

# Update on the Chessie BIBI Analyses

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and

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For the CBP Stream Health Workgroup  
6/17/2022

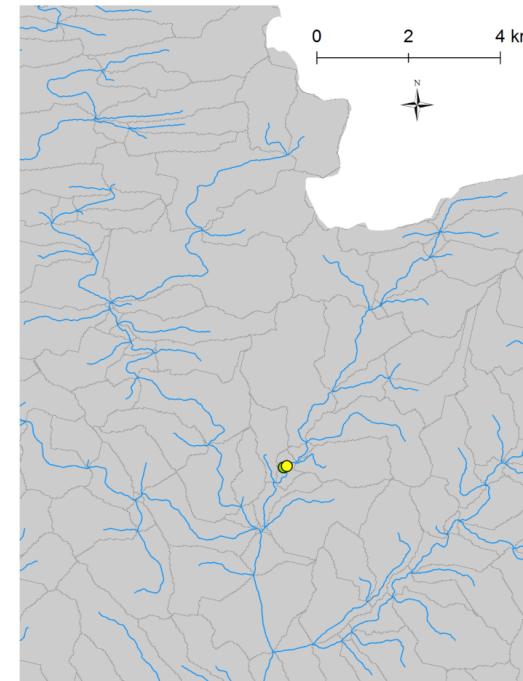
- What is the overall percentage of “healthy” streams in the Chesapeake Bay watershed?
- Is the overall percentage of “healthy” streams increasing over time?



Bay Watershed scale

Monitoring Data

- Can restoration efforts improve stream health?
- What efforts (e.g., protections, BMPs) are most effective?

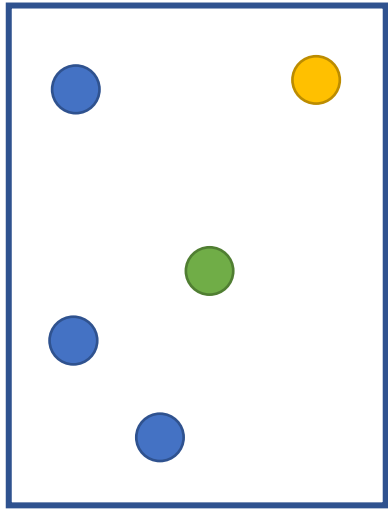


Catchment scale

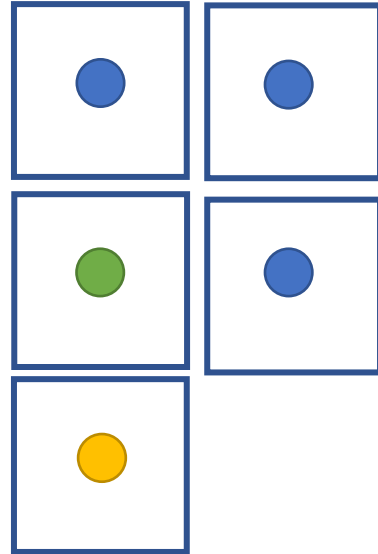
Monitoring & Modeling Data

# Area-Weighting Method is Used to Answer Bay-Scale Questions

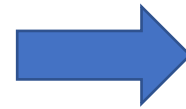
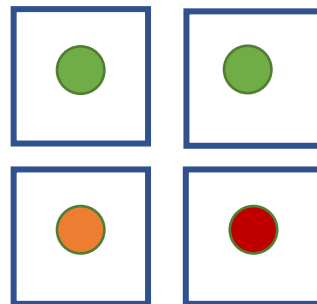
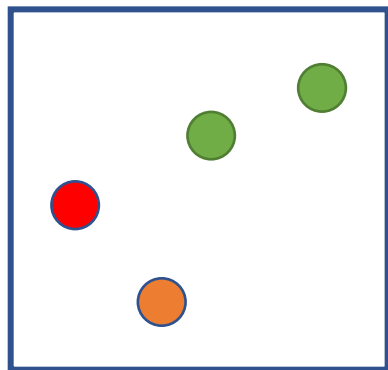
HUC12 A



