

# LSD Oysters: Studying Delaware's Inland Bay Oyster Fishery

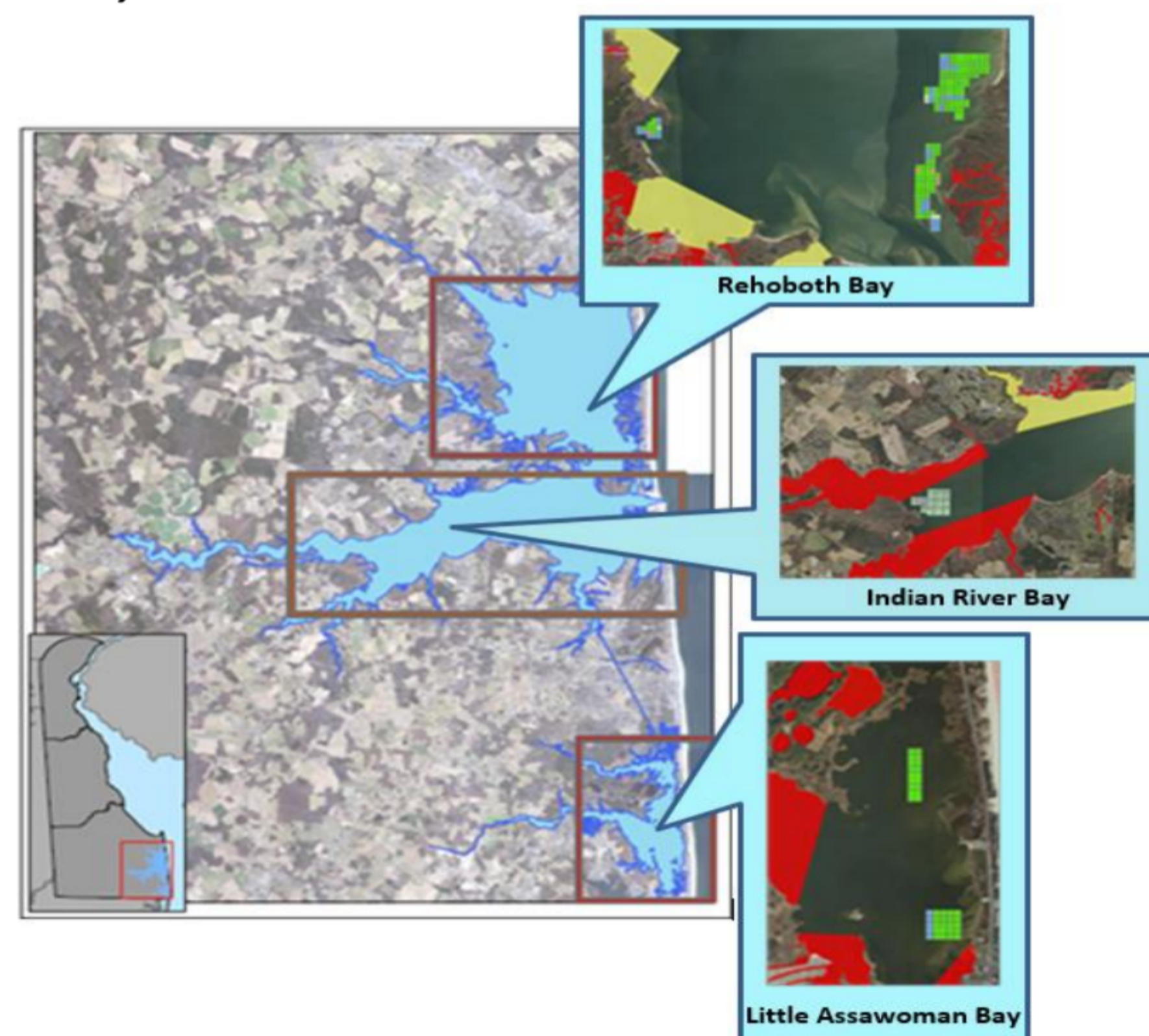
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## Abstract:

