Protecting Sebago Lake

One Subwatershed at a Time

Paul Thomas Hunt
Environmental Manager
Portland Water District

Overview

- About Sebago Lake
- Tipping Point
- The Subwatershed Idea
- Method
- Summary

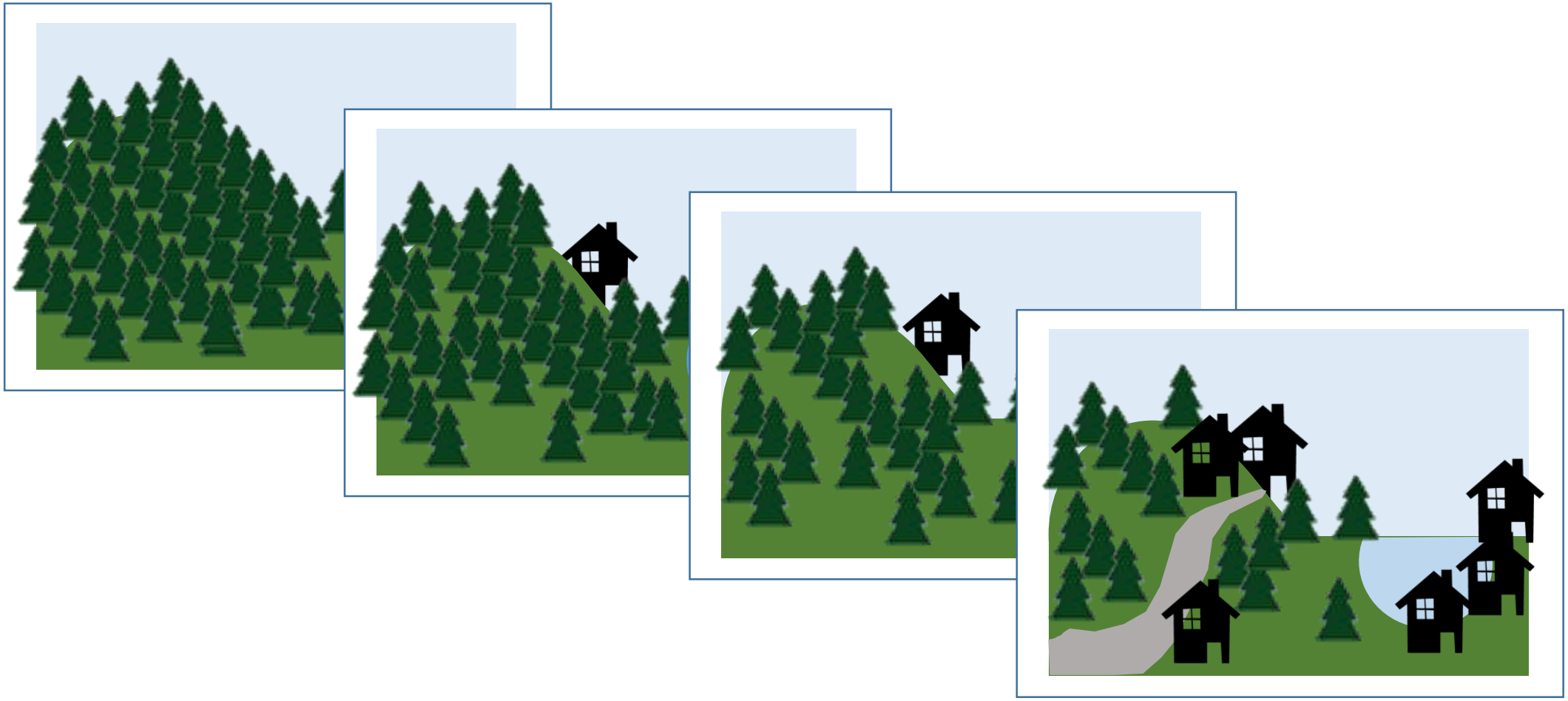

Nearly a trillion gallons of water


100 gallons
for every
human
being on
Earth.


Bethel
450
square
miles
Standish

Maybe Sebago Lake is too big to fail?


27 trillion gallons




TIPPING
POINT

A lake can only take so much….

