Shellfish Aquaculture R+D Programs: Return-on-Investment (ROI) Results

February 18, 2022

S.C. SEA GRANT CONSORTIUM
Coastal Science Serving South Carolina

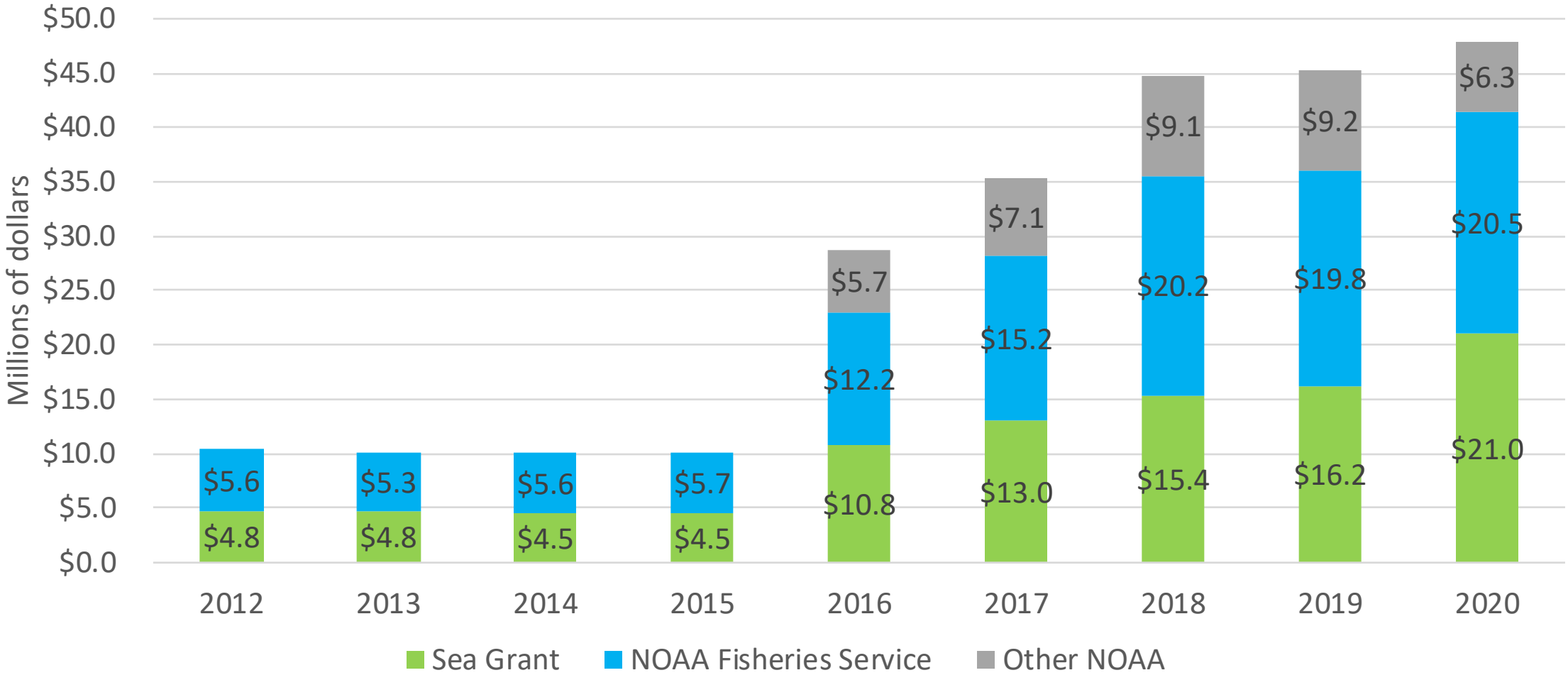
AGENDA

Time	Topic
9:00 – 9:05 am	Introductions
9:05 – 9:15 am	Background
9:15 – 9:20 am	Q+A
9:20 – 9:40 am	Results
9:40 – 9:55 am	Q+A
9:55 – 10:00 am	Next Steps

Background


Feb 2021: Working Group Meeting
May 2021: Hired SAQ Specialist
Summer 2021: Development of ROI scenarios; Data Collection
Fall 2021: Data Analysis
Winter 2021: Results and Report Finalized

