SUBMERSION SERIES

A new series for quarterly conversations among Bay Program partners hosted by the Water Quality Goal Implementation Team (WQGIT) and experts

Reviewing our accounting framework: How can we promote investment in outcome-based management?

Welcome to the webinar! We will begin shortly.

Welcome! Some reminders and logistics

- If you don’t hear me, please check your audio settings (are your speakers/headphones muted?)
- Please use the Q&A function throughout the webinar to ask questions for our speakers
- We also encourage you to use the Reactions feature of Zoom throughout, to keep things light-hearted and positive

Why are we here?

This is not an average WQGIT meeting

Chesapeake Bay Program
40 years of science, restoration and partnership.

SUBMERSION SERIES

ORC

“The Chesapeake Bay Program partners envision an environmentally and economically sustainable Chesapeake Bay watershed with clean water, abundant life, conserved lands and access to the water, a vibrant cultural heritage and a diversity of engaged stakeholders.”

2014 Watershed Agreement’s Vision Statement

Acknowledgements

This first webinar has been a team effort. Thank you to...

WQGIT Leadership team

Ed, Suzanne, Jackie, Sushanth and me

Our wonderful planning team of volunteers for their ideas and time

Adrienne, Jill, KC, Mike, Marel, Matthew, Mary

Big thanks to Green Fin Studio for their support getting this discussion series off the ground

Lauren and Paula

And of course our speakers who worked together to bring us quality content and discussion

Joe, Kurt and Zach

Today's Speakers

Joe Wood

Virginia Senior Scientist
Chesapeake Bay Foundation

Kurt Stephenson

Professor
Virginia Tech

Zach Easton

Professor
Extension Specialist
Virginia Tech

THANK YOU

SUBMERSION SERIES

Questions?
Jeremy Hanson, CRC | Bay Program WQGIT Coordinator
HansonJ@chesapeake.org
(410) 267-5753

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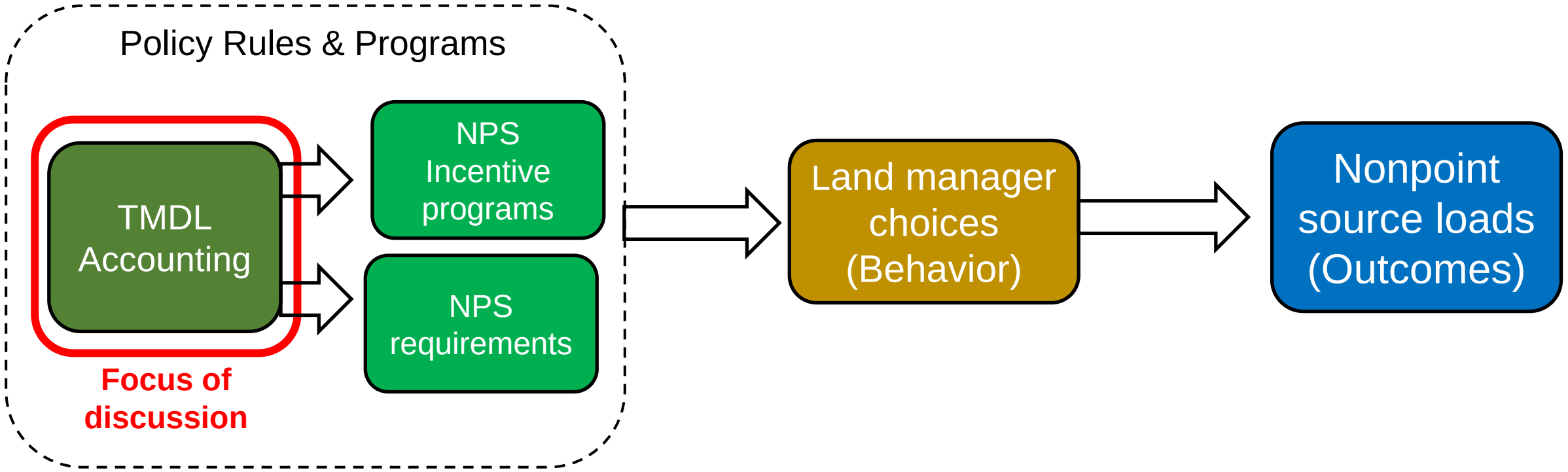
Reviewing our accounting framework: How can we promote investment in innovation and outcome-based management?

Zach Easton & Kurt Stephenson
Virginia Tech

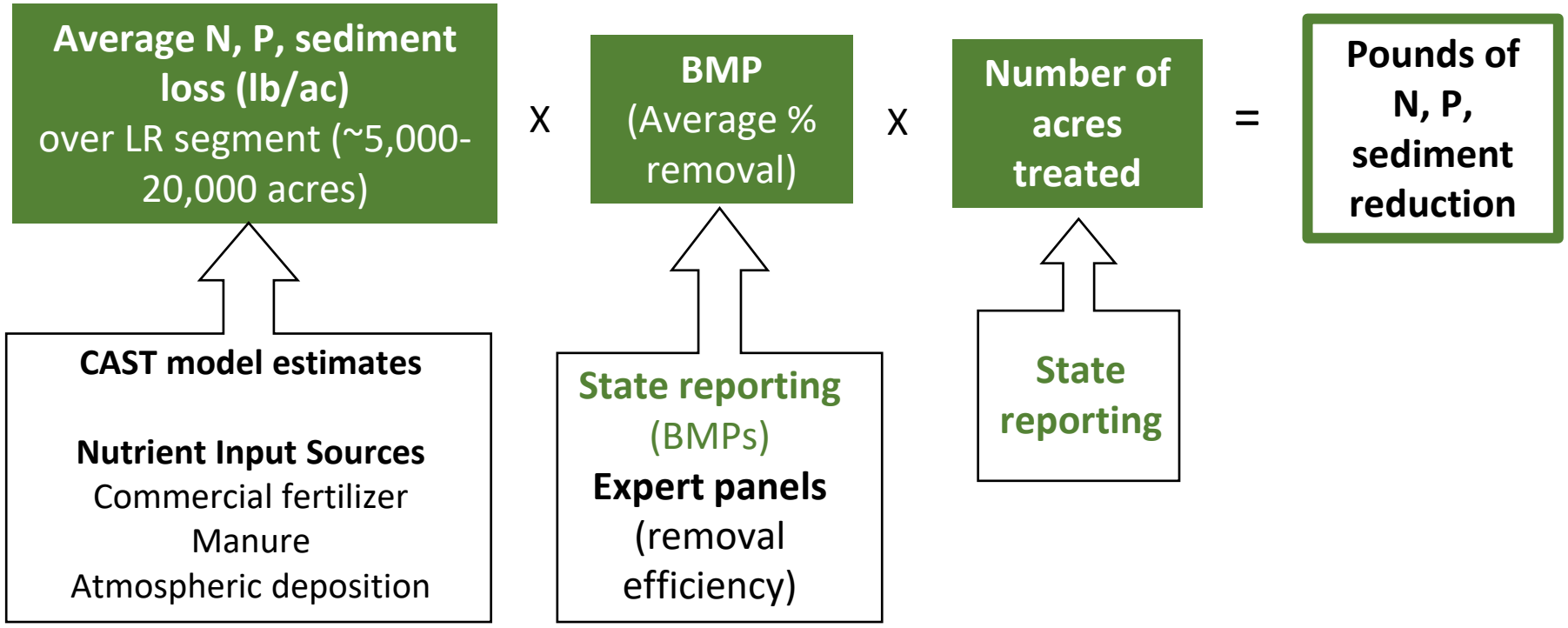
WQGIT Submersion Series 2023

Addressing nonpoint source challenge: Can changes to TMDL crediting/accounting improve outcomes?