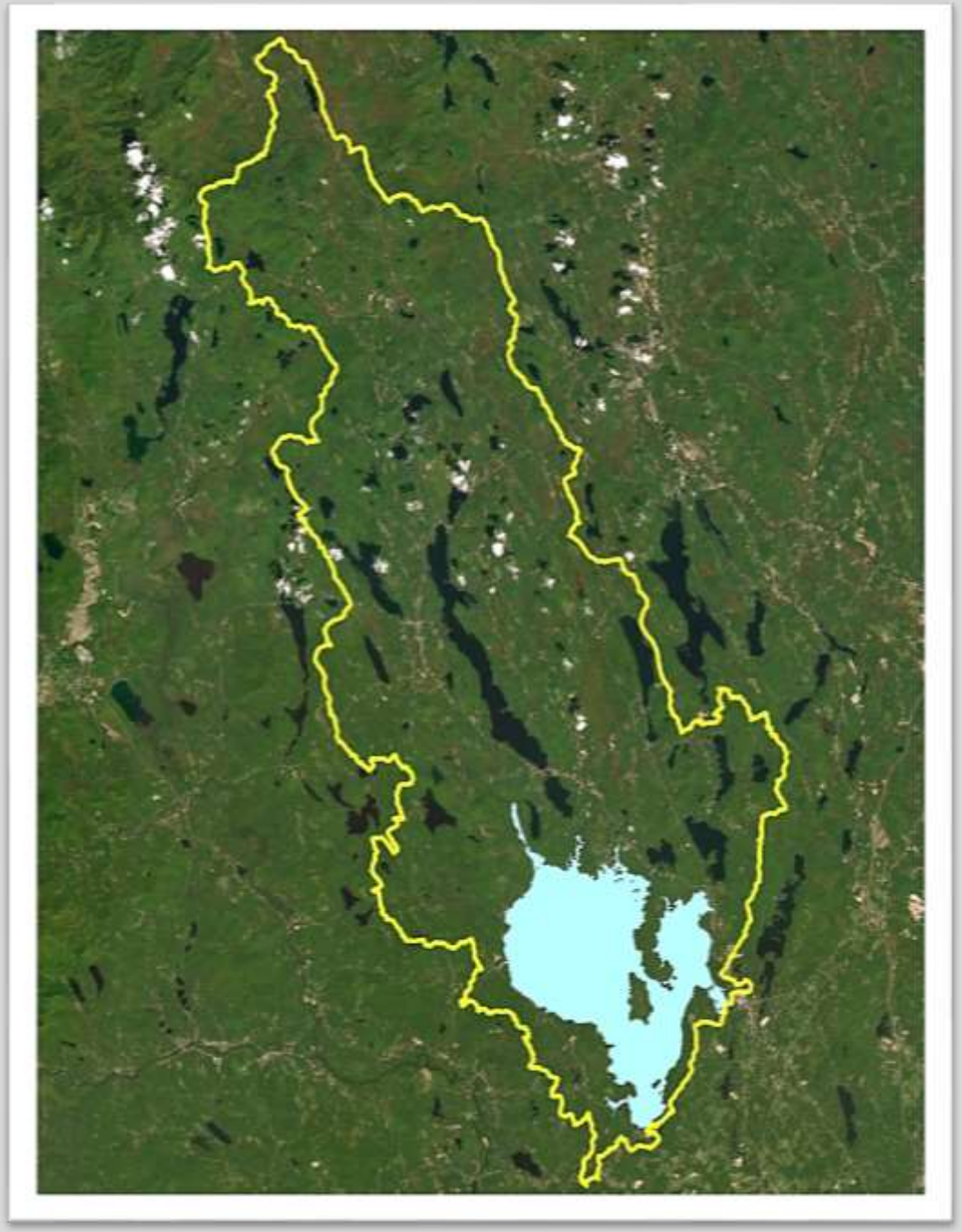
The

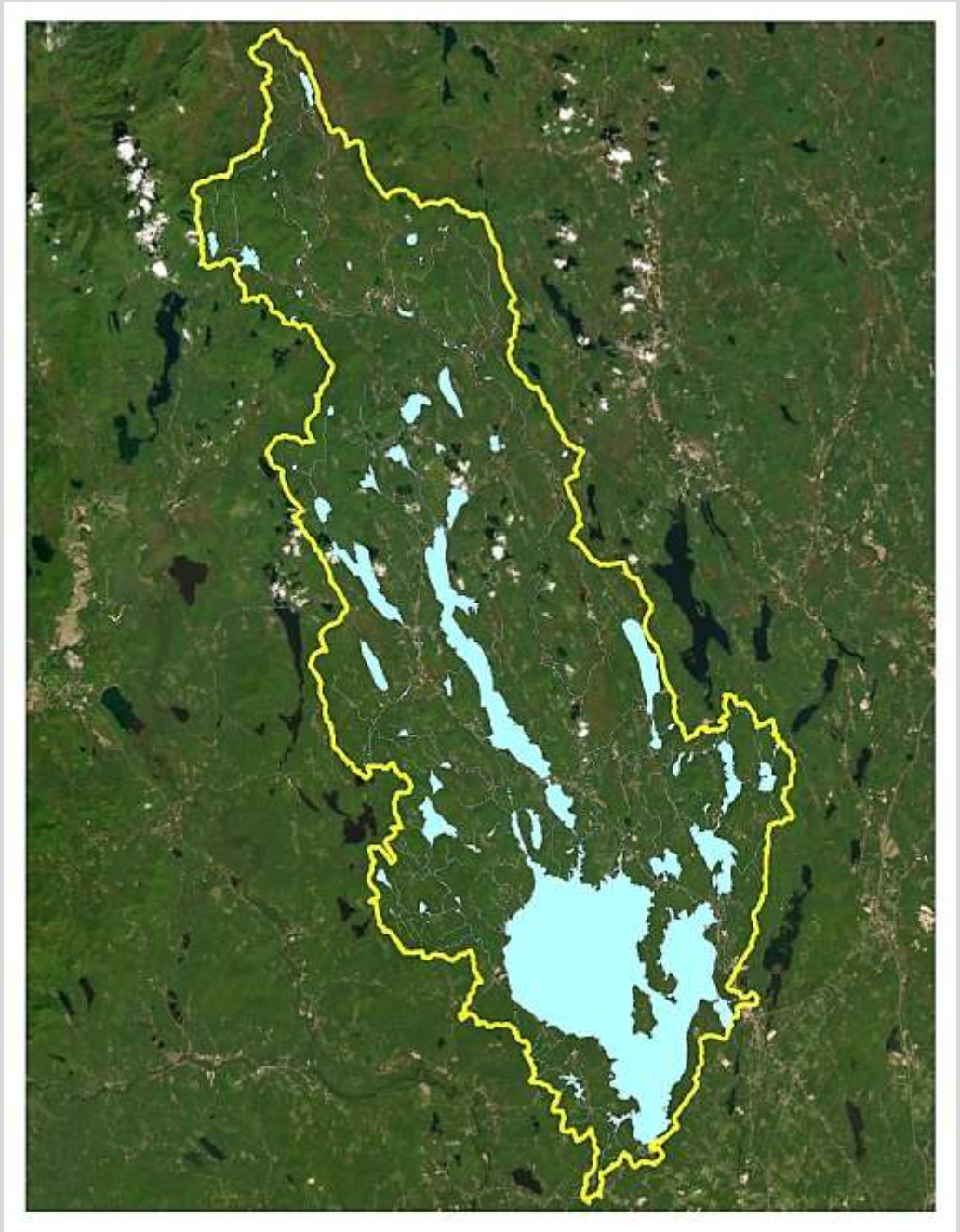
TIPPING POINT

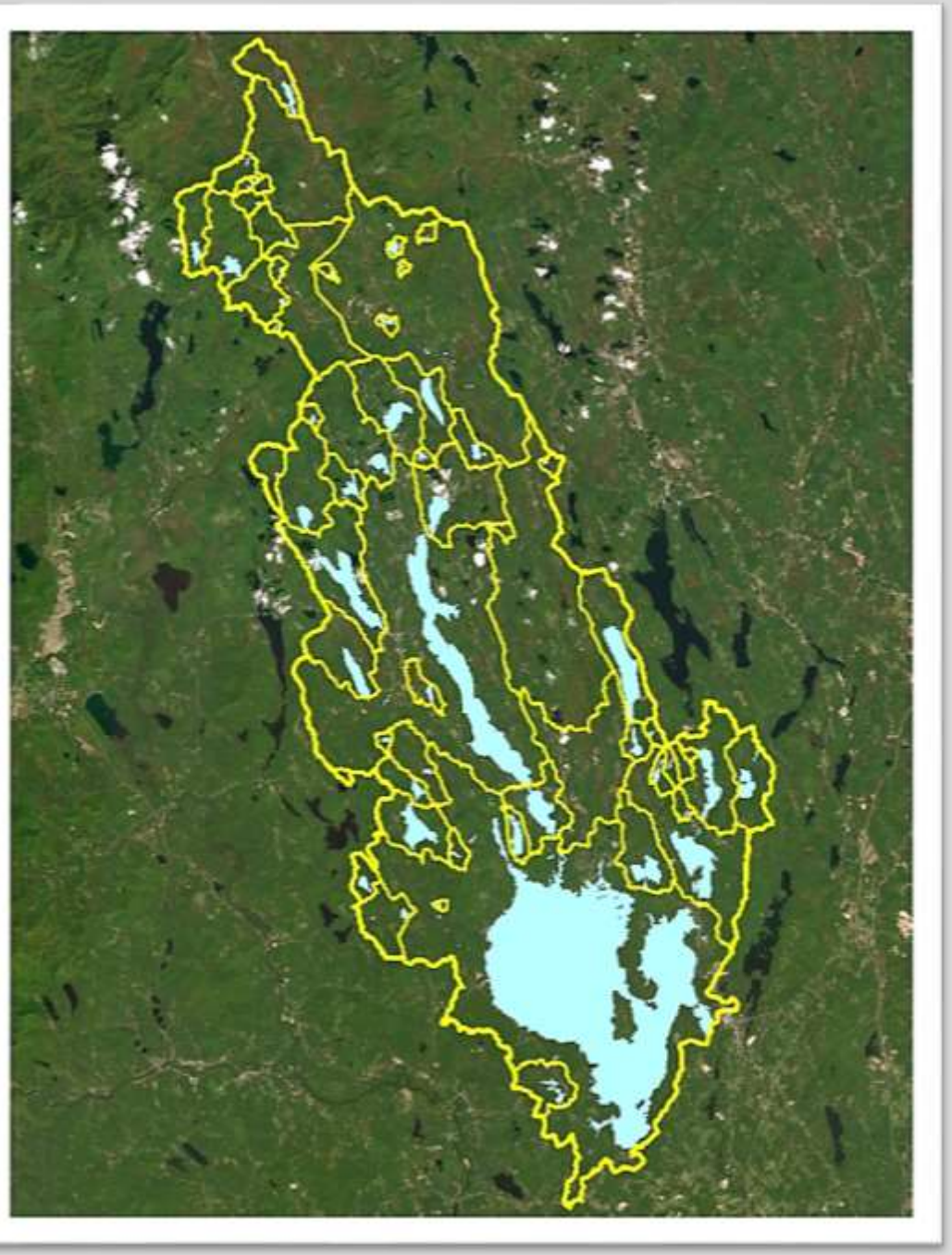
for Sebago Lake

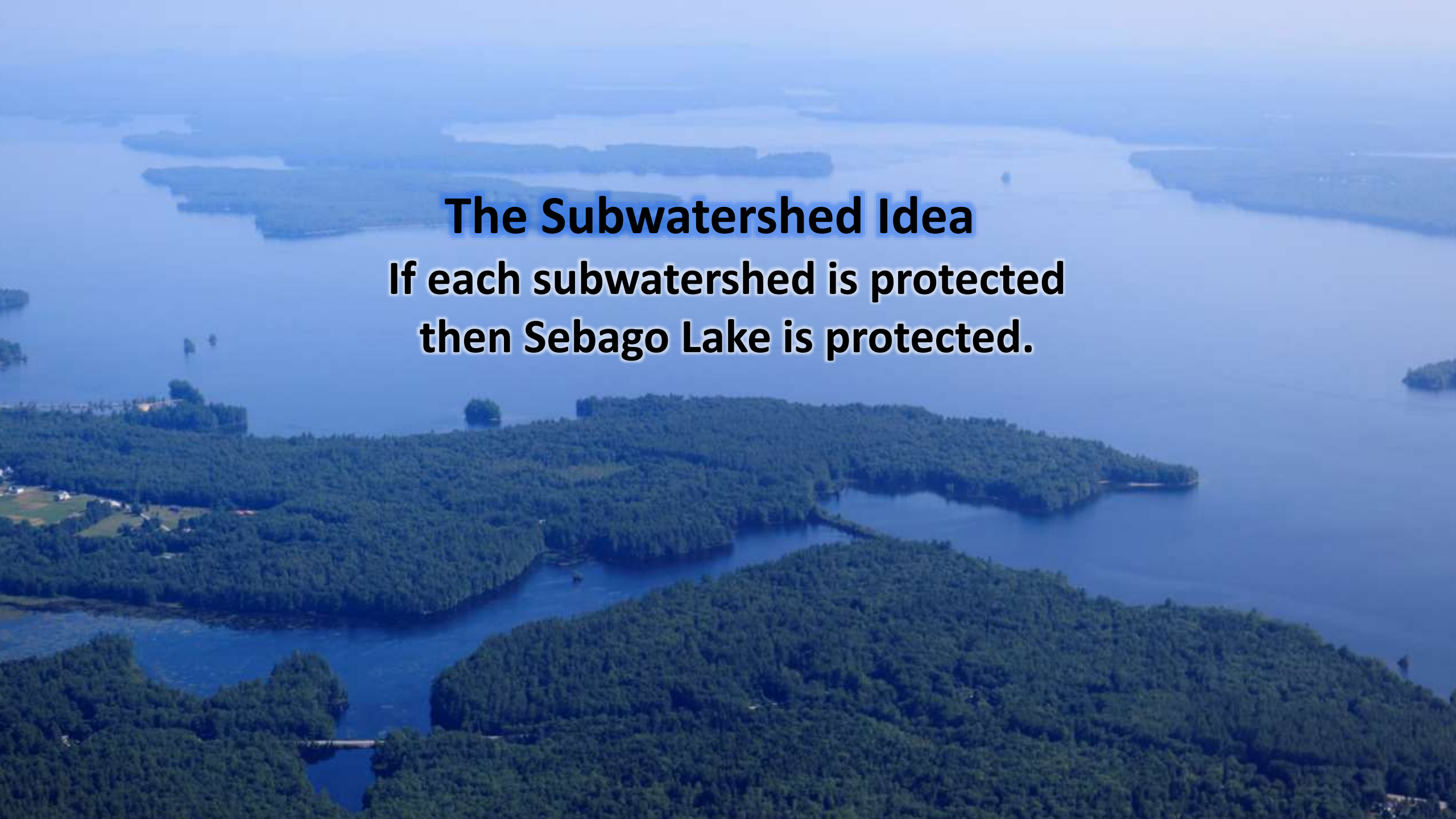
-- Daigneault and Strong, 2019
An Economic Case for the Sebago Watershed
Water & Forest Conservation Fund


Enormous area
Beautiful rural communities
Largely forested
No crisis









The Subwatershed Idea

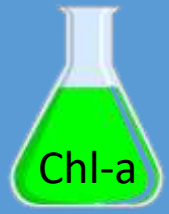
If each subwatershed is protected
then Sebago Lake is protected.

Evaluation

Water Quality

Existing

Trending



Evaluation

Water Quality

Existing

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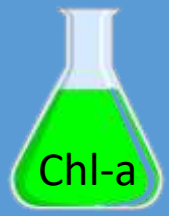