NOAA Investment in Aquaculture Projects



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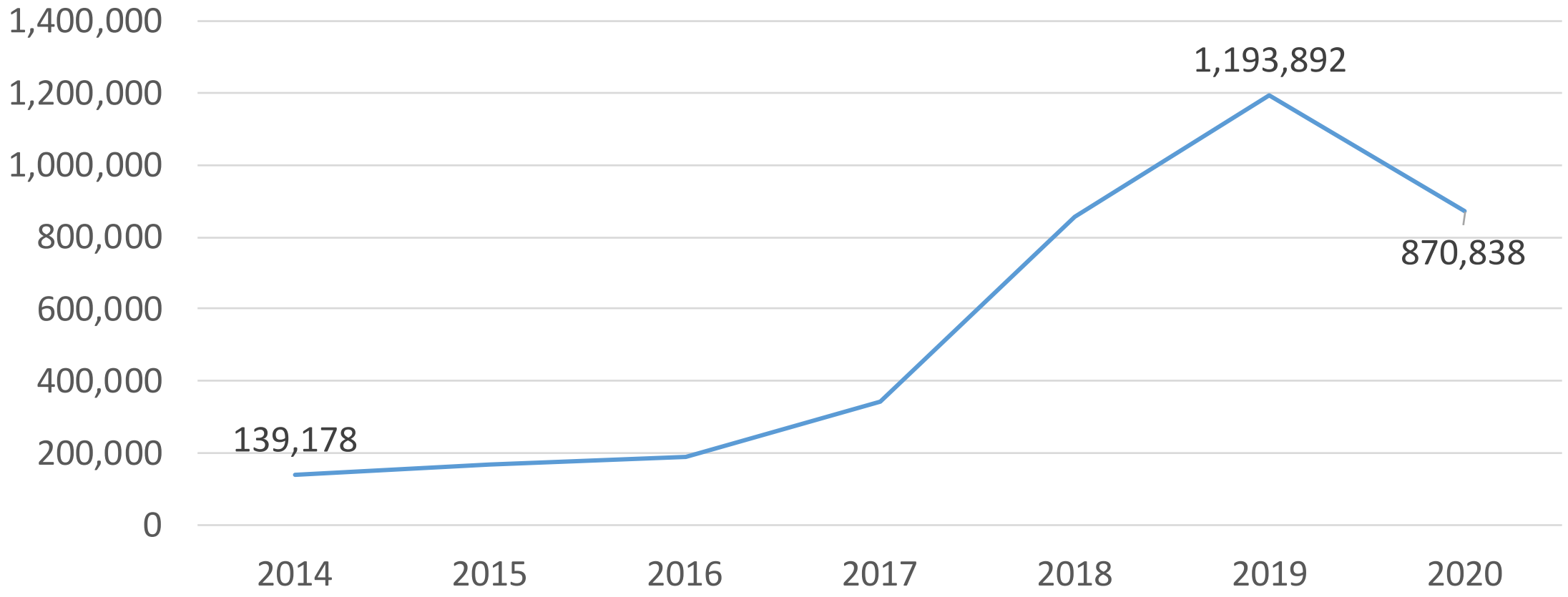
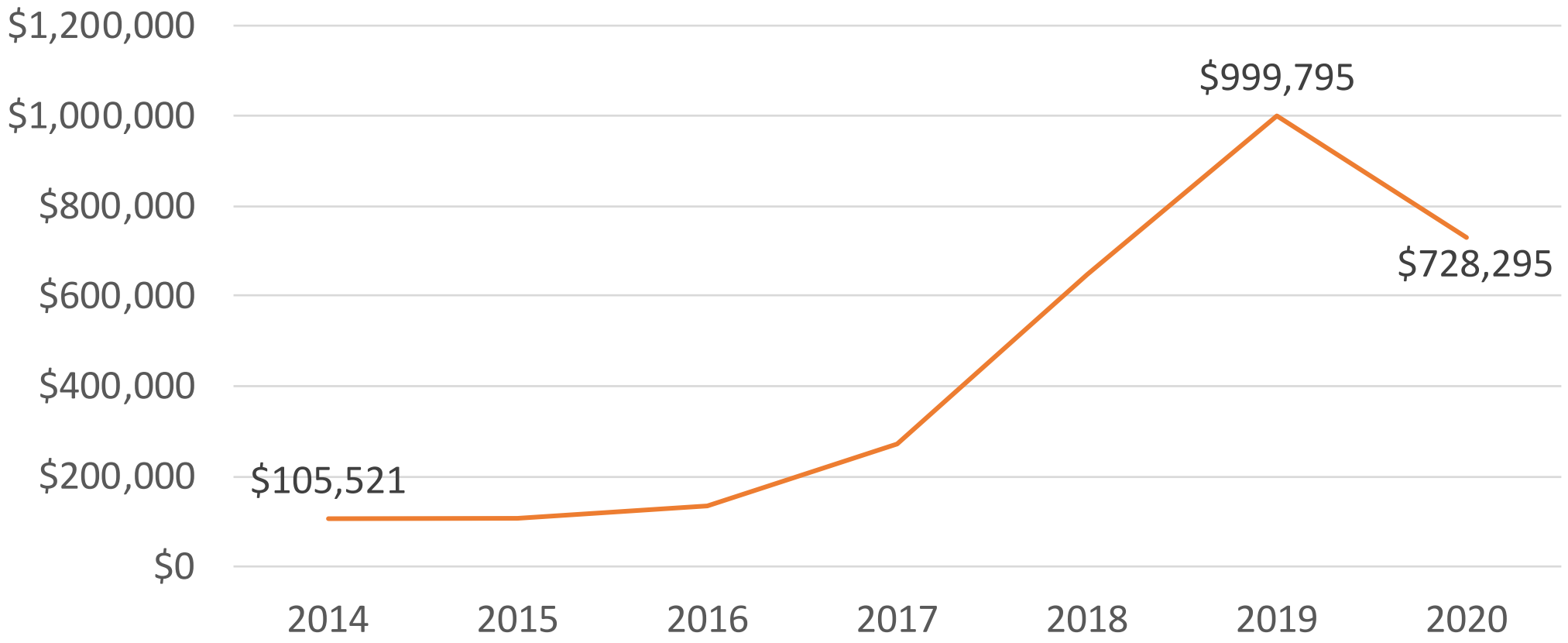
*Data unavailable for "other NOAA" from 2012-2015

