

Valuing the Economic Benefits of Maine's Great Ponds in the 21st Century

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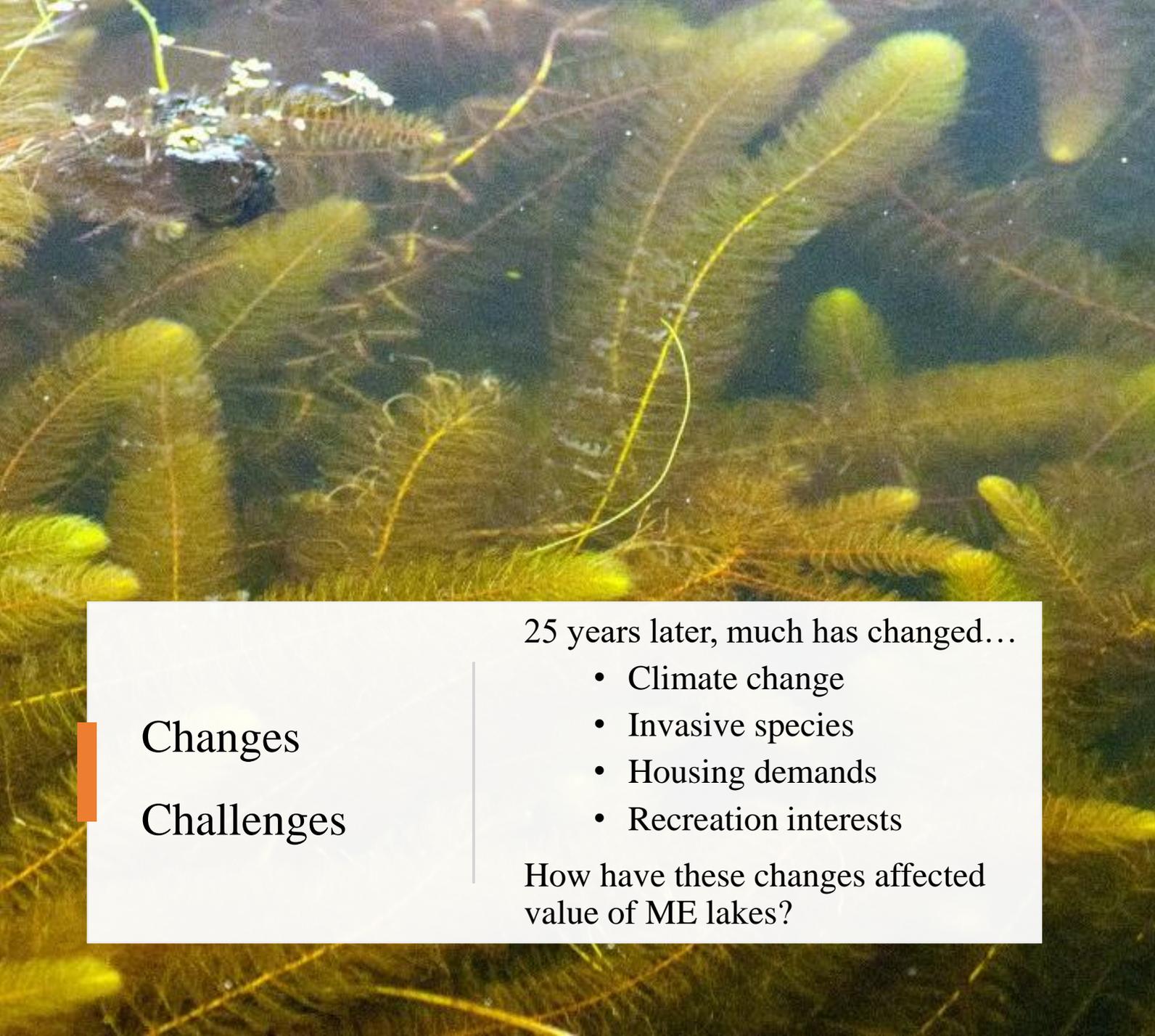
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Introduction

- Ecological, Economical, and Social Value
 - Ecological services: water filtration, flood control, climate regulation
 - Critical wildlife habitats
 - Recreational value: swimming, boating, fishing, hunting
- Econ Value of ME Great Ponds study in 1990s:
 - \$5 billion/yr in direct and indirect sales
 - \$11 billion/yr in net economic value