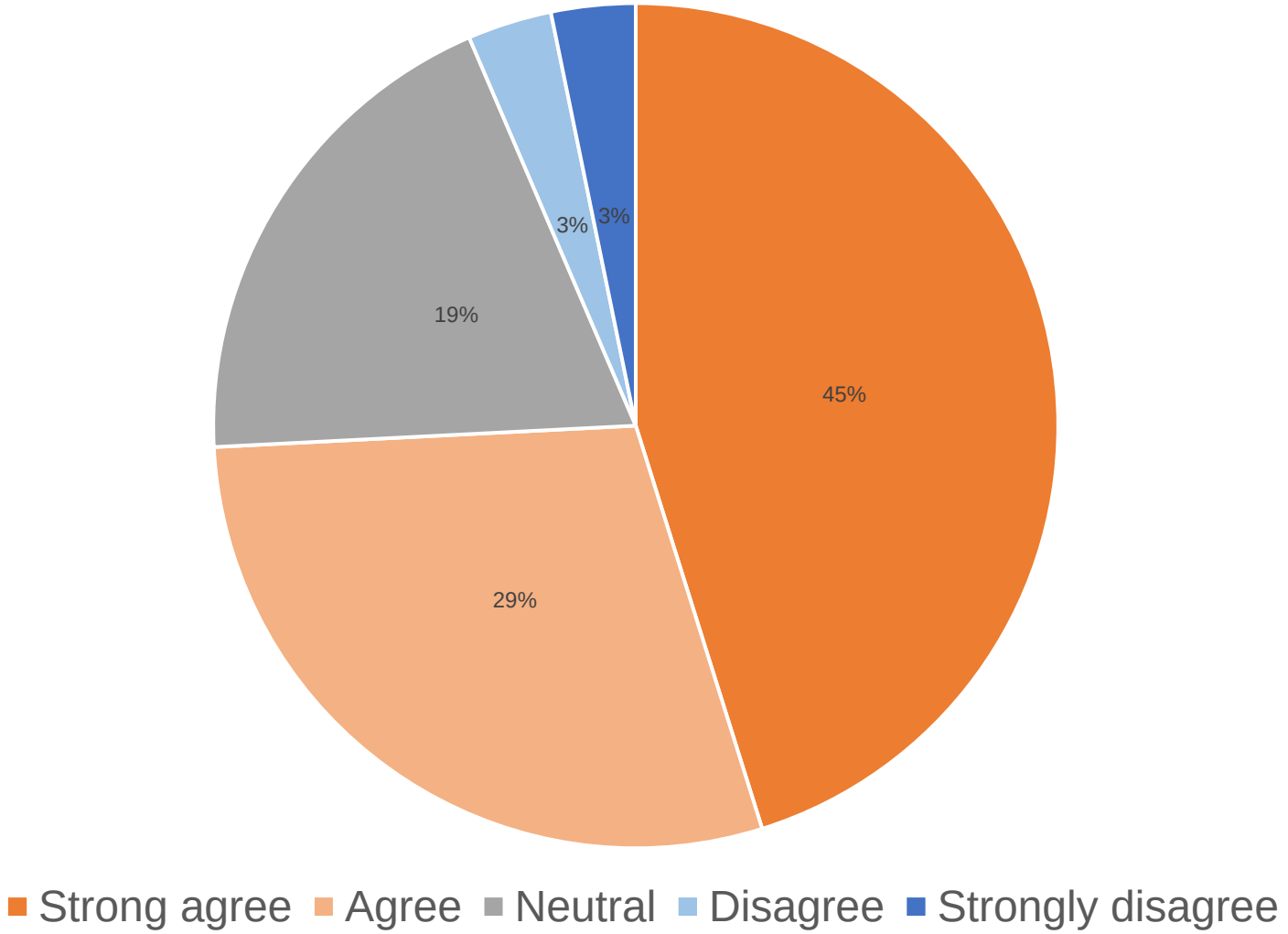


TMDL Accounting Framework Summary

Crediting nonpoint source reductions & the CAST model

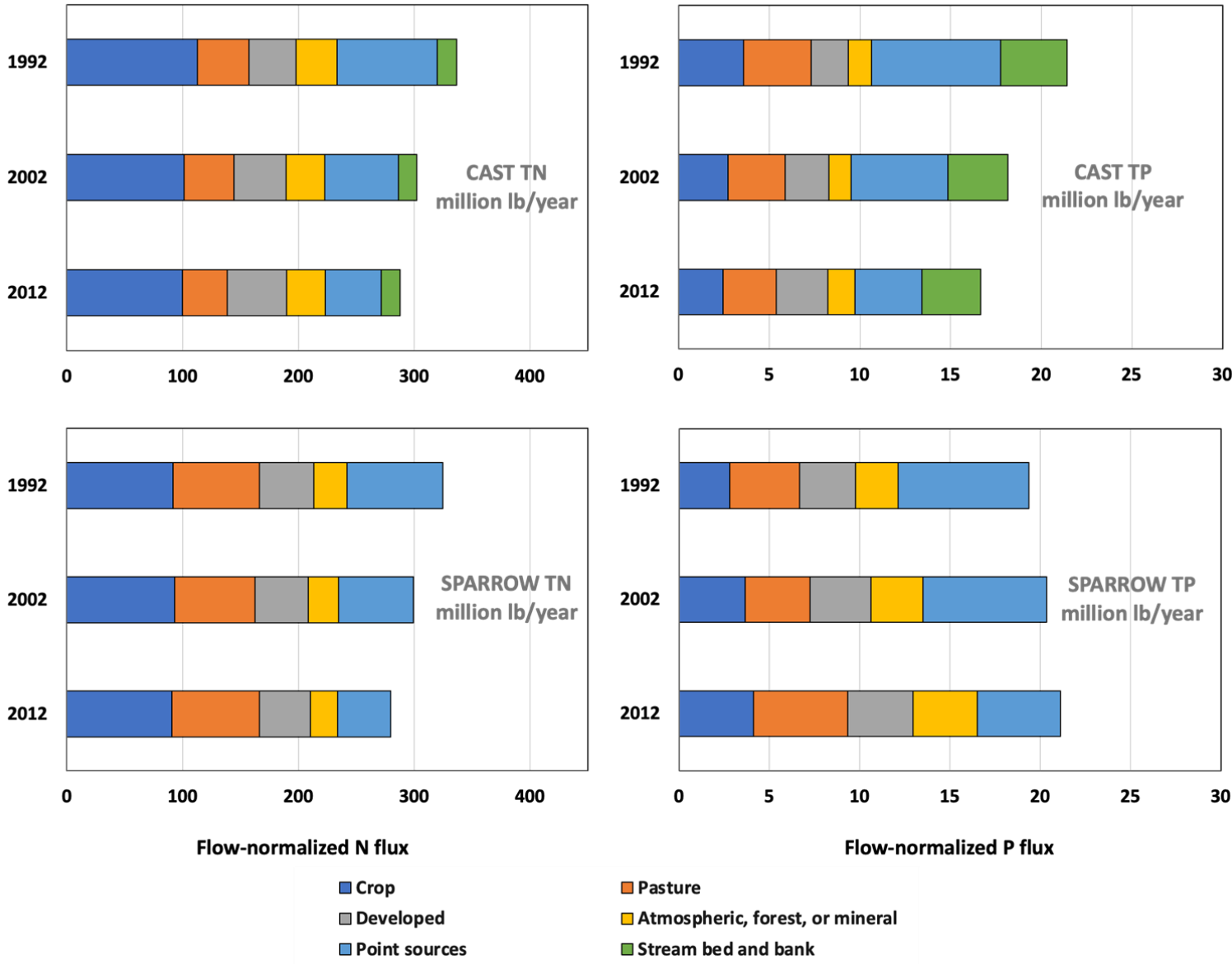


Survey Question: “The way the Chesapeake Bay Program credits nonpoint source reductions strongly influences the way programs are implemented”



The Nonpoint Source Challenge

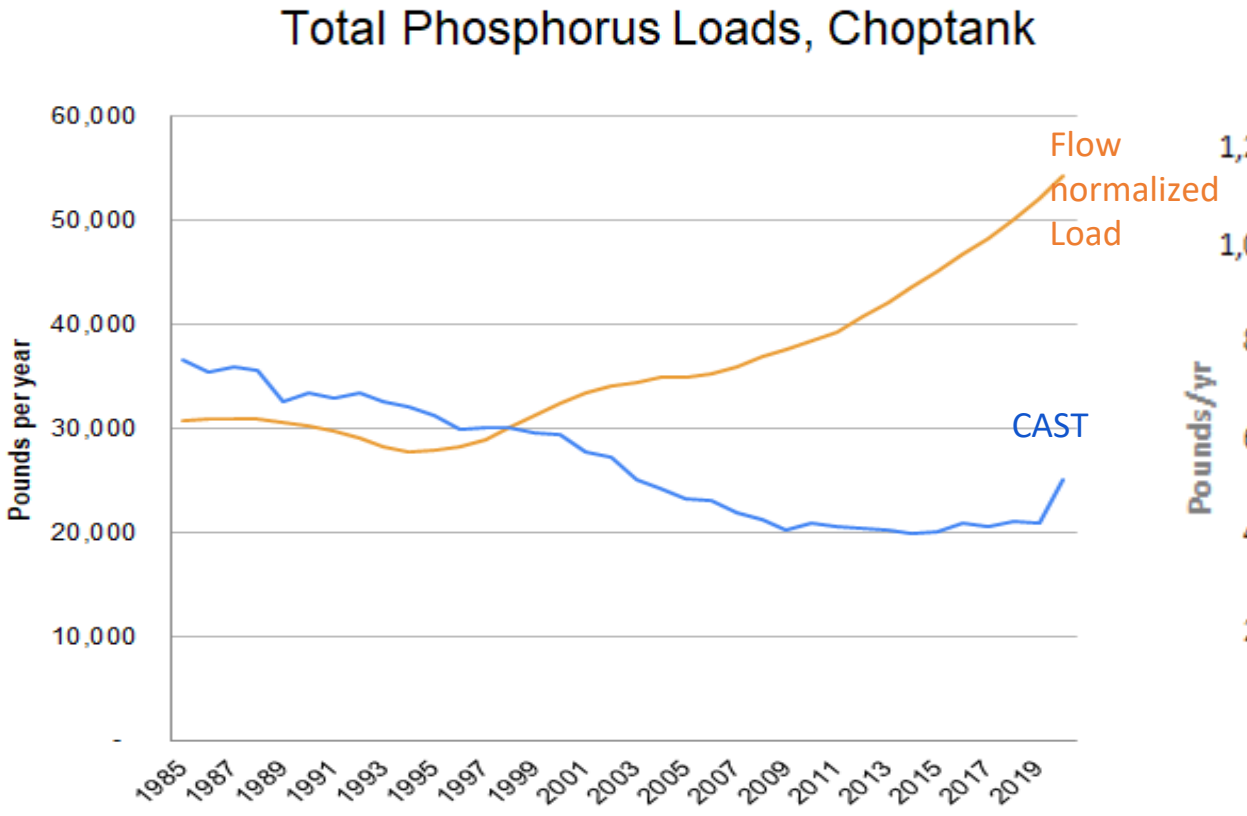
Progress on reducing nonpoint source nutrient loads