Land Cover

Existing

Trending

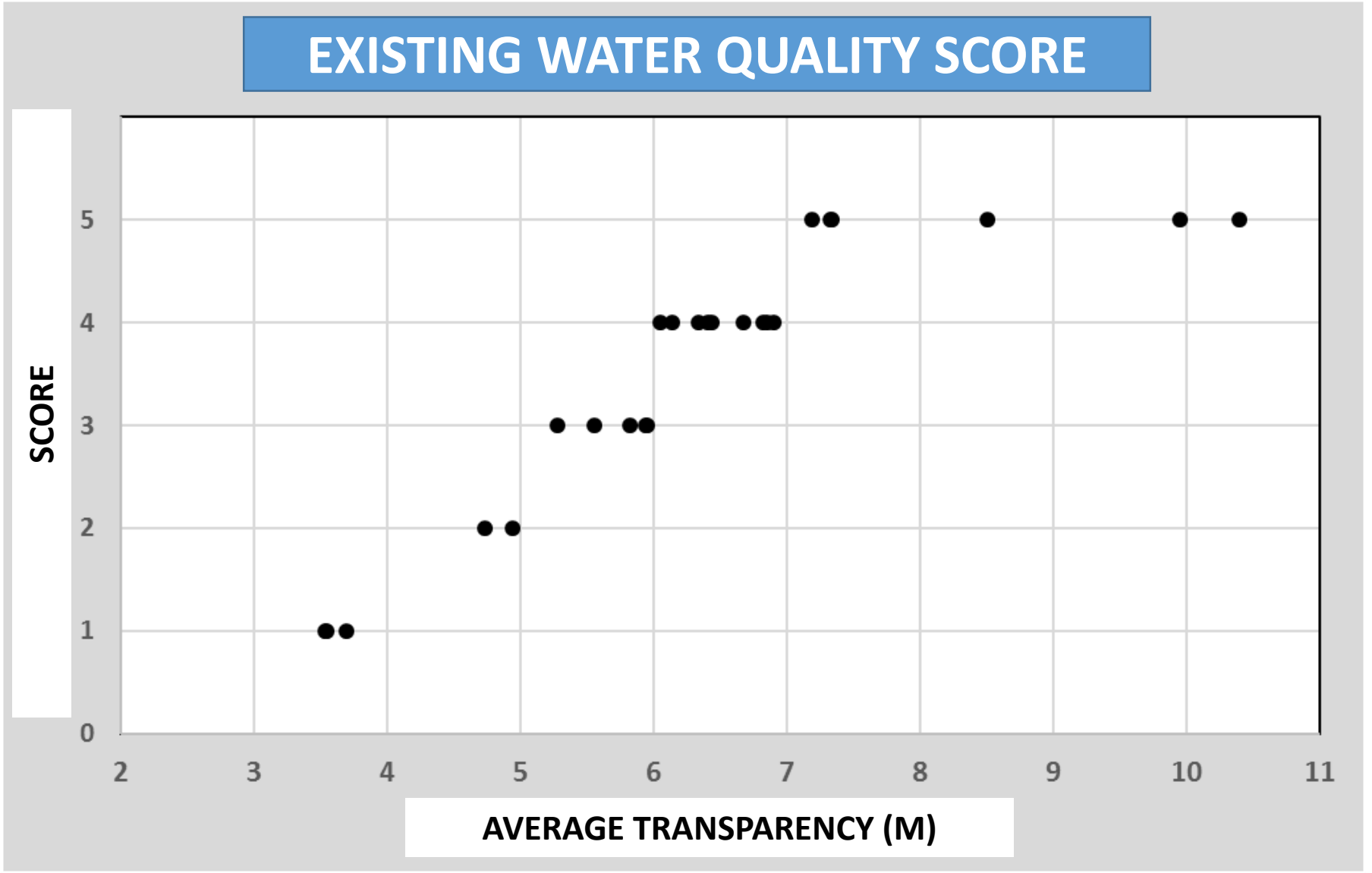
Interpreting the Scores

5	Best
4	Favorable
3	Neutral
2	Unfavorable
1	Worst
ID	Insufficient Data

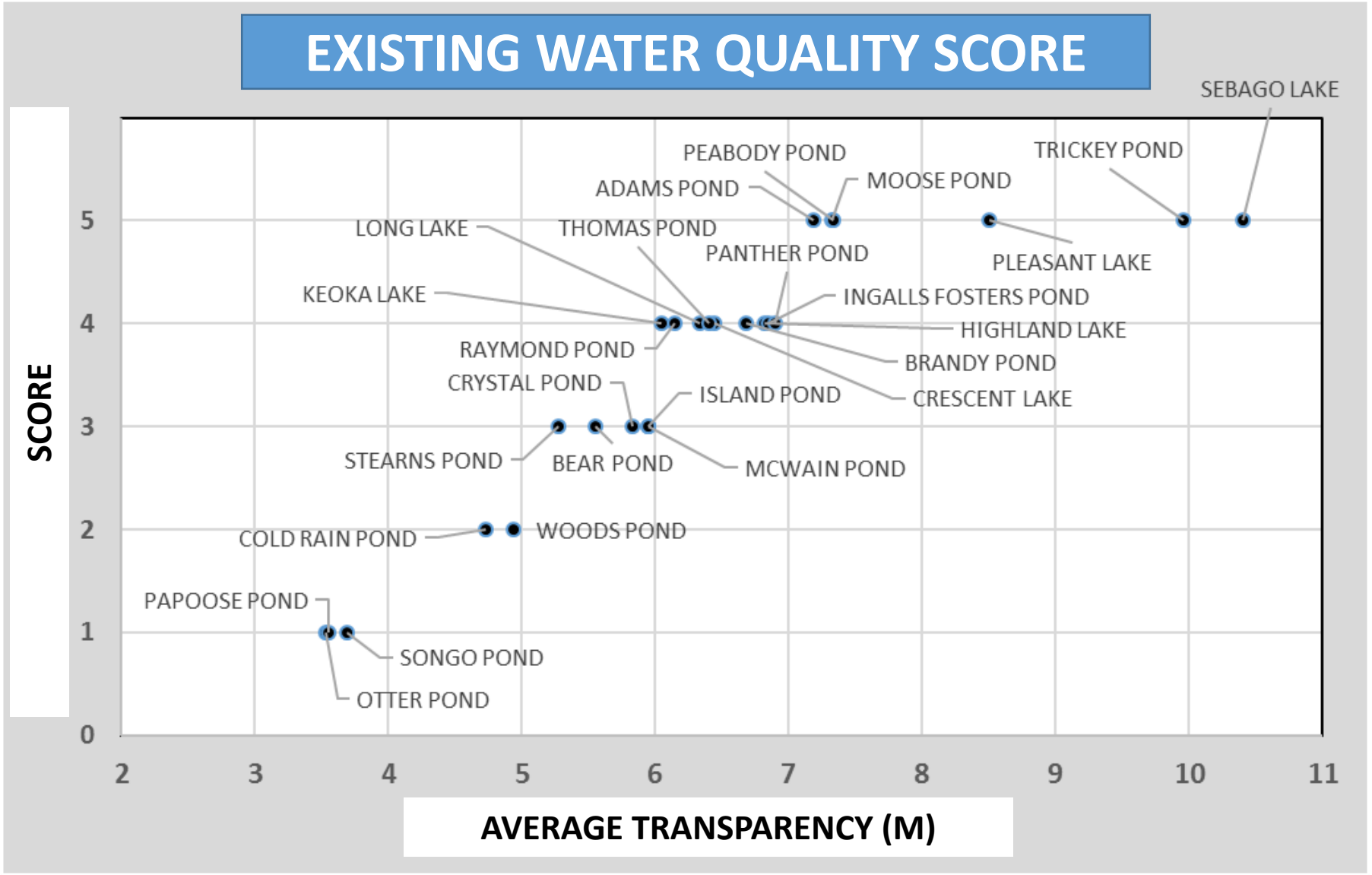
EXISTING Water Quality

Average Secchi transparency over the most recent 10+ years

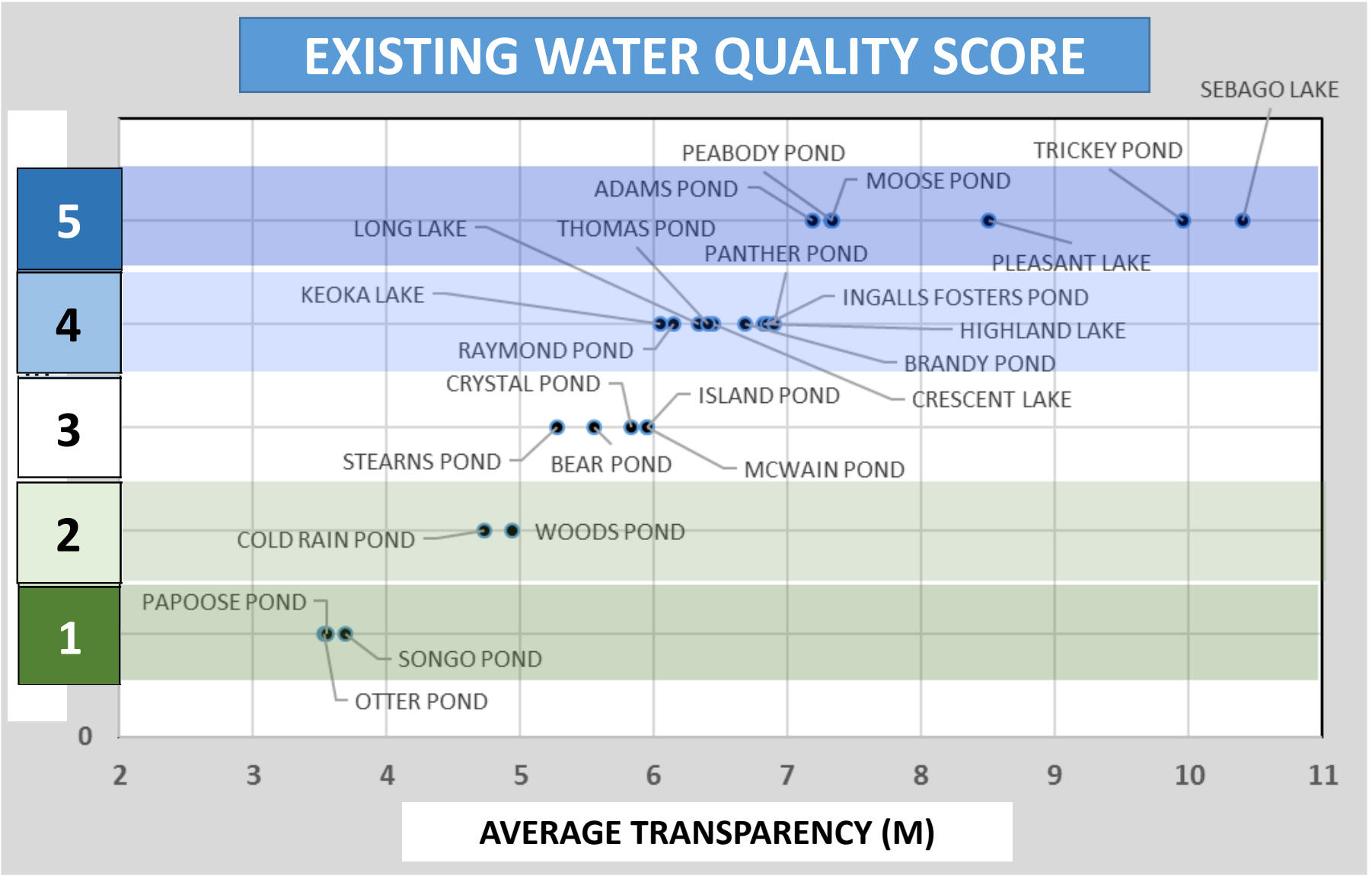
EXISTING WATER QUALITY SCORE



EXISTING WATER QUALITY SCORE



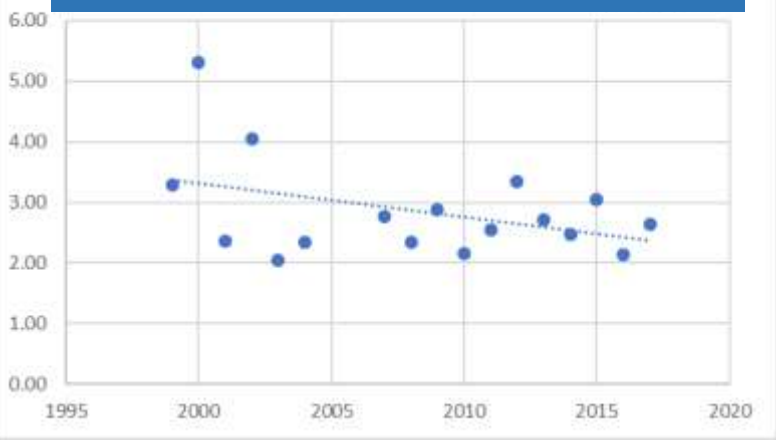
EXISTING WATER QUALITY SCORE



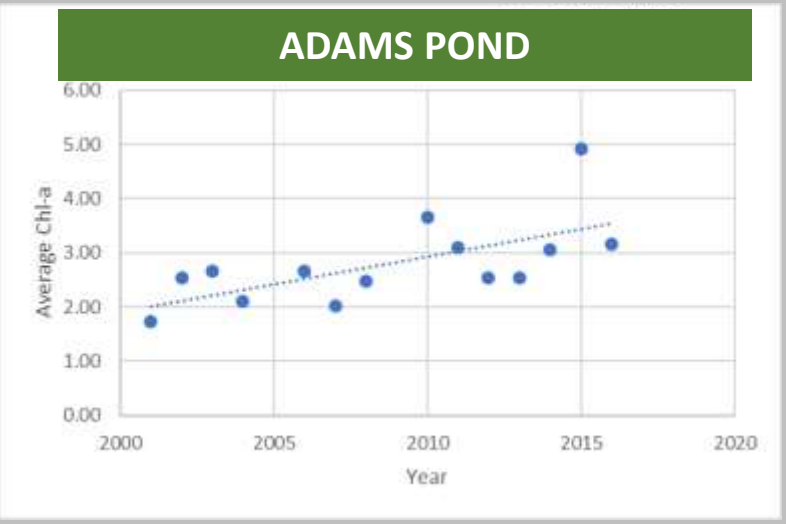
Water Quality TREND

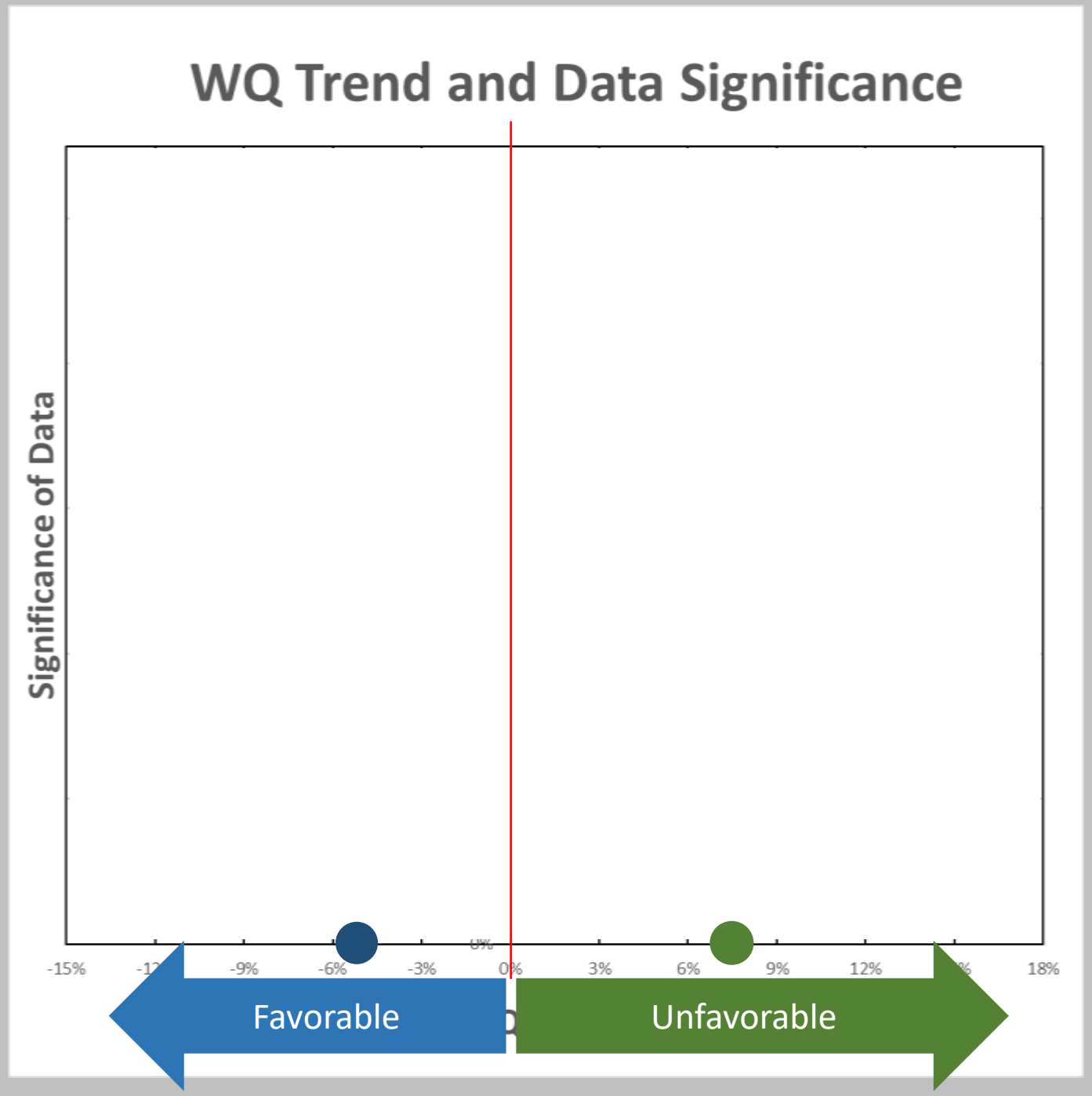
Trend in chlorophyll concentration over the most recent 10+ years