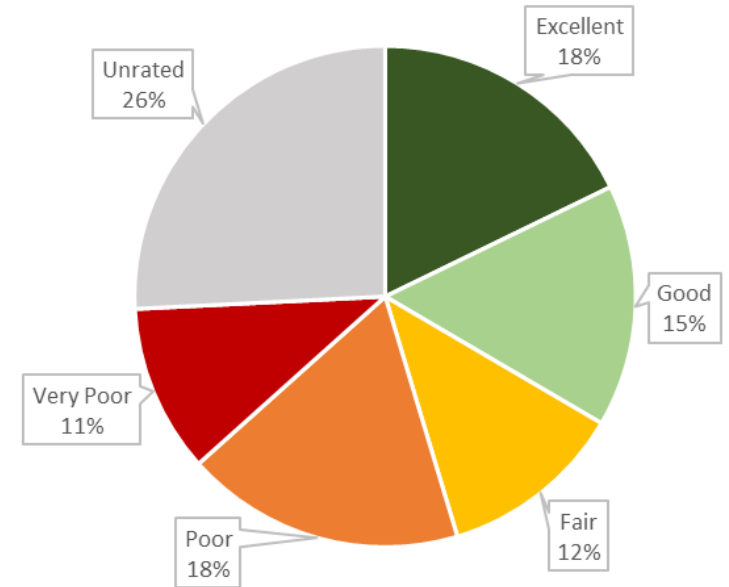
Each HUC12 divided into equal area portions



HUC12 B

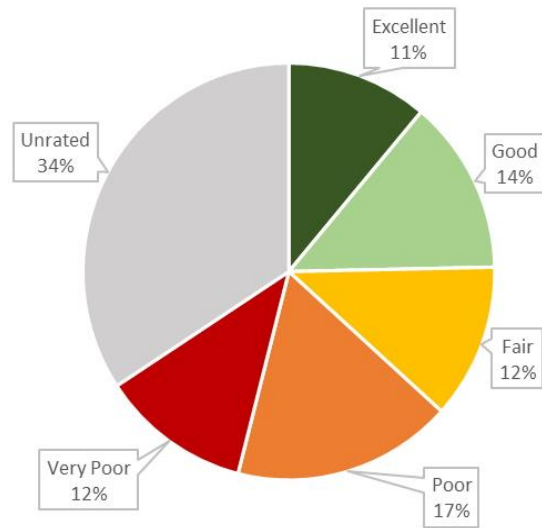


Ratings of all HUC12 area portions summed to Bay watershed area

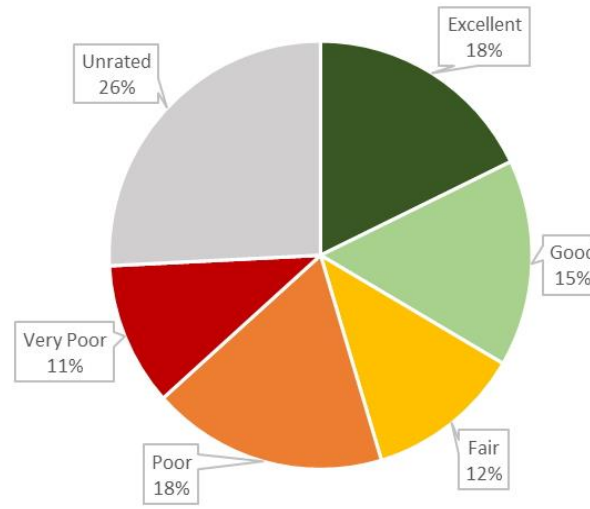


Stream Health measured with Chessie BIBI (Chesapeake Basin-wide Index of Biotic Integrity)

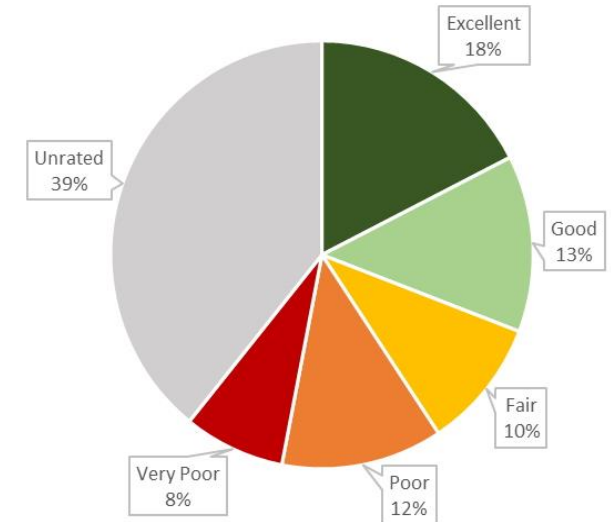
# Area-Weighted Percentages – Observed Data Only