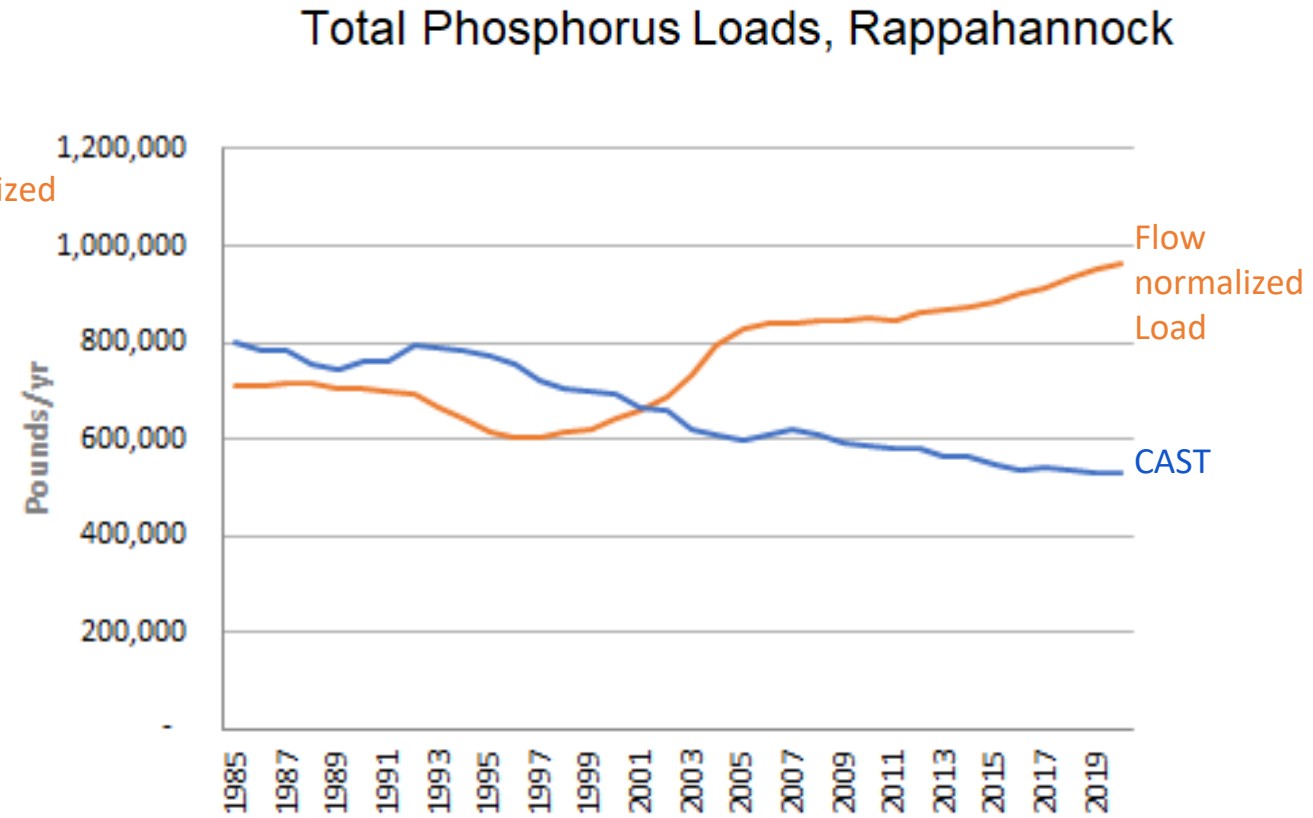


Estimated flow-normalized total and source sector TN and TP fluxes to the Chesapeake Bay for the CAST and SPARROW models

Ator et al. 2020

Illustrations of the NPS response gap:
Difference between expected and observed outcomes





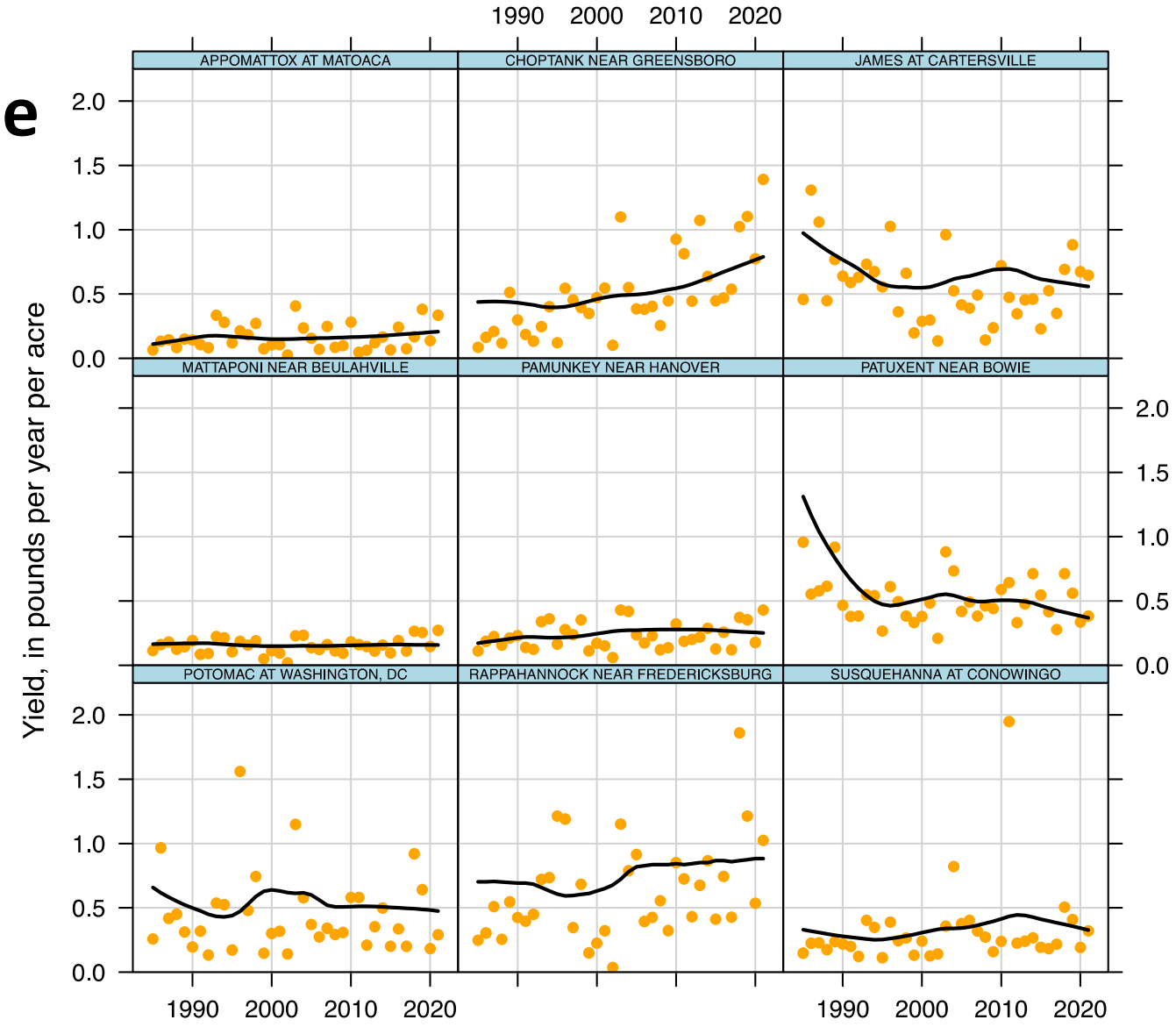
Effectiveness of Nonpoint Source Management Efforts

Achievement of remaining nutrient/ sediment reduction goals rests primarily with NPS sources

Monitoring data shows mixed signals of NPS management effectiveness. Several studies have found relatively little change in NPS loads between 1990 and today.

Keisman et al 2018; Ator et al. 2019; 2020

Challenges to scale adoption to sufficient reductions

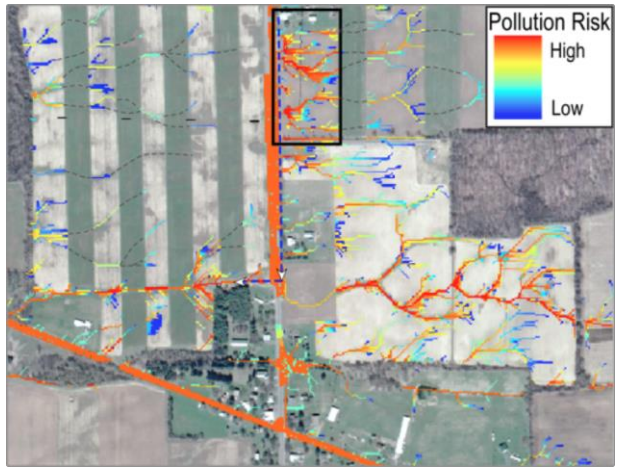


Total Phosphorus Yields at the RIM sites
Black Line is flow Normalized Yield, 1985-2021

