TRED AVON RIVER

Summary of Fall Survey and Other Data

From the 5 Year Oyster Report
Appendix A, Section 45

Christopher Judy
MD DNR Shellfish Division
- Oyster Advisory Commission July 25, 2016 -

The data characterize the Tred Avon environment for oysters,

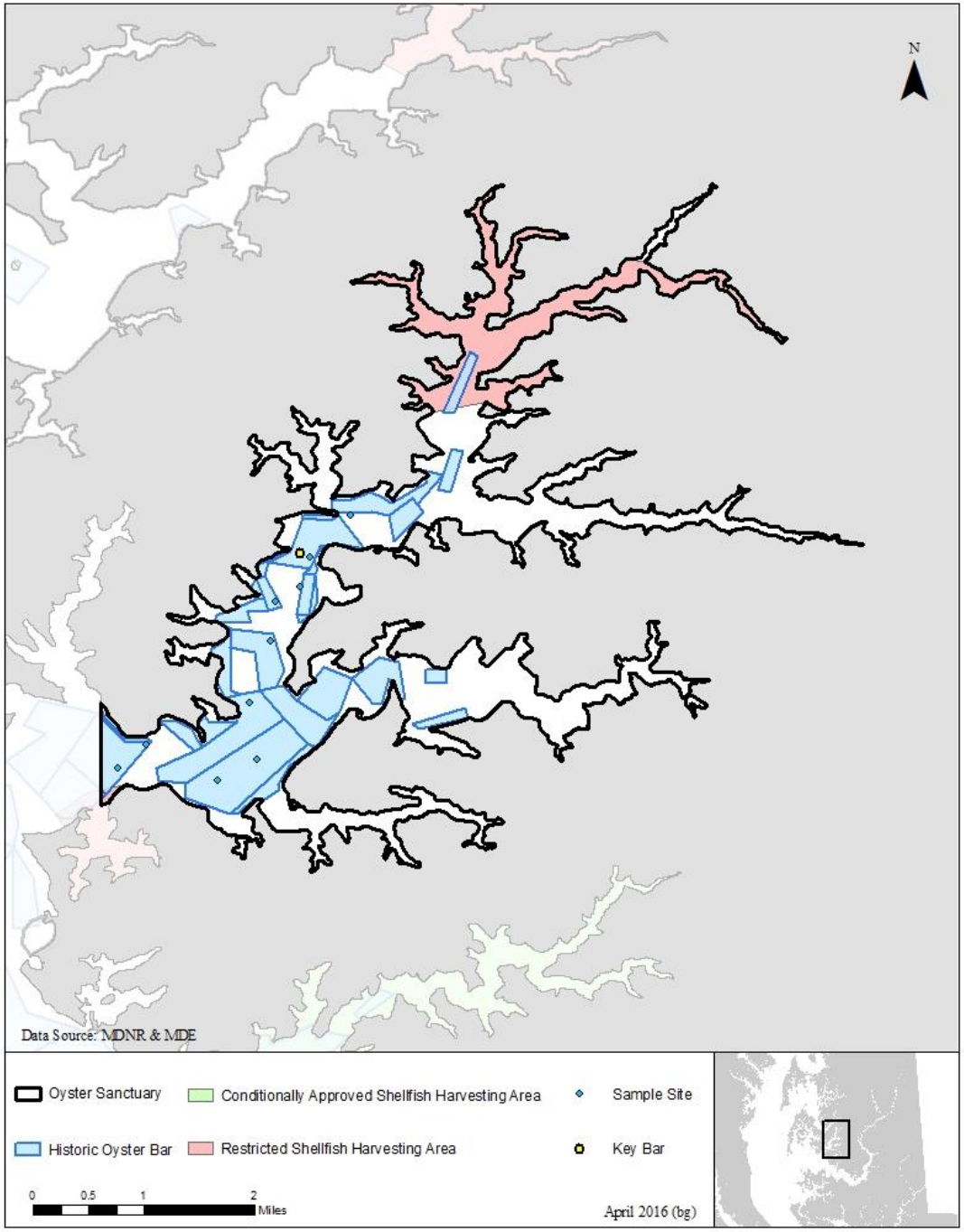
the environment in which
the project is underway and the 8 acres reside.

BAYWIDE RESULTS for CONTEXT

- *How Tred Avon relates to other areas*

TRED AVON RESULTS

- Section 45



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Fall Survey

over 300 samples baywide

Method

- per bushel data
- spat/smalls/markets
- dead oysters
- mortality (%)
- disease (%)
- biomass

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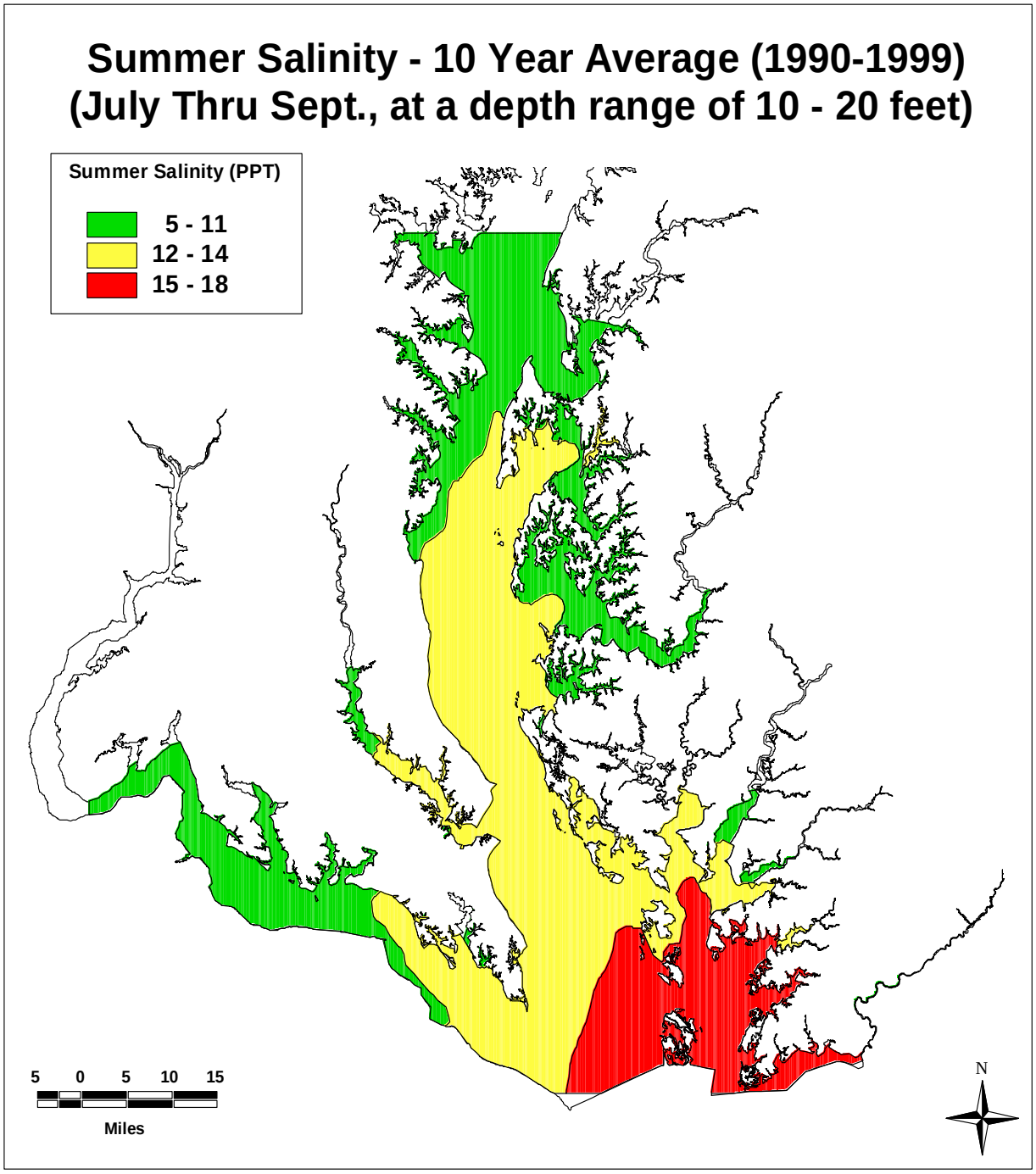
SALINITY – SPAT SET – DISEASE – MORTALITY –BIOMASS

How does the Tred Avon look compared to the Bay overall?



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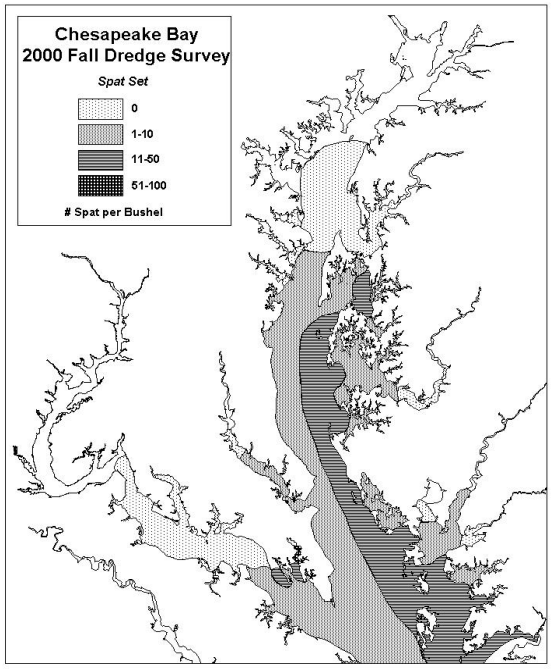
Salinity