**Pre-Baseline**  
2000 - 2005



**Baseline**  
2006 - 2011



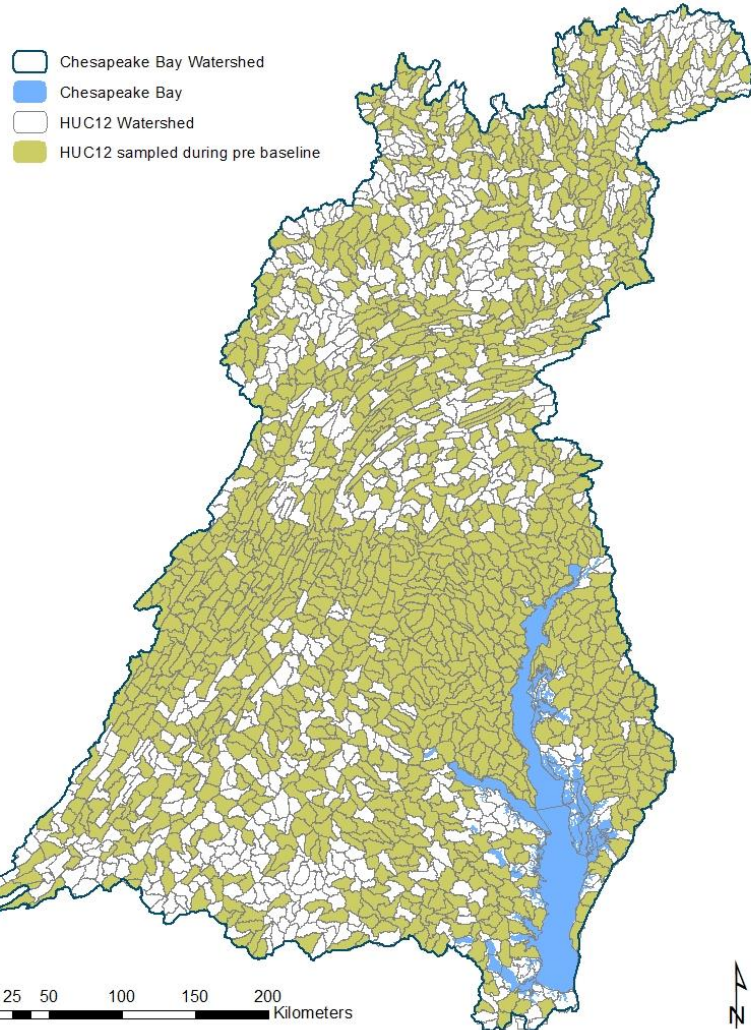
**1<sup>st</sup> Interval**  
2012 - 2013