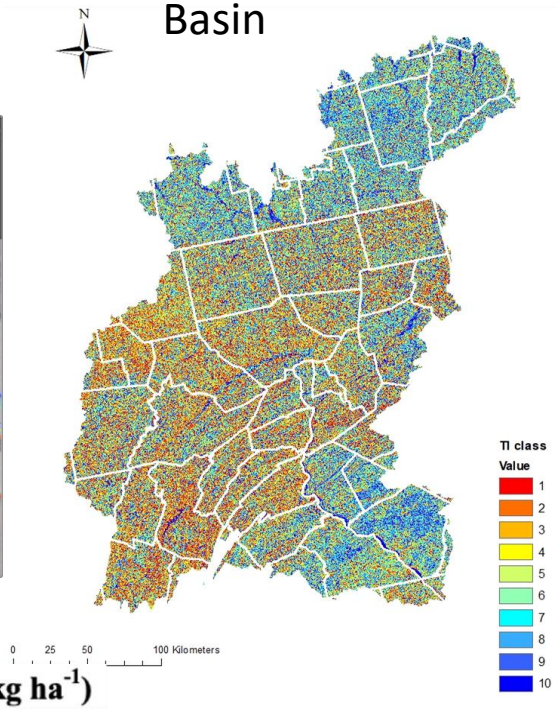
Mason and Soroka, 2022

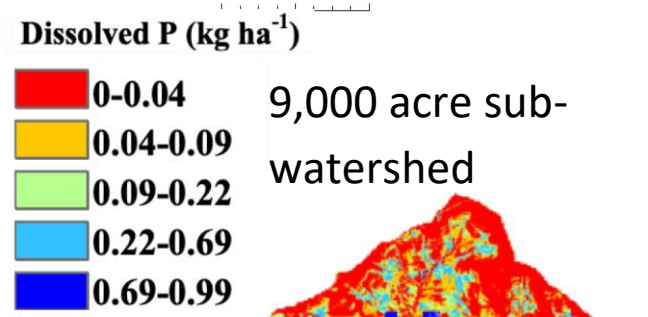
To what extent does TMDL accounting/crediting create barriers/obstacles to improving water quality outcomes?

25 acre parcel

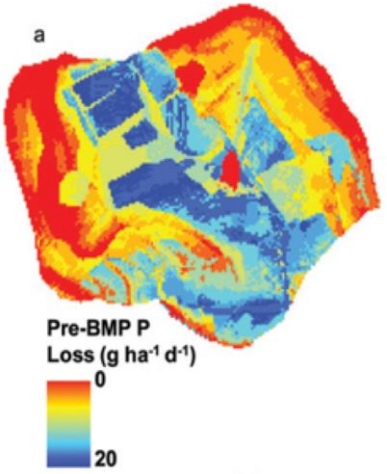


Basin





9,000 acre sub-watershed



400 acre farm

Nutrient loads are highly variable across the landscape across multiple scales

Targeting conservation could improve effectiveness and reduce costs

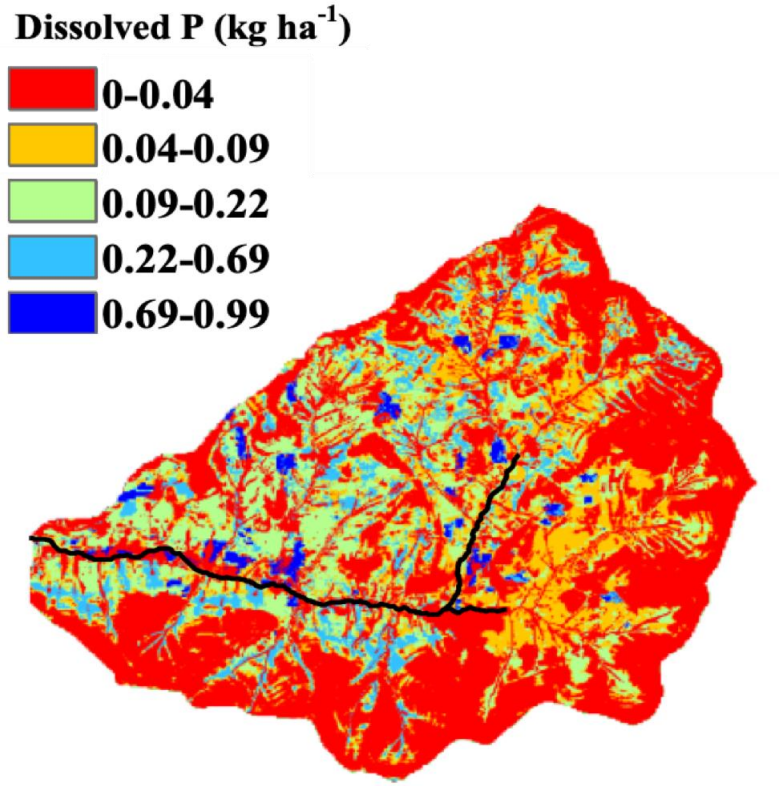
TMDL Accounting/Crediting

TMDL crediting averages area loads across relatively large scales for implementation (5,000 - 20,000 acres)

Average BMP effectiveness

Is TMDL crediting a barrier to identifying and treating localized high loading areas because no additional credit is given for locating and treating high loss areas?

Nutrient loads also vary across land managers



Total phosphorus balance across 58 dairy farms in Shenandoah Valley Virginia, 2018

Quartile	Total P balance (kg/ha)
Minimum	-30.9
1st Quartile	1.5
Median	12.4
3rd Quartile	18.7
Maximum	97.6

(Source: Pearce & Maguire 2020)

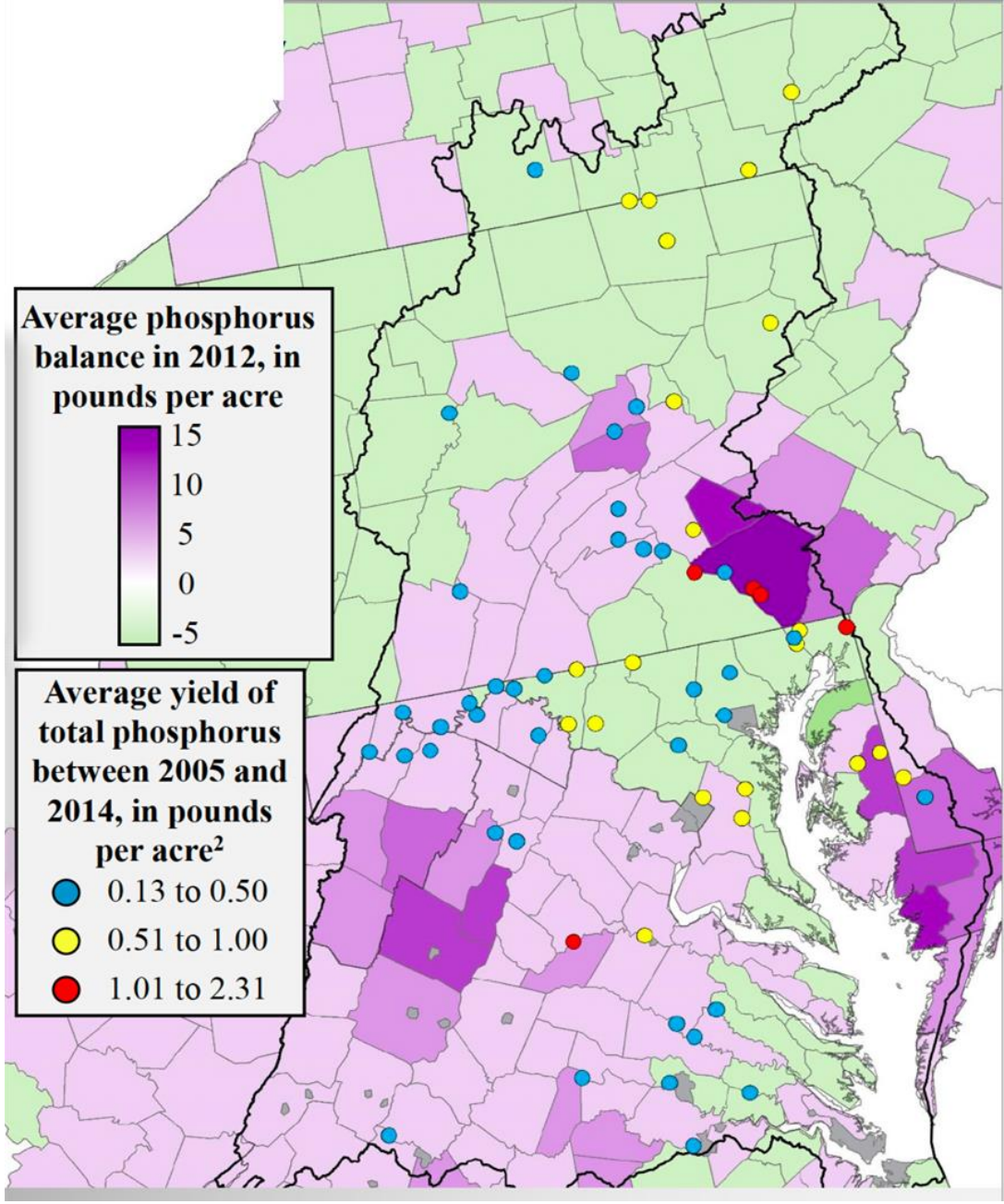
TMDL Accounting/Crediting

TMDL accounting system does not distinguish management actions across land managers

Is TMDL crediting limiting efforts to work with land managers contributing high levels of nutrients because states do not get additional credit for working with these land managers ?