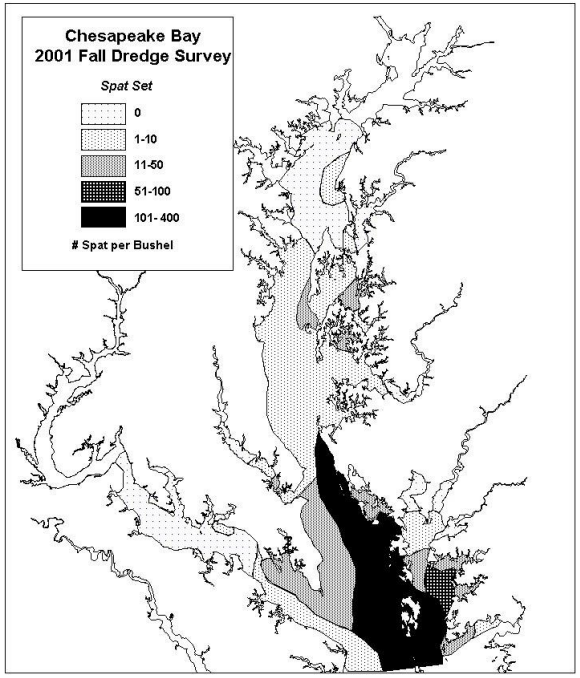
Three basic zones
- low
- mid
- high

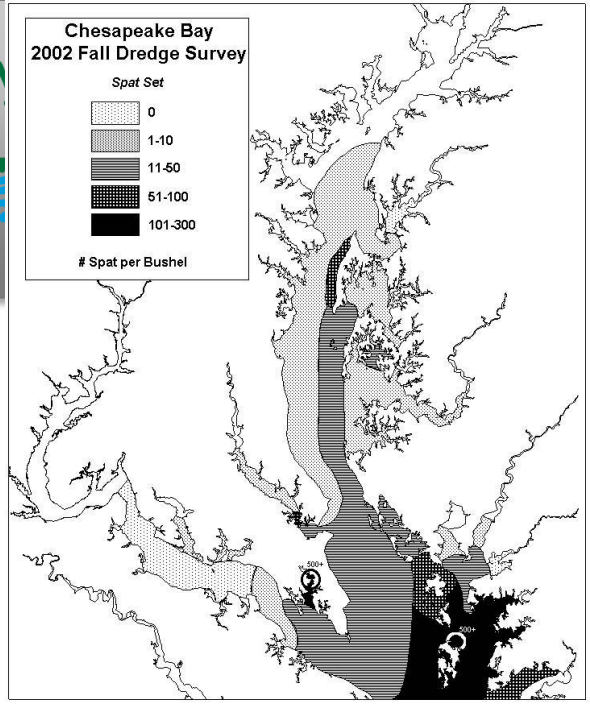
Wet years
(93/94/96/98)

4 year drought
(99-02)

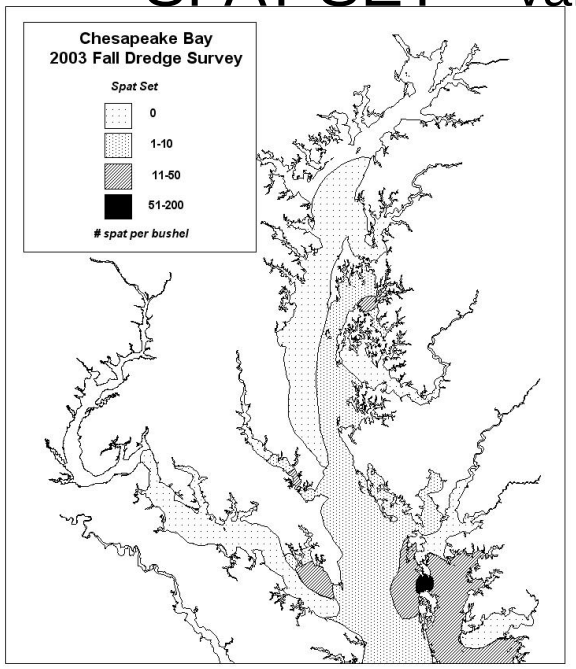
Tred Avon fluctuates
green/yellow
(low-midrange)

