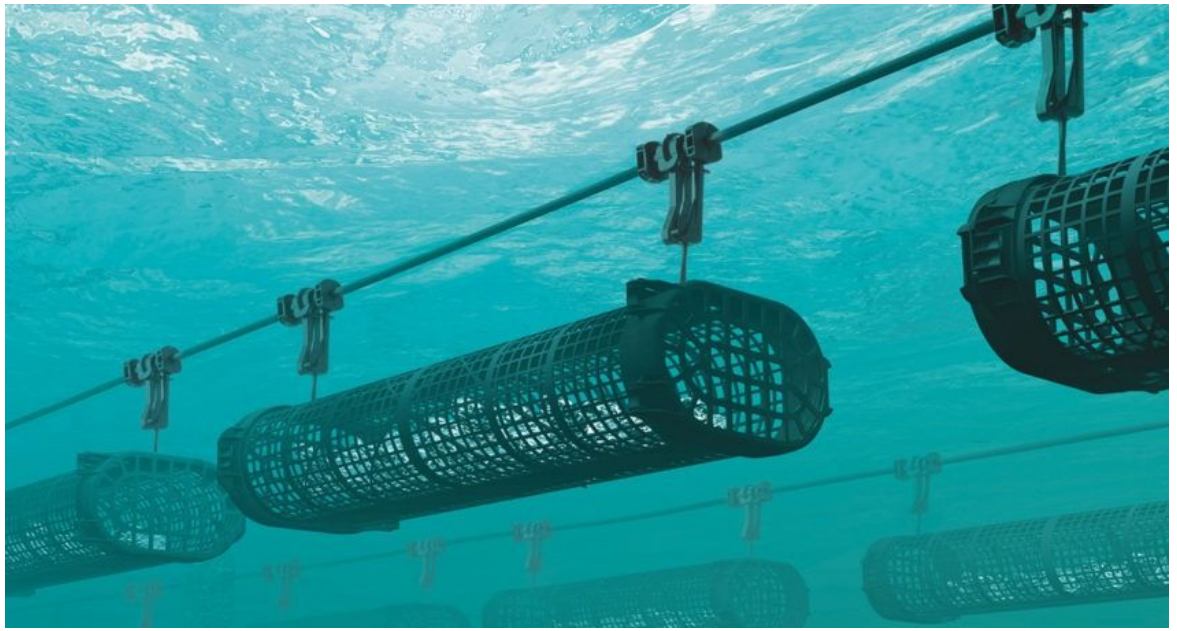
Shellfish Harvest Classifications

As a Metric For The

State of the Inland Bays

The Background

- Recreational and commercial clamming in the Inland Bays
  - Oyster aquaculture in R & IR Bays
  - Clam aquaculture permitted in LA Bay but not yet conducted
  - No recreational oyster harvest in Delaware



The Background

- Illness risk if harvested from polluted areas – filter feeders eaten raw
  - Enteric pathogens (norovirus, hepatitis A, salmonella typhoid, etc)
    - From intestines of humans & other warm-blooded animals
- DNREC classifies waters based on suitability of shellfish for human consumption
  - Classified as Approved, Prohibited, or Seasonally Approved for harvest
- Federal requirements – National Shellfish Sanitation Program (NSSP)
  - Sanitary surveys for actual & potential fecal pollution sources
    - WWTPs, marinas, dog parks, failed septic tanks, etc
  - Monthly sampling for Fecal Coliform indicator bacteria

Sanitary Surveys of Pollution Sources

e.g., Marinas – potential pollution

@.05 Marinas

A. Marina Proper. The area within any marina which is in or adjacent to a shellstock growing area shall be classified as conditionally approved, conditionally restricted or prohibited.
(1) Prior to the Authority establishing a classification of conditionally approved or conditionally restricted in the marina proper, a pollution assessment supporting the classification will be conducted by the authority.
(2) The assignment of a prohibited classification within the marina proper does not require a pollution assessment by the Authority.