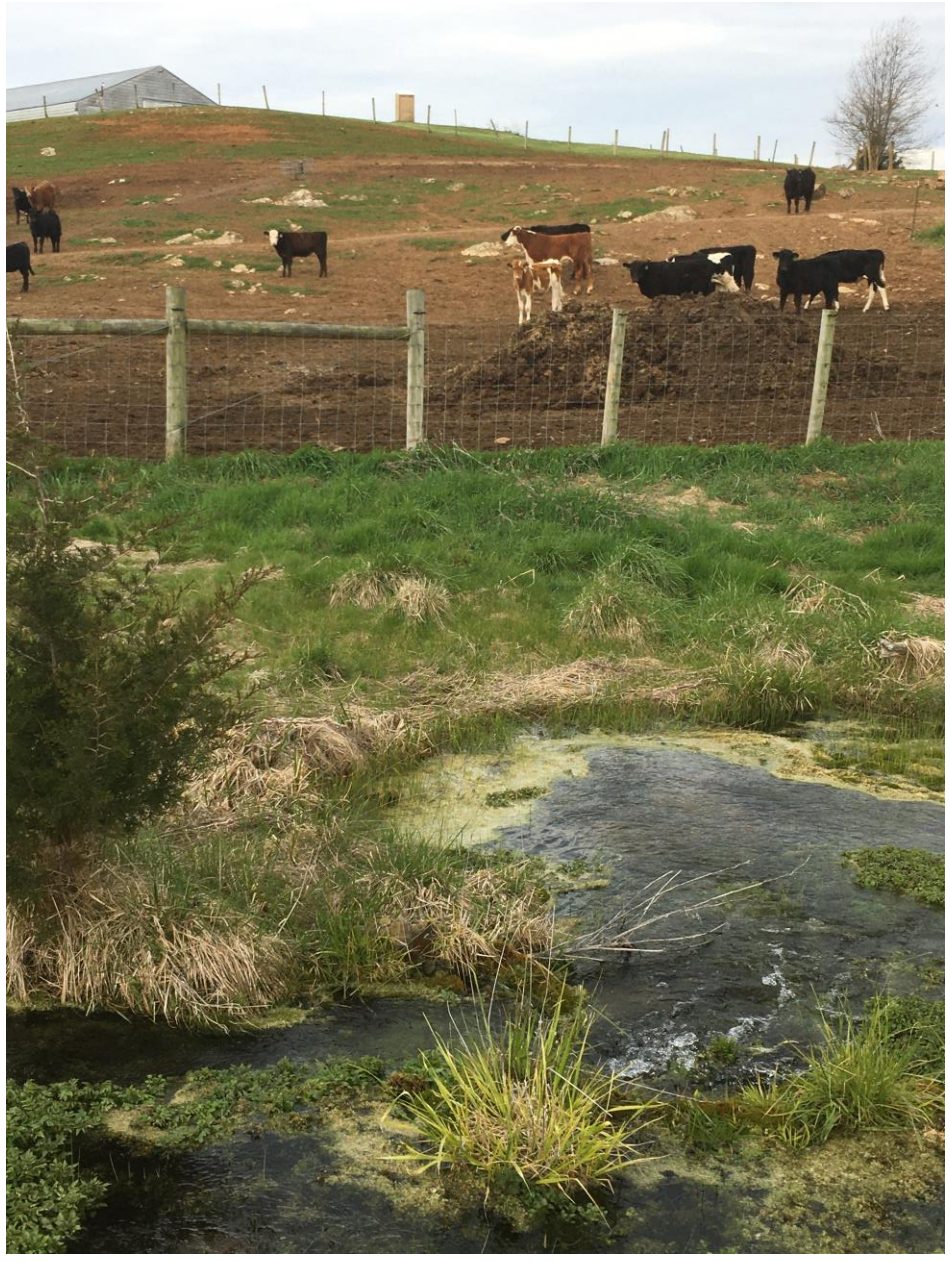
Nutrient Mass Balance

- Large mass balance issues exist in many agricultural dominated regions (inputs of feed and fertilizer exceeding assimilative capacity)
- Continued growth in intensive animal agriculture has compounded this issue and represent large potential source of nutrients in the system



Moyer et al. 2107, Webber, 2017

Illustration of a CBP showcase watershed: Smith Creek



Over past 3 decades, the number of animal units increasing

Over past 3 decades, 4x increase in # of BMPs installed in watershed

Pictured: riparian buffer at headwater spring

Net Result:

Monitored TN loads increasing over time

TMDL Accounting/Crediting

Nutrient use behavior (manure applications) is generally assumed in TMDL crediting

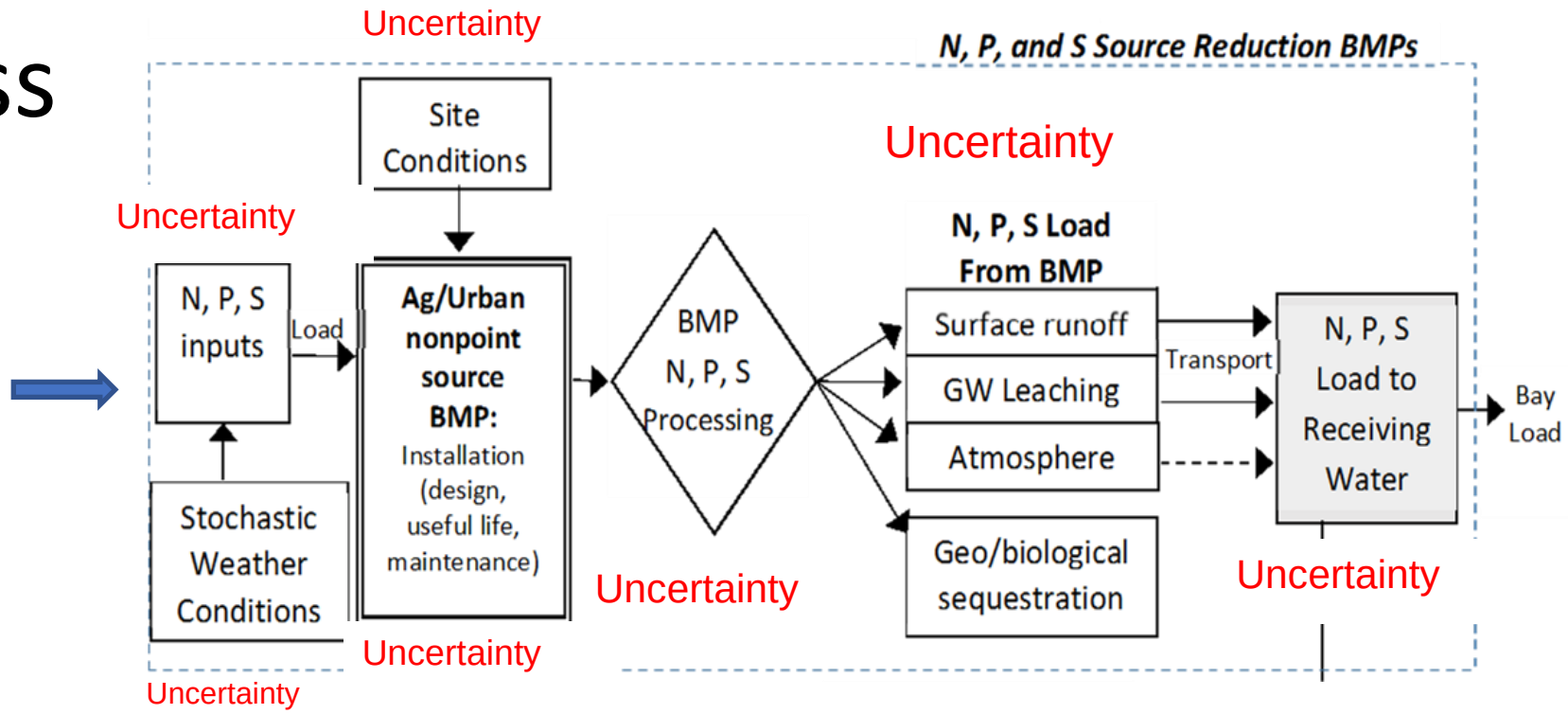
Crediting to account for behavior to improve outcomes?

TMDL accounting/crediting is focused estimates for field level BMPs

Does TMDL crediting create obstacle for regional efforts to address mass imbalances issues?

BMP Effectiveness

Uncertainty regarding BMP effectiveness



TMDL Accounting/Crediting

TMDL accounting system generally assigns a single efficiency estimate for all approved BMPs. No systematic attempts to characterize BMP uncertainty.

Could changing TMDL crediting create greater efforts to provide more assurances that BMPs are working effectively

TMDL Accounting/Crediting

TMDL CAST model calculates reduction based on land use and BMP efficiency. Water quality managers report and verify BMP practice installation for inclusion in CAST model. Progress toward TMDL is based on CAST model results .

Does TMDL crediting/accounting system create too much attention to counting practices rather than monitoring desired outcomes?