Changes

Challenges

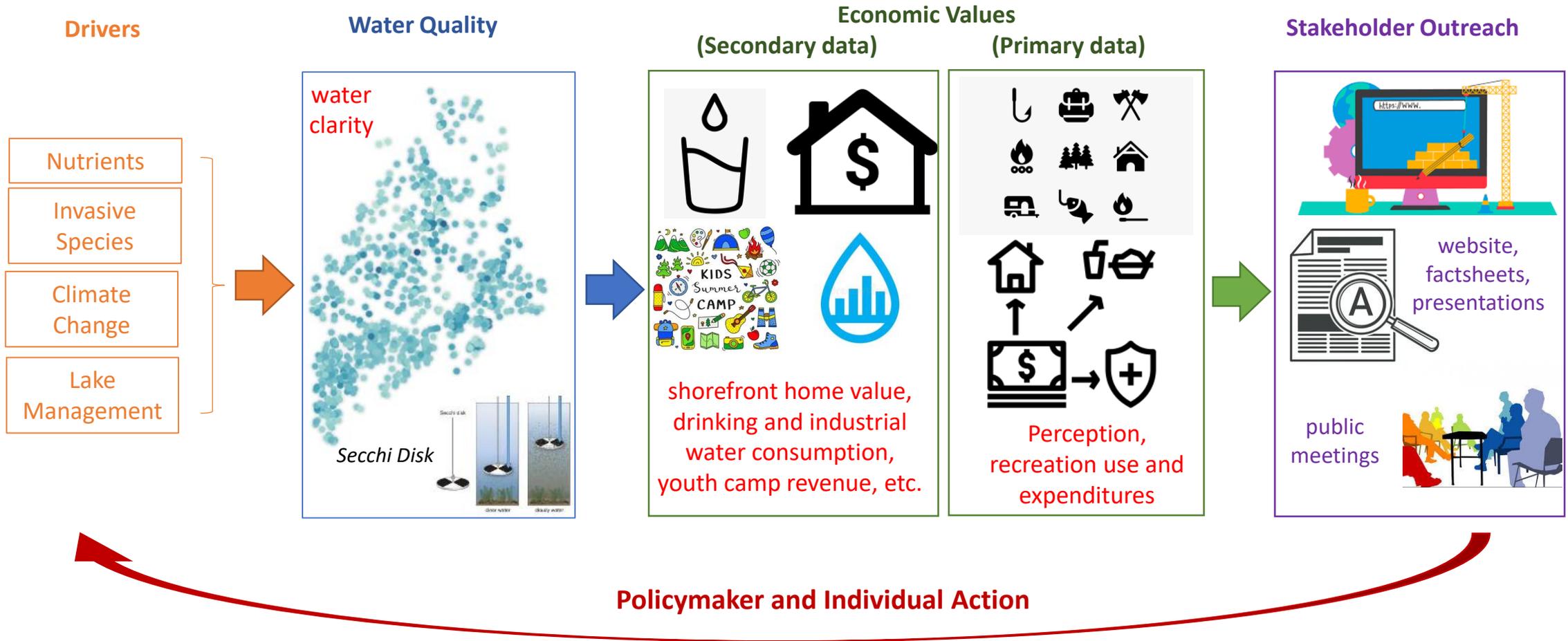
25 years later, much has changed...

- Climate change
- Invasive species
- Housing demands
- Recreation interests

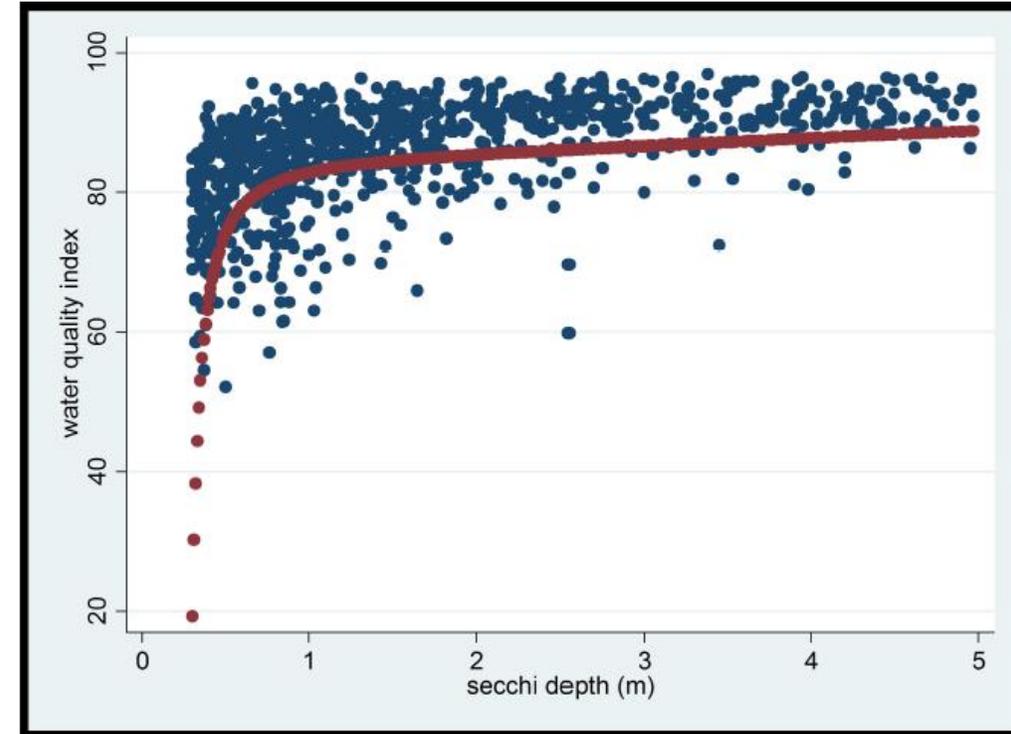
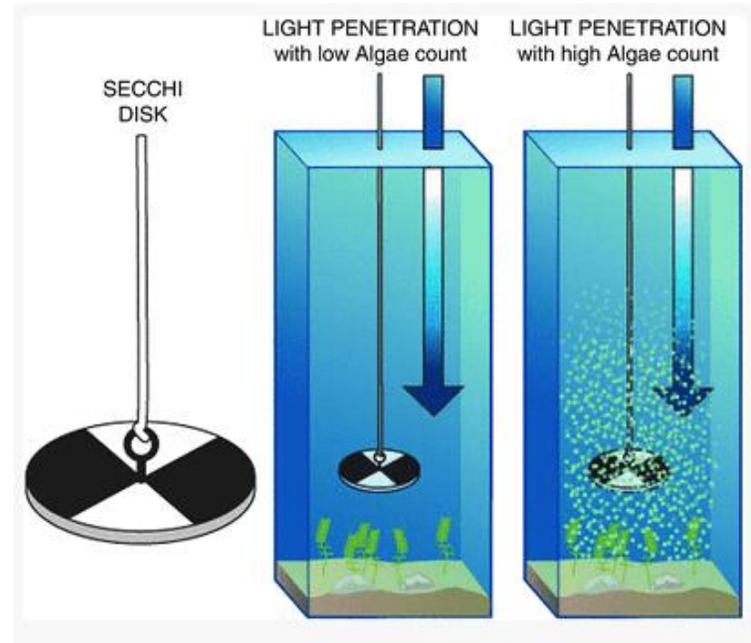
How have these changes affected value of ME lakes?