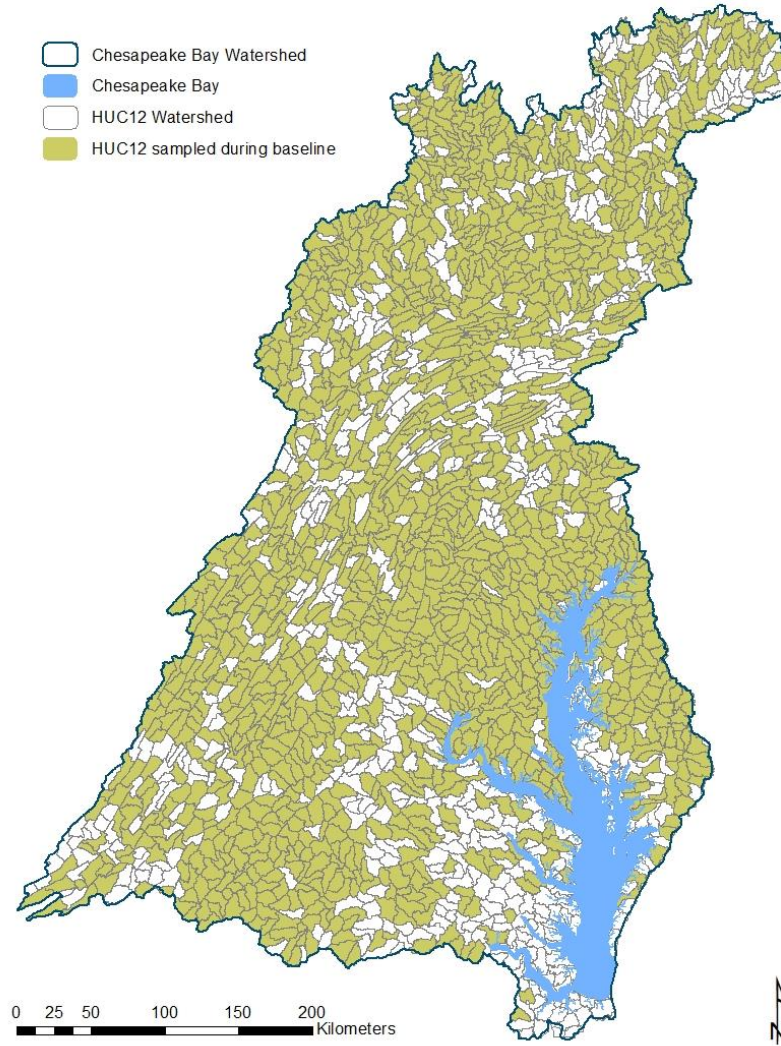
HUC12 condition	Obs # HUC12 = 1,168	Obs # HUC12 = 1,355	Obs # HUC12 = 1,079
“Healthy”	36.9%	45.3%	40.3%
Degraded	28.9%	28.9%	20.5%
Unrated	34.2%	25.8%	39.2%