Refinements and innovations in reducing and controlling nutrients can offer opportunities to reduce costs and improve removal effectiveness

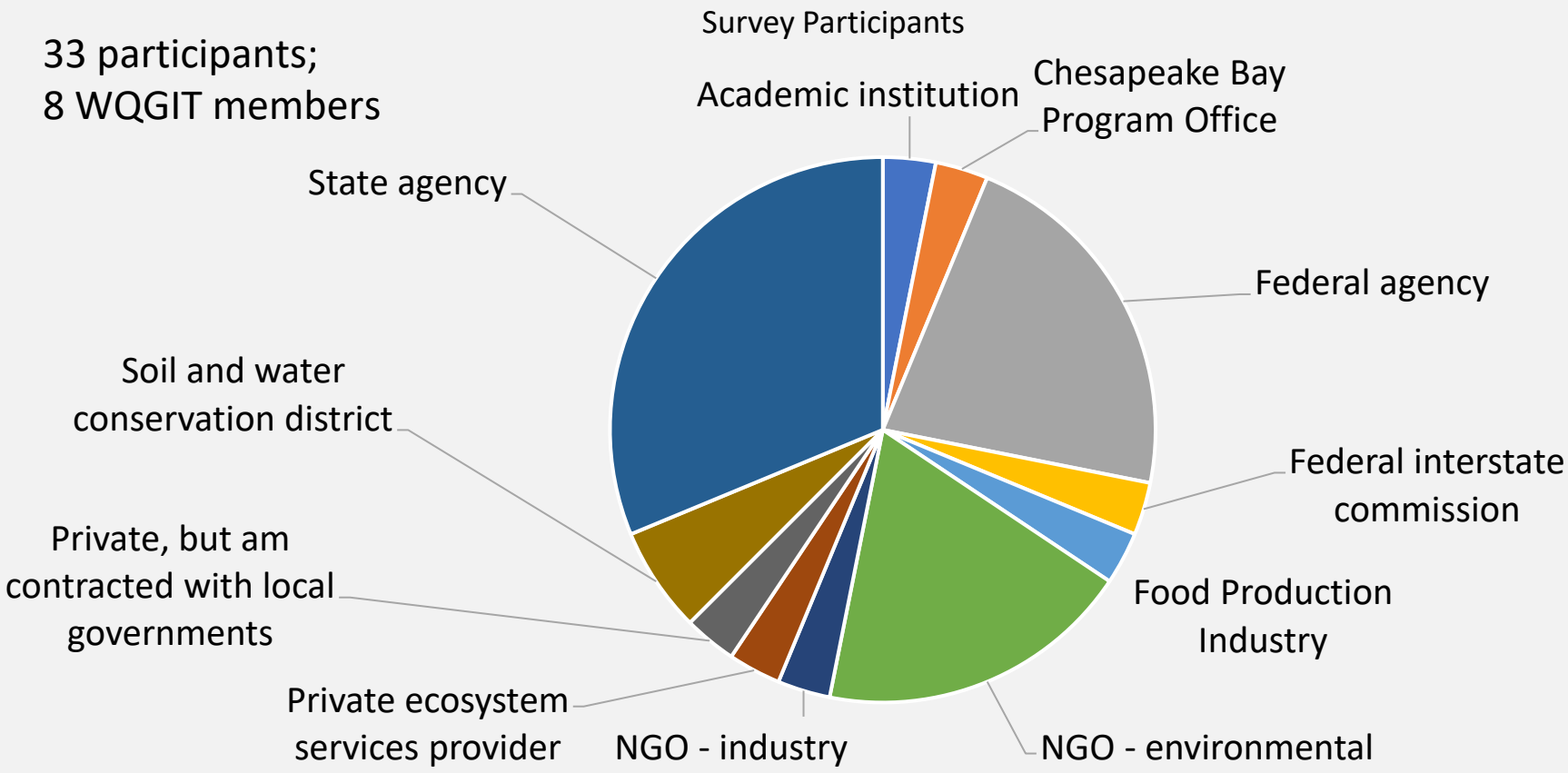
TMDL Accounting/Crediting

TMDL accounting system establishes a review of new BMPs via BMP expert panels, and then recommends a BMP efficiency estimate to include in CAST

Could changing TMDL crediting improve incentives to create new approaches to reducing nutrients?

Survey Results on our accounting framework

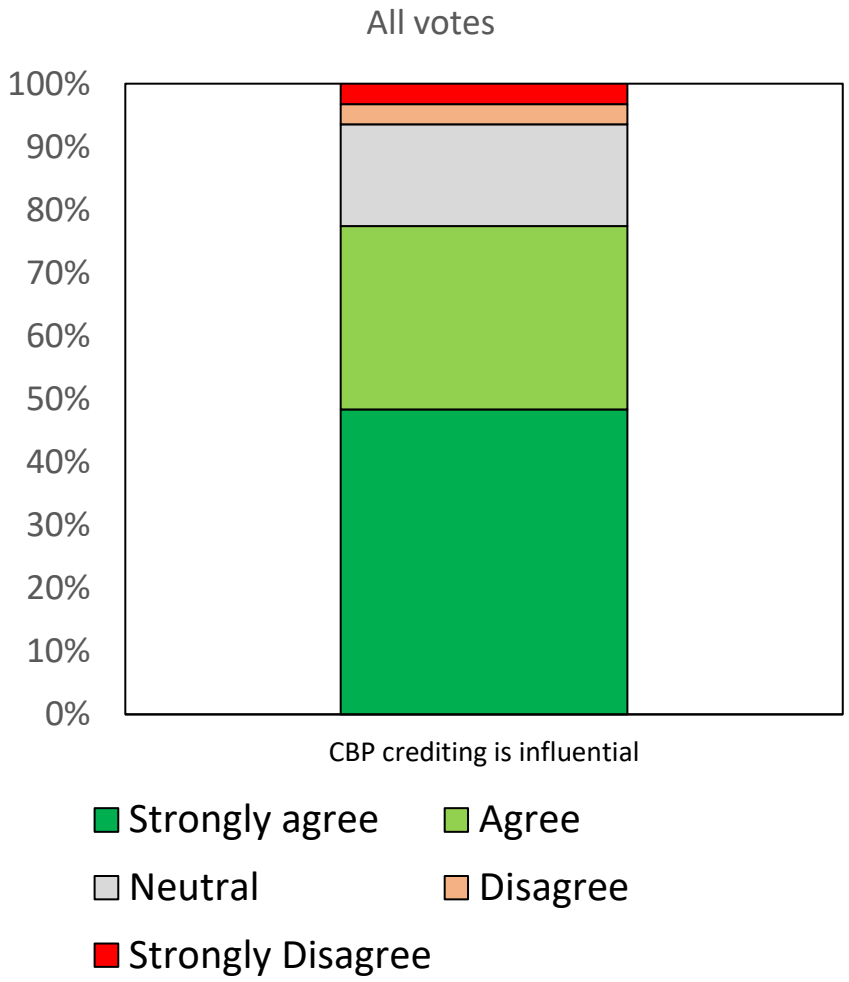
33 participants;
8 WQGIT members



CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

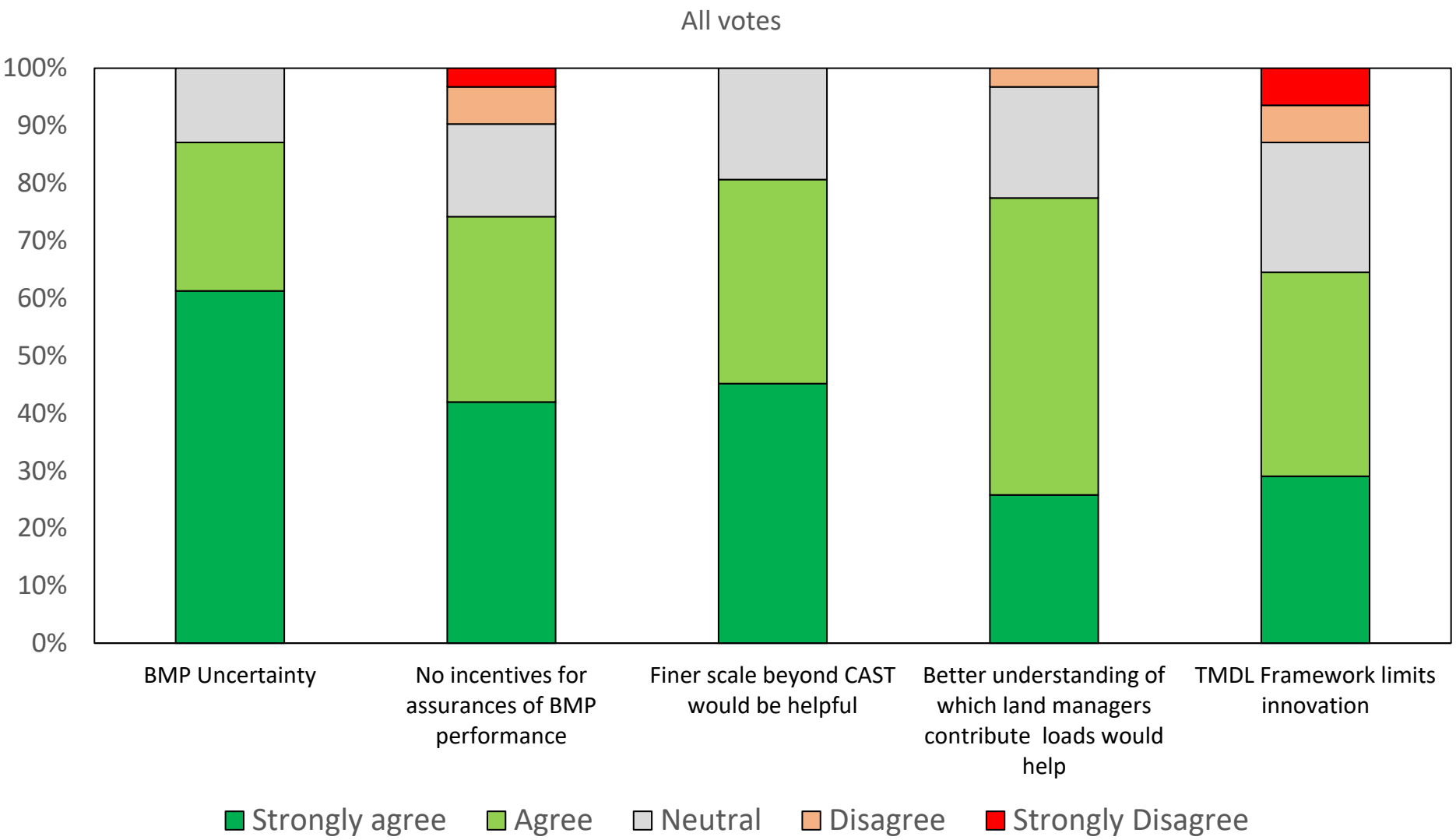
Joe Wood, Ph.D.