Current Project Framework



Measuring Water Quality /Clarity



Housing Value



Trends and Impacts

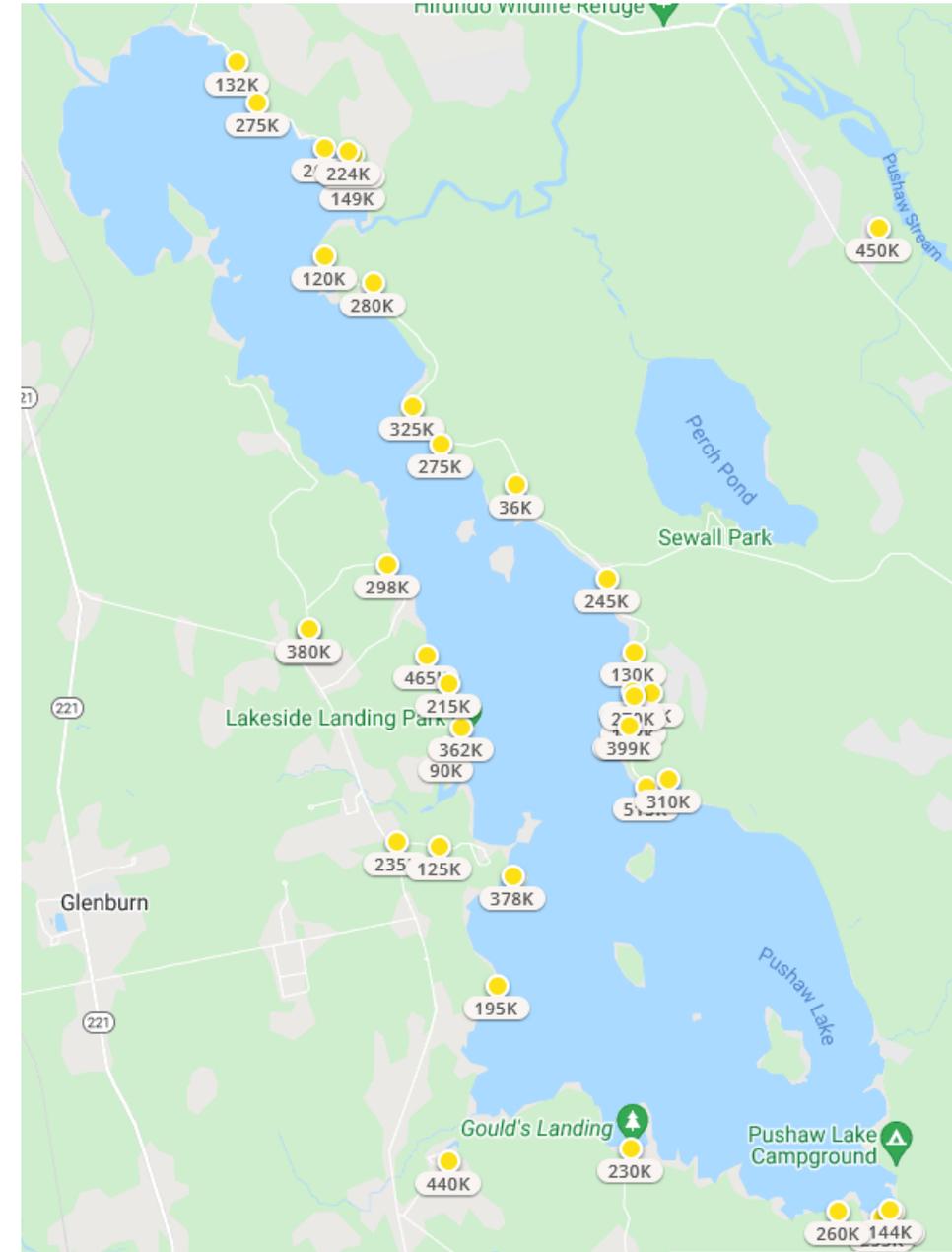
Demand rising for lakefront houses

- Net migration: 2.7% population rise (2019-2023), sales price (>14% rises)
- COVID-19 impacts: value high on privacy, space, and natural setting
- Recreation opportunities
- Convenient life (travel efficiency, network, etc.)