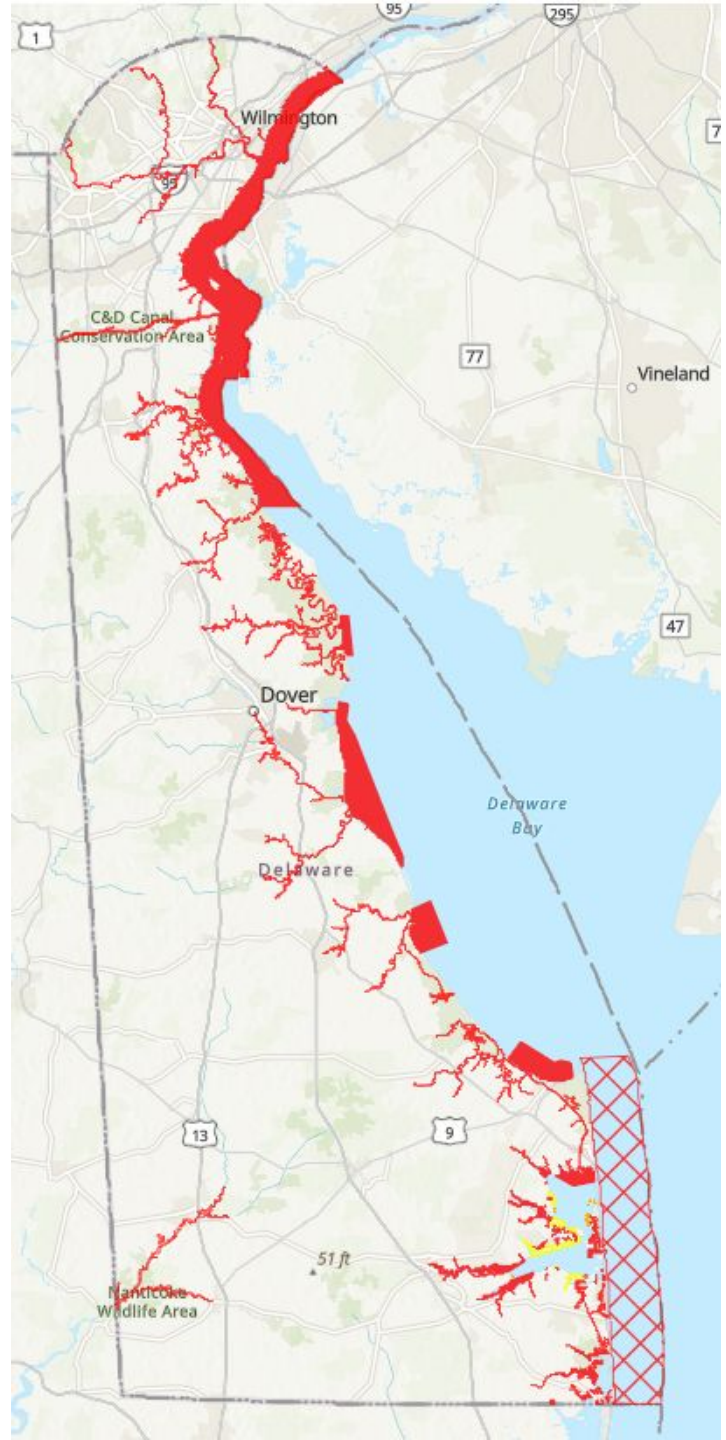
B. Adjacent Waters. Waters adjacent to marina waters classified under Section A. may be impacted by pollution associated with the marina.
(1) A dilution analysis shall be used to determine if there is any impact to adjacent waters.
(2) The dilution analysis shall be based on the volume of water in the vicinity of the marina.
(3) The dilution analysis shall incorporate the following:
(a) A slip occupancy rate for the marina;
(b) An actual or assumed rate of boats which will discharge untreated waste;
(c) An occupancy per boat rate (i.e., number of persons per boat);
(d) A fecal coliform discharge rate of 2×10^9 fecal coliforms per day; and
(e) The assumption that the wastes are completely mixed in the volume of water in and around the marina.
(f) Documentation, verification and enforcement of Federal No Discharge Zones and locally well enforced no discharge and occupancy by-laws and regulations.
(g) Availability and documented use of pump out boats or facilities.
(4) If the dilution analysis predicts a theoretical fecal coliform loading greater than fourteen (14) fecal coliform MPN per 100 ml, the waters adjacent to the marina shall be classified as:
(a) Conditionally approved;
(b) Restricted;
(c) Conditionally restricted; or
(d) Prohibited.
(5) If the dilution analyses predicts a theoretical fecal coliform loading less than or equal to fourteen (14) fecal coliform MPN per 100 ml, the waters adjacent to the marina may be classified as:
(a) Approved; or
(b) Conditionally approved.
(6) If the Authority chooses not to determine a specific occupancy per boat rate by investigation in specific areas or sites, the Authority shall assume a minimum occupancy rate of two (2) persons per boat.