Number of oysters produced in South Carolina



Data Source: SC DNR

Wholesale value of oysters produced in South Carolina



Data Source: SC DNR

Scenario Development

1. Traditional land-based hatchery (with land purchase)
2. Traditional land-based hatchery (without land purchase)
3. Hatchery on a barge
4. Offshore aquaculture
   - Different from the other scenarios as it assumes private investment and available seed

Logic and Assumptions

- The investment into shellfish aquaculture research programs is expected to yield economic benefits in 3 key ways:
  1. Economic output resulting from shellfish seed being provided to farmers
  2. Income earned by those who work in the research faculties
  3. External grant funding obtained due to the presence of the facility

Logic and Assumptions

- Costs would include
  1. Initial capital expenditures on construction
  2. Construction labor
  3. Operational costs, repairs
  4. Permits
  5. Land, property taxes, flood insurance (in some cases)

Data Collection

- Hatchery equipment needs
- BLS wage rates
- Land prices
- Hatchery survival rates
- Federal grant dollars invested by SC Sea Grant Consortium since 2014
- Market prices of mariculture oysters (wholesale and retail)
- Regional purchase coefficients

The Interactions of Local Supply and Demand

Regional Purchase Coefficient (RPC): the proportion of local demand met by local production

Regional Supply Coefficient (RSC): the proportion of local supply that goes to meet local demand