For years Delaware was the only coastal state in the U.S. that did not utilize aquaculture as a means of producing shellfish. To address this, DNREC proposed parceling plots of the Inland bays to allow fishermen to grow and harvest oysters in 2014 and plots were open for lease in the May of 2017. Only 18.6% of the plots have been leased as of February 2020 (DNREC). This objective of this study was to examine the costs and benefits associated with a Marketing Cooperative for Inland Bays oysters. We found that the primary concern associated with a Marketing Cooperative is that the increased revenue from joining the cooperative does not cover the fee to be a member. Furthermore, in this area there is an uncertainty in seasonal demand, a lack of marketing experience, and possible quality control issues. For these reasons we see speculated that a Market Cooperative may help to solve the main issues in the current market. Although data on prices, production costs, and yields are scant, we attempt to provide some insight into the monetary costs of starting and maintaining a marketing cooperative for Inland Bay Oysters by using case studies and data from other fisheries. We ran attempted to run a cost benefit analysis on the market with the inclusion of a market cooperative to see its effects. We found that it may be beneficial to do so because it would provide access to quality supplies and services at reasonable cost.

## Introduction and background:

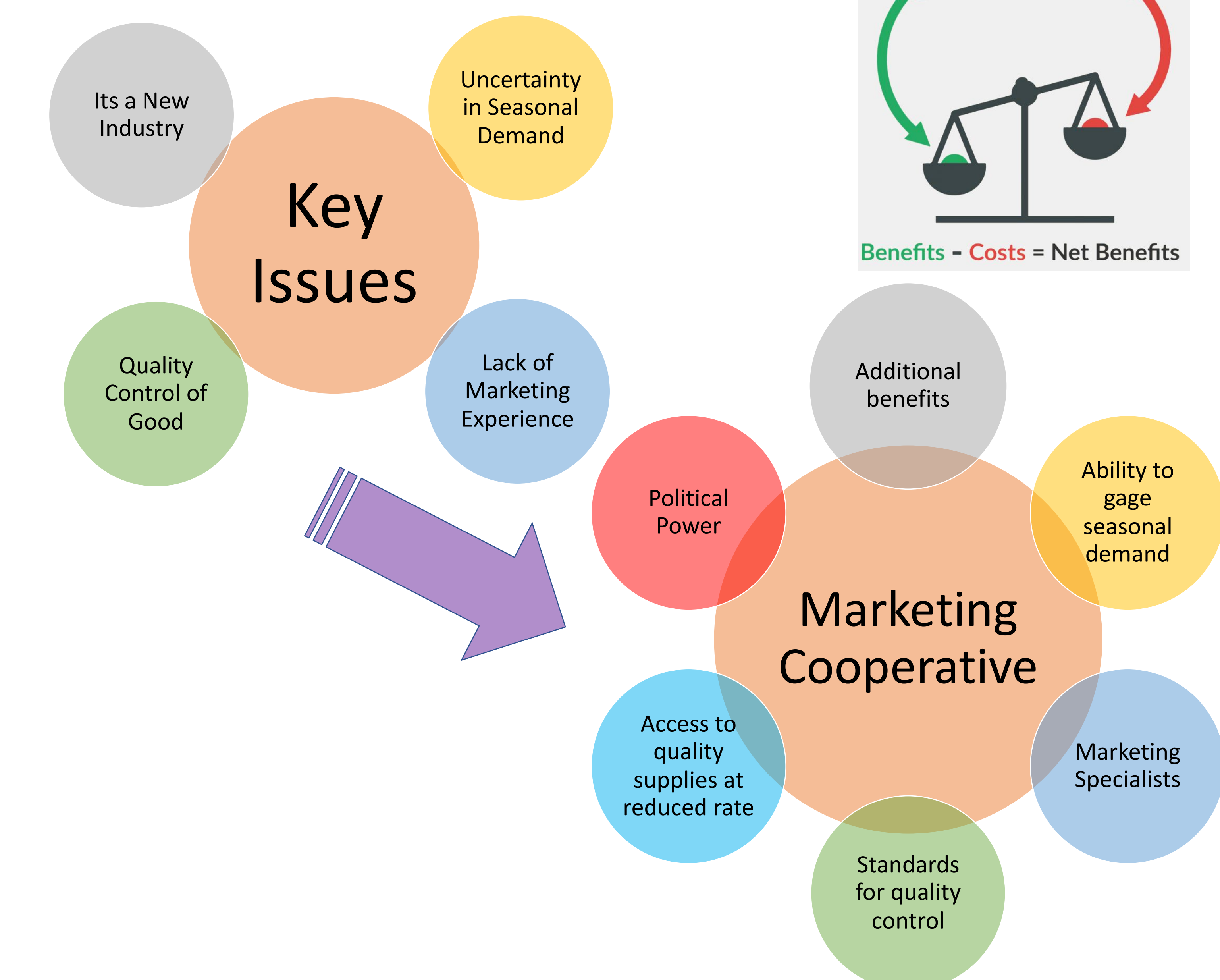
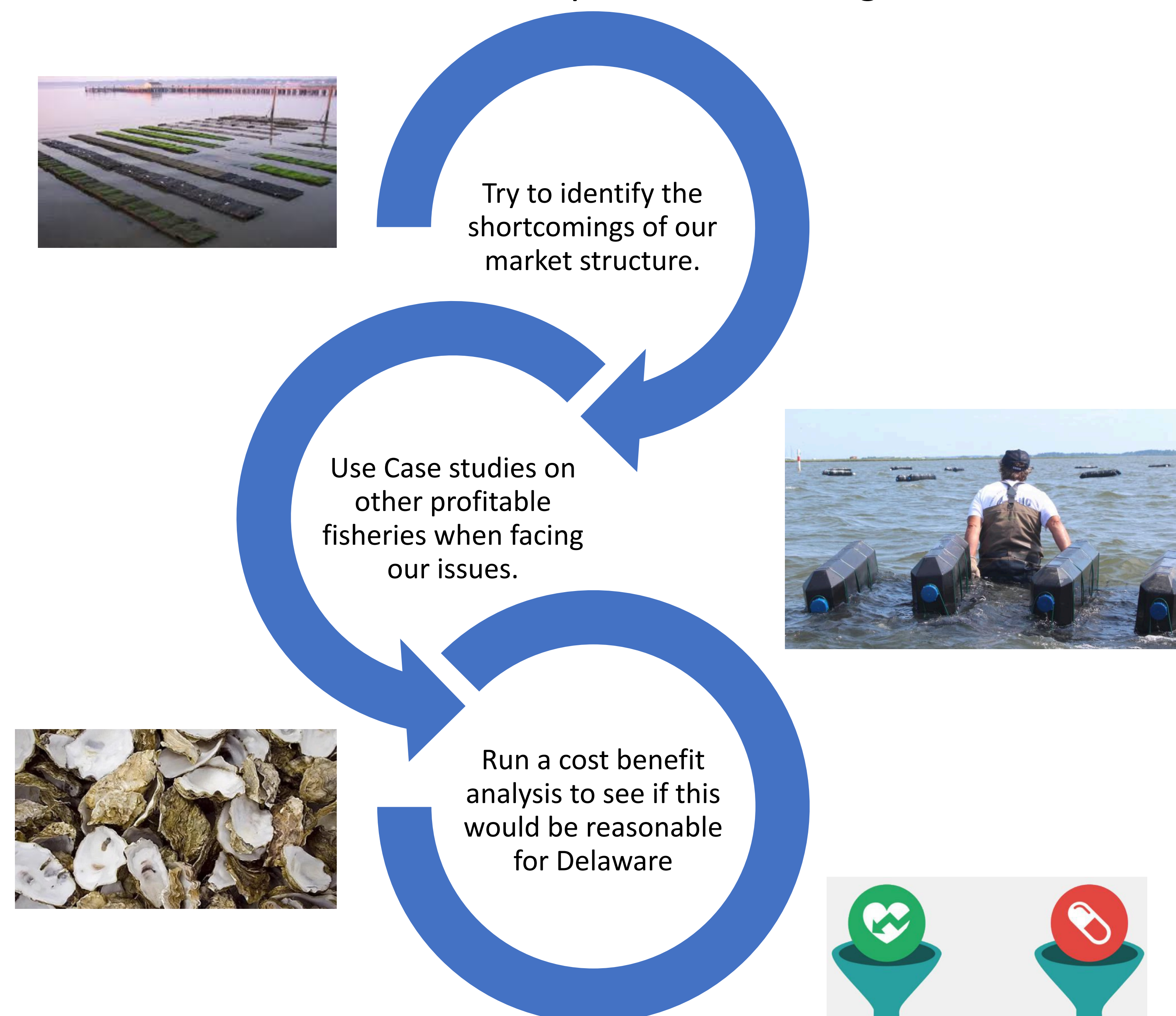
Leased in the Inland Bays



