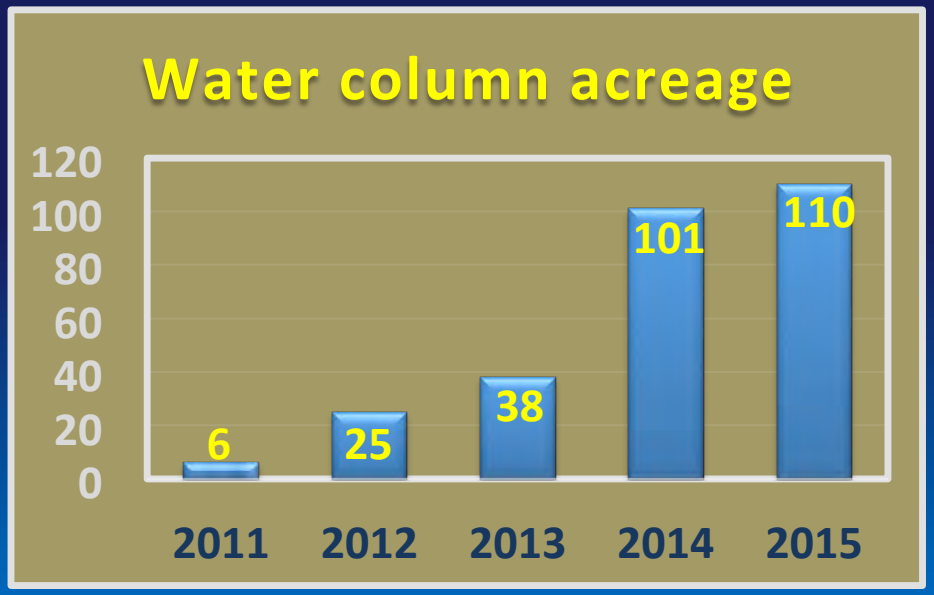




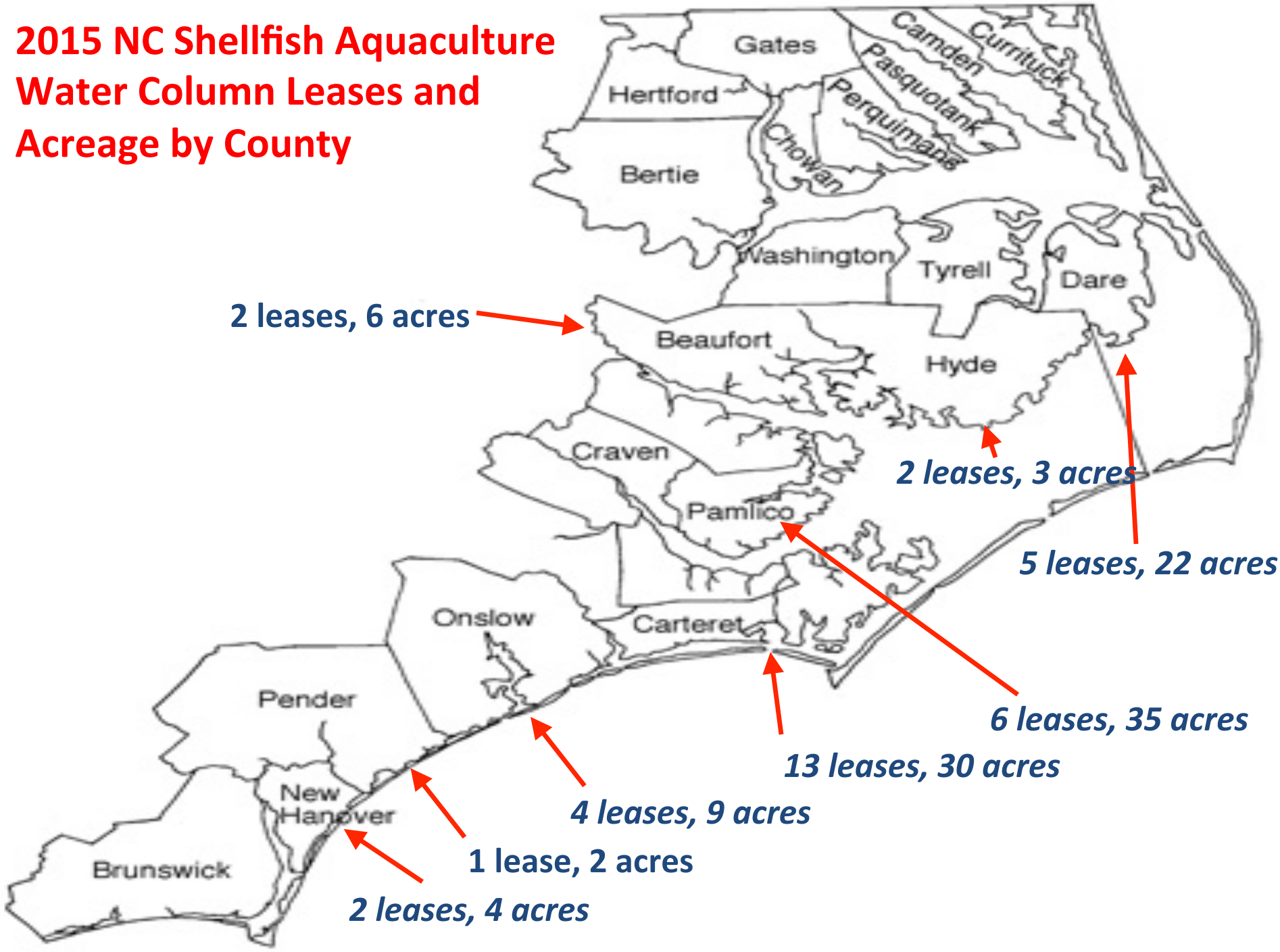
Increased number of leases and acreage devoted to water column leases

2015 – 35 leases (+ 6.1%)
110 acres (+ 8.9%)





2015 NC Shellfish Aquaculture Water Column Leases and Acreage by County



2015 Shellfish Aquaculture Legislation

- ✓ Increased research and ~~outreach~~
- ✓ ~~Demonstration hatchery/nursery facility~~
- ✓ ~~Increased disease surveillance~~
- ✓ Increased penalties for shellfish theft/poaching
- ✓ Enhanced lease program

Upcoming Legislation

- ✓ Core Sound and Brunswick County

Expansion and Diversification of the North Carolina Shellfish Aquaculture Industry

Aquaculture Extension and Technology Transfer Program

- ✓ **Establish shellfish aquaculture demonstration centers**
- ✓ **Evaluate culture gear types and oyster strains**
- ✓ **Explore new species for culture**
- ✓ **Shellfish market demand and product development**


NCSU
CMAST Building
S 38th St
CCC
Aquaculture
Facility
Demonstration
Pavilion
Clam
Screens
Clam
Bags
Clam
Cages
Floating
Bags
Longline systems
Floating
Cages
Bottom
Cages
Bogue Sound

Sea Grant
North Carolina

Assessment of current production practices and economics of the developing North Carolina oyster aquaculture industry

Evaluation of methods to control biofouling

Multi –state project (LA, MS, AL, FL, SC, NC)

Links

NC Sea Grant – marine aquaculture page:
https://ncseagrant.ncsu.edu/aquaculture/

North Carolina Shellfish Growers Association
http://www.ncshellfish.org/

East Coast Shellfish Growers Association
http://www.ecsga.org/

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