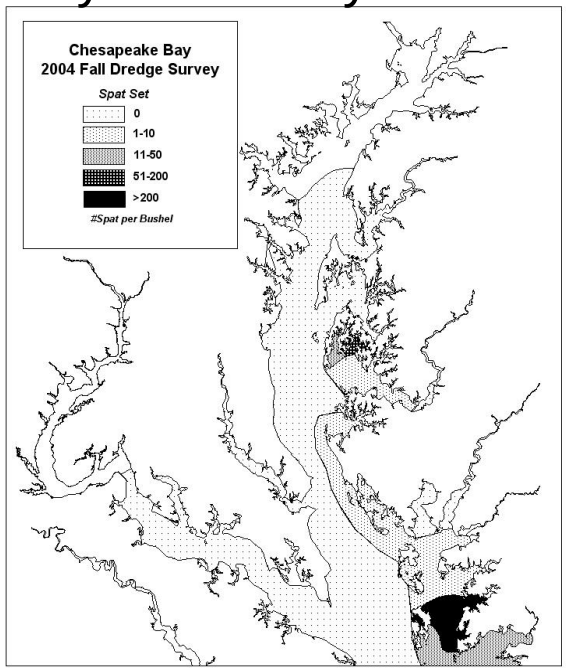


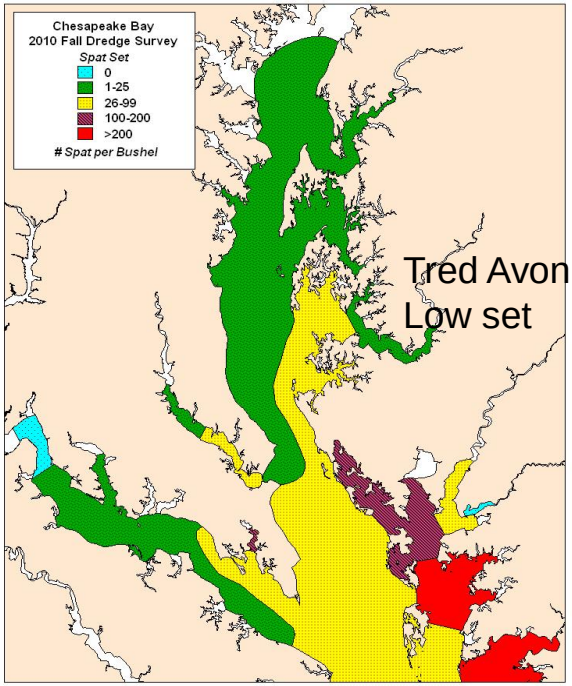


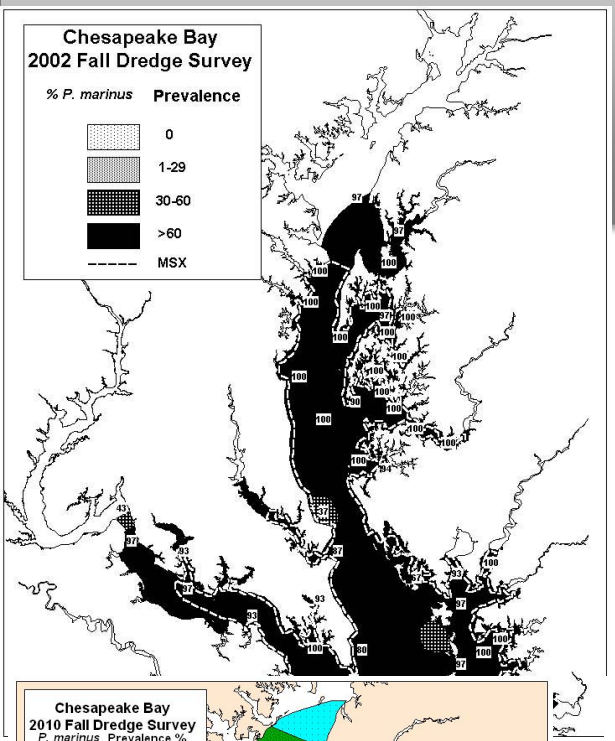


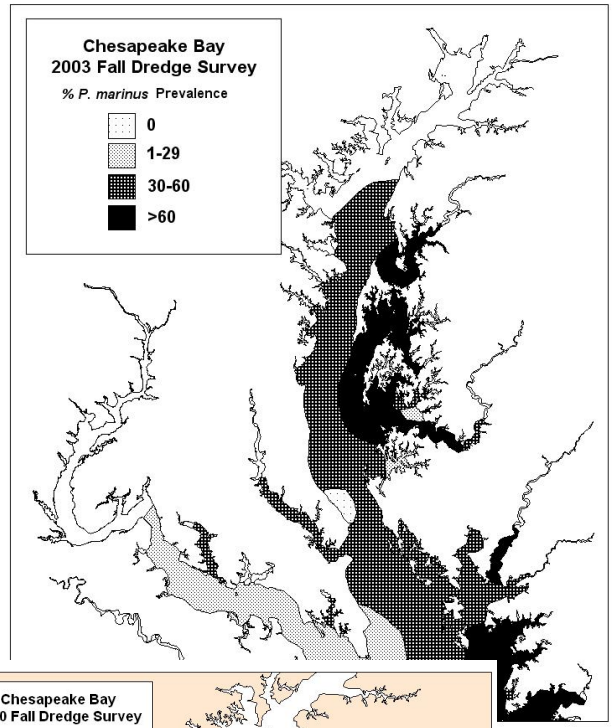
SPAT SET - variable by area and year

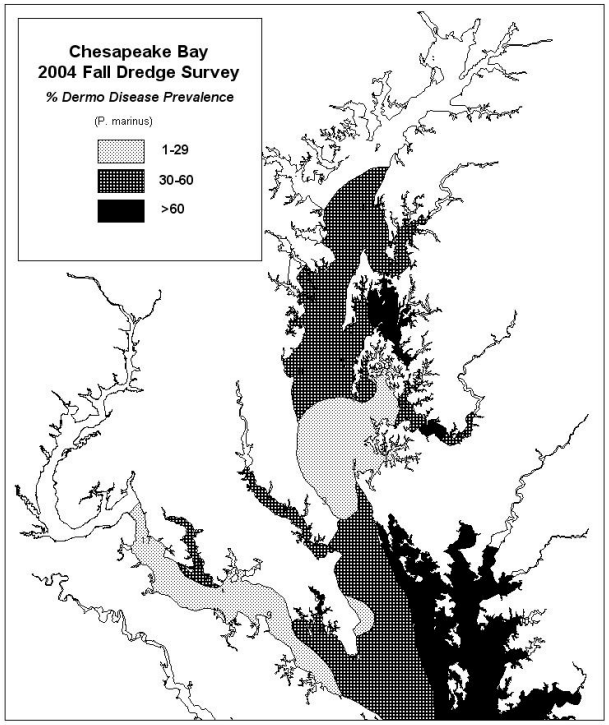


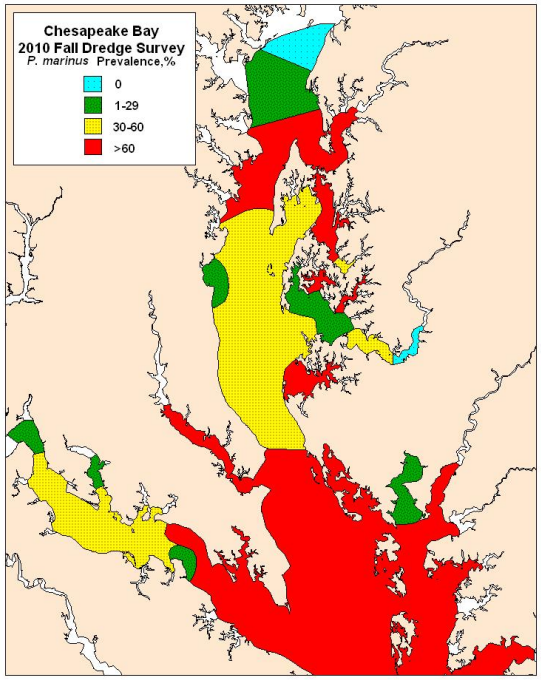


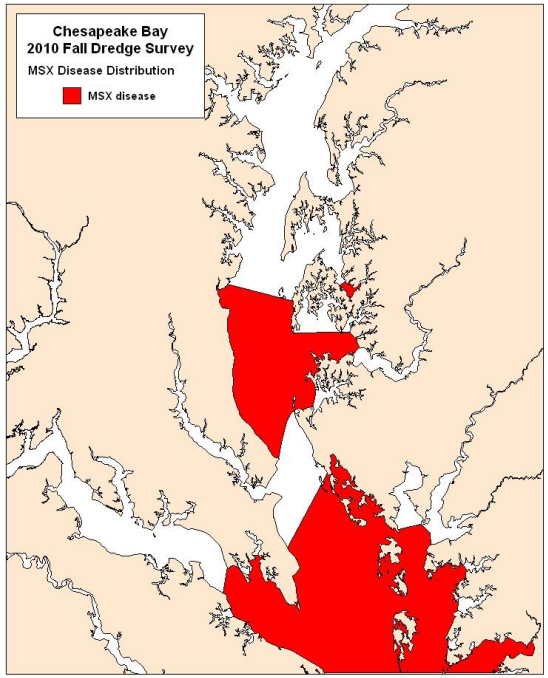






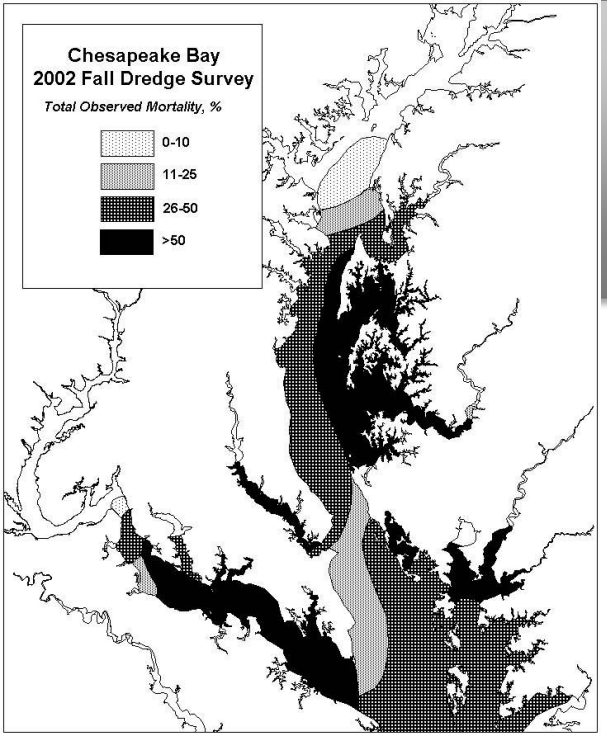


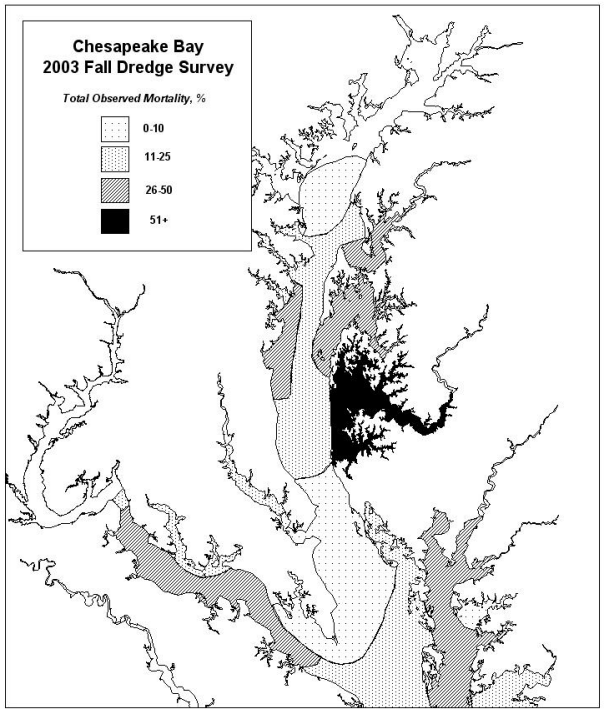


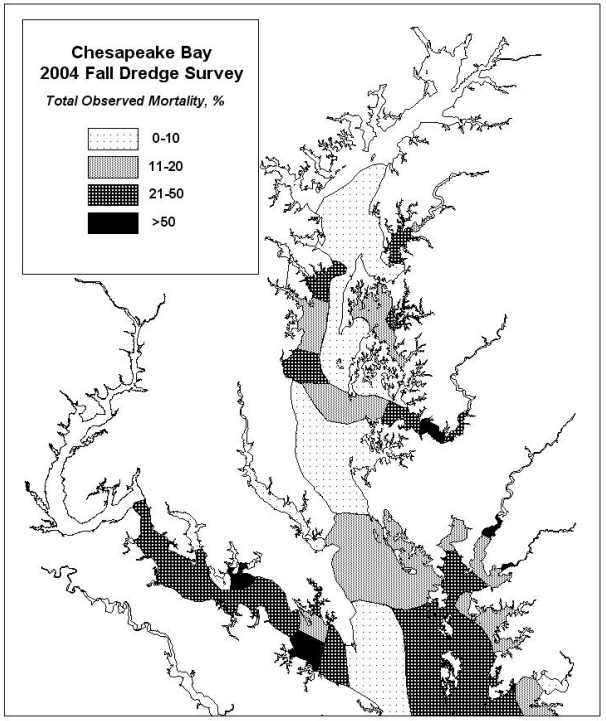


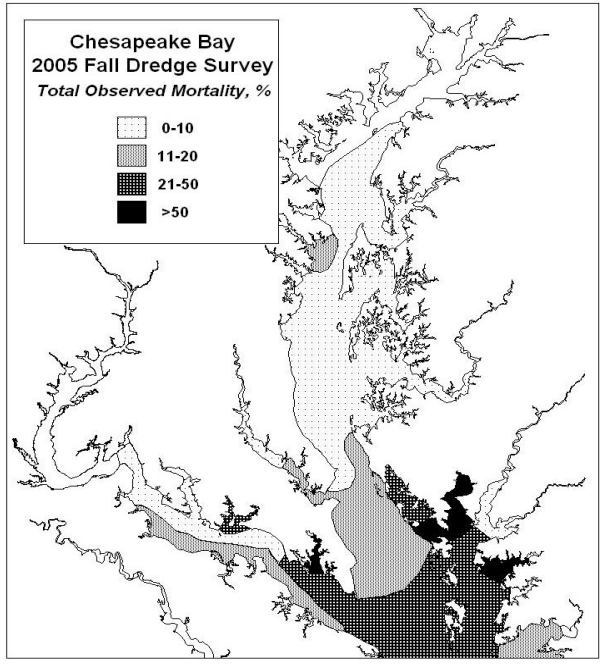
DISEASE:

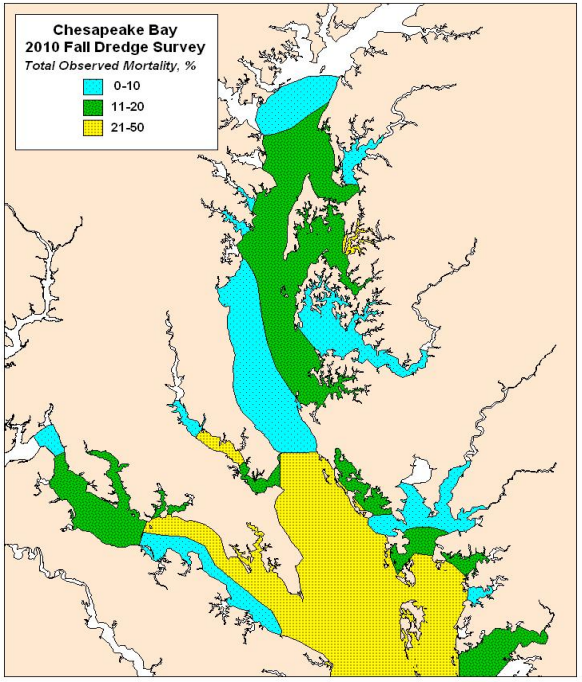
- Variable by area and year
- Tred Avon varies
  - Dermo and MSX can be low to high











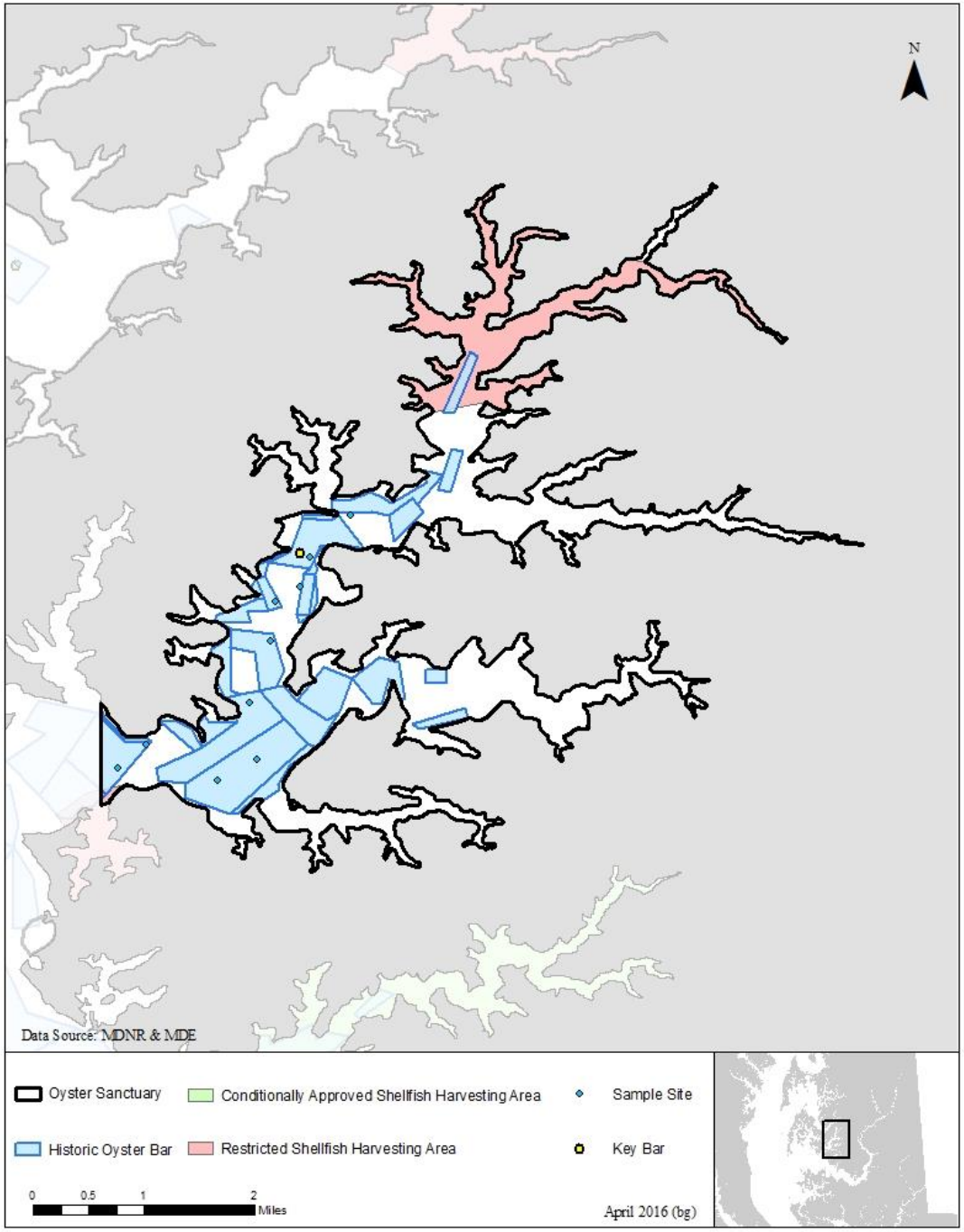
MORTALITY:

- Variable by area and year
- Tred Avon varies
  - can be low to high

SUMMARY

How does the Tred Avon look compared to the Bay overall?