Zoning and Development

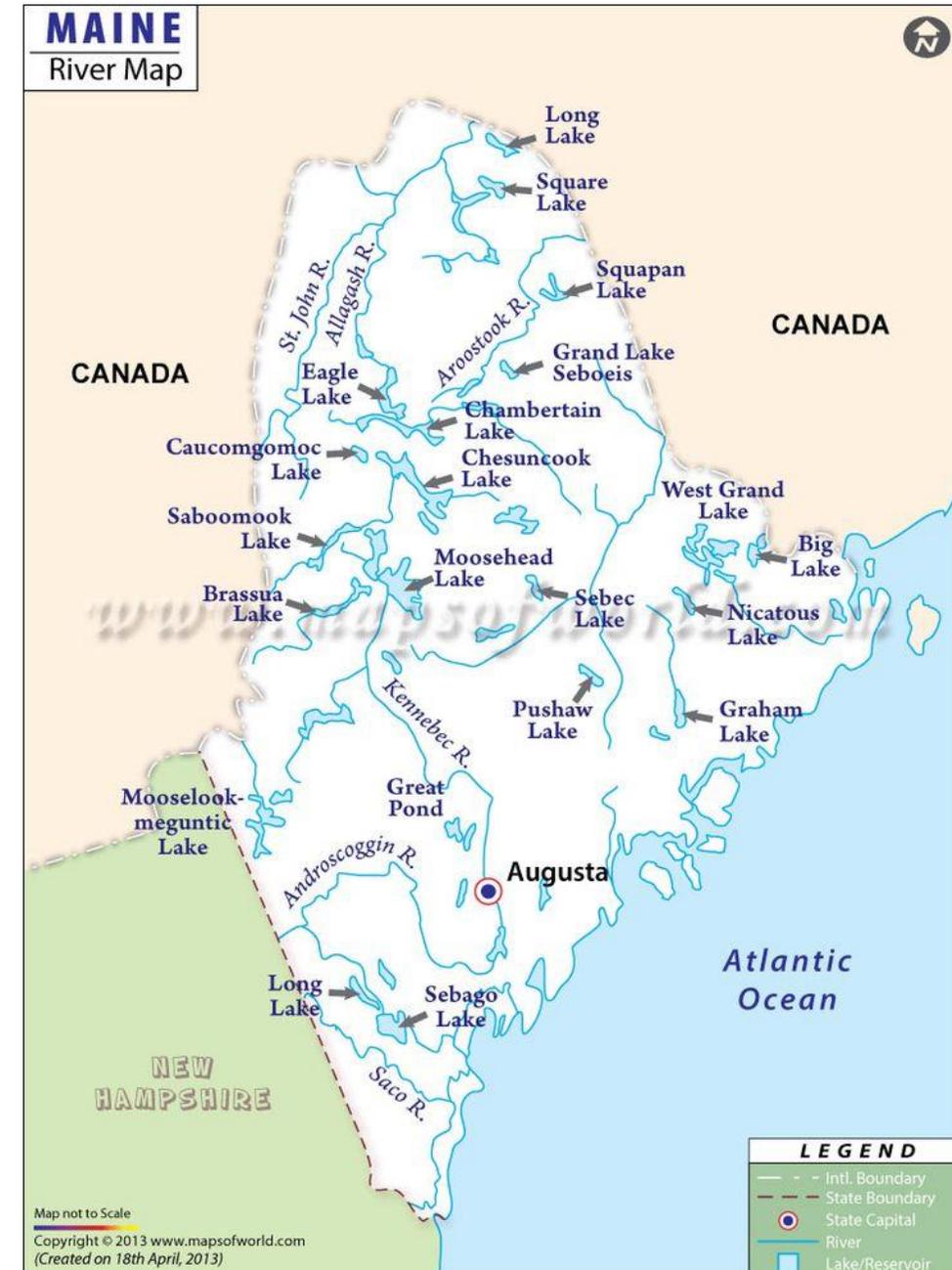
Economic factors: interest rates, inflation, insurance

Lake quality



Regional Lake Analysis

Original Groups (1990s)	New Groups (Today)
Lewiston/Auburn Area	Lewiston/Auburn Area
Augusta Area	Winthrop Lakes Region
Waterville Area	Belgrade Lakes Region
Newport/Dexter Area	Newport/Dexter Area
Ellsworth Area	Ellsworth Area
Northern Maine	Northern Maine
Camden	Camden
	Greenville
	Sebago
36 lakes	150 lakes



Hedonic Pricing Models

Hedonic pricing estimates economic value of ecosystems that are linked to market goods