Monthly FC Sampling

for Confirmation of Survey Findings

The Final Product –

Shellfish Harvest Classifications


95
295
1
Wilmington
95
C&D Canal
Conservation Area
77
Vineland
47
Dover
Delaware
Bay
Delaware
13
9
51 ft
Nanticoke
Wildlife Area

The Metric

The amount of acreage in the Inland Bays classified as Approved for shellfish harvest

Good metric – data easy to obtain

<u>But how to use it?</u>

The Old Use

- In the Human Health Risks section of the SotB report
  - One of the metrics for the risk of human illness from various uses of the Bays
    - Along with recreational contact (swimming, wading, boating) standards – Enterococcus
    - And fish consumption advisories – mercury and PCBs

- Sounds reasonable, right?
  - After all, shellfish harvest classifications are made to protect public heath

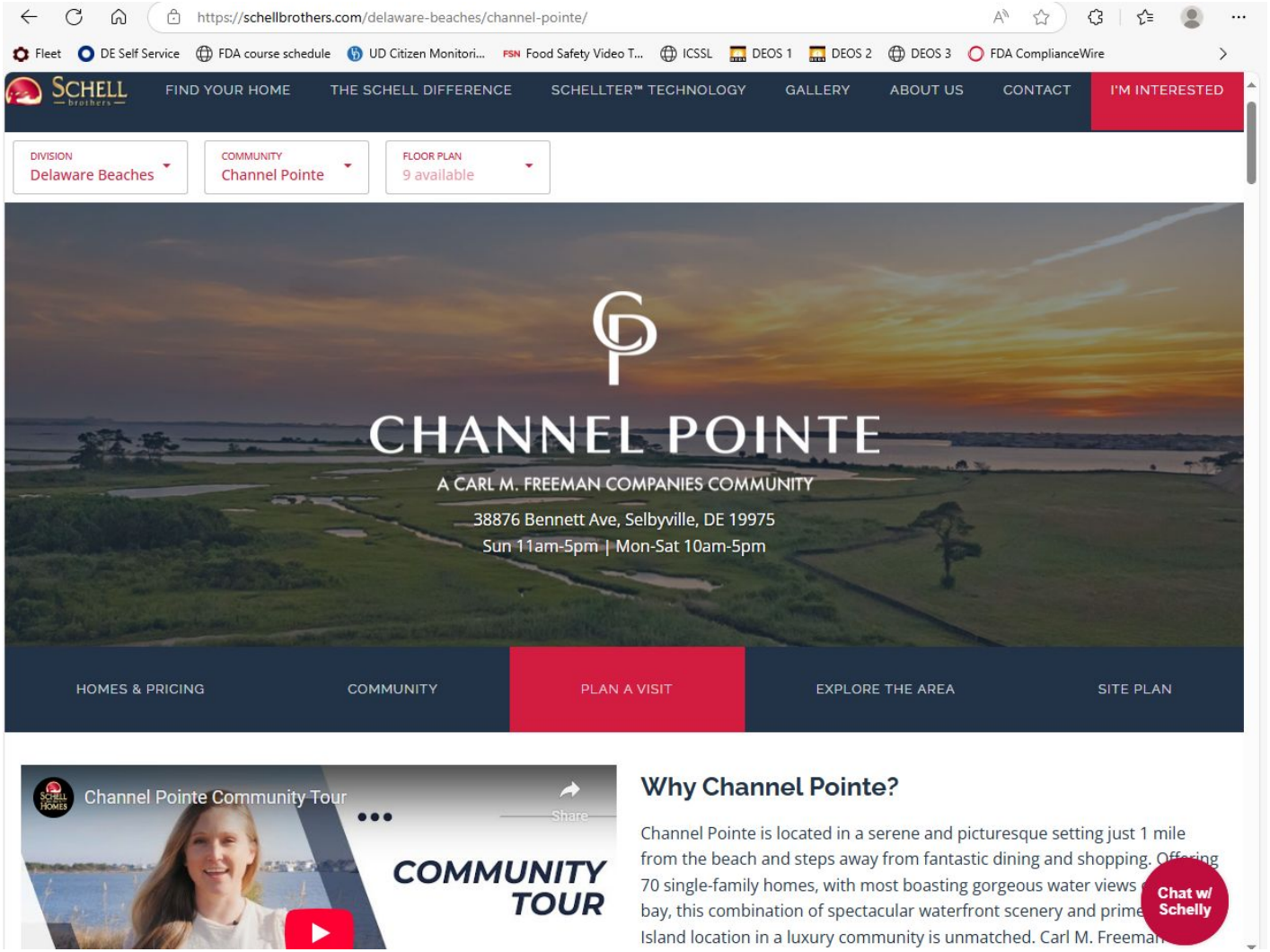
- But it gets a little complicated…

It Gets Complicated

- Harvest classifications are more than a direct product of pollution and water quality sampling
  - Potential pollution sources – theoretical calculations
  - Regulatory descriptions – landmarks
  - Ease of enforcement – police patrols
  - Lack of industry interest – clam sanctuaries
  - Other uses – SAV beds
  - Product of history – shifting priorities

There is not a direct relationship between human health risks and shellfish harvest classifications

Case in Point



Case in Point

Case in Point

- If a new marina is constructed, we are federally required to add a Prohibited buffer around it
  - Even though Fecal Coliform sampling results will probably not change
  - Based on potential pollution – theoretical boat releases

- So, the Approved shellfish harvest area will have decreased
  - But was there actually any negative impact to public health?
  - Therefore, shellfishing acreage is not a metric of human health risk
    - But it must be a good metric for *something* – What?