- The Fall Survey data quantify and describe the environment in which the Tred Avon project will exist. Generally…..
  - Low set
  - Chronic dermo
  - Sporadic MSX
  - Good survival as a trend, but with potential setbacks
  - Prone to severe impacts in extended droughts
  - Increasing biomass under current conditions



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TRED AVON
FALL SURVEY DATA

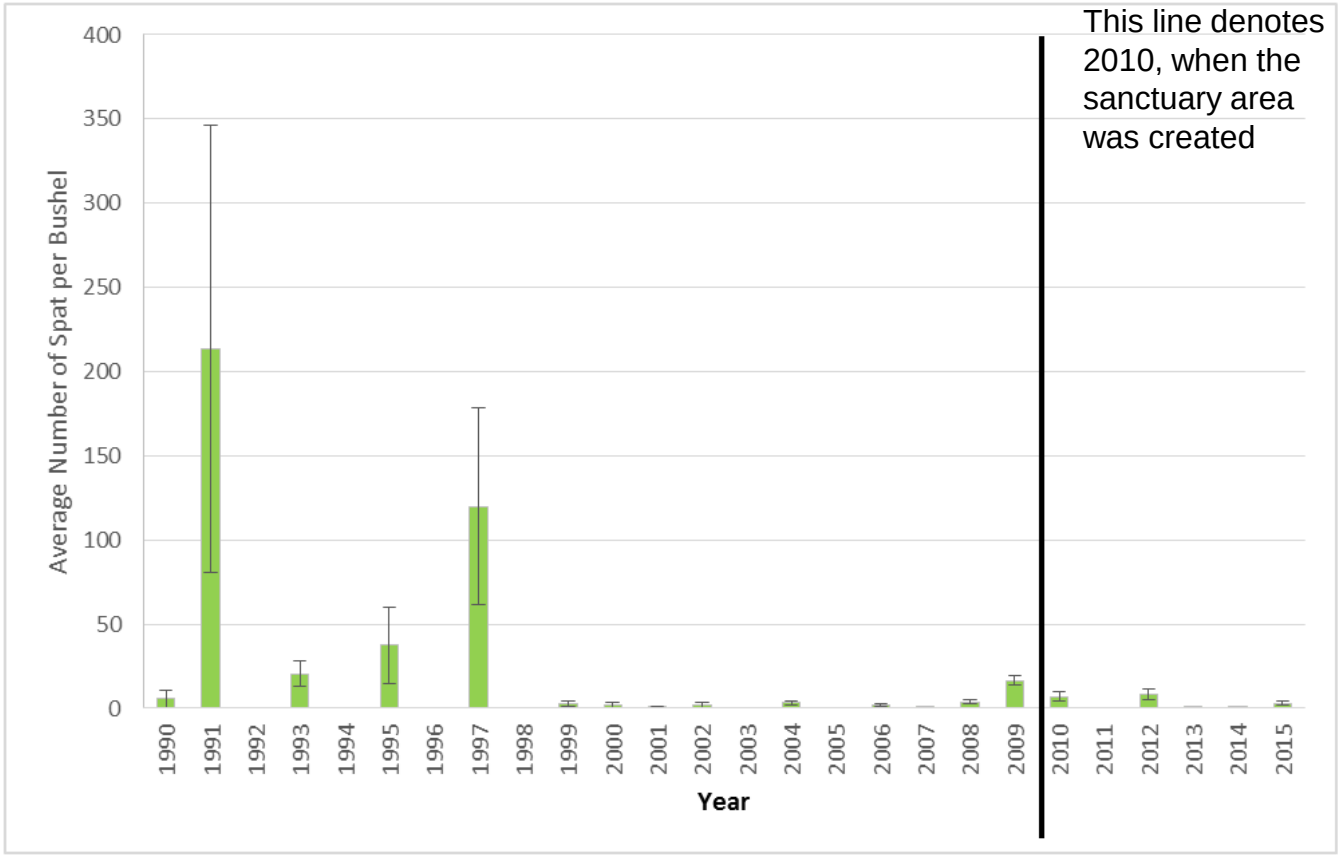
-section 45-

Sanctuary Area

- Spat set
- Live oysters
- Disease
- Mortality
- Biomass

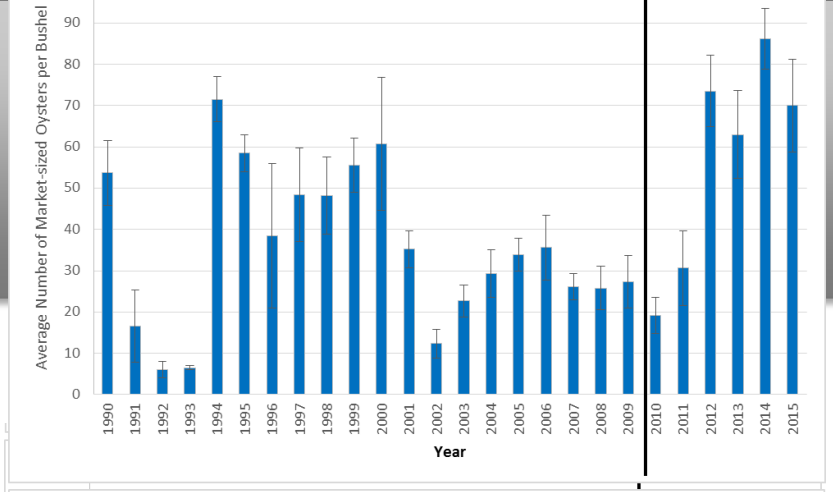
The following data are from the sanctuary portion of the Tred Avon

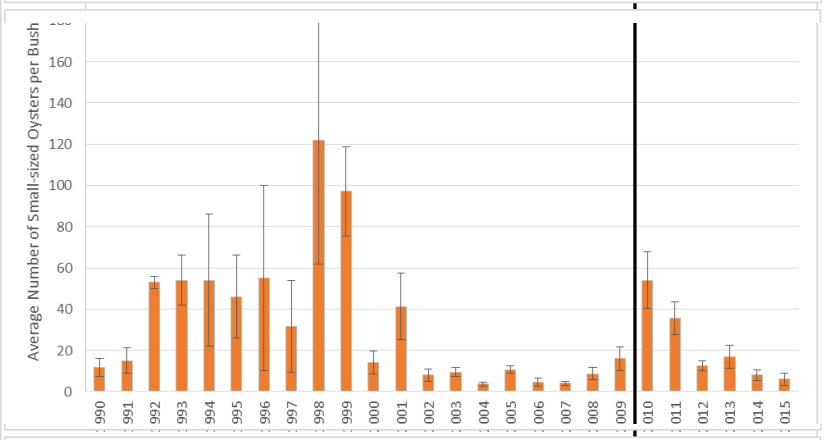
TRED AVON Spat Set ---- typically low

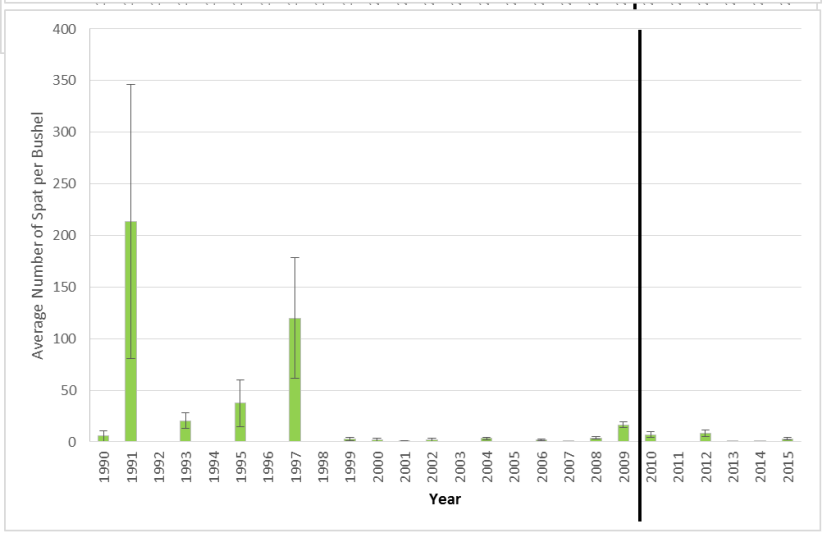


31yr Spat Av

41/bu MD
19/bu TA







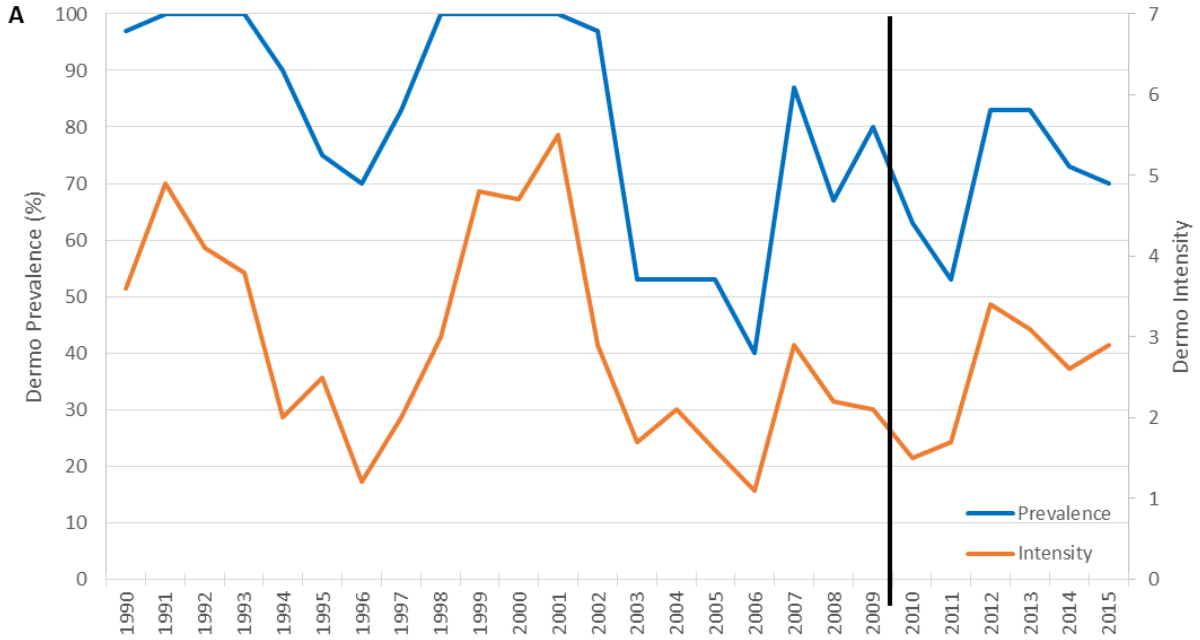
TRED AVON

Spat/Smalls/Markets:

Spat < 1 yr old
Smalls 1 yr to <3”
Mkts 3” and up

- Low sets are typical
  (the 1991 and 1997 sets were anomalies, not just for the river but the bay overall)
- Low sets and low small counts can build populations (but low mortality conditions are key)
- Disease outbreaks cause declines
- Survival is key

TRED AVON Dermo & MSX



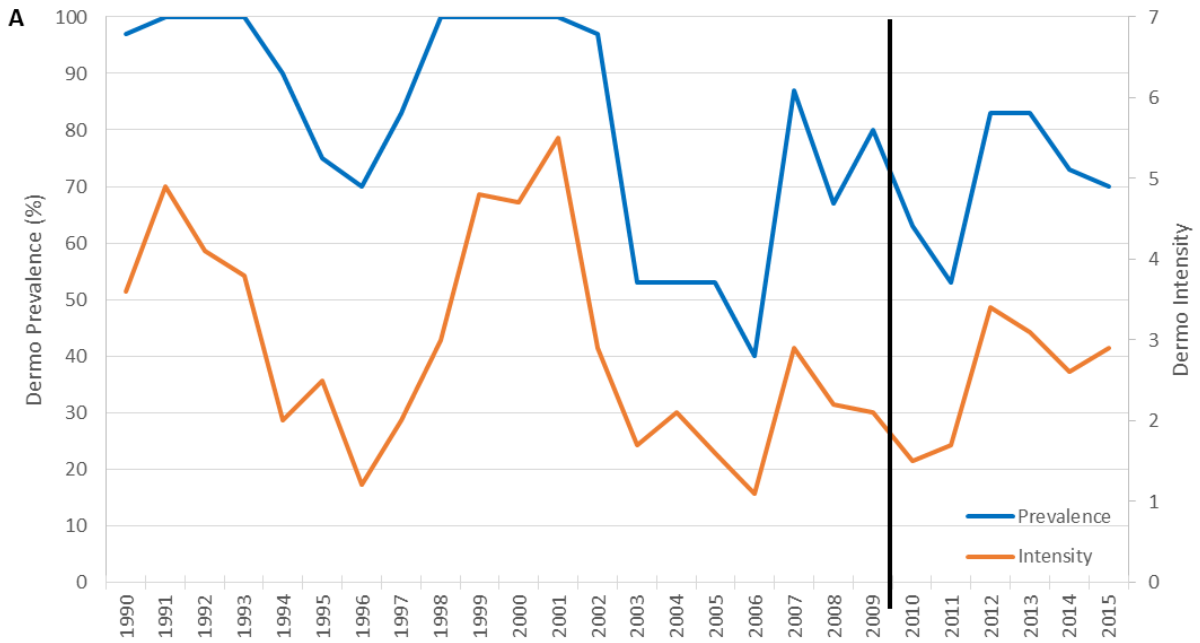
DERMO

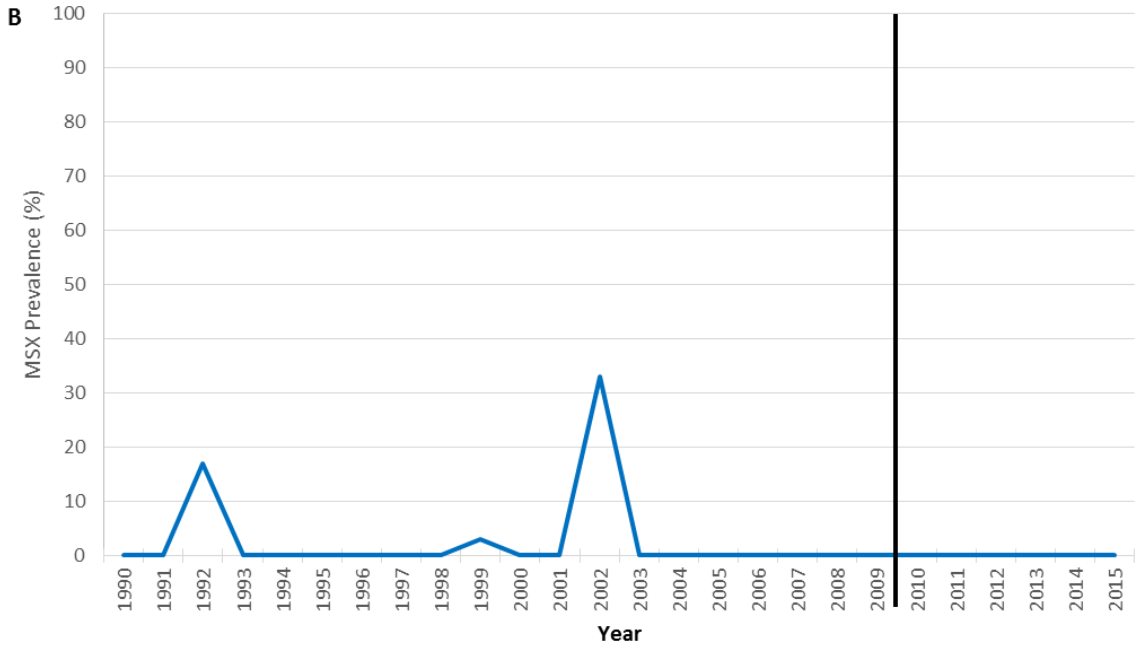
- High prevalence (like many areas)
- Intensity is key
- Intensity spikes yield mortality

Aver Int TA 2.8

Aver Int MD 2.2

TRED AVON Dermo & MSX





DERMO

- High prevalence (like many areas)
- Intensity is key
- Intensity spikes yield mortality

Aver Int TA 2.8

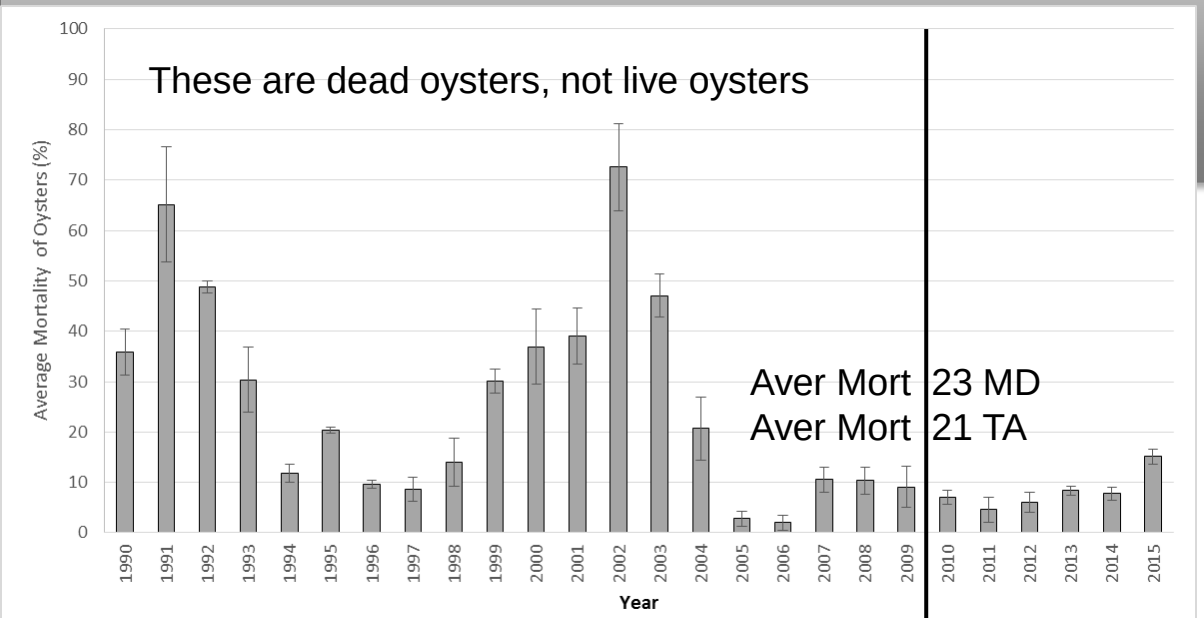
Aver Int MD 2.2

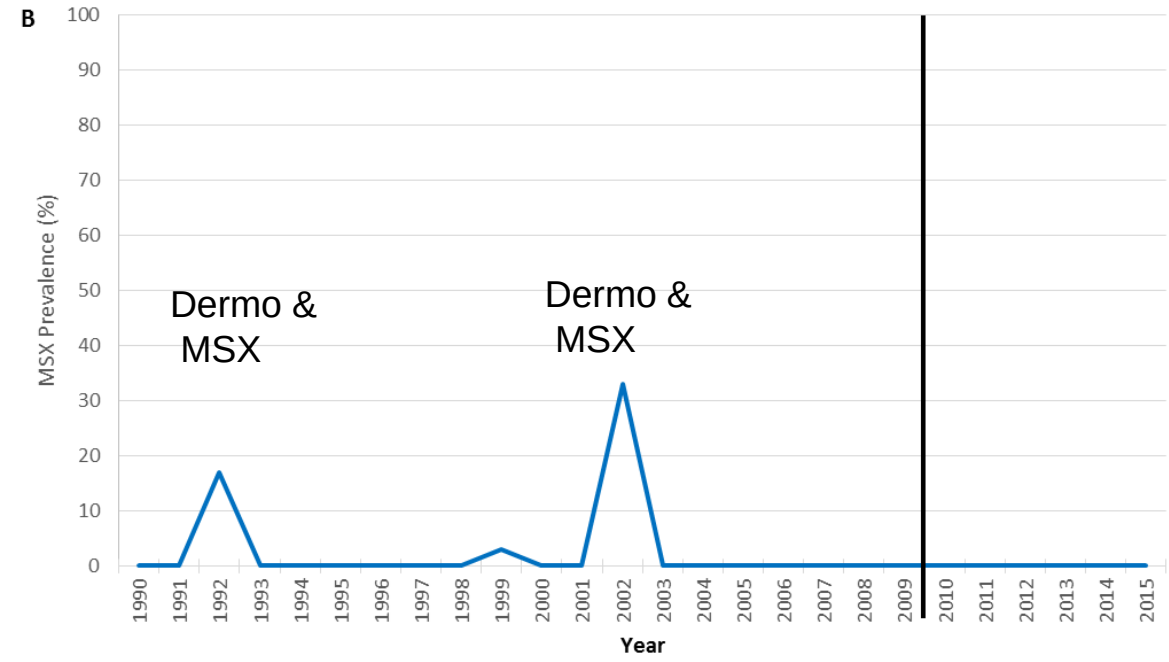
- MSX varies
  - (like many areas)