Logic: people pay more for goods associated with high environmental quality

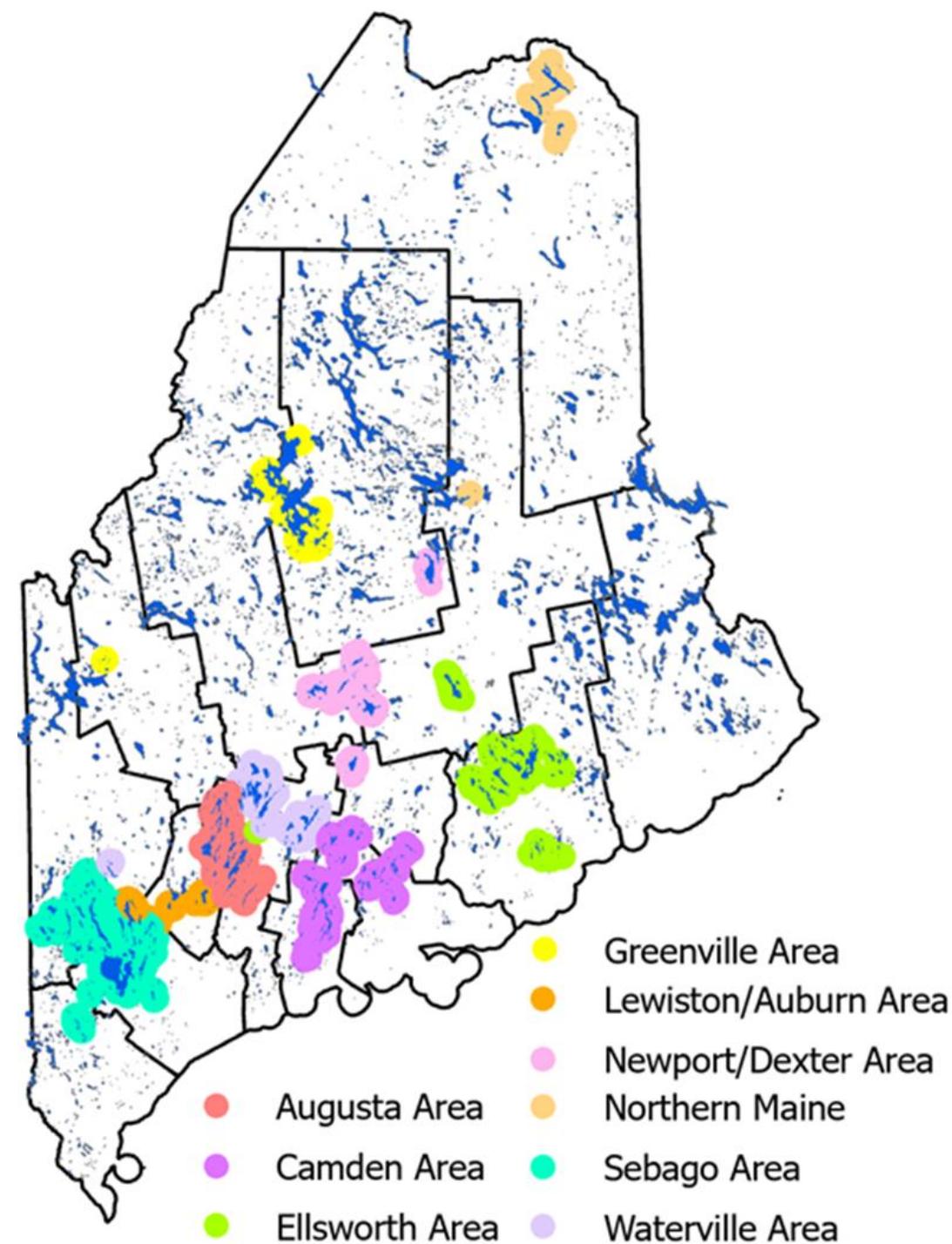
Data Collection

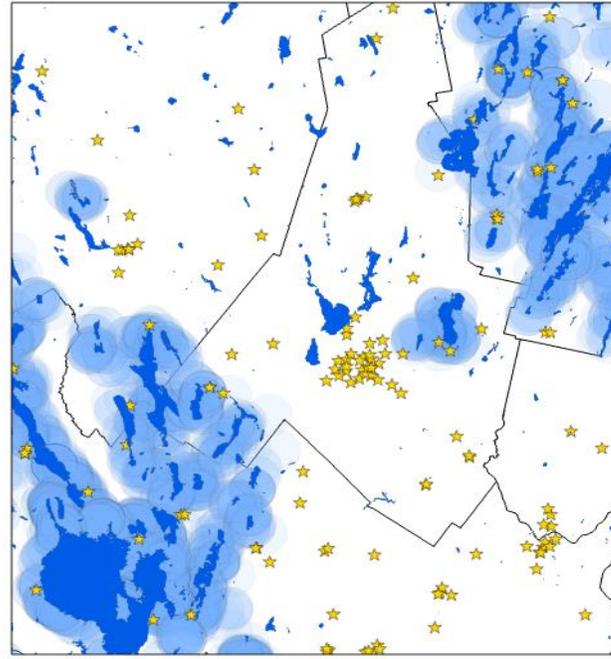
Key variables

- Property prices
- Property characteristics
- Indicator for water quality

Sources: Redfin, Zillow, Maine DEP, VLMP

- Time range: 2017-2022
- Lakefront single-family properties
- Over 3,800 housing transactions
- Around 150 lakes





Housing Attributes

- # Rooms, Lot Size
- Fireplace, Garage, Private water
- Water frontage, Site characteristic

Location Attributes

- School district ratings
- Population density
- Household income
- Geographic information: Zip code, Census tract

