

**The problem with absolute measures:**

Another perspective on MD oyster restoration

Native oyster restoration in MD has been judged a failure:

- MD-DNR proposal to introduce fertile, diploid, 'Oregon strain' *C. ariakensis* to Chesapeake Bay
- Intent is to finish evaluation and have diploids in the water by 2005

But is native oyster restoration hopeless?

It depends on whether we assume we know how to do restoration.

Sanctuaries, or no-take reserves, have never been used for any species challenged by both overfishing and disease

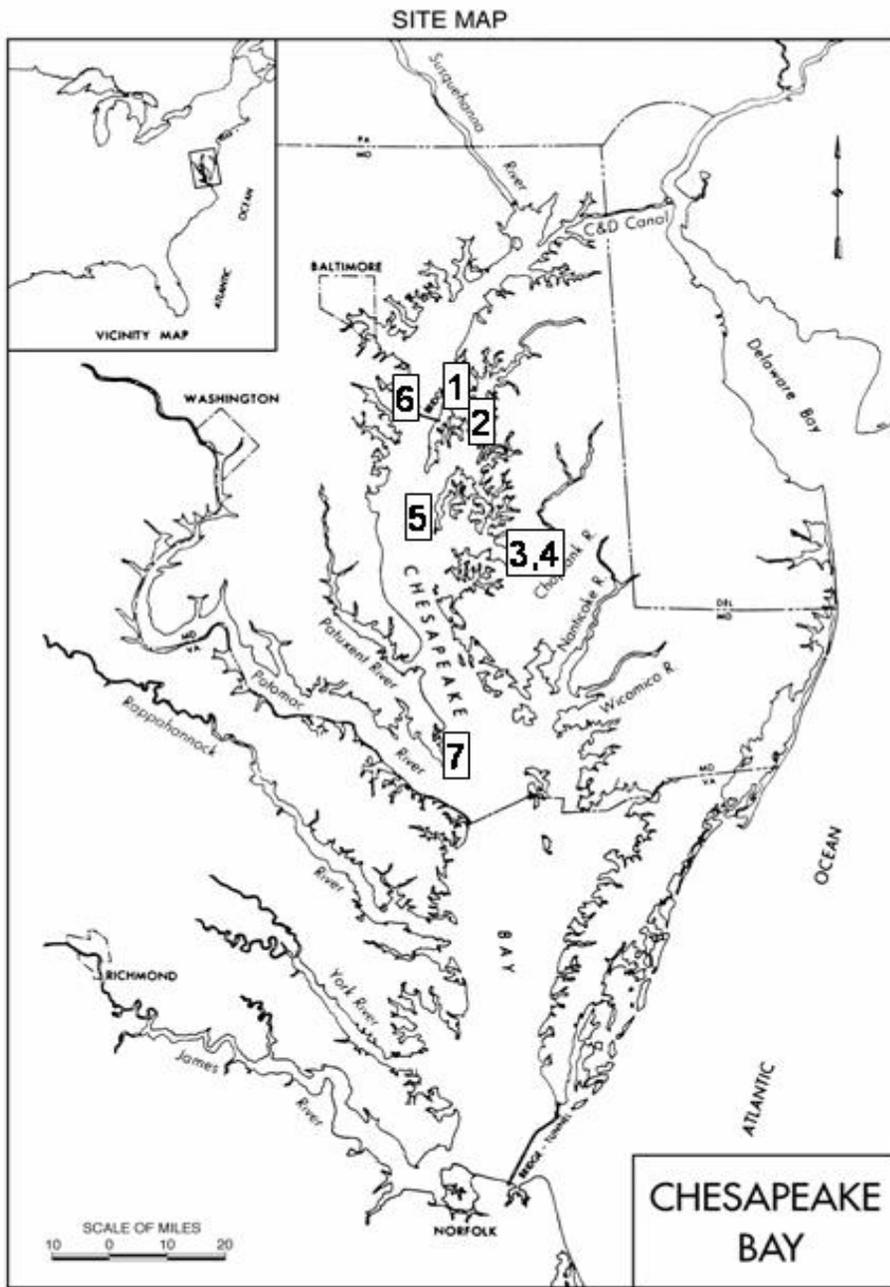
High densities potentially increase disease transmission

This doesn't mean it's impossible, only that restoration needs to be approached as an experiment

Oyster restoration in MD has generally not been done in a consistent, comparative way that allows us to learn what gains we could make relative to fished sites receiving no restoration effort....