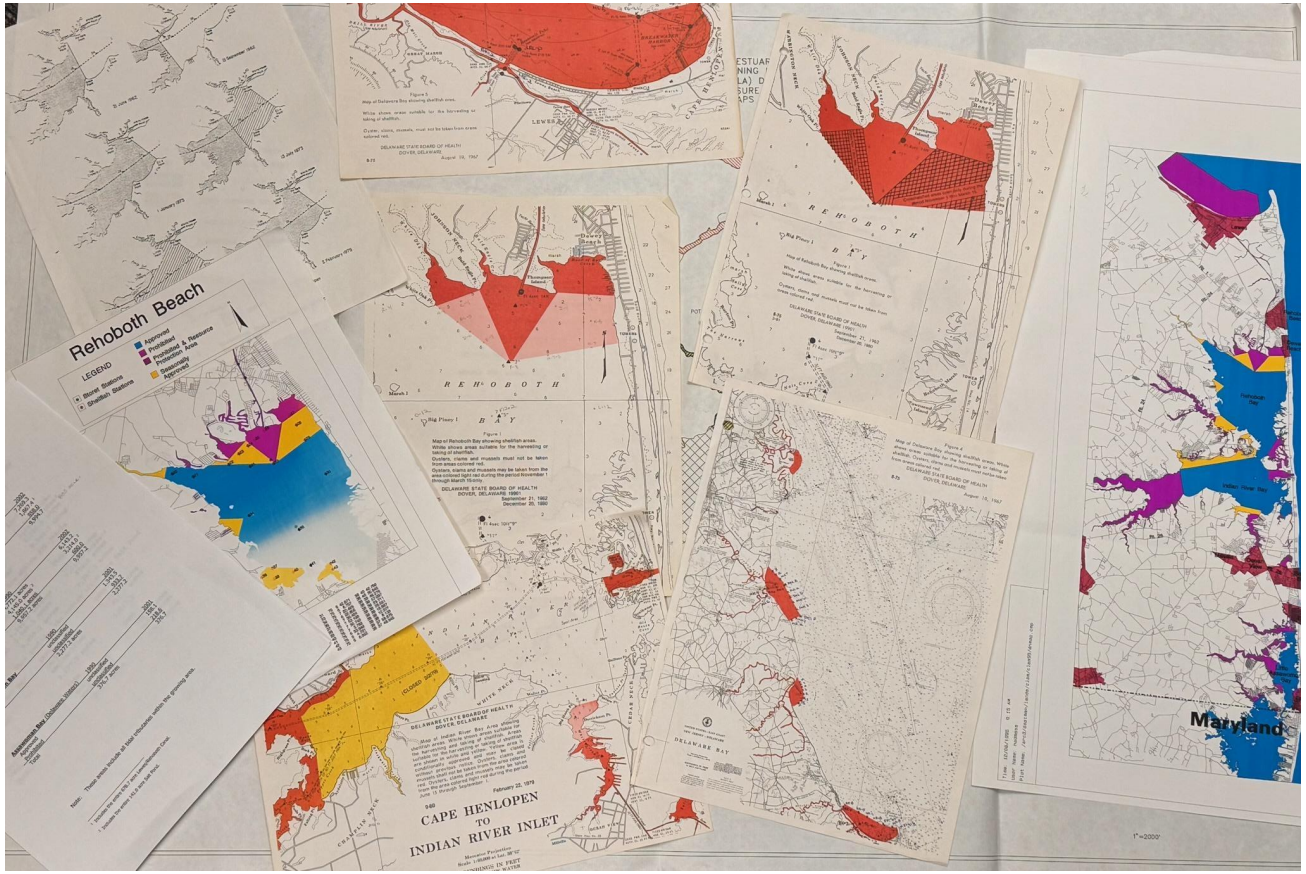
The New Use

- Move it to the Living Resources section
  - with to Recreational Fishing, Hard Clam Landings, Shellfish Farming, etc

- The Upshot:
  - Purpose of shellfish harvest classifications is protect public health
  - But other factors result in Prohibited zones being larger than strictly needed