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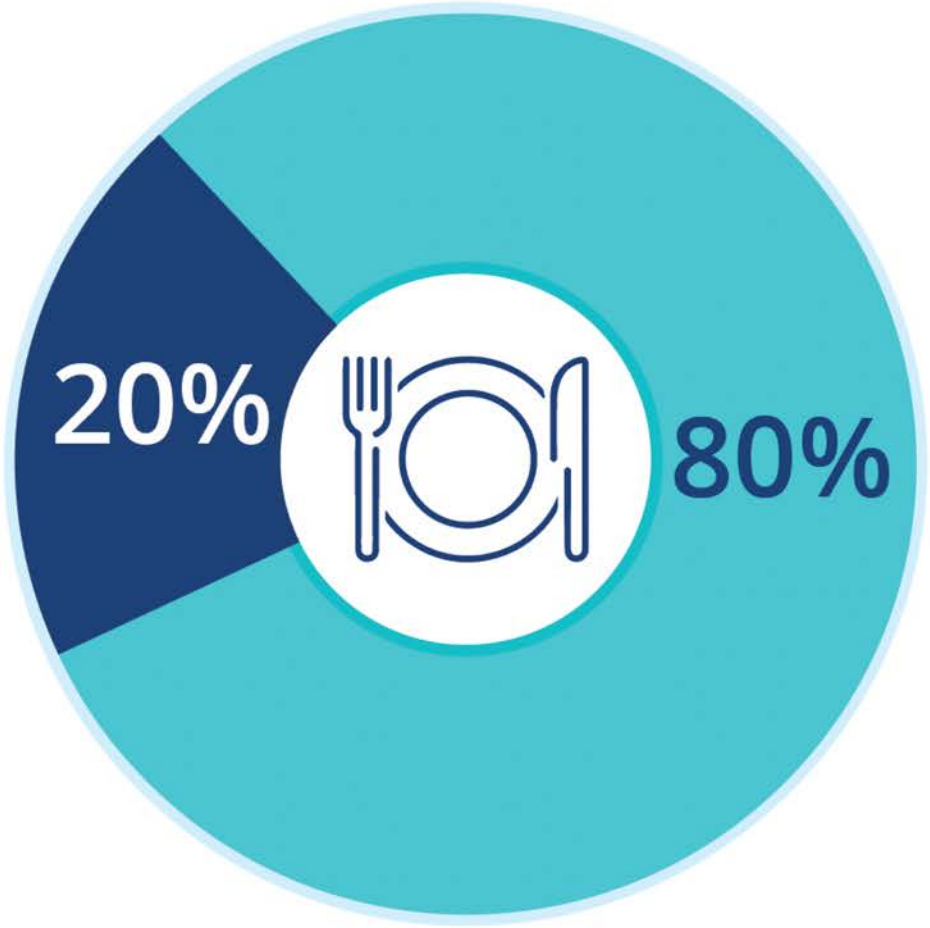
Mariculture Oyster RPC = .196, or 19.6%



Just ***one out of every five mariculture oysters (20%)*** *purchased by consumers in South Carolina is produced in South Carolina. This reveals a significant potential demand for additional local mariculture oyster production not currently being satisfied.*

Supply and Demand for Mariculture Oysters

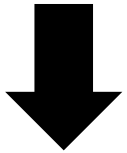
Estimates Reflect Pre-Pandemic (2019) Averages

Metric	Dollar Value
South Carolina Demand	$4,338,521
South Carolina Supply	$999,795
S.C. Production Meeting S.C. Demand	$834,829
Potential Unmet Demand	**$3,504,177**

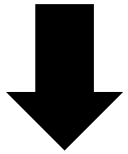
The market potential for mariculture oysters in South Carolina is more than triple the current production of existing South Carolina oyster farms.

Economic Impact Analysis

Initial change in economic activity (e.g., new business formation)



Spending activity



Economic activity (GDP), Job creation, Income creation

Economic Impact Analysis

- *Direct Effects – Spending resulting from initial economic activity*
- *Indirect Effects – Spending resulting from inter-industry supply chain*
- *Induced Effects - Spending resulting from changes in household income*

Annual Increase in Economic Impact from In-State Producers Meeting all S.C. Mariculture Oyster Demand

Impact Type	Annual Output
Direct Effect	$3,504,177
Indirect Effect	$832,690
Induced Effect	$330,131
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Total Impact	**$4,666,998**

→ *Economic multiplier of approximately 1.3*

A Cost/Benefit Analysis of Investments in S.C. Mariculture Infrastructure

Projected Sales Revenue from Each SCSGC Investment Scenario

Investment Year	Scenario 1 Land-Based Hatchery Operation w/ Land Purchase		Scenario 2 Land-Based Hatchery Operation w/o Land Purchase		Scenario 3 Barge Hatchery Operation		Scenario 4 Offshore Mariculture Operation	
	Wholesale Revenue	Quantity	Wholesale Revenue	Quantity	Wholesale Revenue	Quantity	Wholesale Revenue	Quantity
1	$0	0	$0	0	$0	0	$0	0
2	$0	0	$0	0	$0	0	$356,000	500,000
3	$3,560,000	4,000,000	$3,560,000	4,000,000	$3,560,000	4,000,000	$378,250	500,000
4	$3,782,500	4,250,000	$3,782,500	4,250,000	$3,782,500	4,250,000	$801,000	1,000,000
5	$4,005,000	4,500,000	$4,005,000	4,500,000	$4,005,000	4,500,000	$801,000	1,000,000
6	$4,005,000	4,500,000	$4,005,000	4,500,000	$4,005,000	4,500,000	$2,403,00	3,000,000
7	$4,005,000	4,500,000	$4,005,000	4,500,000	$4,005,000	4,500,000	$2,403,00	3,000,000
8	$4,005,000	4,500,000	$4,005,000	4,500,000	$4,005,000	4,500,000	$2,403,00	3,000,000
9	$4,005,000	4,500,000	$4,005,000	4,500,000	$4,005,000	4,500,000	$2,403,00	3,000,000
10	$4,005,000	4,500,000	$4,005,000	4,500,000	$4,005,000	4,500,000	$2,403,00	3,000,000