Aver % MD 6

Aver % TA 2

- "Double hit"
  - both diseases
  - serious mortalities

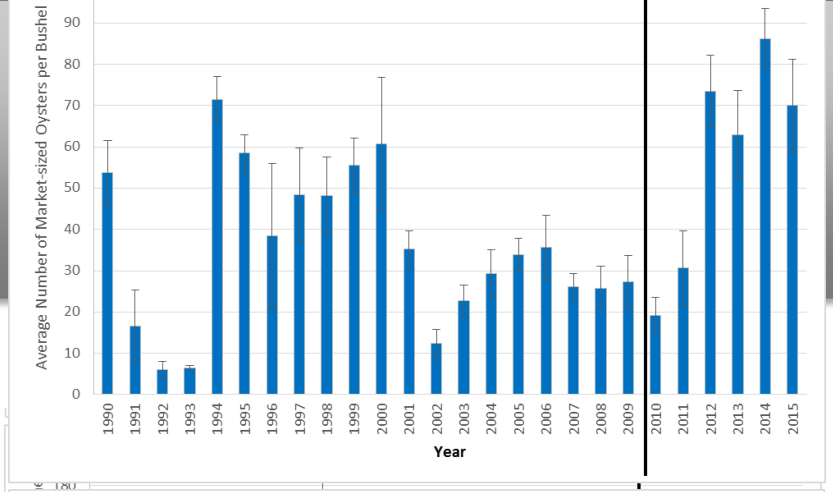


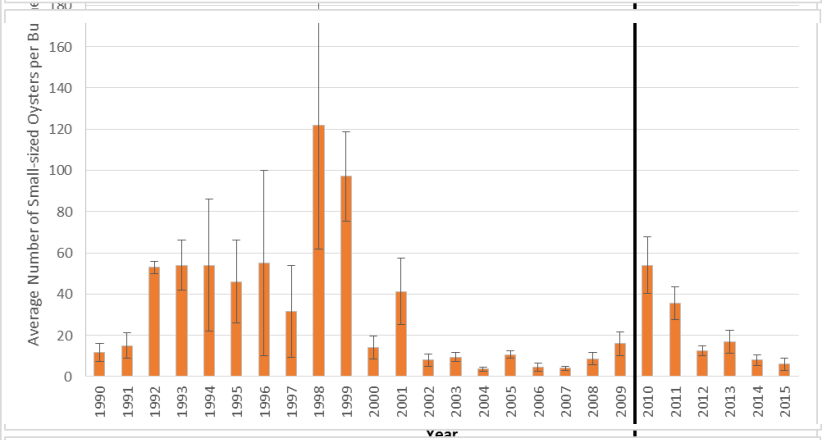


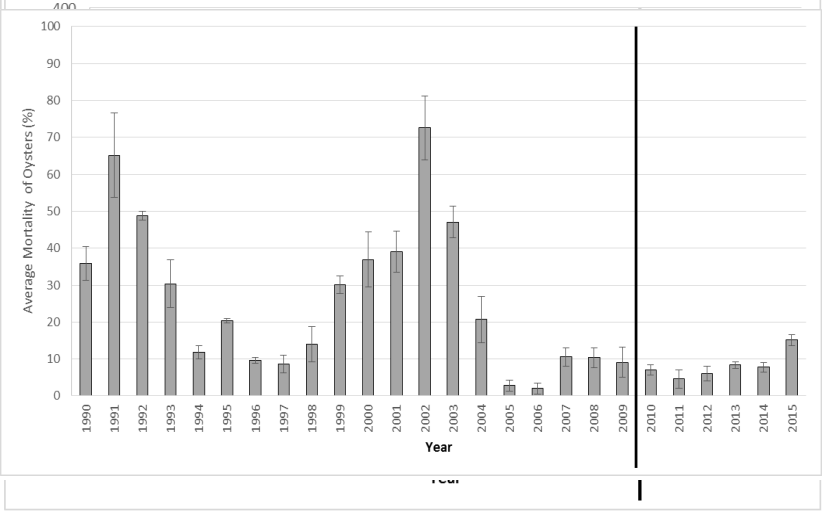
TRED AVON

Disease & Mortality

- Disease causes mortality
- Mortality spikes cause a decline in oysters
- Tred Avon has experienced two major mortality events
- The 4 year drought had a severe impact







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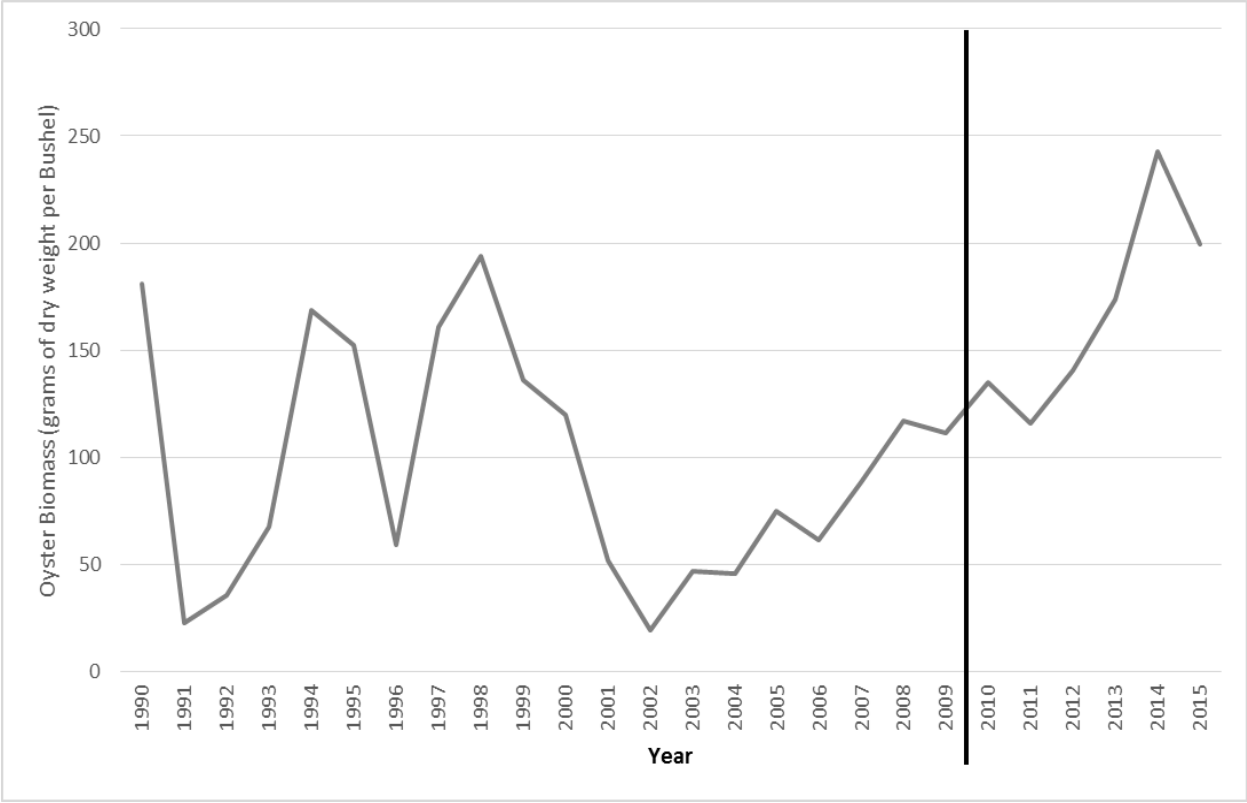
TRED AVON

Spat/Smalls/Markets:

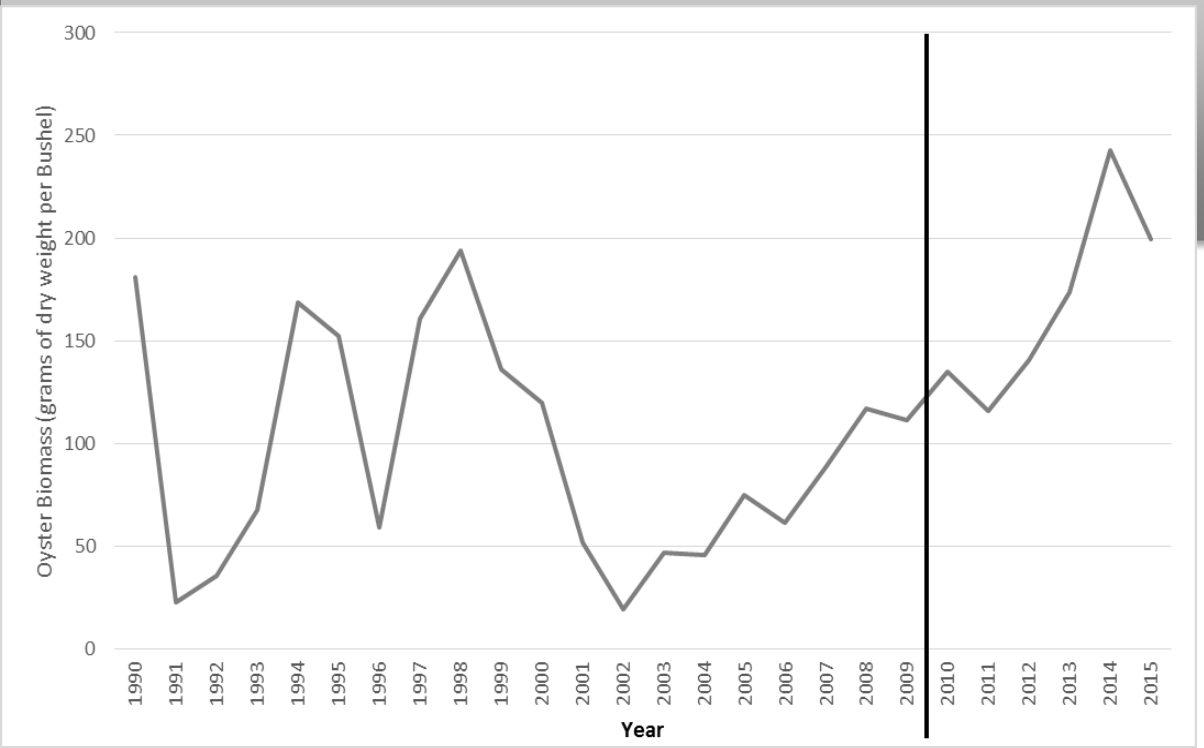
- Relationship to disease
- Disease outbreaks yield declines
- When diseases subside, oyster numbers increase