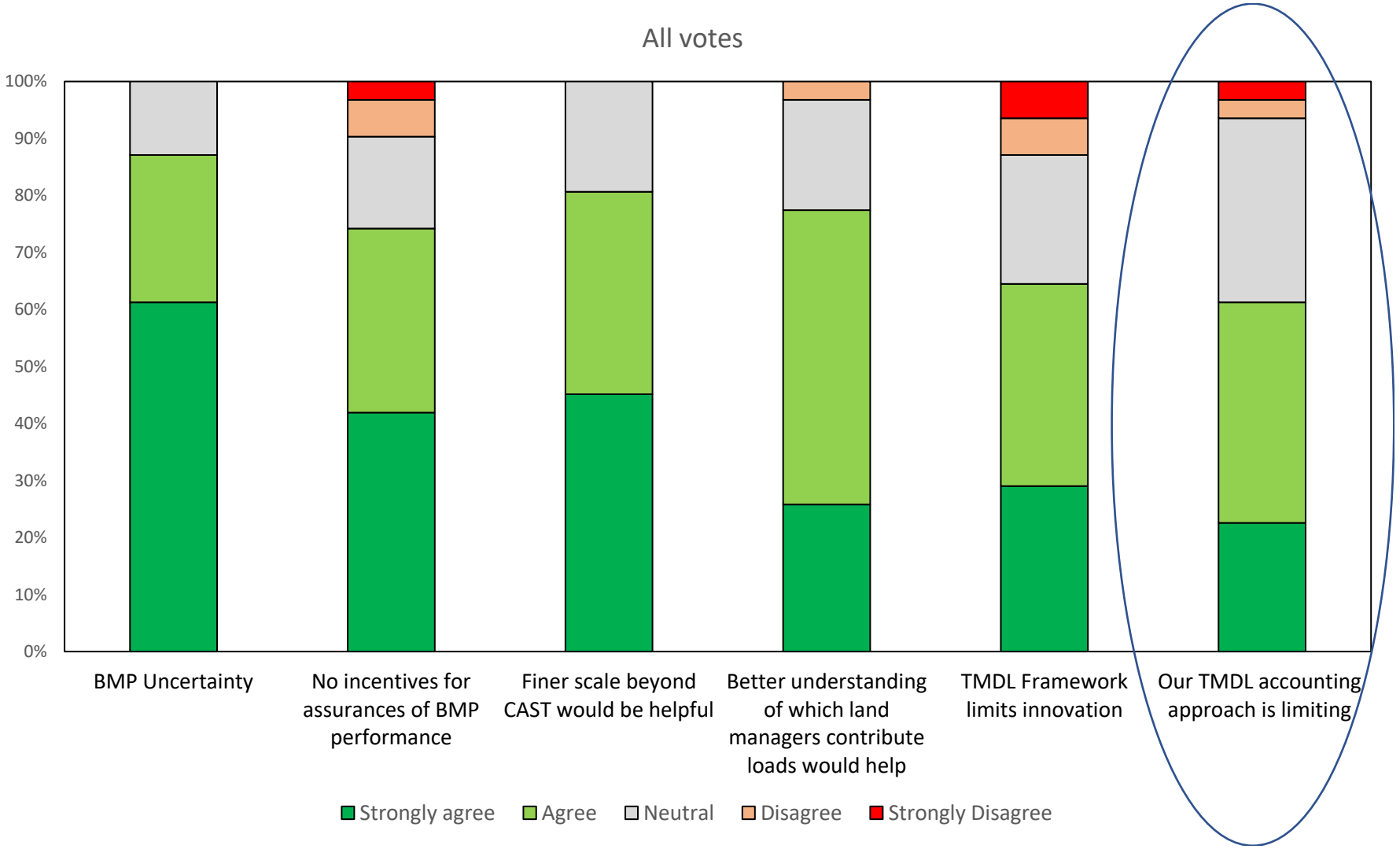
Virginia Senior Scientist, jwood@cbf.org



The way the Chesapeake Bay Program credits nonpoint source reductions strongly influences the way programs are implemented.

Most think crediting is influential


All votes
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
BMP Uncertainty
No incentives for assurances of BMP performance
Finer scale beyond CAST would be helpful
Better understanding of which land managers contribute loads would help
TMDL Framework limits innovation
Strongly agree
Agree
Neutral
Disagree
Strongly Disagree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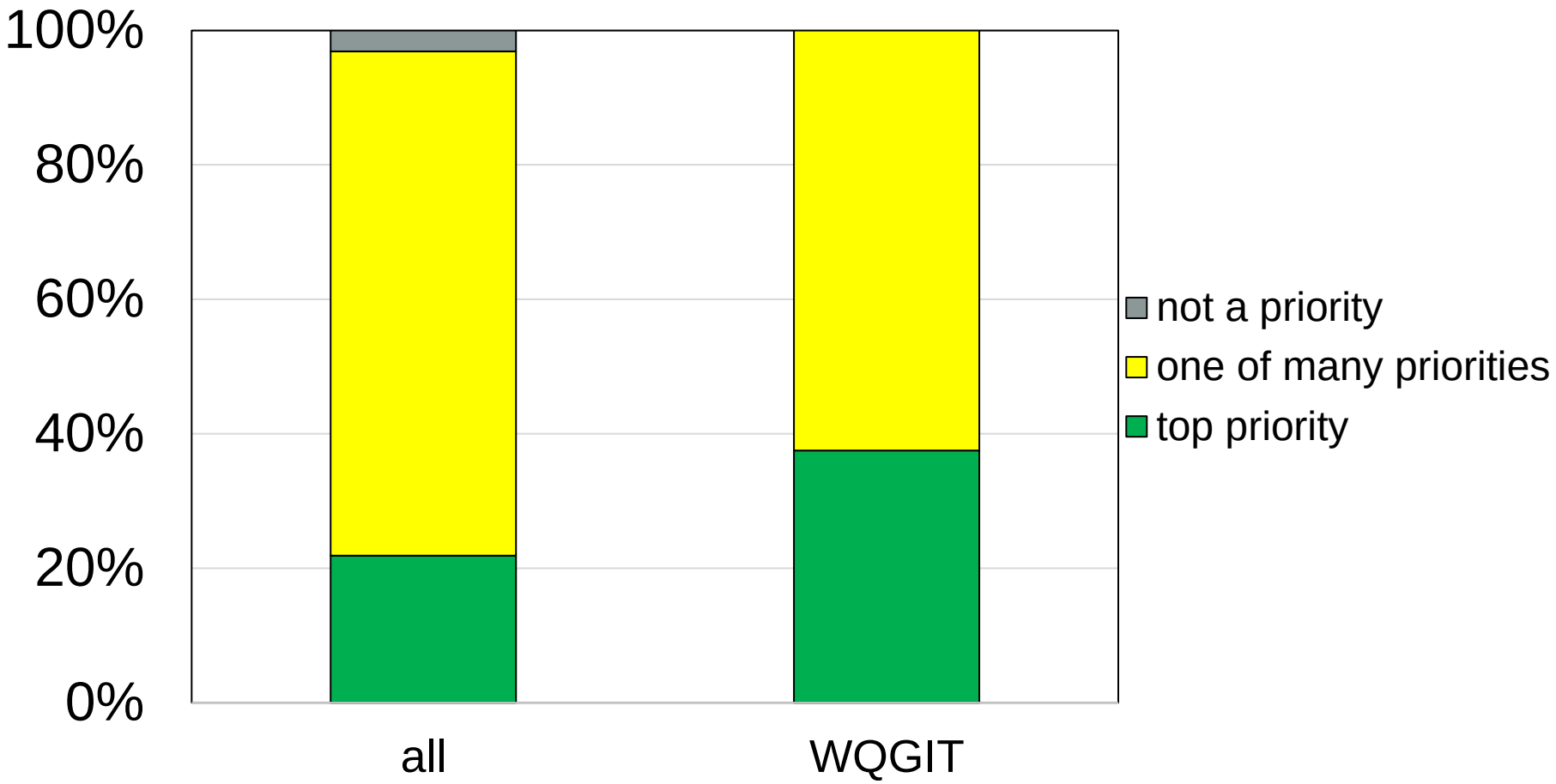
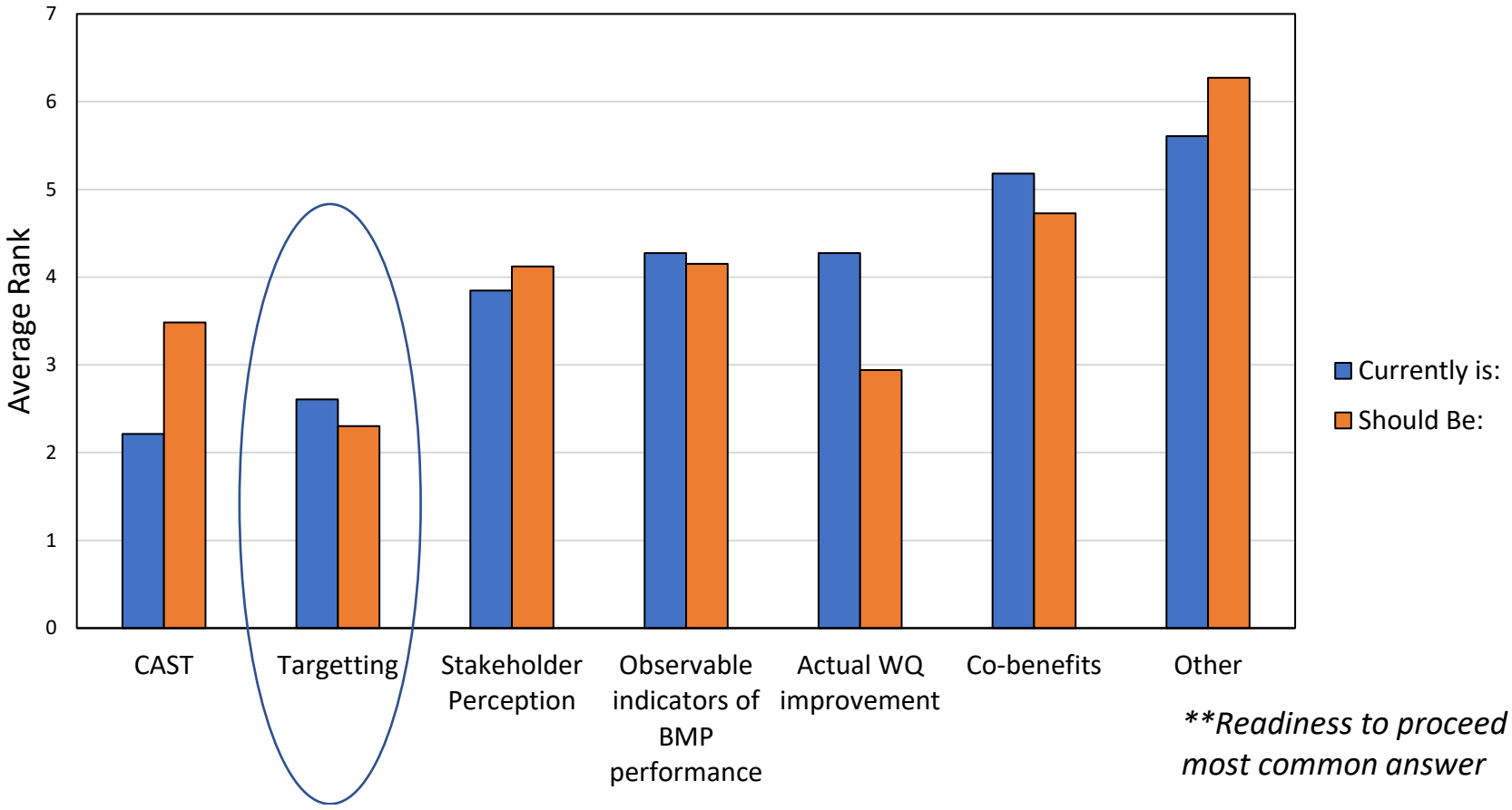
50%
40%
30%
20%
10%
0%
BMP Uncertainty
No incentives for assurances of BMP performance
Finer scale beyond CAST would be helpful
Better understanding of which land managers contribute loads would help
TMDL Framework limits innovation
Our TMDL accounting approach is limiting
Strongly agree
Agree
Neutral
Disagree
Strongly Disagree