Lake Attributes

- Shoreline length
- Lake area
- Secchi depth

Finding: Lake related variables

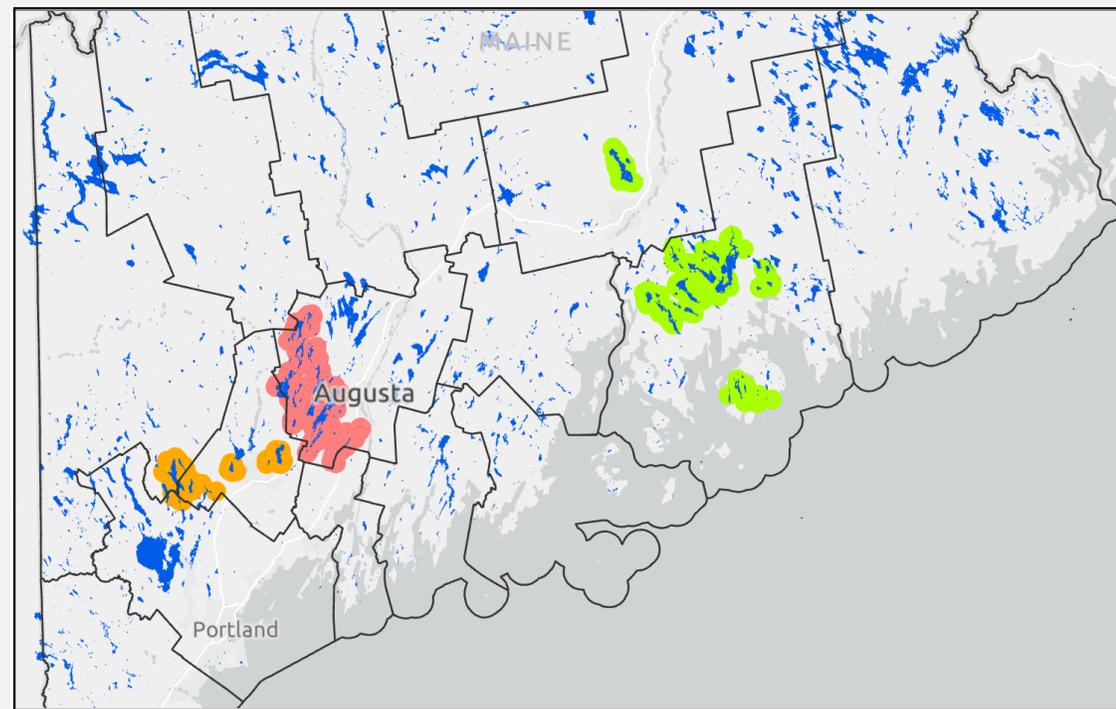
- Secchi depth (+), Private water (+),
- Water frontage length , Lake area no effect, Intersection terms with Secchi depth (+)

Results:

Prices much higher with higher Secchi depth

Water quality ↑ brings more add values

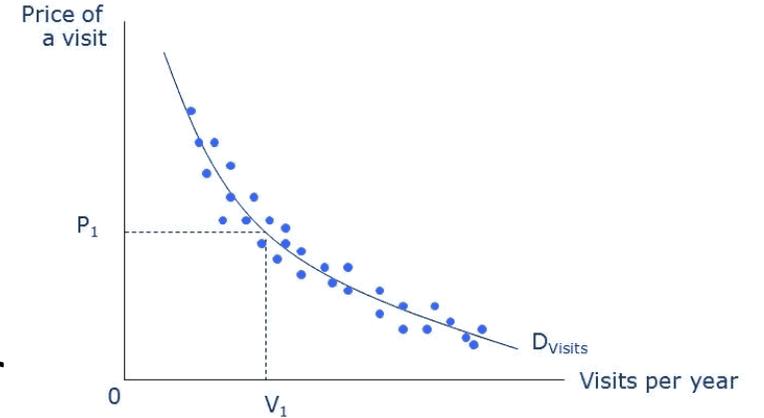
- property with longer water frontage or near larger lake area.
- property located to Lewiston/Auburn Area , Ellsworth Area, Augusta Area



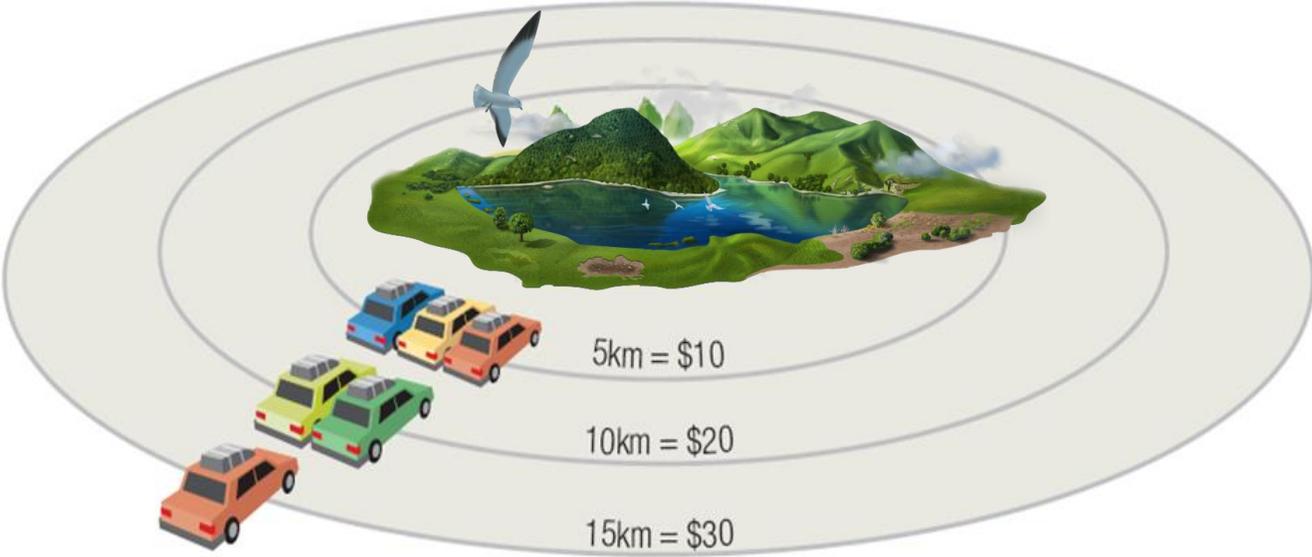
(\$2023 dollars)	Net economic value
Lake-front Properties	\$13.3 billion
1 foot water quality (+)	1.1%

Recreation Demand

- Collected using survey-based estimates
- Activities include boating, fishing, swimming, hunting
- Estimates based on travel cost
 - Higher quality or better amenities → willing to travel farther



Travel cost: the value of a recreational site can be estimated from the number of visitors and the cost of travelling there