HIGHLAND LAKE

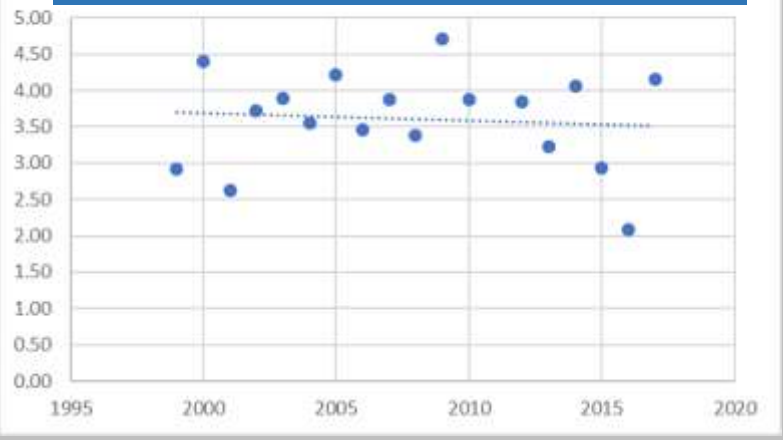


ADAMS POND

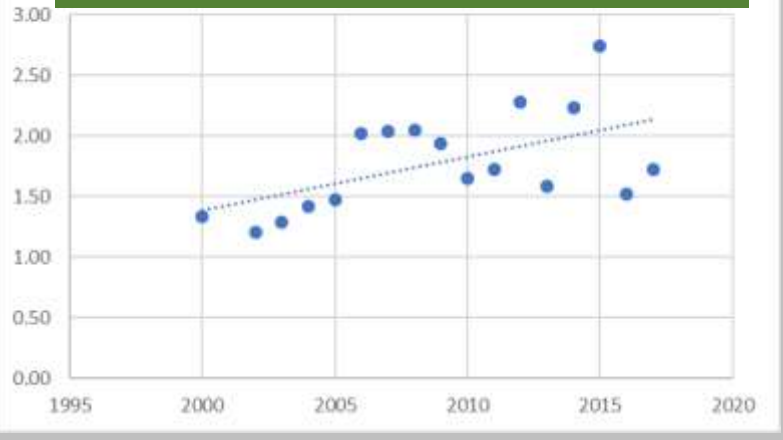


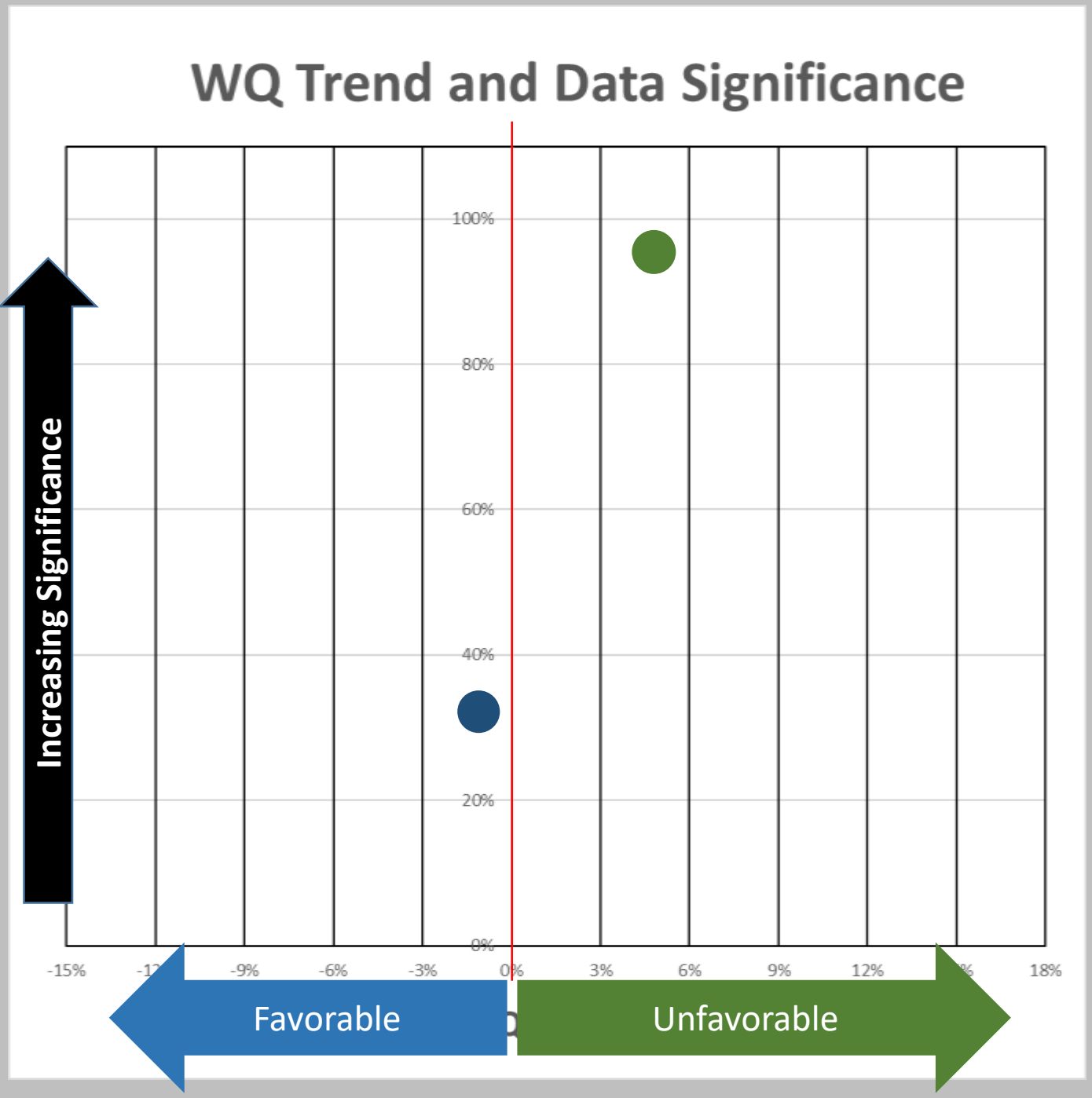


KEOKA LAKE

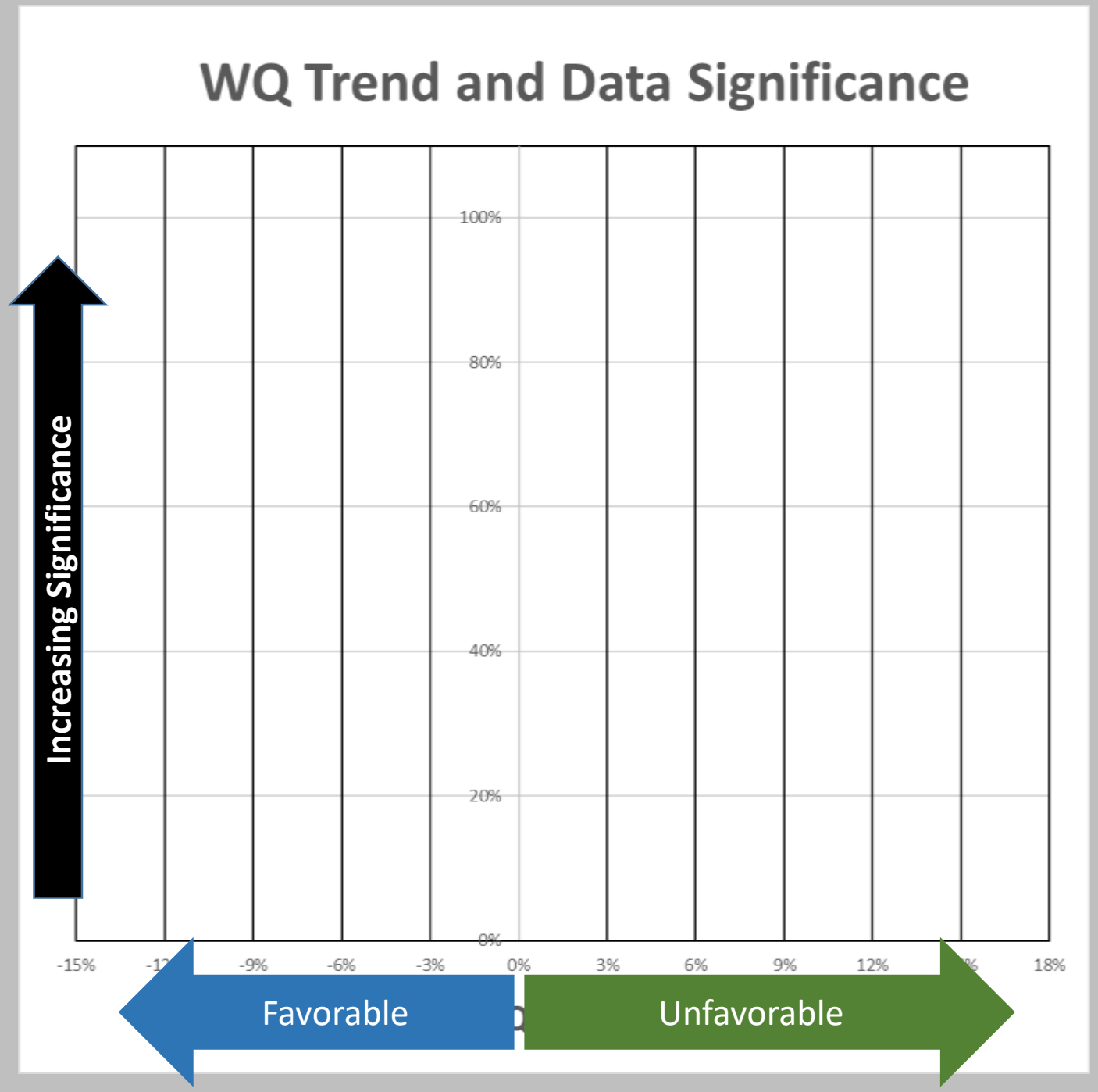


TRICKEY POND





- Lakes with Favorable WQ Trend
- Lakes with Unfavorable WQ Trend



- Lakes with Favorable WQ Trend
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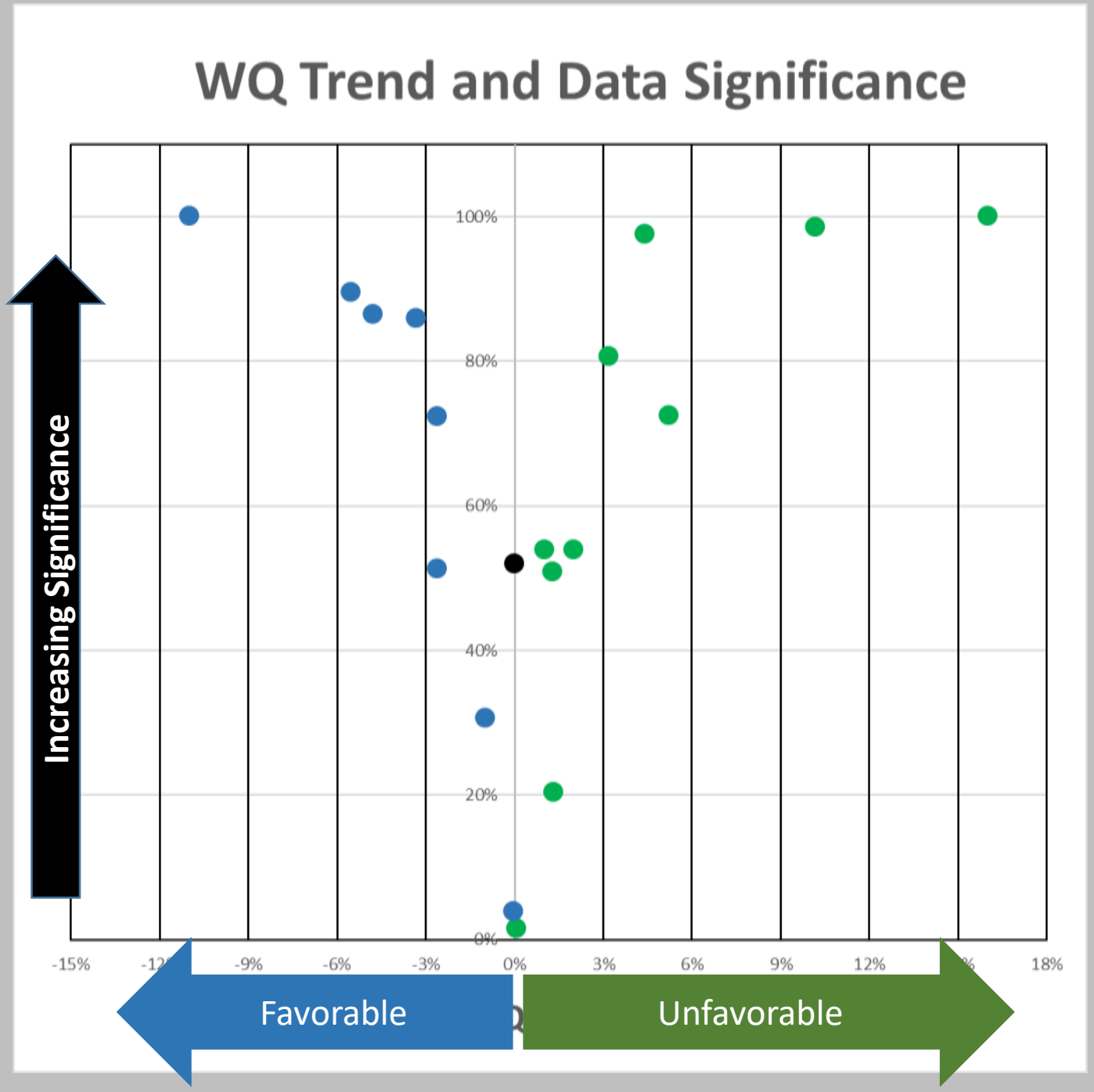