  - So shellfish harvest classifications ends up not being a metric of human health risk
  - Instead a metric of commercial and recreational fishing/aquaculture opportunity

Great Idea. Now What?

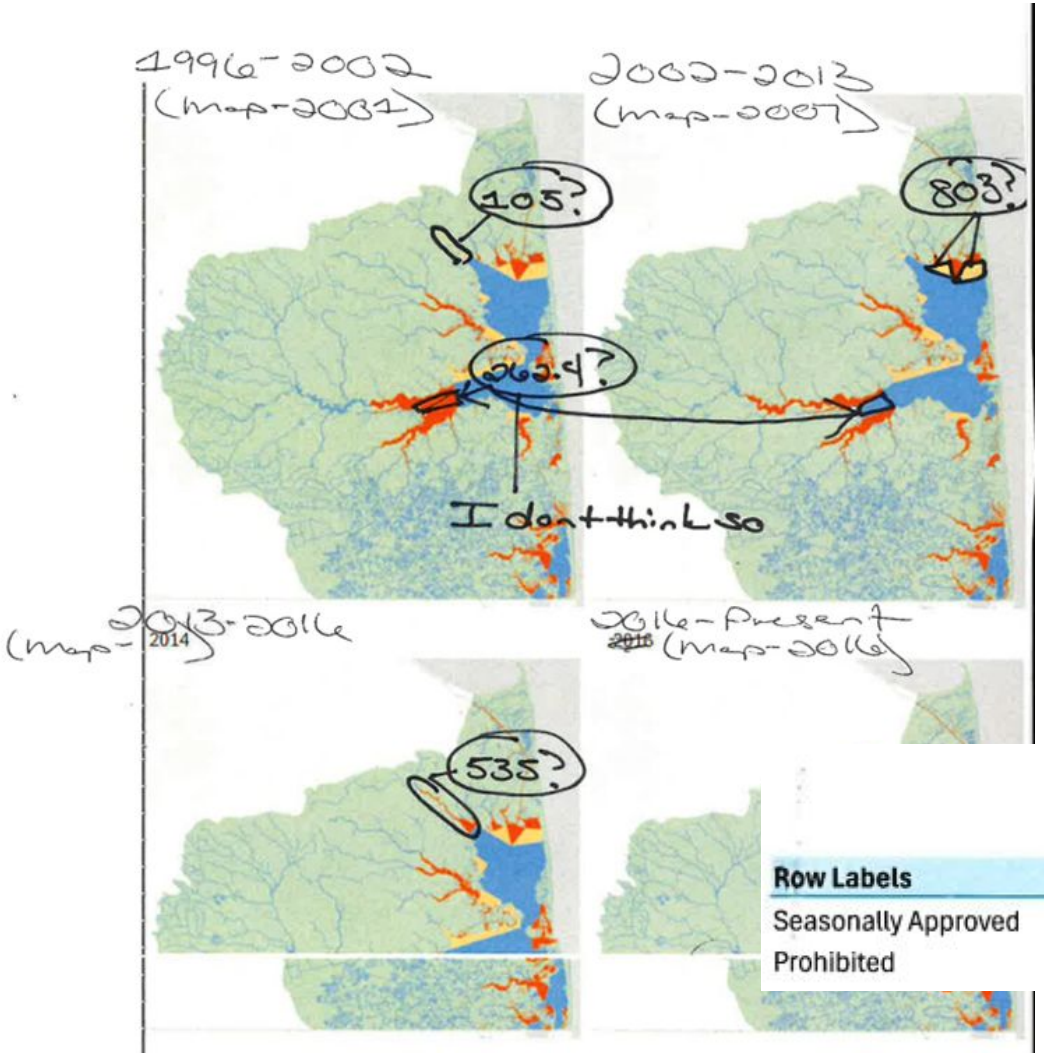
- Checking numbers – ensuring the dataset is good
- First, old files – when did the classifications change?