- In 2014 DENREC parceled 333 acres of water in the inland bays (Rehoboth, Indian River, and Little Assawomen) sq. acre plots.
- Only 51 acres have been claimed by growers.
- Surrounding states have found success growing oysters and developing their markets for them

So why is it that very few people are own these plots? Is there a way we can make oyster farming more profitable to help increase the production and reduce available plots?

## Methods and Experimental Design:



## Case Studies:

- Increased resilience and empowerment of small aquafarmers through cooperatives in China. (Xinhua)
  - Small scale aquafarmers had too many expenses; this did not allow individuals to pursue economic development.
  - With the introduction of a Marketing Cooperative resources could be bought in bulk and gave a stronger voice to groups of fishermen to influence political action.
- Resilience through risk management: Cooperative insurance in small-holder aquaculture systems (Watson)
  - This case study looked at insurances for aquaculture owners and how the effects of environmental disasters and local economies should be best protected
  - They determined that the implementation of a cooperative which could make the insurances cost be associated with all members. Thereby protecting the local fisheries through inclusion from natural disaster or volatile markets.
- Measuring Benefits from a Marketing Cooperative in the Copper River Fishery (Sunny)
  - This case study looked at a fishery located in Alaska which had already implemented a cooperative in the area.
  - They made a benefit list which includes increased sales prices, greater returns for fisherman, better quality of catch, and regulation quantities caught.

## Cost Benefit Analysis:

- Must be hypothetical because we do not have all the necessary data to run a completely accurate model.
- Assumptions were made on potential demands for oysters not observed.
- With use of cooperative a farmer would need to produce 1,031,250 oysters minimum to break even.
- That's 206,250 per acre. Which is well within the range of production possibility.

## Next steps Forward/ What's next:

- Give time to get growth and sales data from current market
- Determine demand for oysters in Delaware
- Run a more accurate cost benefit analysis to see if a Market Cooperative is a reasonable option
- Possible implementation

## References:

- DNREC "2019 Delaware Inland Bays Shellfish Aquaculture Report Planting, harvest, and survey of participants" Division of fish and wildlife Feb. 2020.
- DNREC "Division of Fish & Wildlife." *Shellfish Aquaculture*, (2020): [www.dnrec.delaware.gov](http://www.dnrec.delaware.gov)
- Ewart, John W. "Shellfish Aquaculture in Delaware's Inland Bays Status, Opportunities, and Constraints." *Center for the Inland Bays Oyster Gardening Program* 2003 (2013): 21.
- Sunny L. Jardine, C.-Y. Cynthia Lin, James N. Sanchirico, Measuring Benefits from a Marketing Cooperative in the Copper River Fishery, *American Journal of Agricultural Economics*, Volume 96, Issue 4, July 2014, Pages 1084–1101,
- Watson, James R., et al. "Resilience through risk management: cooperative insurance in small-holder aquaculture systems." *Heliyon* 4.9 (2018): e00799.
- Xinhua, Yuan, and Li Feifan. "Country Paper 6: Increased resilience and empowerment of small aquafarmers through cooperatives in China." *Sustainable intensification of aquaculture in the Asia-Pacific region*: 71.