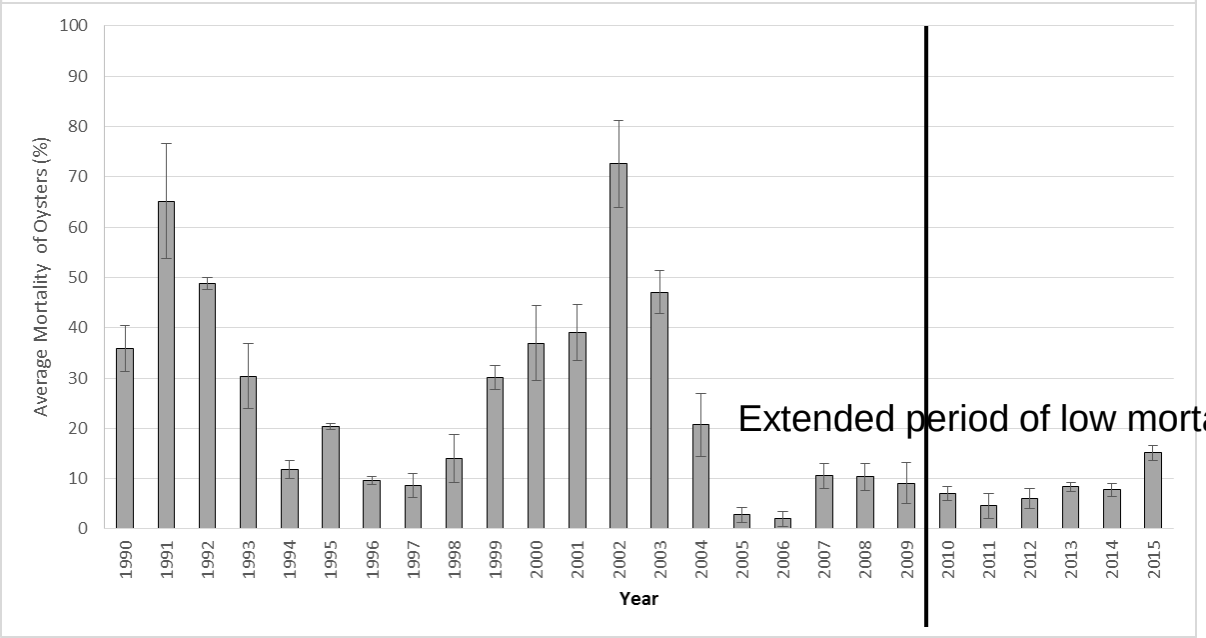
TRED AVON Oyster Biomass



Biomass

- Measure of live oyster tissue (no shell)
- As oysters grow the biomass increases
- As there are more oysters the biomass increases
- MDwide for 2015 149





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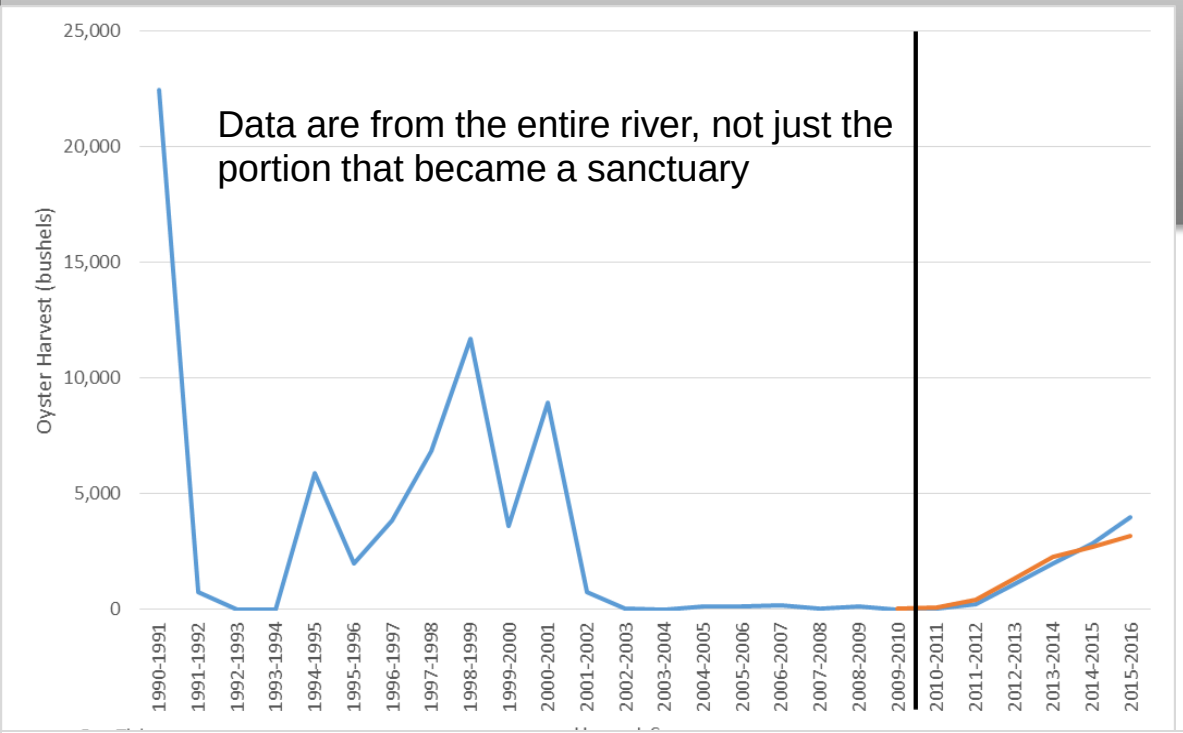
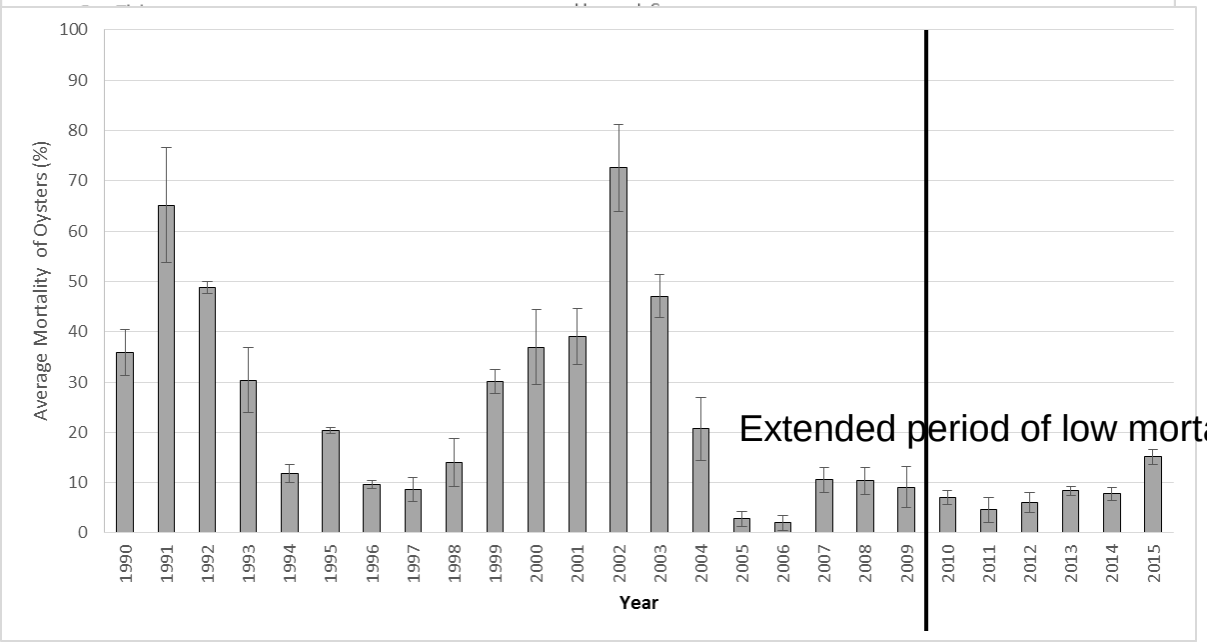
TRED AVON Oyster Biomass

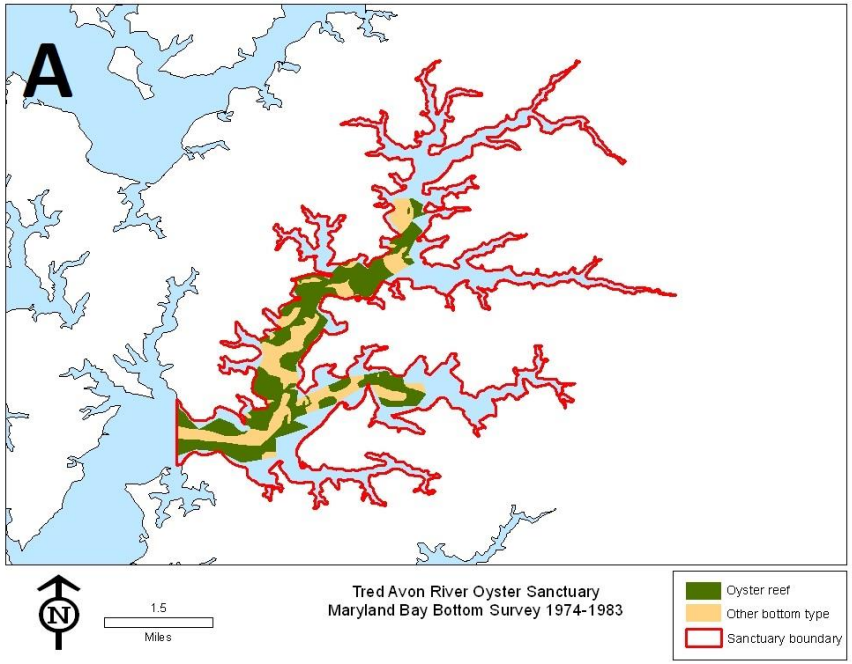
- Biomass varies with Mortality
- Low mortality helps build Biomass