Different densities, different seed, different reef configurations at different locations & times

# Planned fished:unfished comparison



Metrics:

Oyster density

Oyster survival

Oyster growth

Disease prevalence

(dermo and MSX)

Disease intensity (dermo)

All in fished vs unfished reefs

All in high vs low density

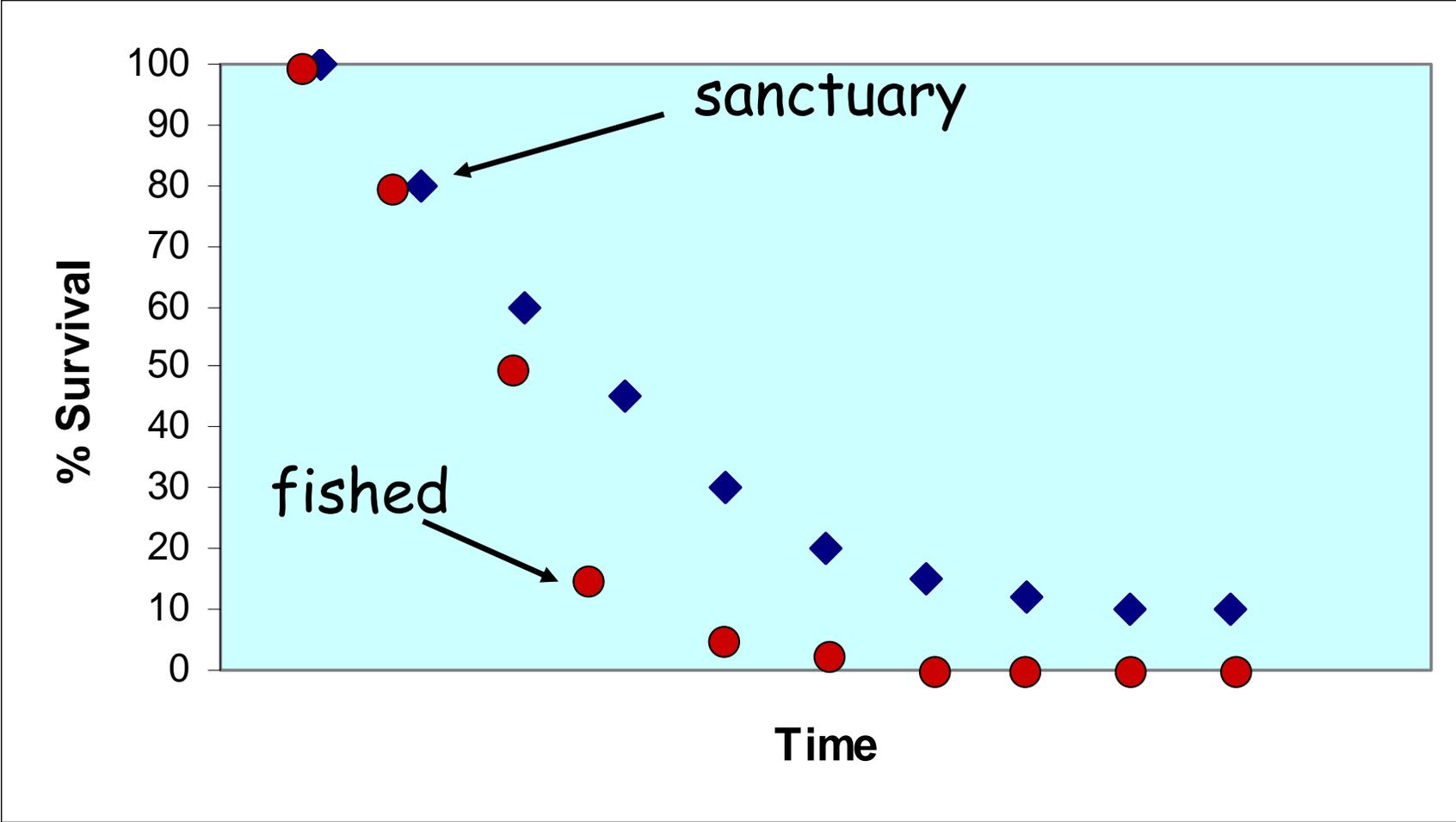
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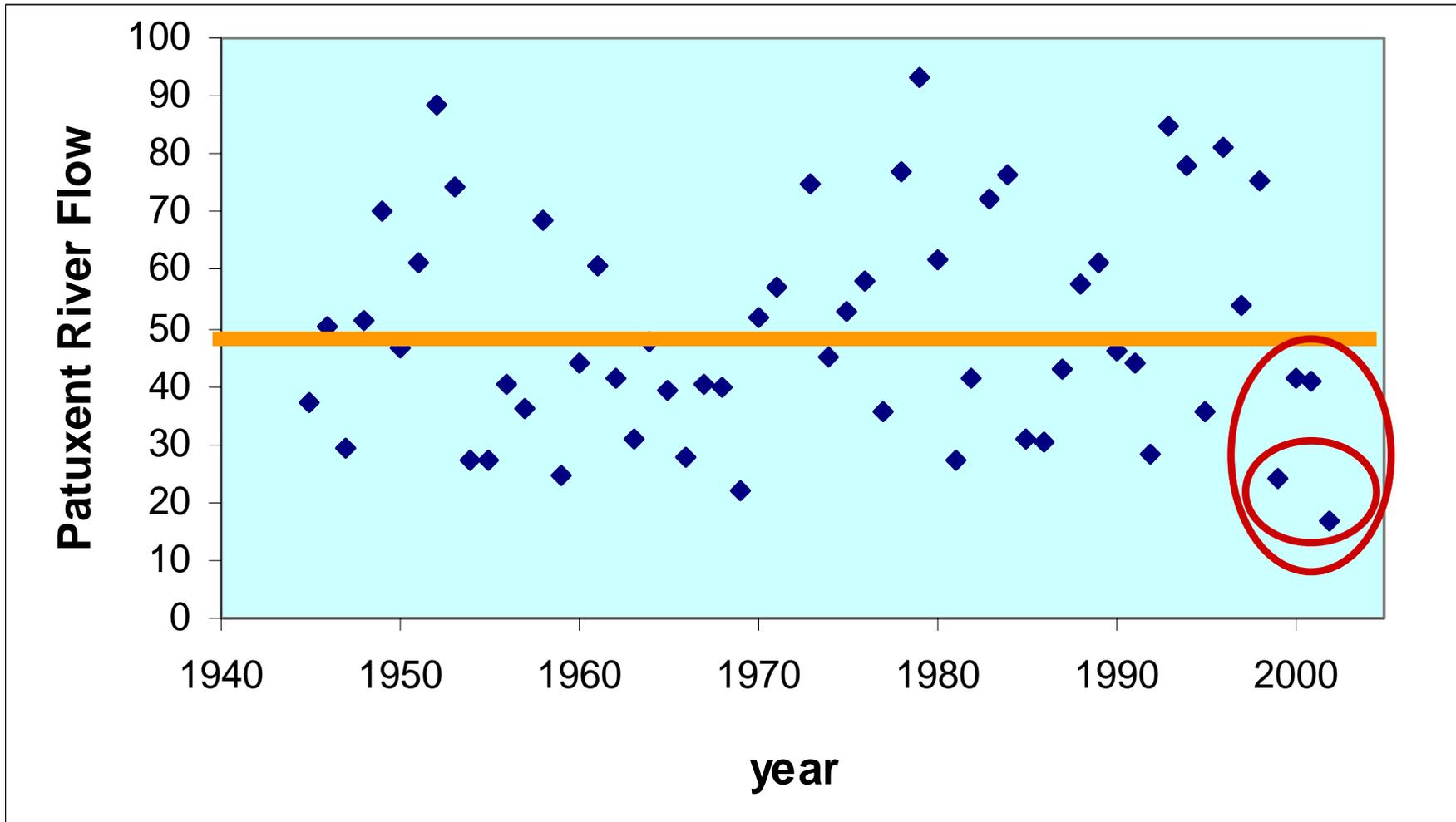
It depends on how we measure success