- Found the years when reclassifications were made

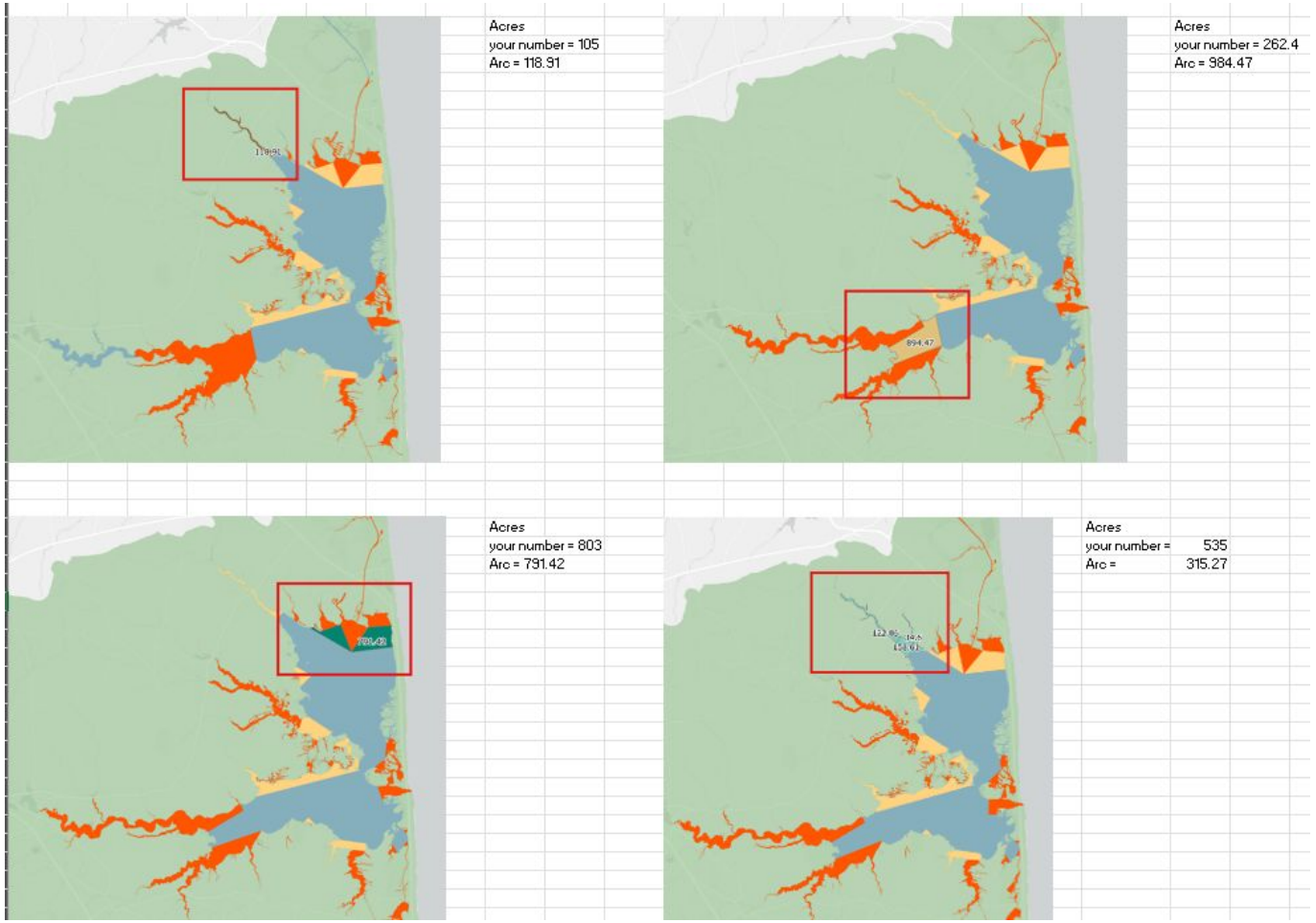
Growing Area	Sub-Area	Type of Change	Date of Change
Rehoboth	Canal Mouth	Seasonally Approved -> Prohibited	9/1/2016
	Love Creek	Seasonally Approved -> Prohibited Approved -> Prohibited	5/15/2013
Indian River	Confluence of River & Pepper/Vines	Prohibited -> Approved	2002