# Discrepancies are largely related to differences in sample distributions

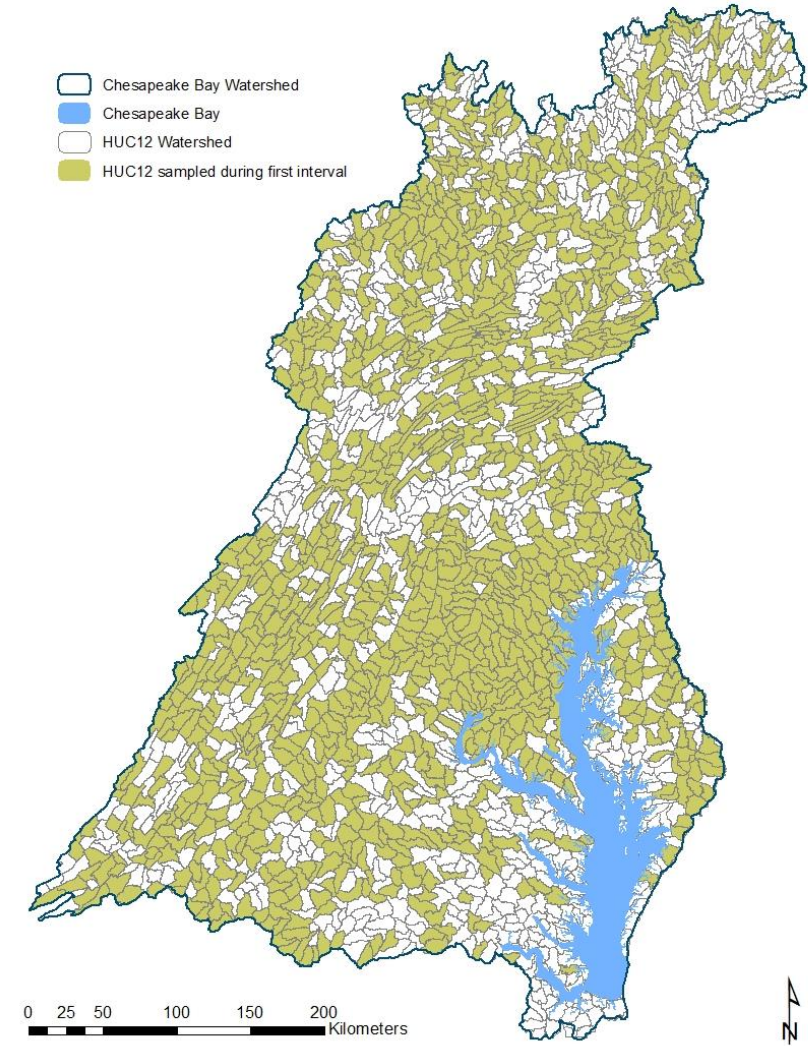
2000 – 2005  
Pre-Baseline



2006 – 2011  
Baseline



2012 - 2017  
First Interval



# However, conservative estimating might give us a better idea of watershed stream health...

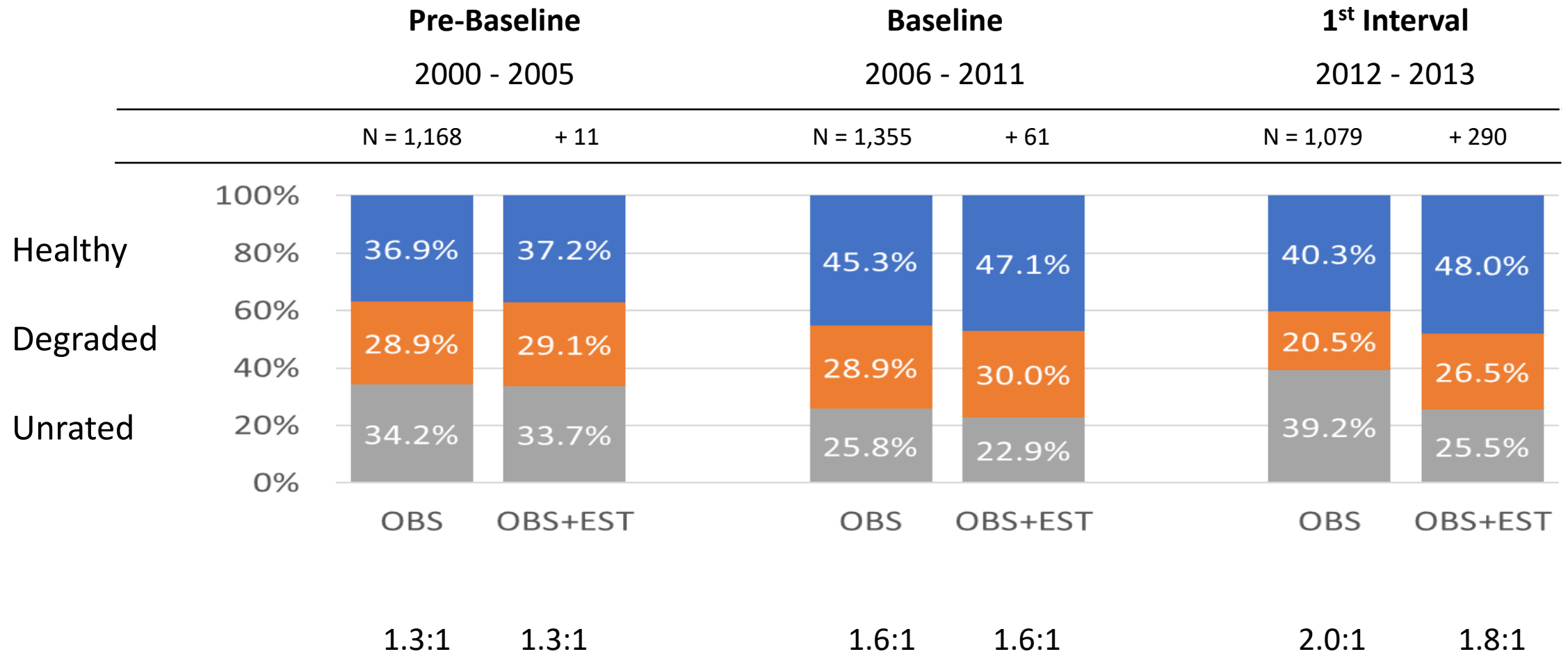
● = estimated rating

## “RULES”

Before 2000 < 2000	Pre-Baseline 2000 - 2005	Baseline 2006 - 2011	1 <sup>st</sup> Interval 2012 - 2017	Action
(yes)	yes	●	yes	Ratings match Check for land use changes; if none, then use 1 <sup>st</sup> interval rating for the baseline
(yes)	yes	●	yes	Ratings don't match but are close (e.g., excellent and good) Check for land use changes; if none, then use 1 <sup>st</sup> interval rating for the baseline
(yes)	yes	X	yes	Rating don't match and are not close (e.g., excellent and fair) Don't use ratings
(yes)	yes	yes	●	Ratings match Check for land use changes; if none, then use baseline rating for 1 <sup>st</sup> interval
(yes)	yes	yes	●	Ratings don't match but are close (e.g., excellent and good) Check for recent land use changes; if none, then use baseline rating for 1 <sup>st</sup> interval
yes	●	yes	●	Ratings match Check for recent land use changes; if none, then use baseline rating for 1 <sup>st</sup> interval
yes	yes	●	X	Pre-baseline and before 2000 ratings match or are close Check for recent land use changes; if none, then use for pre-baseline for baseline rating