- whether the measures reflect the manipulation we're actually doing in the restoration efforts,
- whether we have the appropriate controls against which to measure progress,
- what time frame is used

It depends on whether we use absolute or relative measures

# Is this success or failure?





Most restoration during drought

Important to include climate variability in metrics

Should results of wet & dry periods be compared to project long term gain (if any) relative to fished areas?

Does high mortality in recent attempts imply failure?

Appropriate expectations:

EX: What is the expected survival when spat seeded at densities of up to 30 ind/shell?

If 3/shell survive, mortality is 90%

# How long should we wait to declare success or failure?

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Title: The problem with absolute measures

Oyster restoration in MD declared a failure

Consequence is intention to introduce non-native oyster to Ches Bay

if successful, will spread throughout atlantic coast & maybe beyond

But how do we decide it's a failure? A failure relative to what?

Primary strategy has been sanctuaries; never applied to marine pops stressed by both disease & overfishing  
problem w/ densities

What do sanctuaries (no-take marine reserves) do?

remove fishing pressure

So, important metrics for success are measures care about (oyster survival, growth, etc) in sanctuaries vs.  
fished areas.

Instead: abs survival

Need to incorporate climate variability in metrics

Oyster restoration success vs. failure based on 3 year drought

Need to consider long-term...

Unless goal is an absolute: e.g., restore fishery to a certain level and a put & take fishery as the total focus  
of restoration is acceptable.

Agencies need to be honest about goal

Table 1. Paired sanctuary and reserve sites to be tested. Some sites are listed more than once because very large shelled areas (e.g., up to 40 acres) can be planted with separate spat plants each only a few acres. \*Background shell may include historical shell additions >5 years old.

Pair	Location	Bar	Sanctuary or Open Harvest or Reserve	Year shell added	Year of spat addition to be tested
1	Chester River	Strong Bay -04	Sanctuary	2002-2003	2004
		Wickes Beach	Open Harvest	2003	2004
2	Chester River	Strong Bay – 03	Sanctuary	2002-2003	2003
		Blunts (NOB 7-3)	Reserve	2003	2003
3	Choptank River	Shoal Creek 2	Sanctuary	2003	2004
		Black Buoy -03	Reserve	2003	2004
4	Choptank River	States Bank	Sanctuary	2004	2004
		Black Buoy-04	Reserve	2004	2004
5	Main Bay	Poplar Island Sanc.	Sanctuary	2003	2004
		Poplar Island Res.	Reserve	2003	2004
6	Severn River	Tolly Point	Sanctuary	1999	2004
		Tolly Point	Reserve	Background*	2004
7	Main Bay	St. Mary's	Sanctuary	Background*	2004
		St. Mary's	Open Harvest	Background*	2004