- Now, what about the acreages?
  - From the old files, hope this is right…



Row Labels	96-02	2002	02-13	2013	13-16	2016	16-25
Seasonally Approved	2,304.24	-	2,304.24	105.76	2,410.01	(803.49)	1,606.51
Prohibited	7,217.54	(262.43)	6,955.11	535.40	7,490.51	803.49	8,293.99

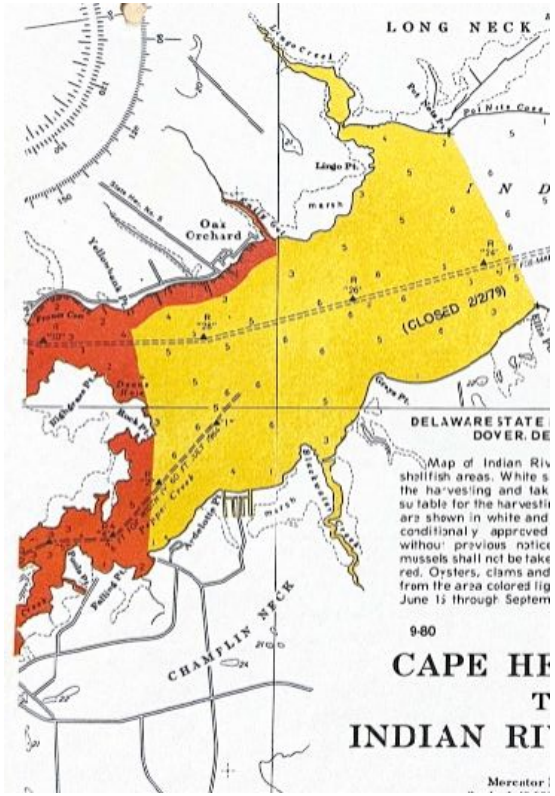
- Got GIS help –
  - Some numbers from the old files were right; some weren’t



We’ll figure it out!

Limitations

- How far back can we go before meaning is lost?
  - Different approaches have been used to classify over time



At one point, they were doing conditional approvals based on recent rainfall

DIVISION OF WATER RESOURCES
Shellfish & Recreational Water Branch

CLASSIFICATION ACREAGE SPECIFICATIONS 1990 vs. 2000

(NOTE: These figures include all tribs.)

Growing Area		
Rehoboth Bay	1990	2000
Approved:	7,269.3 acres	6,188.1 acres
Prohibited:	1,867.4 acres*	2,470.1 acres*
Conditionally Approved:	858.0 acres	1,336.5 acres
TOTAL:	9,994.7 acres	9,994.7 acres

* NOTE: This includes the entire 678.7-acre Lewes/Rehoboth Canal

Indian River Bay	1990	2000
Approved:	4,772.1 acres	5,212.2 acres
Prohibited:	4,145.0 acres**	4,145.0 acres**
Conditionally Approved:	1,040.1 acres	600.0 acres
TOTAL:	9,957.2 acres	9,957.2 acres

** NOTE: This incl[illegible] the entire 141.0-acre Salt Pond

Little Assawoman Bay	1990	2000
Approved:	unclassified	1,343.5 acres
Prohibited:	unclassified	933.7 acres
TOTAL:	2,277.2 acres	2,277.2

Assawoman Day (DE only)	[illegible]	2000
Approved:	unclassified	158.1 acres
Prohibited:	unclassified	218.6 acres
TOTAL:	376.7 acres	376.7 acres