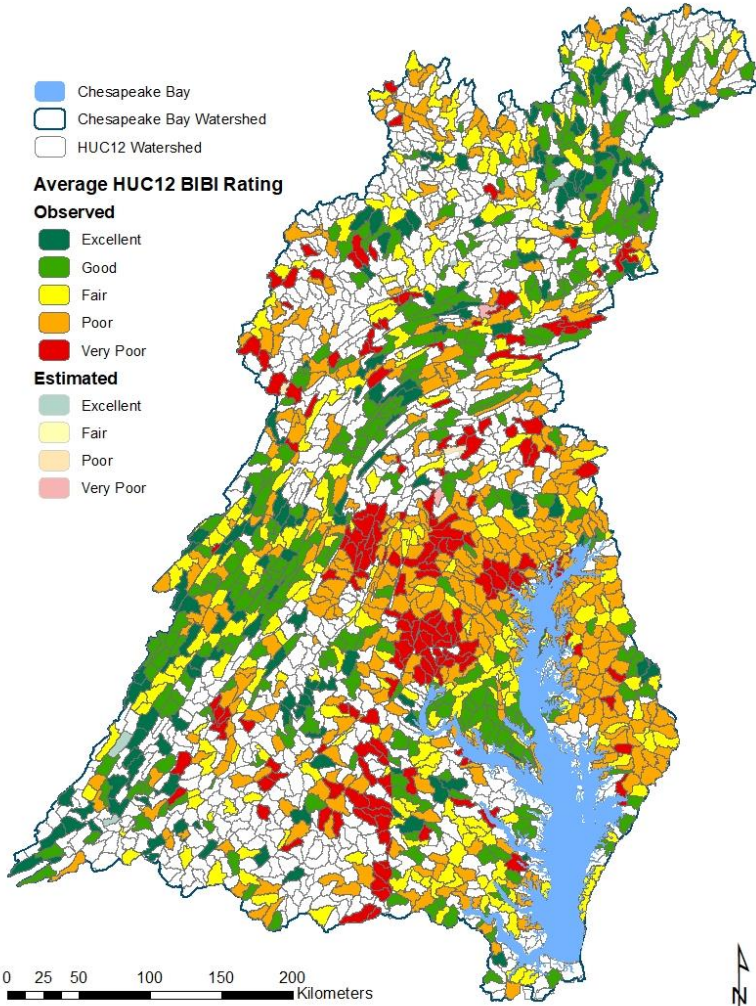
\* Land use change can be determined with multiple parameters, e.g., % imperviousness, % forest

This is probably the best we can do with just monitoring data and HUC12s  
 (but we could “improve coverage” if we group results by HUC8s)