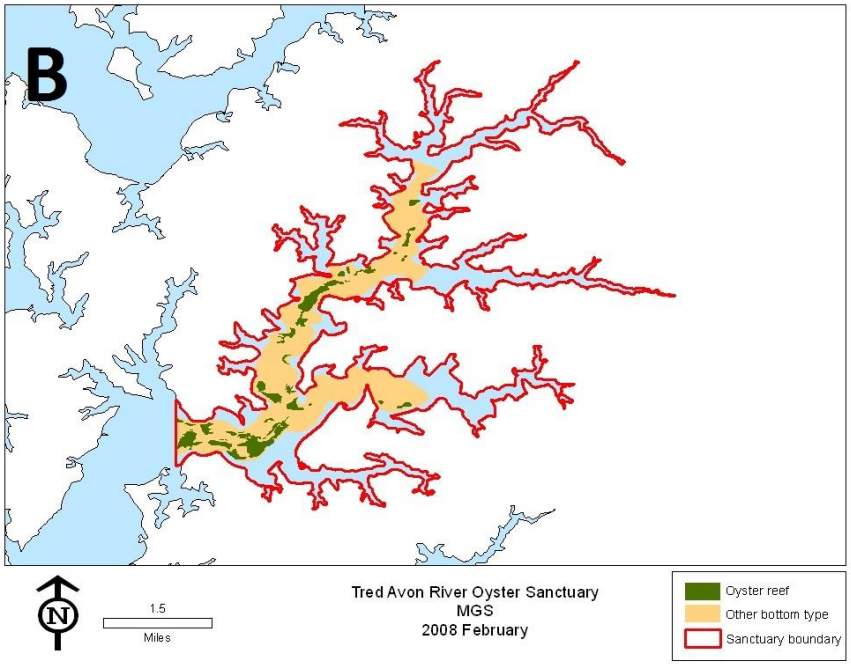




TRED AVON Harvest Data

- Harvest varies with Mortality
- Low mortality helps build Harvest
- *But spat sets are needed in addition*
- The fishery is largely driven by spat set and survival, though other factors occur





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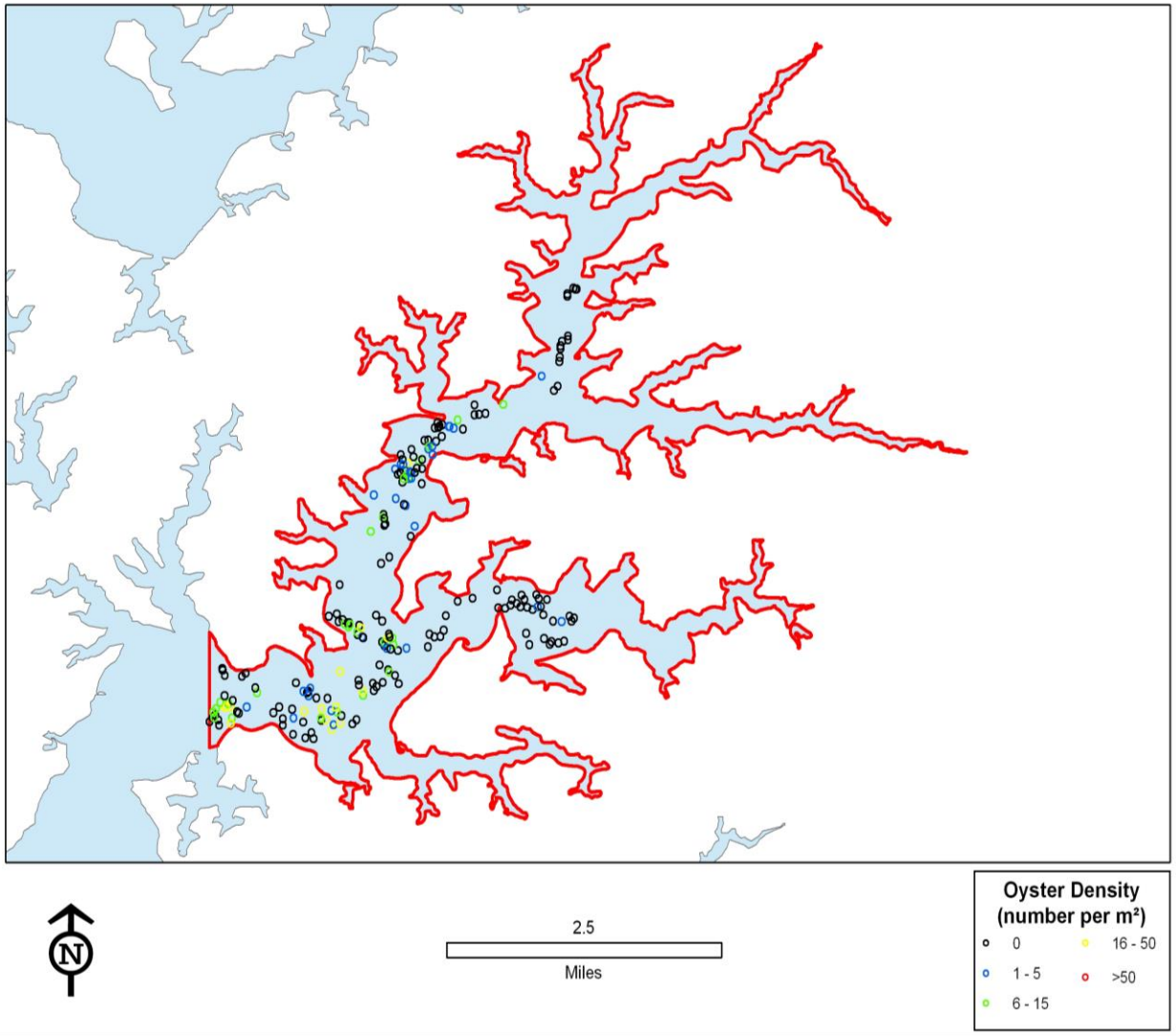
BOTTOM TYPE (habitat)

- Used to TARGET restoration
- Plantings are made based on existing habitat (or lack of)

BBS (1975-83)
Shell bottom 962 a

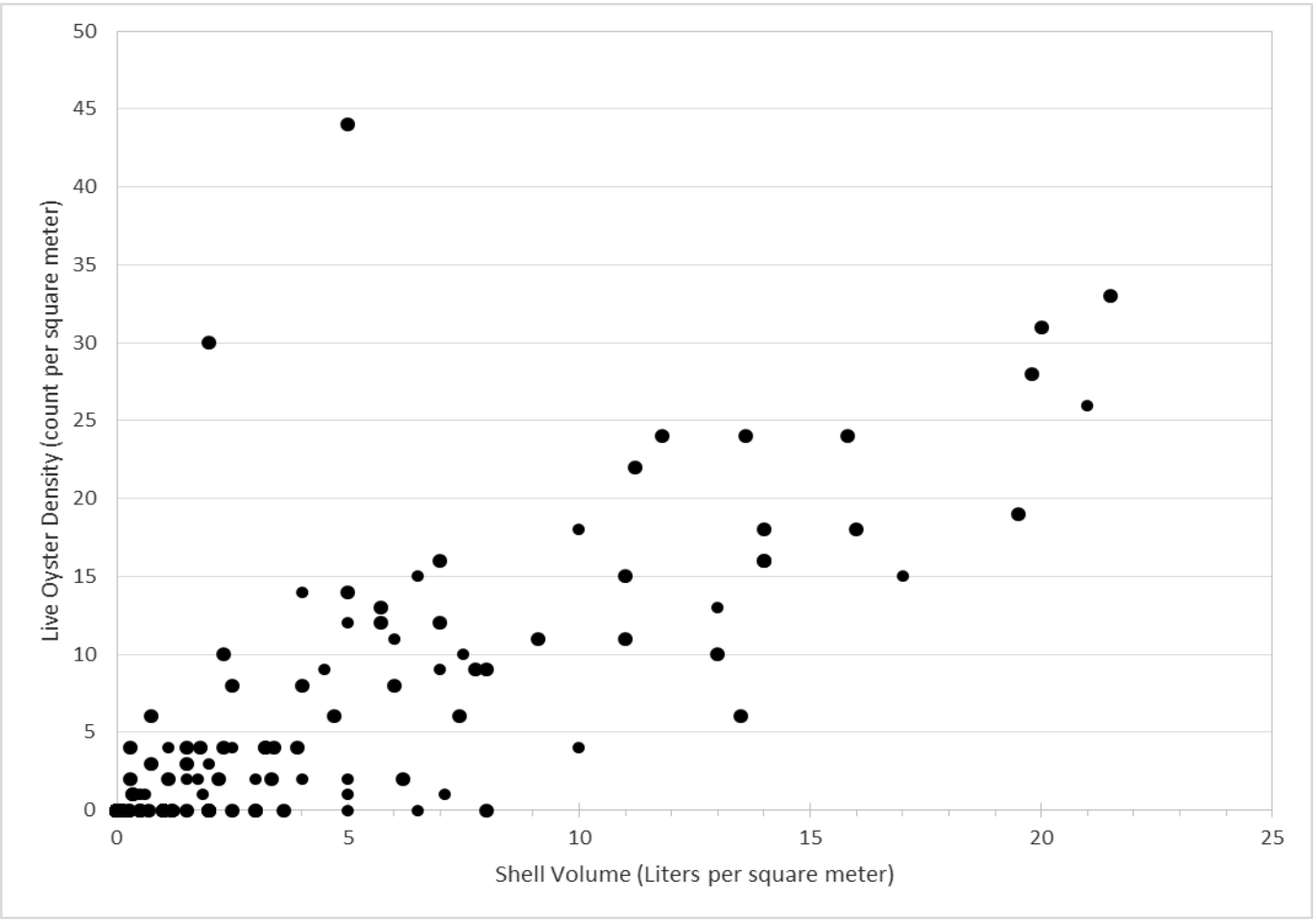
MGS (2008)
Shell bottom 241 a

Caution: Methods were different. Caution when trying to precisely quantify loss over time.



OYSTER DENSITY (PT Survey)

- Used to TARGET restoration
- Plantings based on existing population (or lack of)
- Planting adjustments were made to avoid oysters and habitat
- Serves as a baseline survey for future comparisons



SHELL

- Important for oysters
- More shell….more oysters

SUMMARY

- The Fall Survey data quantify and describe the environment in which the project will exist. Generally…..
  - Low set
  - Chronic dermo
  - Sporadic MSX
  - Survival as a trend, but with potential setbacks
  - Prone to severe impacts in extended droughts
  - Increasing biomass under current conditions

- The data don't speak exactly to the 8 acres or any exact site(s) but they speak to the overall trends for the river

- Caution should be used when comparing habitat surveys over time