The proposed increase in SC-based mariculture oyster production is likely to be almost fully absorbed in SC markets

Scenario 1: Land-Based Hatchery Operation w/ Land Purchase

Investment Year	Estimated Total Annual Economic Output for South Carolina	Estimated Annual Tax Revenue Generated for South Carolina
1	$1,574,962	$41,453
2	$540,740	$14,232
3	$5,246,542	$138,089
4	$5,540,655	$145,830
5	$5,834,767	$153,571
6	$5,834,767	$153,571
7	$5,834,767	$153,571
8	$5,834,767	$153,571
9	$5,834,767	$153,571
10	$5,834,767	$153,571

Scenario 2: Land-Based Hatchery Operation w/o Land Purchase

Investment Year	Estimated Total Annual Economic Output for South Carolina	Estimated Annual Tax Revenue Generated for South Carolina
1	$752,694	$19,811
2	$540,740	$14,232
3	$5,246,542	$138,089
4	$5,540,655	$145,830
5	$5,834,767	$153,571
6	$5,834,767	$153,571
7	$5,834,767	$153,571
8	$5,834,767	$153,571
9	$5,834,767	$153,571
10	$5,834,767	$153,571

Scenario 3: Barge Hatchery Operation

Investment Year	Estimated Total Annual Economic Output for South Carolina	Estimated Annual Tax Revenue Generated for South Carolina
1	$1,002,771	$26,393
2	$540,740	$14,232
3	$5,246,542	$138,089
4	$5,540,655	$145,830
5	$5,834,767	$153,571
6	$5,834,767	$153,571
7	$5,834,767	$153,571
8	$5,834,767	$153,571
9	$5,834,767	$153,571
10	$5,834,767	$153,571

Scenario 4: Offshore Mariculture Operation

Investment Year	Estimated Total Annual Economic Output for South Carolina	Estimated Annual Tax Revenue Generated for South Carolina
1	$1,763,964	$46,428
2	$1,011,321	$26,618
3	$1,040,732	$27,392
4	$1,599,546	$42,100
5	$1,599,546	$42,100
6	$3,717,157	$97,836
7	$3,717,157	$97,836
8	$3,717,157	$97,836
9	$3,717,157	$97,836
10	$3,717,157	$97,836