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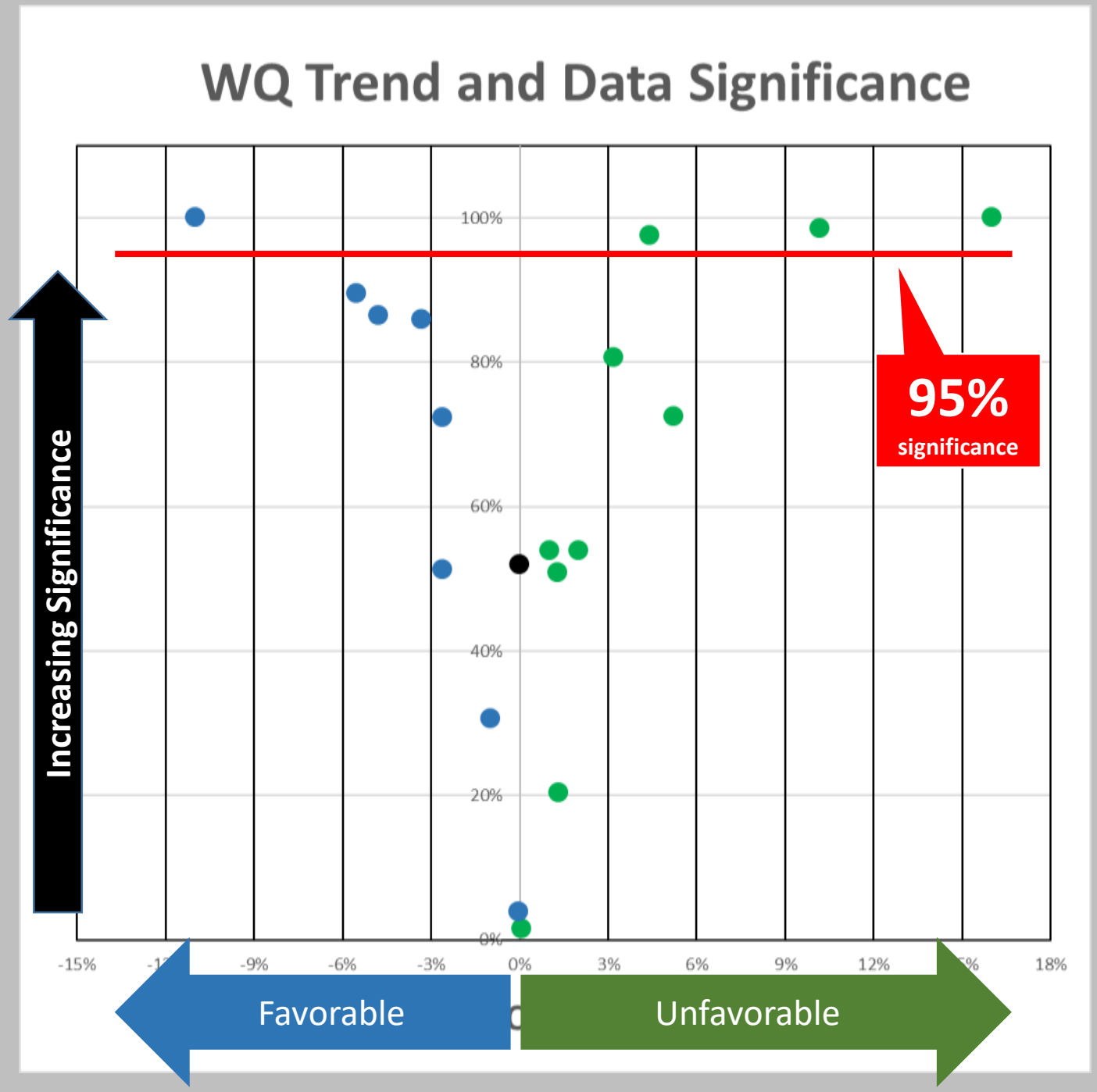
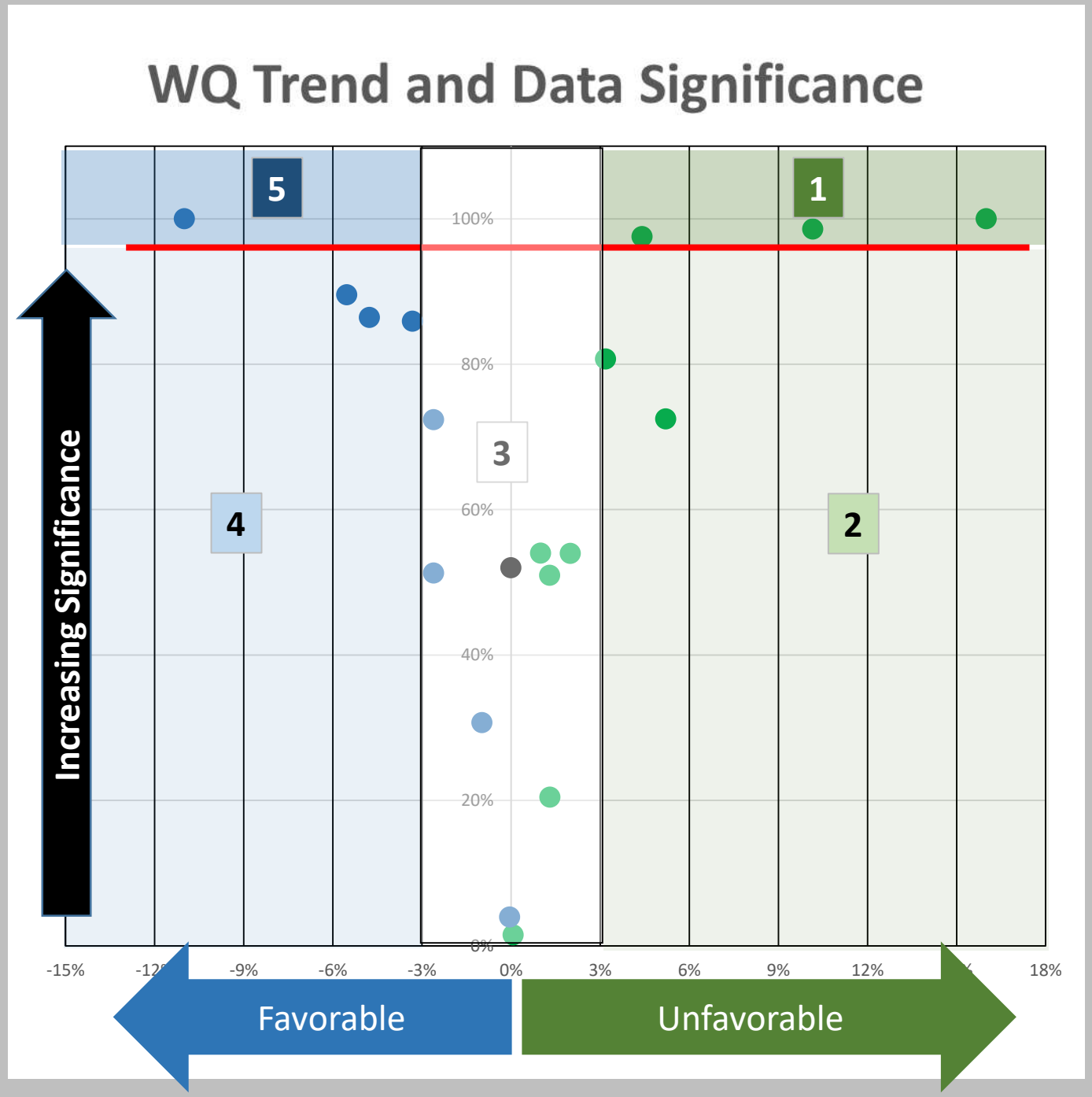