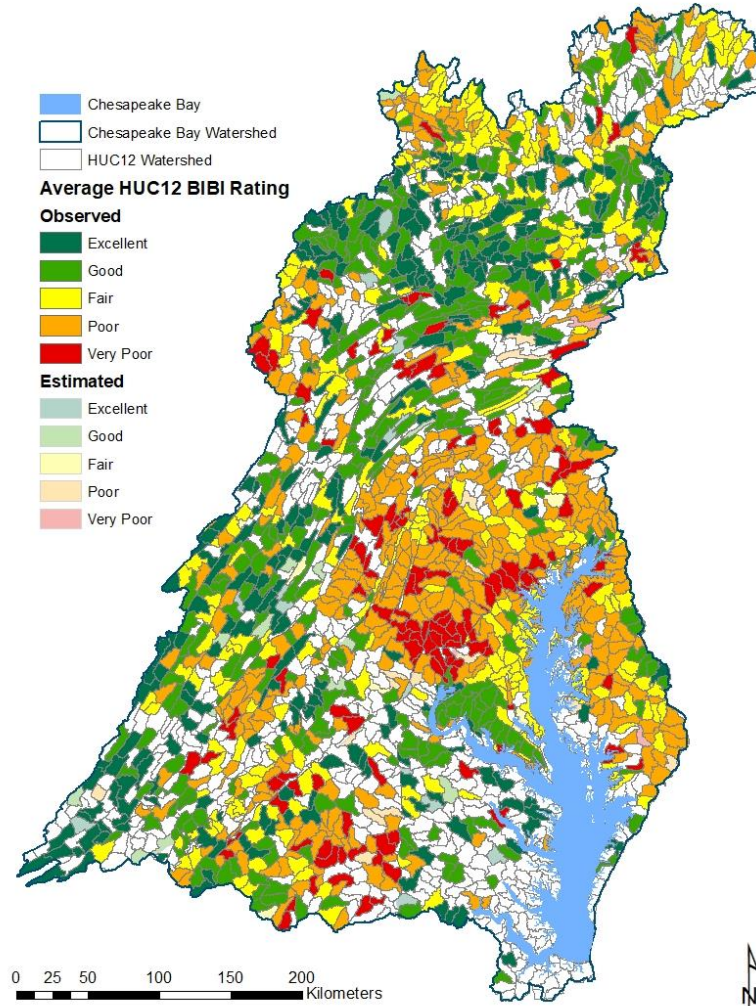


The odds of sampling streams of higher quality appears to be increasing

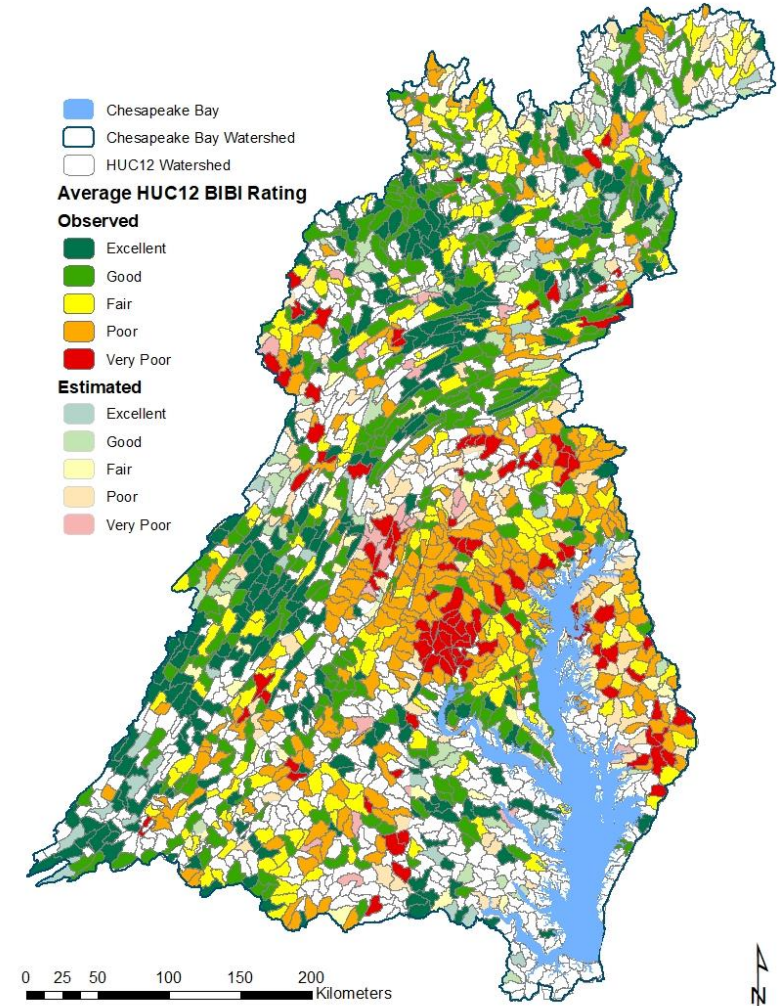
Pre-Baseline  
2000 – 2005  
65.8 % total area