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5 May 2020

### Abstract:

For years Delaware was the only coastal state in the U.S. that did not utilize aquaculture as a means of producing shellfish. To address this, DNREC proposed parceling plots of the Inland bays to allow fishermen to grow and harvest oysters in 2014 and plots were open for lease in the May of 2017. Only 18.6% of the plots have been leased as of February 2020 (DNREC). This objective of this study was to examine the costs and benefits associated with a Marketing Cooperative for Inland Bays oysters. We found that the primary concern associated with a Marketing Cooperative is that the increased revenue from joining the cooperative does not cover the fee to be a member. Furthermore, in this area there is an uncertainty in seasonal demand, a lack of marketing experience, and possible quality control issues. For these reasons we see speculated that a Market Cooperative may help to solve the main issues in the current market. Although data on prices, production costs, and yields are scant, we attempt to provide some insight into the monetary costs of starting and maintaining a marketing cooperative for Inland Bay Oysters by using case studies and data from other fisheries. We attempted to run a cost benefit analysis on the market with the inclusion of a market cooperative to see its effects. We found that it may be beneficial to do so because it would provide access to quality supplies and services at reasonable cost.

### Introduction and Background:

In 2014, DNREC parceled 333 acres of water in the inland bays (Rehoboth, Indian River, and Little Assawomen) into 333 sq. acre plots. These plots were intended to be used to grow oysters, which has the additional benefit of improved water quality. In 2018 the 333 plots were cut back to only be 252 due to be parceled for clamming grounds. Unfortunately, by 2019, only 51 acres were leased out of the total 252.

To obtain the rights to grow oysters, a potential fisherman has to submit their names into a ballot to determine the assigned plots. They also are required to be verified by the state to be allowed to oyster which requires various paperwork and permits. By law one fisherman can only claim five acres. It should also be noted that the spat (juvenile oysters) need to be infertile or unable to reproduce in accordance with DNREC regulations. They can produce the oysters using different strategies that the individual sees as best fit.

The University of Delaware had partnered with Sea Grant to try to make a brand name for the oysters produced in these areas. After field testing and surveying with different brand names they decided to call them Inland Bay Oysters. In this study they found that by naming the oysters "Inland Bay" (a local name for the area), consumers would recognize and would be more willing to purchase this brand. The fisherman are not required to call their oysters this but can use it as a market umbrella to sell their product.

Oyster fisheries along the majority of the east coast have been extremely profitable. For instance, in Virginia the oyster industry is valued at \$9.5 million. In Rhode Island the shell fishing industry is valued at \$2.82 million (Ewart). So why are there so many available plots if this industry can be so lucrative? The University has been tasked with finding the reasons behind why this is the case and what ways they can try to improve the market structure to incentivize more fishermen to join the industry.

### Methods and Experimental Design:

We used multiple case studies from different local and national fisheries to try to find our fishery's shortcomings. Once we find these, we need to continue to research how similarly troubled

markets addressed their issues. We then will take the best market strategy and do a cost benefit analysis on it. This will give us a good idea about how viable this strategy currently is or if we need to look for other alternatives to address the small market.

#### Case Study and the Major Takeaways:

- ❖ Increased resilience and empowerment of small aquafarmers through cooperatives in China. (Xinhua)
  - Small scale aquafarmers had too many expenses; this did not allow individuals to pursue economic development.
  - With the introduction of a Marketing Cooperative resources could be bought in bulk and gave a stronger voice to groups of fishermen to influence political action.
- ❖ Resilience through risk management: Cooperative insurance in small-holder aquaculture systems (Watson)
  - This case study looked at insurances for aquaculture owners and how the effects of environmental disasters and local economies should be best protected
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#### Results:

The initial issues with the Market.