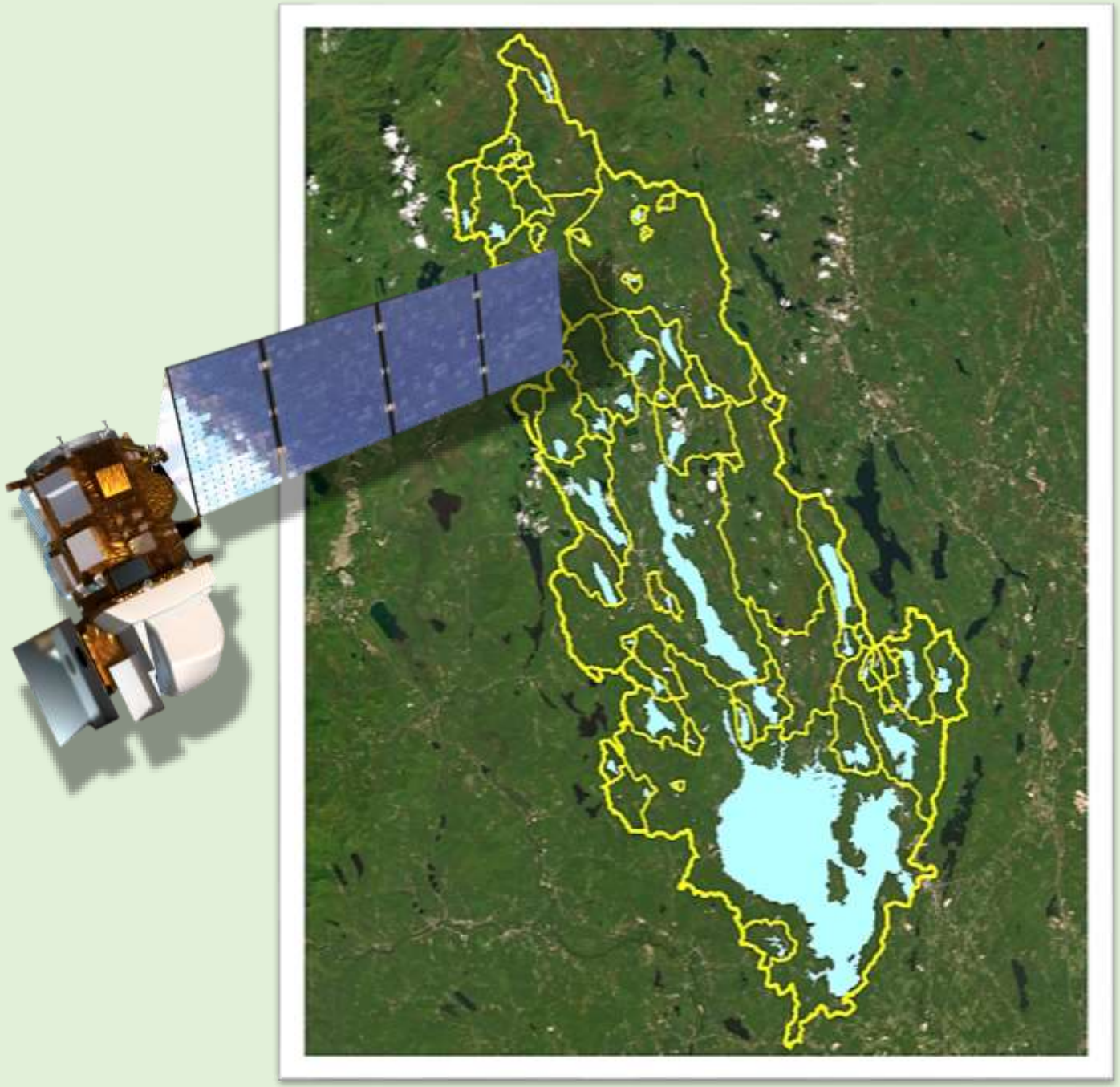
Lakes with Favorable WQ Trend

Lakes with Unfavorable WQ Trend

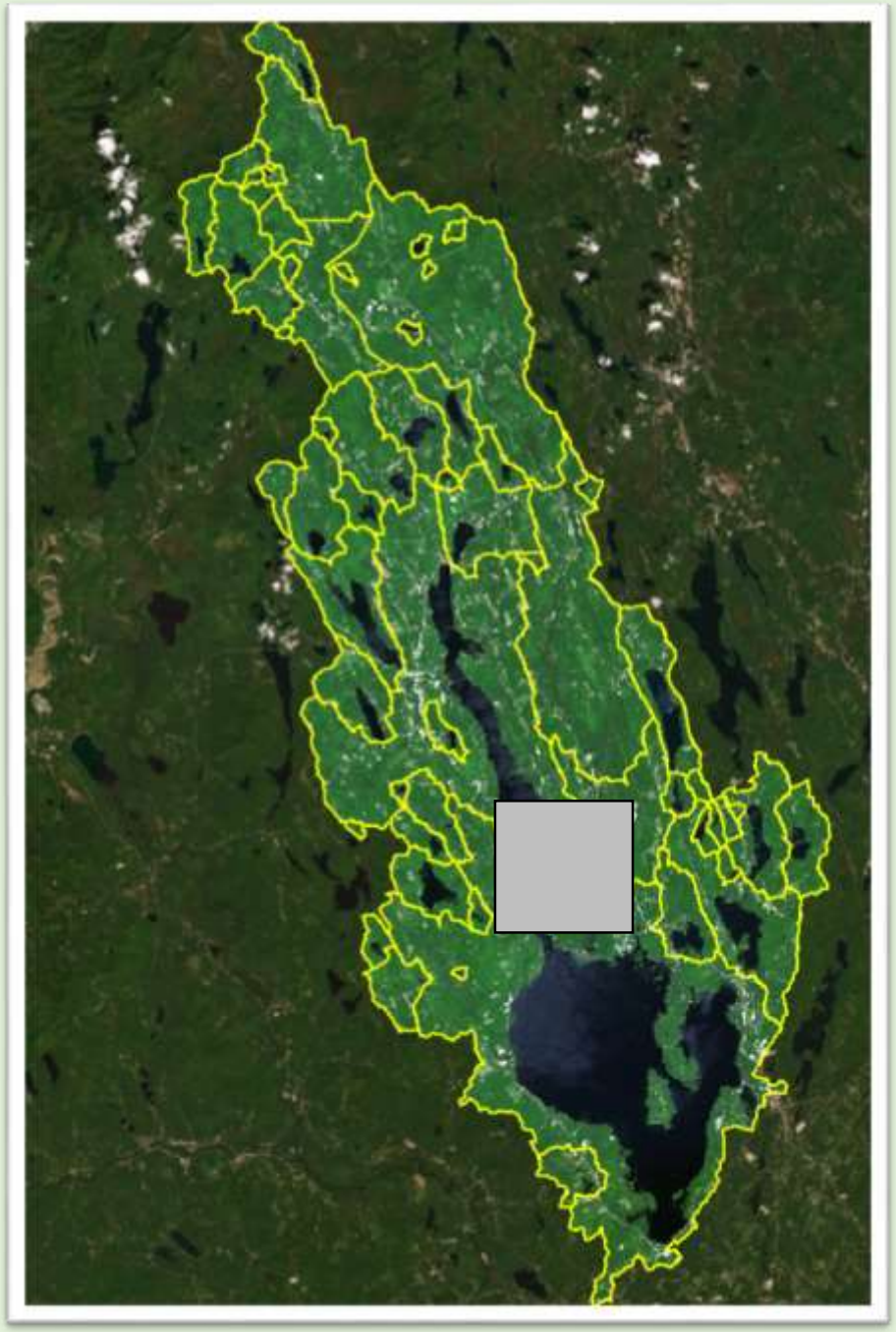


EXISTING
Land Cover

Percent of each subwatershed that is "green" in 2018 LANDSAT imagery

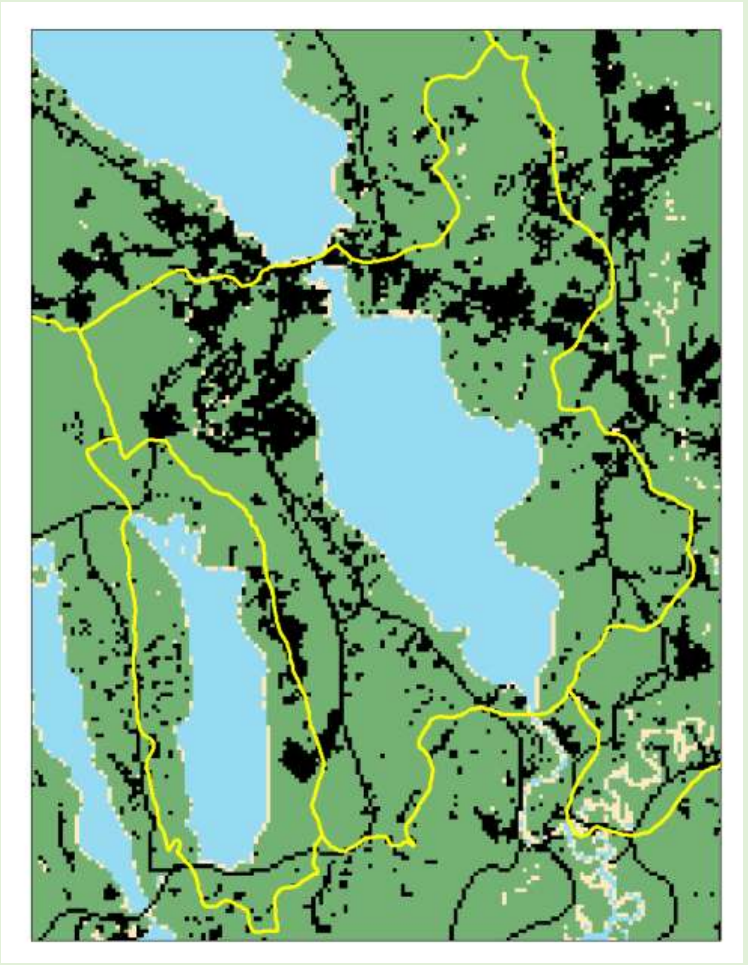


Raw 2018
LANDSAT imagery

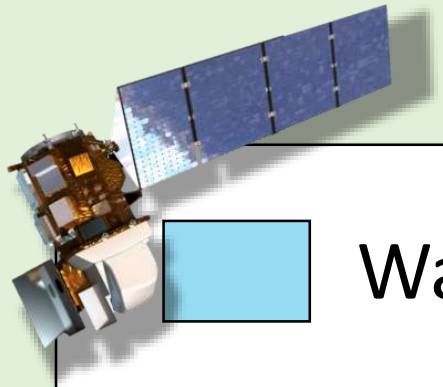


Hi-res aerial imagery

Raw LANDSAT imagery



Classified LANDSAT imagery

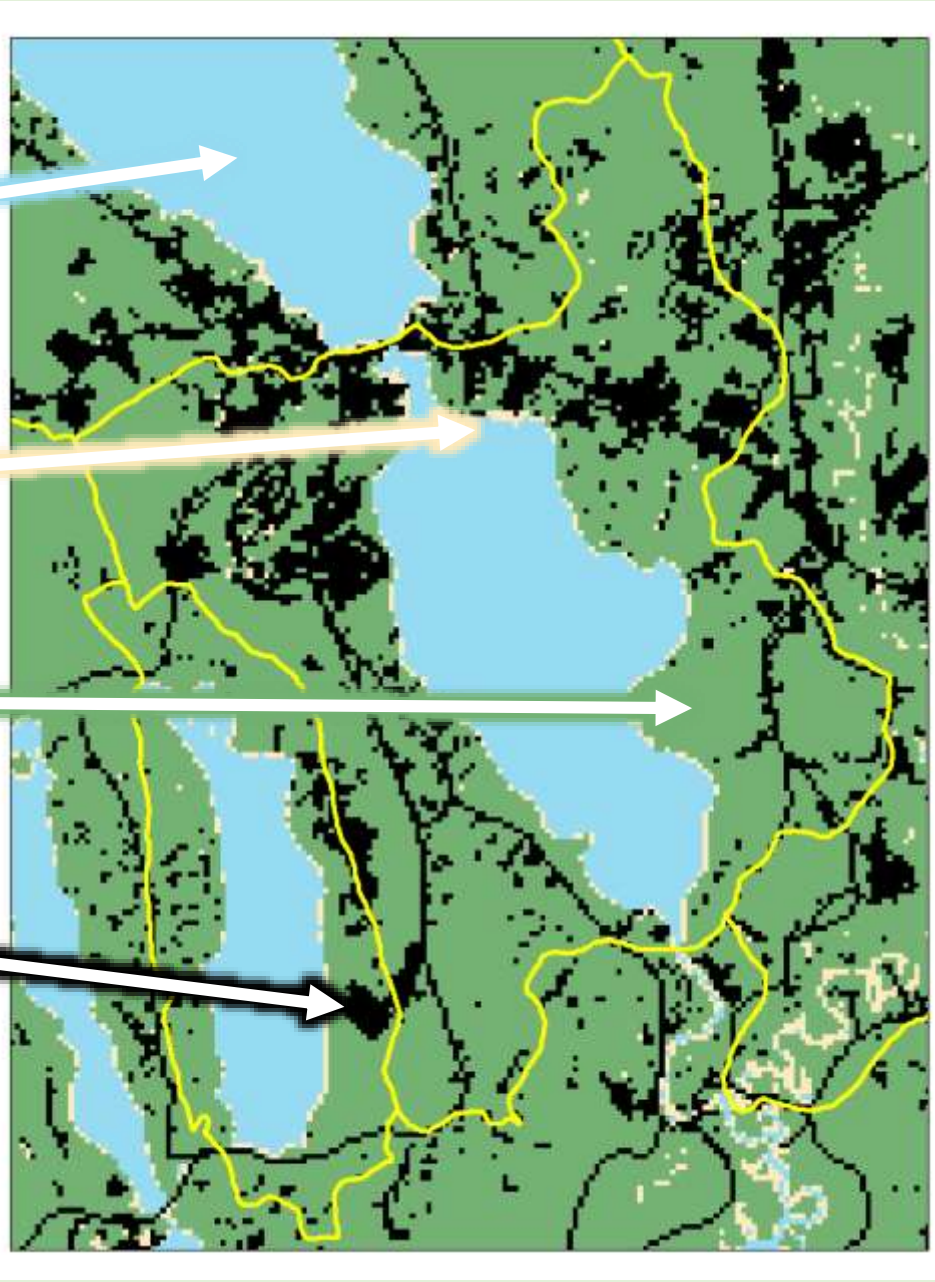


Water

Bare Ground

“Green”