Baseline  
2006 – 2011  
74.2 % total area



First Interval  
2012 - 2017  
60.8% total area





## 2018 White Paper

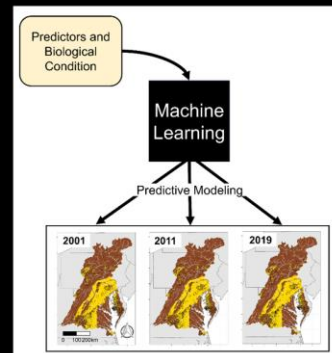
- **BASELINE PERIOD (2005 – 2011)**
- Monitoring results combined with early modeling results
- Almost entire area of Chesapeake watershed had a stream health rating

	Monitoring + Model data	Recent Analysis Mon + Est data
Healthy	60%	47.1%
Degraded	40%	30.0%
Unrated	0%	22.9%

## February 2022 presentation to SHWG

### Measuring stream condition in the Chesapeake Bay watershed: An update on the Chessie BIBI predictive modeling effort

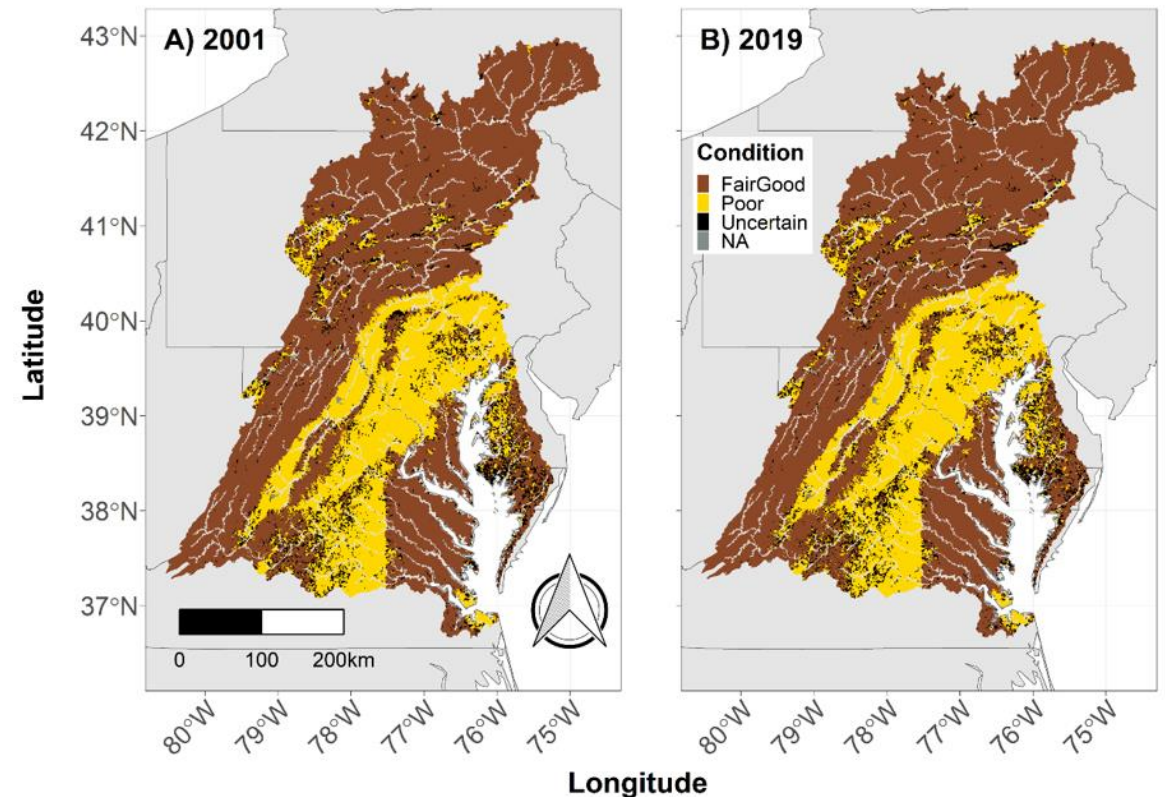
Kelly Maloney (USGS), Claire Buchanan (ICPRB), Rikke Jepsen (ICPRB), Kevin Krause (USGS), Benjamin Gressler (USGS), Matthew Cashman (USGS), John Young (USGS)



Preliminary Data, not for citation or distribution

Models were redone for the land use layer closest in time

Model results available for almost all catchments in Chesapeake Bay watershed.



Results currently in review