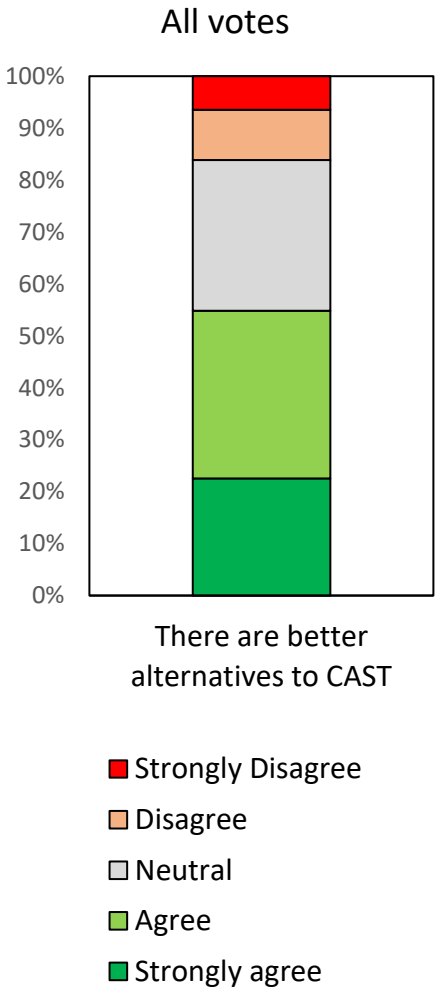
Is Changing Crediting Framework a priority?

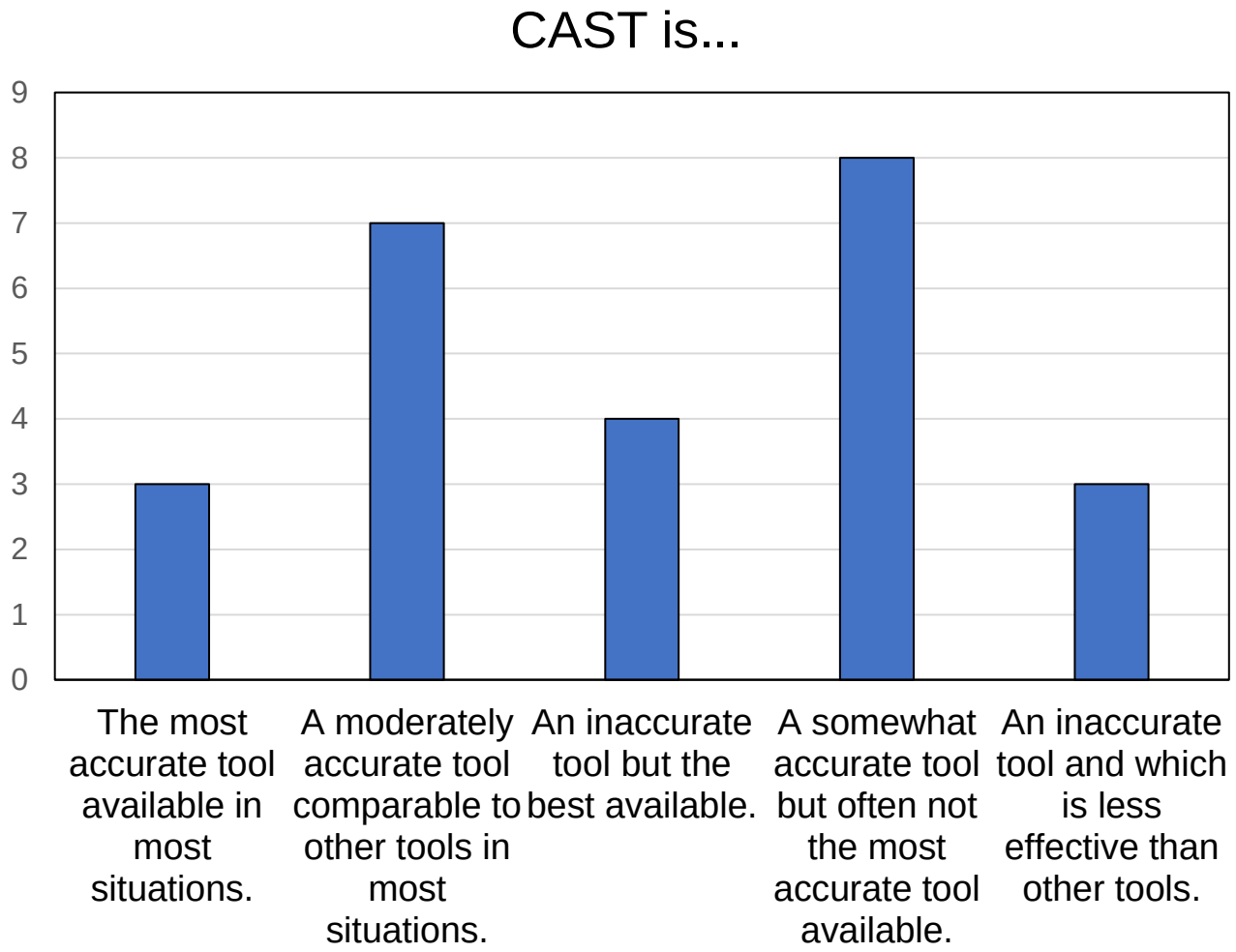


Ranking priorities for decisions makers



***Readiness to proceed most common answer*





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Could changing our TMDL Crediting and evaluation help us address issues discussed today?