Developed

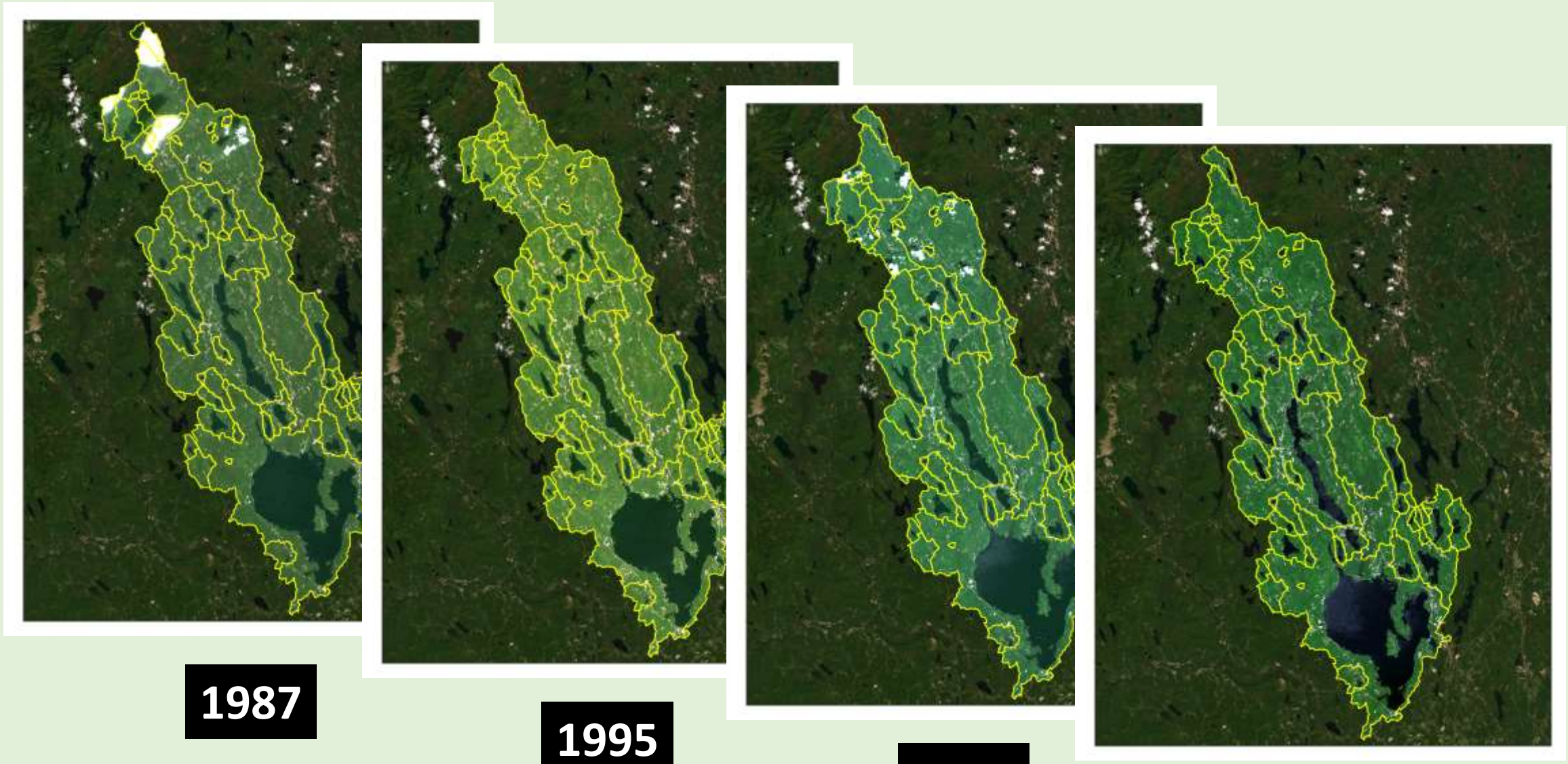


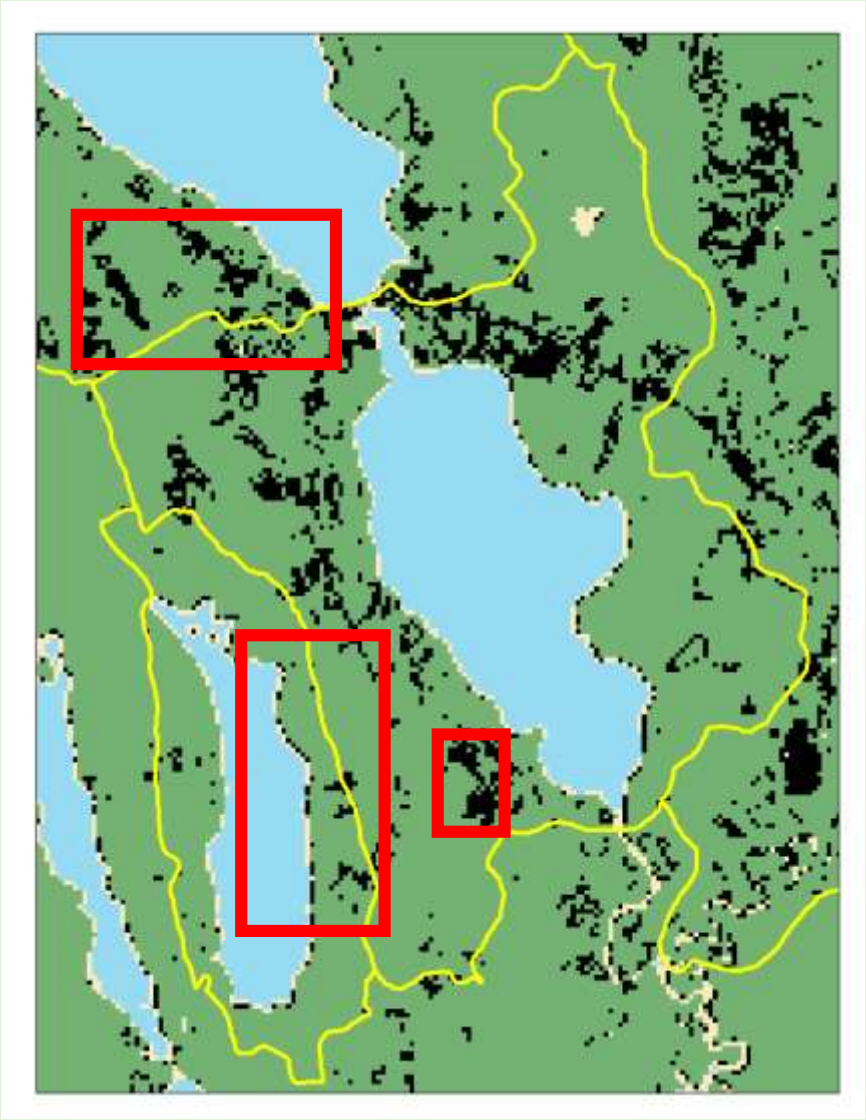
Percent Green

Existing Land Cover score	% Green in 2018
5	90+
4	85-90
3	80-85
2	75-80
1	<75

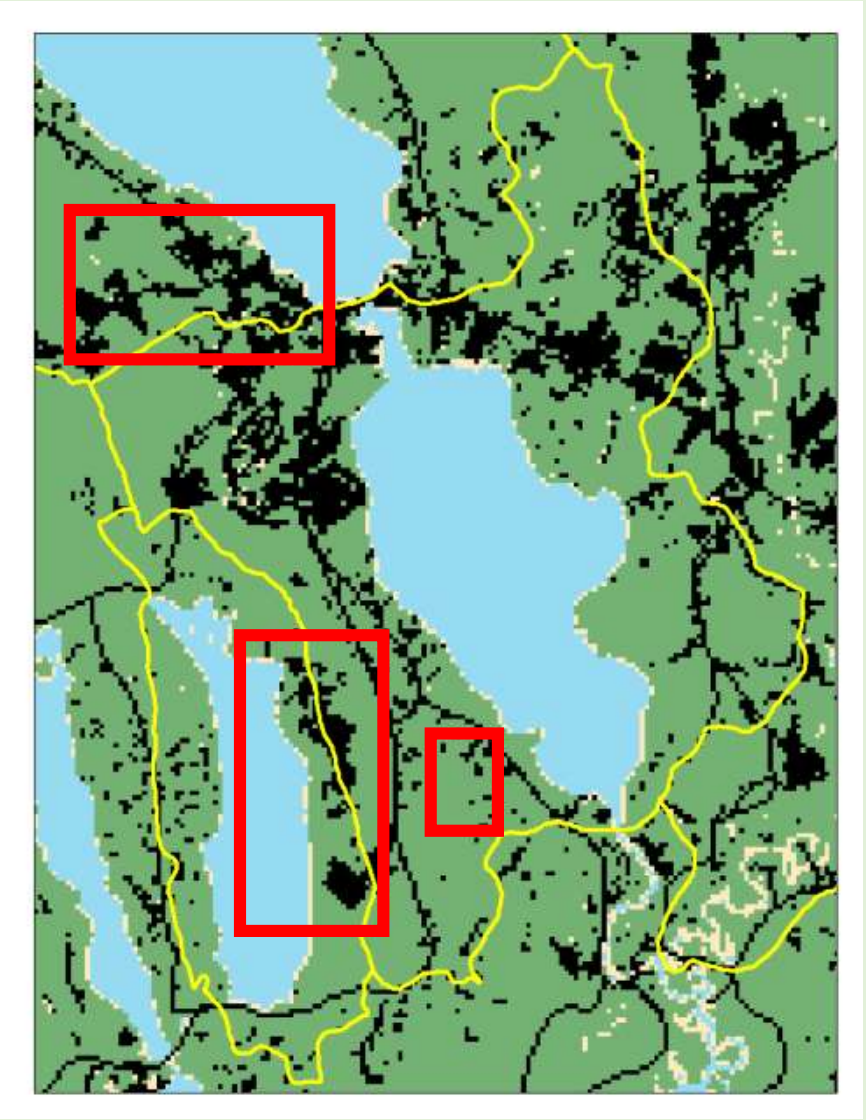
Land Cover TREND

The pace at which “green” is changing to “developed”


1987
1995
2009
2018

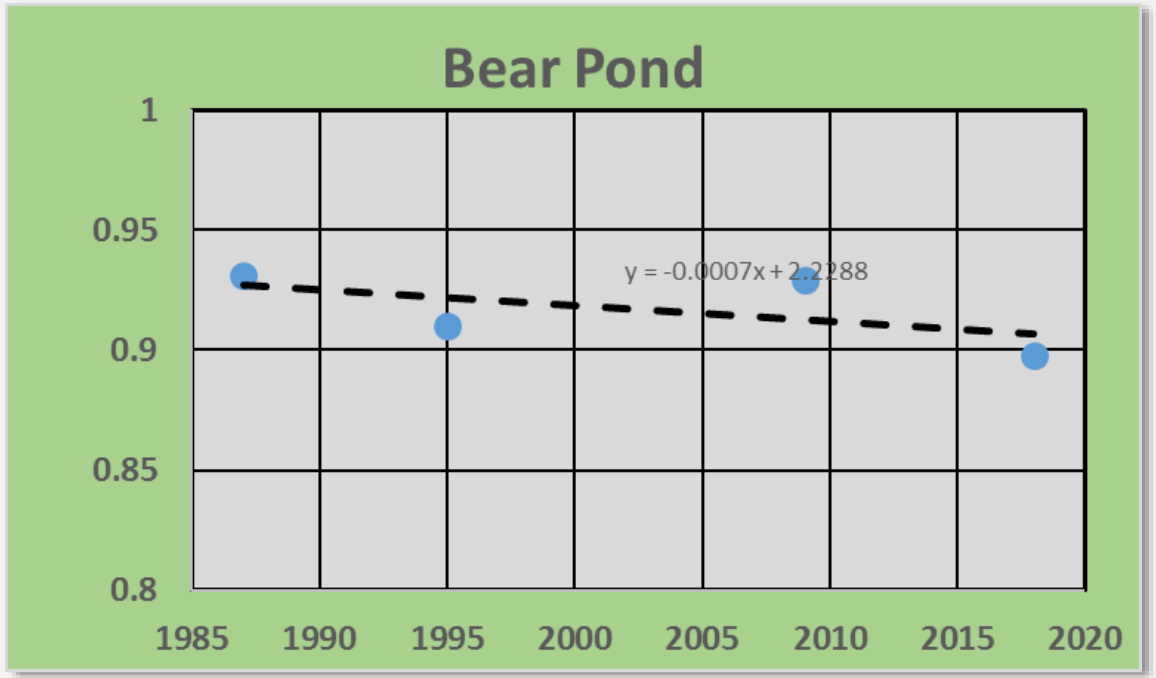


1987



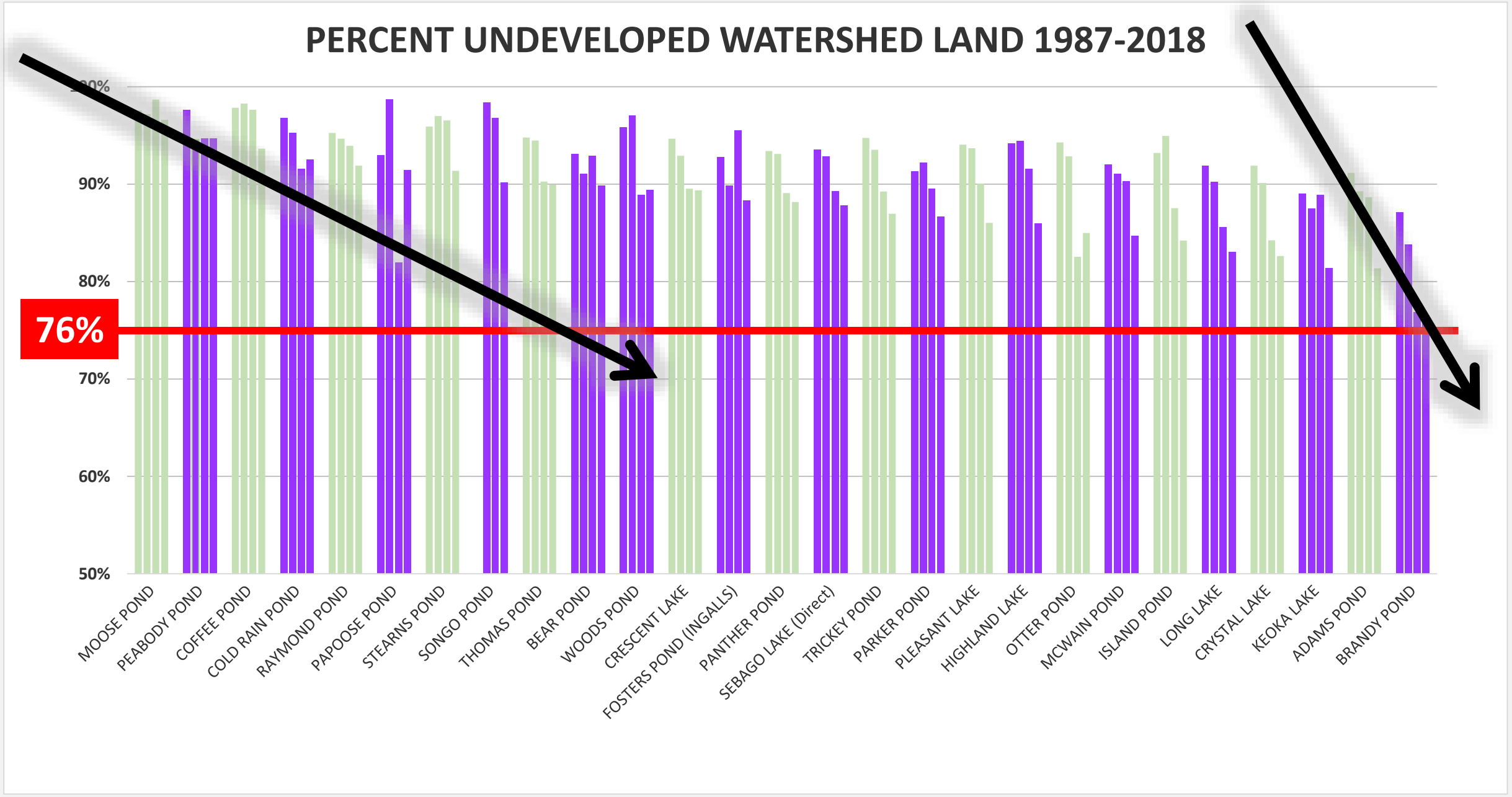
2018

Subwatershed Name	1987	1995	2009	2018
ADAMS POND	91.2%	89.3%	88.7%	81.4%
BRANDY POND	87.1%	83.8%	76.9%	76.5%
BEAR POND	93.1%	91.0%	92.9%	89.8%
COLD RAIN POND	96.8%	95.3%	91.6%	92.5%
CRYSTAL LAKE		90.1%	84.[illegible]%	[illegible]%



TIPPING POINT

How many years until the tipping point?