Scenario 1 Cost/Benefit Analysis: Land-Based Hatchery Operation w/ Land Purchase

Figure 2 – South Carolina Net Tax Revenue Projections for Scenario 1

in Thousands of Dollars

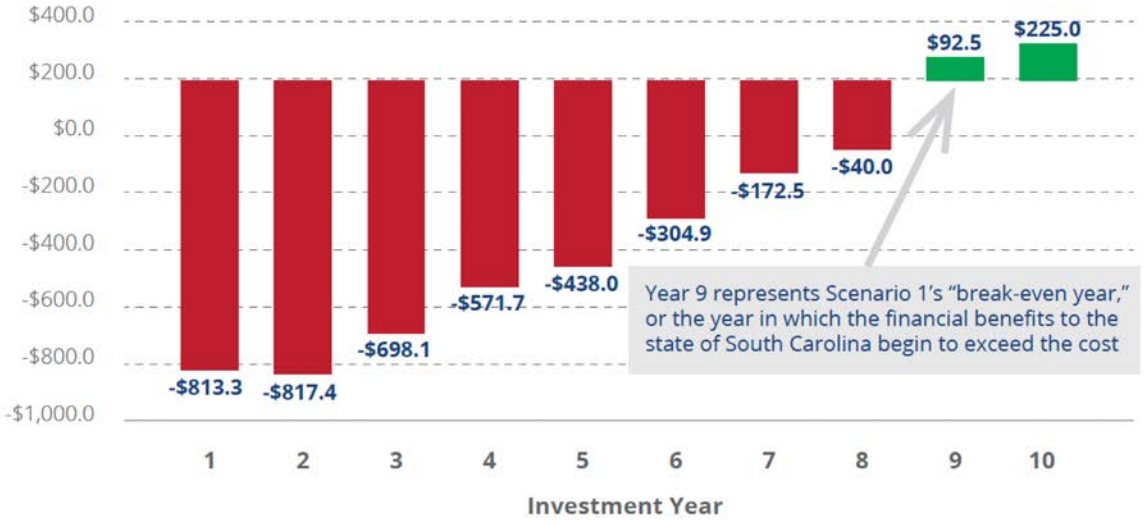

Figure 3 – South Carolina Cumulative Economic Output Projections for Scenario 1

in Millions of Dollars

Scenario 2 Cost/Benefit Analysis: Land-Based Hatchery Operation w/o Land Purchase