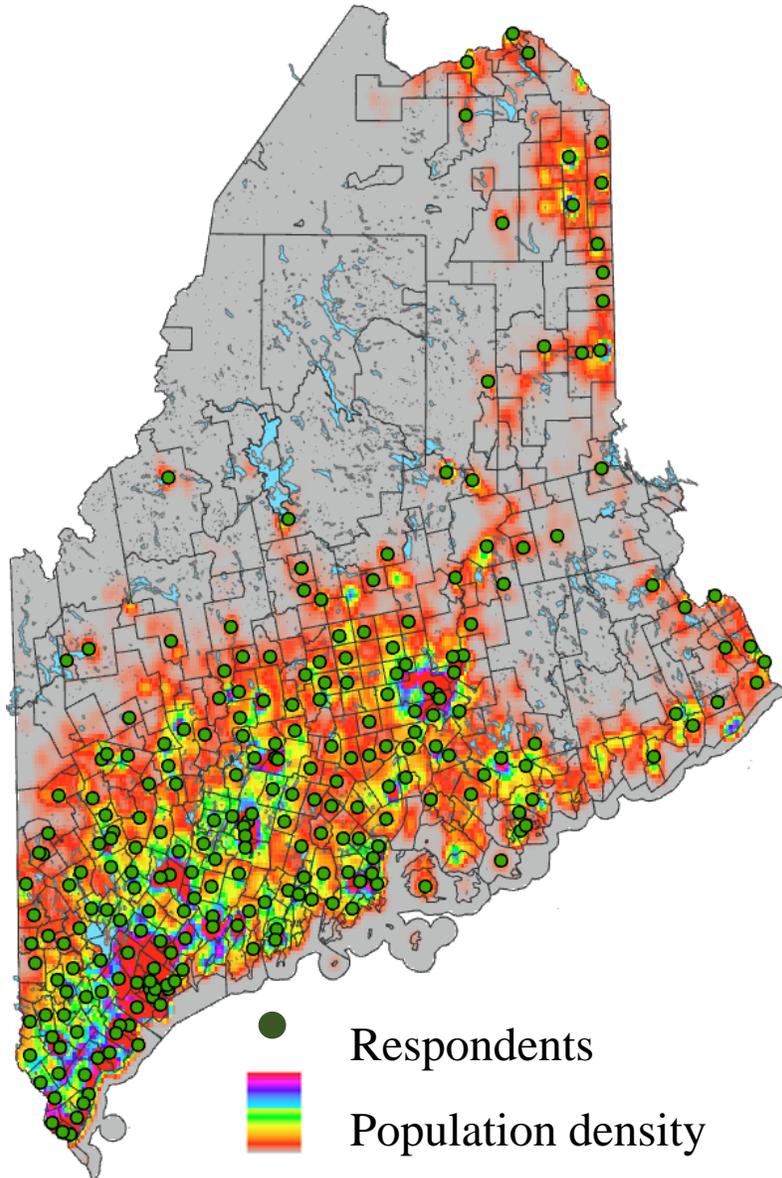


	Travel and Activity Factor = 0.20
	Travel and Activity Factor = 0.22
	Travel and Activity Factor = 0.61