- It's a new industry to Delaware
- People may be waiting to see if it's profitable before investing more.
- There is uncertainty in the seasonal demand
- They don't know how much to produce to fill demand without exceeding it and getting cheaper prices.
- Marketing to other sellers
- They have little marketing experience (why theirs not others)
- Quality control
- With different allowable growing strategies and one umbrella brand, a bad player can affect the entire products quality

Best Market Strategy: Create a Market Cooperative

Cost benefit result:

- Must be hypothetical because we do not have all the necessary data to run a completely accurate model.
- Assumptions were made on potential demands for oysters not observed.
  - Price Per Bushel = \$27.74
  - Price Per Oyster = \$.10
- With use of cooperative a farmer would need to produce 1,031,250 oysters minimum to break even.
- That's 206,250 per acre. Which is well within the range of production possibility.

### Discussion:

We found that with the implementation of a Cooperative could help to solve a lot of the market issues. By forming this type of cooperative we would be able to address three major problems. After the cooperative is formed it would be able to regulate the production levels of the producers to try to maximize the sales price of different graded oysters. Because it is a Market Cooperative the producers would no longer need to self-market their products. They can sell directly to the cooperative and not need to worry about marketing costs associated with distribution and identifying buyers. And as alluded to earlier, they would be able to grade the oysters from each producer to ensure quality control of the product. Not only does it address these issues, but it may also be able to provide access to quality supplies and services at reasonable cost. If the Co-op were to grow it can be a large influencer on political action which may benefit the industry. Some of the associated downsides are having to pay a fee on sold products to sustain the cooperative. It doesn't guarantee that each participant will be profiting from joining. The last issue which needed to be addressed was for quality control, which is the ability to set a standard for a product. Because the product will be sold under one market umbrella (Inland Bays Oysters) having multiple producers can lead to different ways the oysters are grown, this could lead to differing tastes. The Co-op will be able to establish set standards for size, shape, and taste that should be able to be reproduced throughout the different locations. Given the results of our cost benefit analysis we were also able to determine the price range oysters would have to be in and how much would need to be produced to make adding a Cooperative economical. The break-even point for a potential grower would need to produce around 1,032,000 million oysters on 5 acres of land or 206,250 per acre. This is assuming the price per oyster is 10 cents.

### Limitations:

Our project came with numerous limitations. The age of Delaware aquaculture is less than three years old. This leads to an inherent lack of data on the industry as a whole. DNREC is still in the process of collecting data for costs of production, costs of labor, associated profits, demand on a local scale, and many other critical areas which need to be explored before making any decisions on how to address this market. However, even with these shortcomings, after communicating with some local growers it is apparent that something does need to be done to stimulate growth in the industry.

### Going Forward:

The next step in this process is to gather more data when it becomes available. After each selling season production and sales survey should go to all of the growers. This could better help us understand the demand for the oysters being produced. Along with that information an average price per oyster or per bushel should be calculated to see if the industry is profitable. If we could determine the average profits we could more easily run an effective cost benefit analysis on the market to determine if a market cooperative truly is a good idea or if other strategies to further the industry in Delaware is more realistic.

### Reflection:

Working for Brandon and Adam has been a great opportunity for me to broaden my spectrum and really see behind the scenes of how economics can be used to problem solve. Getting

the chance to write literature reviews and try to find useful data on my own was a great learning experience. I have come to appreciate the magnitude of the work that goes behind everything from finding background information, evaluating case studies, and trying to interpret the results. I am grateful for this amazing opportunity and glad that I was able to participate in this program offered by DENNIN.

## References:

DNREC “2019 Delaware Inland Bays Shellfish Aquaculture Report Planting, harvest, and survey of participants” Division of fish and wildlife Feb. 2020.

DNREC “Division of Fish & Wildlife.” *Shellfish Aquaculture*, (2020): [www.dnrec.delaware.gov](http://www.dnrec.delaware.gov)

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