Figure 4 - South Carolina Net Tax Revenue Projections for Scenario 2

in Thousands of Dollars

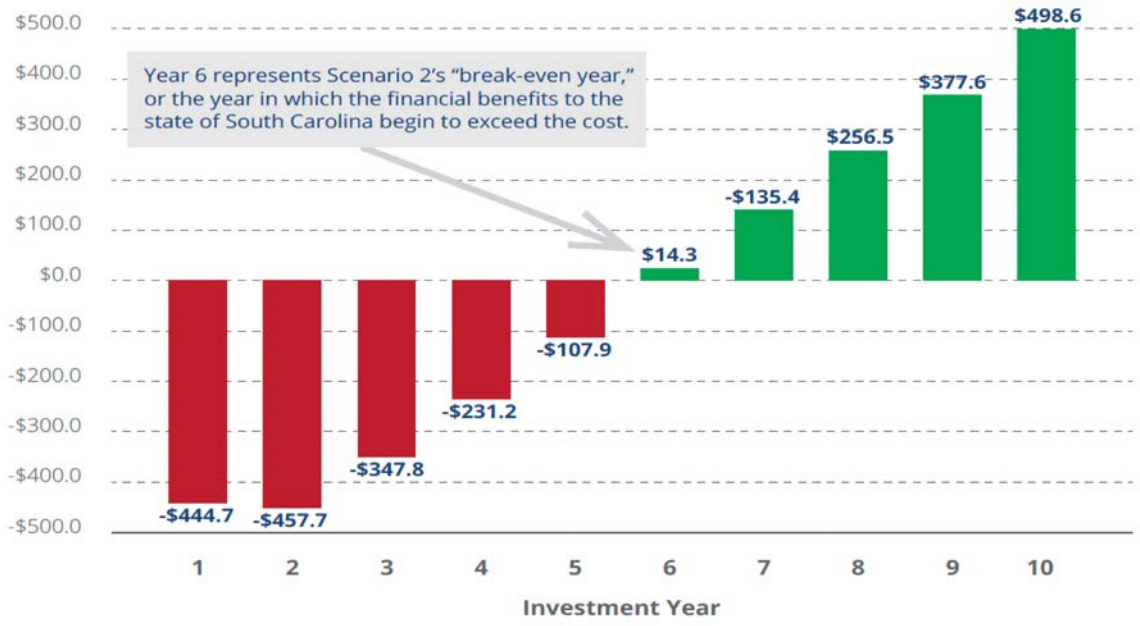

Figure 5 – South Carolina Cumulative Economic Output Projections for Scenario 2

in Millions of Dollars

Scenario 3 Cost/Benefit Analysis: Barge Hatchery Operation

Figure 6 – South Carolina Net Tax Revenue Projections for Scenario 3

in Thousands of Dollars

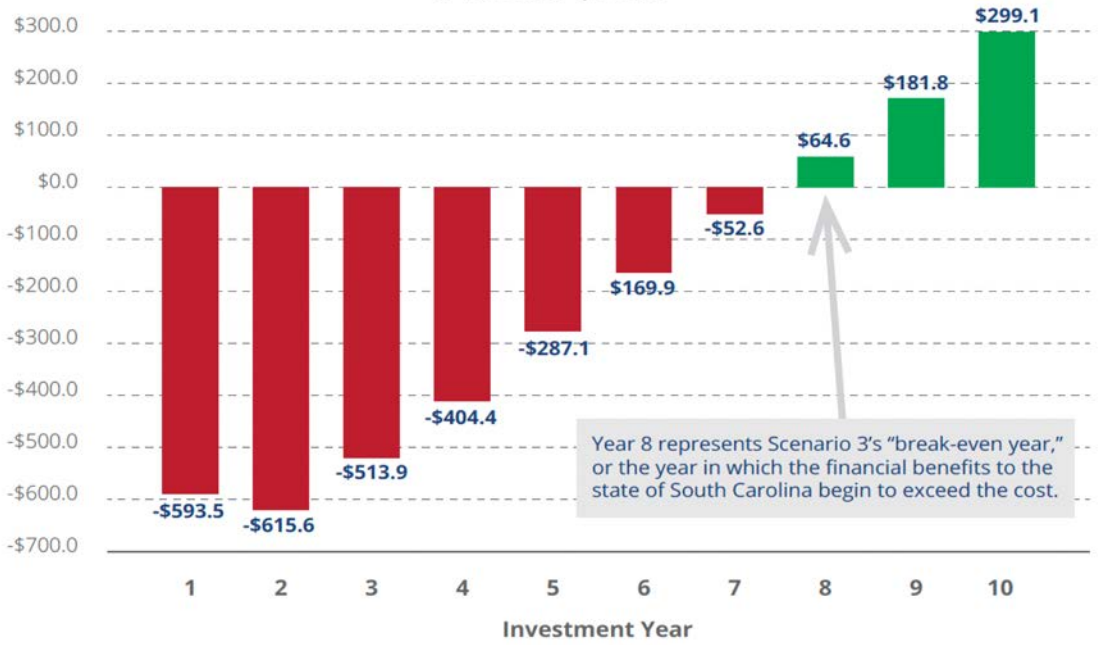

Figure 7 – South Carolina Cumulative Economic Output Projections for Scenario 3

in Millions of Dollars

Scenario 4 Cost/Benefit Analysis: Offshore Mariculture Operation

Figure 8 – South Carolina Net Tax Revenue Projections for Scenario 4

in Thousands of Dollars

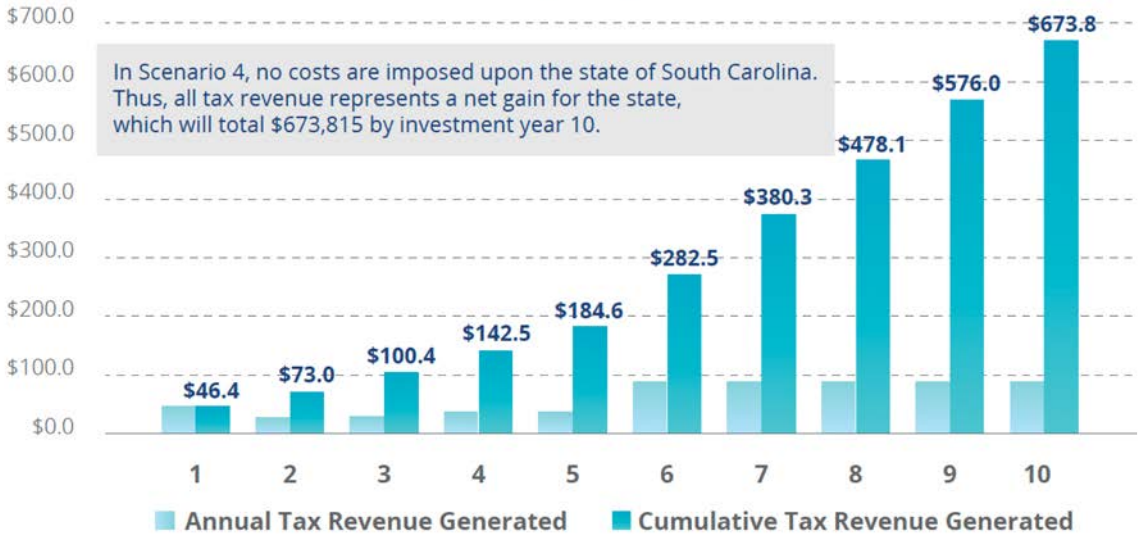

Figure 9 – South Carolina Cumulative Economic Output Projections for Scenario 4

in Millions of Dollars