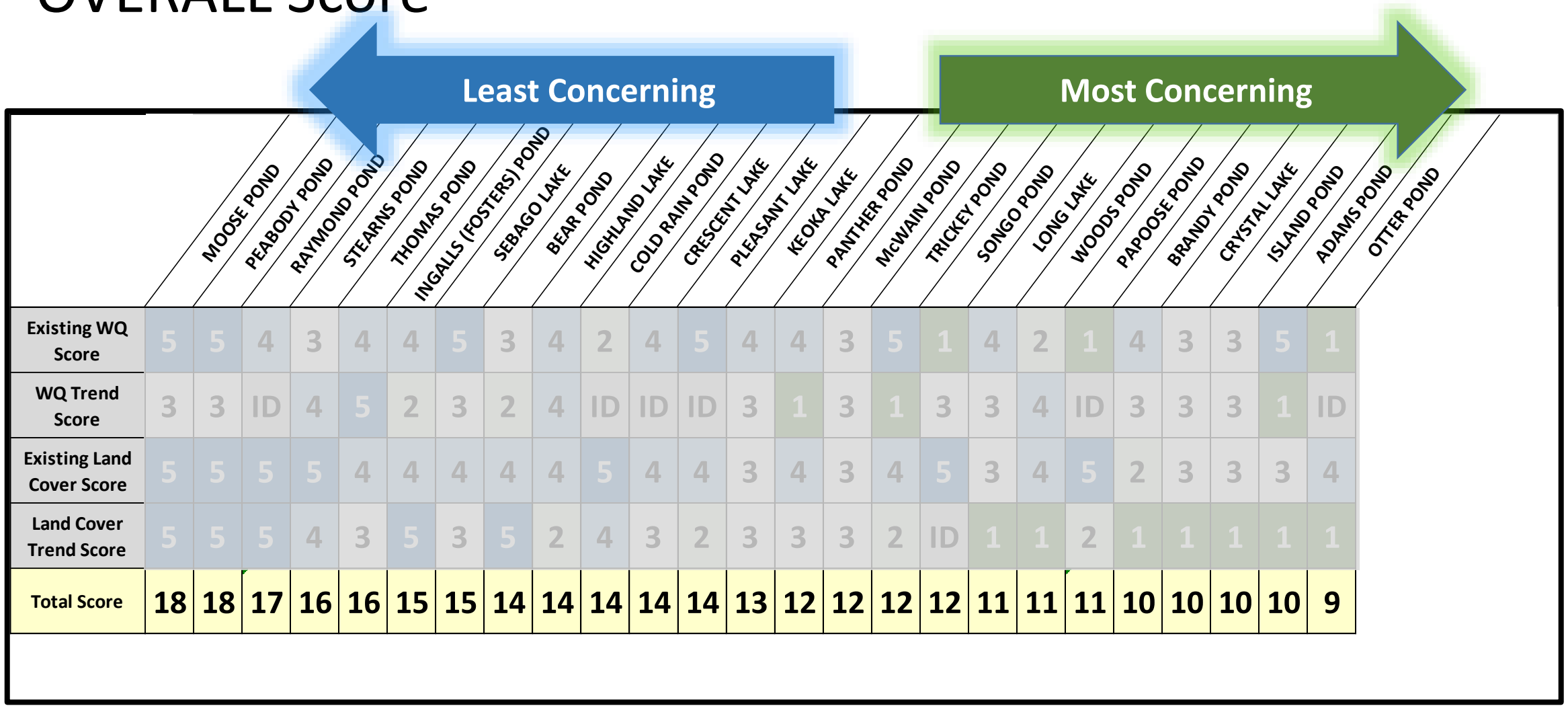

PERCENT UNDEVELOPED WATERSHED LAND 1987-2018
90%
80%
76%
70%
60%
50%
MOOSE POND
PEABODY POND
COFFEE POND
COLD RAIN POND
RAYMOND POND
PAPOOSE POND
STEARNS POND
SONGO POND
THOMAS POND
BEAR POND
WOODS POND
CRESCENT LAKE
FOSTERS POND (INGALLS)
PANTHER POND
SEBAGO LAKE (Direct)
TRICKEY POND
PARKER POND
PLEASANT LAKE
HIGHLAND LAKE
OTTER POND
MCWAIN POND
ISLAND POND
LONG LAKE
CRYSTAL LAKE
KEOKA LAKE
ADAMS POND
BRANDY POND

Land Cover Trend score	Years to Tipping Point
5	>100 years
4	50-100 years
3	30-50 years
2	20-30 years
1	20 or fewer

Subwatershed SCORES

	MOOSE POND	PEABODY POND	RAYMOND POND	STEARNS POND	THOMAS POND	INGALLS (FOSTERS) POND	SEBAGO LAKE	BEAR POND	HIGHLAND LAKE	COLD RAIN POND	CRESCENT LAKE	PLEASANT LAKE	KEOKA LAKE	PANTHER POND	McWAIN POND	TRICKEY POND	SONGO POND	LONG LAKE	WOODS POND	PAPOOSE POND	BRANDY POND	CRYSTAL LAKE	ISLAND POND	ADAMS POND	OTTER POND
Existing WQ Score	5	5	4	3	4	4	5	3	4	2	4	5	4	4	3	5	1	4	2	1	4	3	3	5	1
WQ Trend Score	3	3	ID	4	5	2	3	2	4	ID	ID	ID	3	1	3	1	3	3	4	ID	3	3	3	1	ID
Existing Land Cover Score	5	5	5	5	4	4	4	4	4	5	4	4	3	4	3	4	5	3	4	5	2	3	3	3	4
Land Cover Trend Score	5	5	5	4	3	5	3	5	2	4	3	2	3	3	3	2	ID	1	1	2	1	1	1	1	1

OVERALL Score



	MOOSE POND	PEABODY POND	RAYMOND POND	STEARNS POND	THOMAS POND	INGALLS (FOSTERS) POND	SEBAGO LAKE	BEAR POND	HIGHLAND LAKE	COLD RAIN POND	CRESCENT LAKE	PLEASANT LAKE	KEOKA LAKE	PANTHER POND	McWAIN POND	TRICKEY POND	SONGO POND	LONG LAKE	WOODS POND	PAPOOSE POND	BRANDY POND	CRYSTAL LAKE	ISLAND POND	ADAMS POND	OTTER POND
Existing WQ Score	5	5	4	3	4	4	5	3	4	2	4	5	4	4	3	5	1	4	2	1	4	3	3	5	1
WQ Trend Score	3	3	ID	4	5	2	3	2	4	ID	ID	ID	3	1	3	1	3	3	4	ID	3	3	3	1	ID
Existing Land Cover Score	5	5	5	5	4	4	4	4	4	5	4	4	3	4	3	4	5	3	4	5	2	3	3	3	4
Land Cover Trend Score	5	5	5	4	3	5	3	5	2	4	3	2	3	3	3	2	ID	1	1	2	1	1	1	1	1
Total Score	**18**	**18**	**17**	**16**	**16**	**15**	**15**	**14**	**14**	**14**	**14**	**14**	**13**	**12**	**12**	**12**	**12**	**11**	**11**	**11**	**10**	**10**	**10**	**10**	**9**

Summary

Summary

	MOOSE POND	PEABODY POND	RAYMOND POND	STEARNS POND	THOMAS POND	INGALLS (FOSTERS) POND	SEBAGO LAKE	BEAR POND	HIGHLAND LAKE	COLD RAIN POND	CRESCENT LAKE	PLEASANT LAKE	KEOKA LAKE	PANTHER POND	McWAIN POND	TRICKEY POND	SONGO POND	LONG LAKE	WOODS POND	PAPOOSE POND	BRANDY POND	CRYSTAL LAKE	ISLAND POND	ADAMS POND	OTTER POND
Existing WQ Score	5	5	4	3	4	4	5	3	4	2	4	5	4	4	3	5	1	4	2	1	4	3	3	5	1
WQ Trend Score	3	3	ID	4	5	2	3	2	4	ID	ID	ID	3	1	3	1	3	3	4	ID	3	3	3	1	ID
Existing Land Cover Score	5	5	5	5	4	4	4	4	4	5	4	4	3	4	3	4	5	3	4	5	2	3	3	3	4
Land Cover Trend Score	5	5	5	4	3	5	3	5	2	4	3	2	3	3	3	2	ID	1	1	2	1	1	1	1	1
Total Score	18	18	17	16	16	15	15	14	14	14	14	14	13	12	12	12	12	11	11	11	10	10	10	10	9

- Lots of 4's and 5's
- Particularly "existing" conditions
- Less certainty regarding "trends"
- Most lakes aren't declining in WQ
- There are fewer trees


L.E.A.
LAKES ENVIRONMENTAL ASSN.


usm

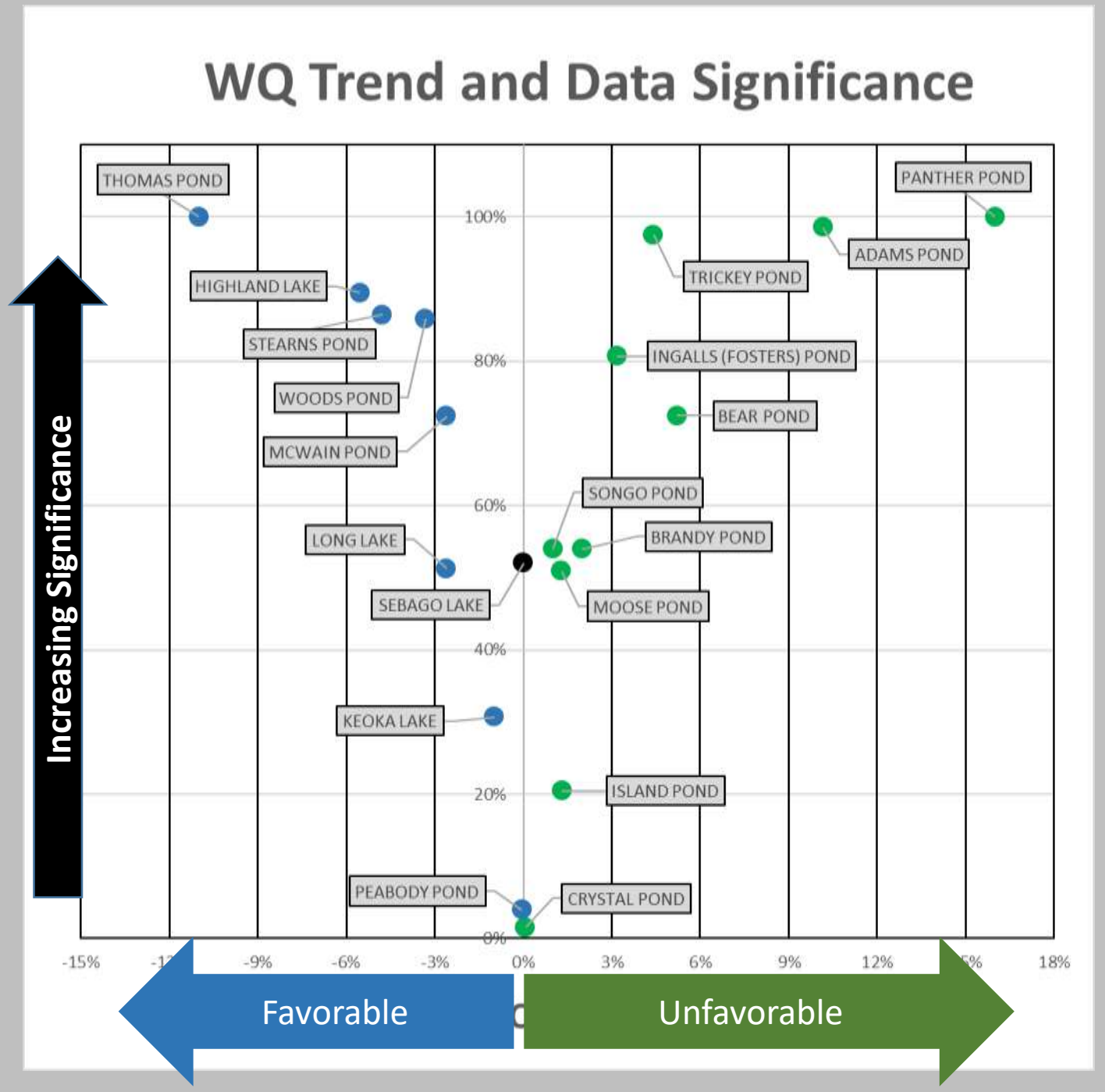

W
E


1912
SAINT JOSEPH'S
COLLEGE


DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OF MAINE


Questions?

- Lakes with Favorable WQ Trend
- Lakes with Unfavorable WQ Trend



- Lakes with Favorable WQ Trend
- Lakes with Unfavorable WQ Trend