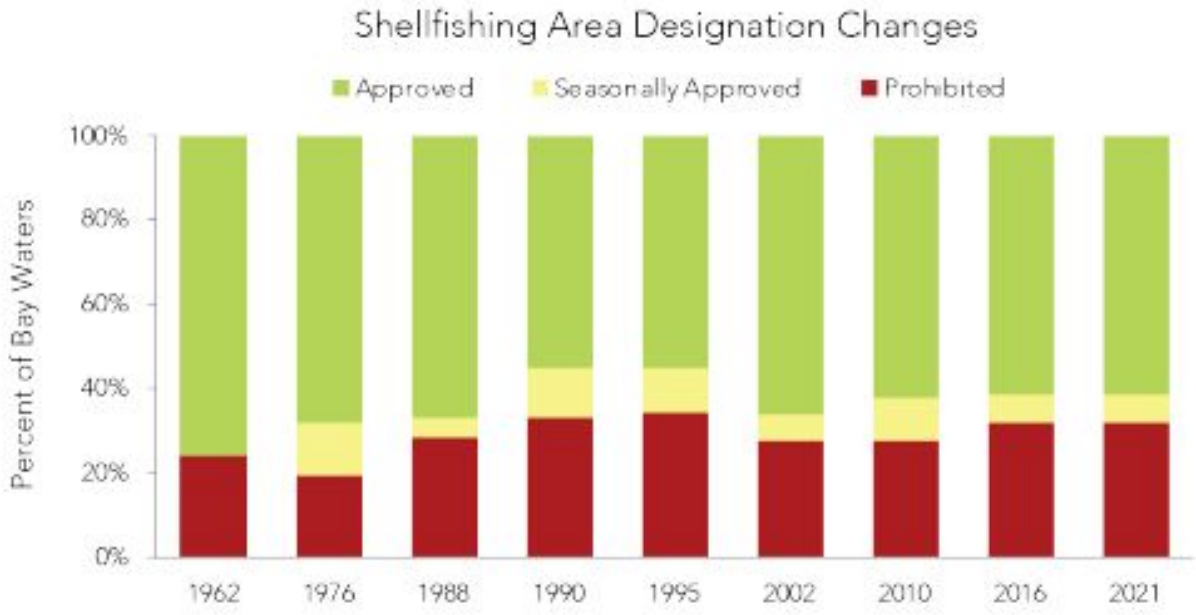
LA Bay wasn't even classified until at some point in the 1990s

Unanswered Question

- Hopes for SAV & oyster reef restoration
- Significant areas - protect from clamming with new Prohibited zone
- Thus Prohibited acreage increases - but not because of pollution
- So do we count it in this metric?
  - On one hand, shellfishing opportunity has decreased
  - On the other, the opposite of an overall negative trend for the SotB

Limitations

- How far back can we go before meaning is lost?
  - My impression: 1996

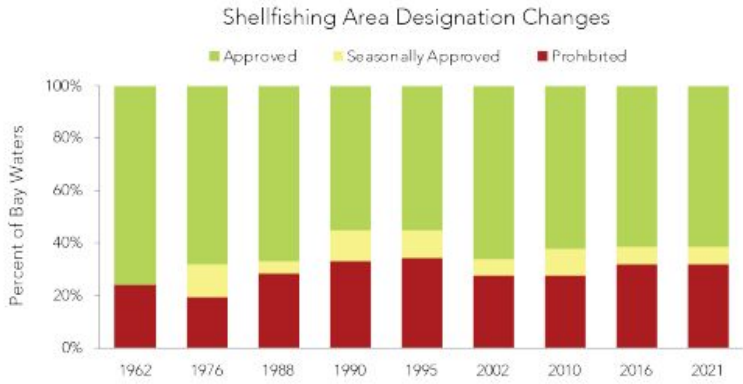


Should we discard the older data if it was the result of a different process?

One Last(?) Idea

- Standardization for intuitiveness?
  - Possible goal – only two colors in graph instead of three?
  - Since Seasonally Approved open in winter and closed in summer
    - So, maybe some kind of “shellfishing opportunity unit”? (name TBD)
  - Calculate the number of days per year each acre was open
    - (Approved year-round + Seasonally Approved in winter)
    - Then convert into percentages – days per acre?
  - So that we can present a graph showing at-a-glance of how shellfishing opportunities have changed over time

- A step too far? Even more confusing?
  - I’ll try it and we’ll see – a work in progress!



The Ultimate Goal

To make shellfish harvest classifications as useful a metric as possible for the State of the Inland Bays