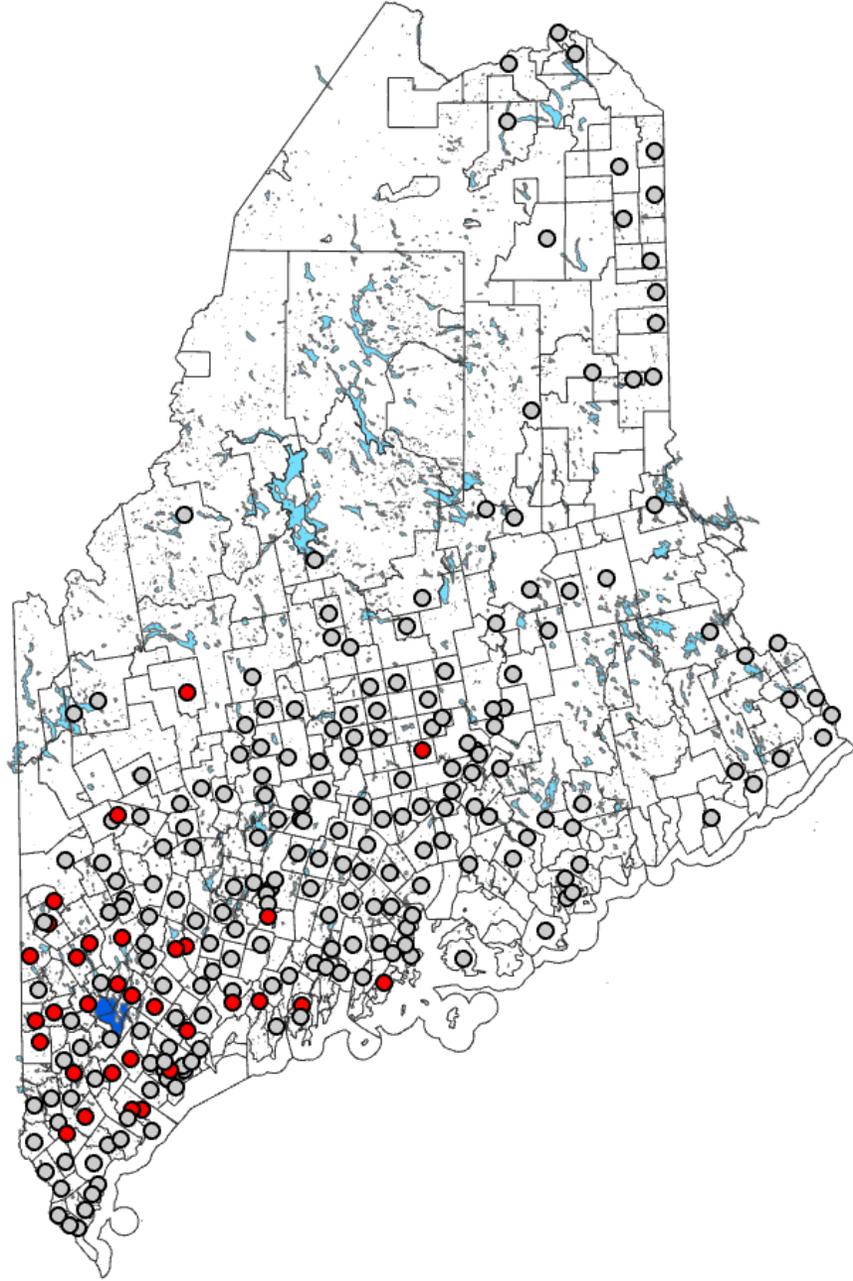


Survey results

- 768 residents selected at random
- 77% residents visited lakes
- Visited respondents
 - Trips frequency & Expenditure up to 5 lakes (150 lakes)
 - 2022 actual trips (13.3 trips/ person/ yr)
 - Anticipated trips – water quality changes (2 less trips / person /yr)
 - Access and barriers of Maine’s lakes uses
 - Perceptions of environment and water quality
 - Socio-demographic data



Sebago



- 77% residents visited lakes
- 22% visited Sebago lake
- 13% visited Moosehead

Visited lakes

○ No

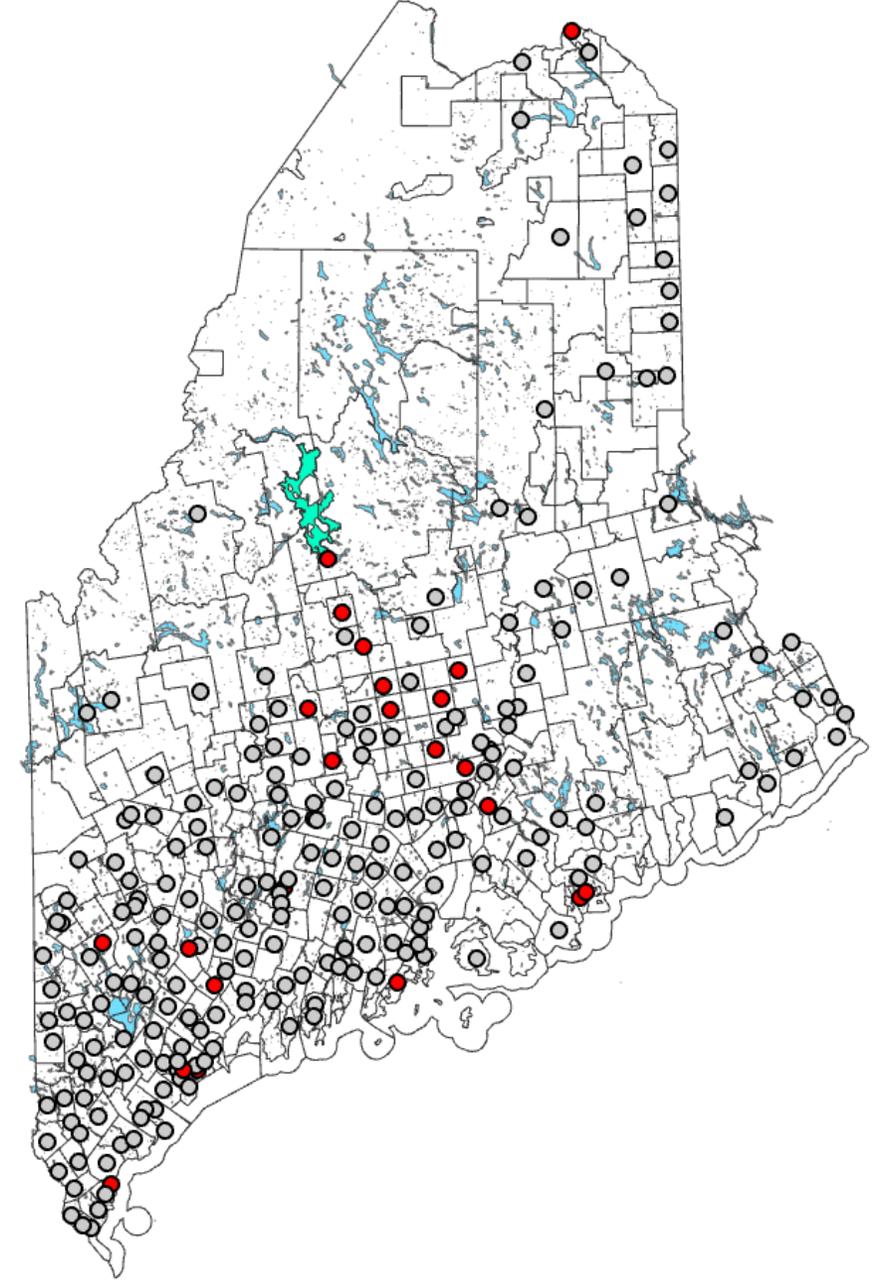
● Yes

■ Moosehead

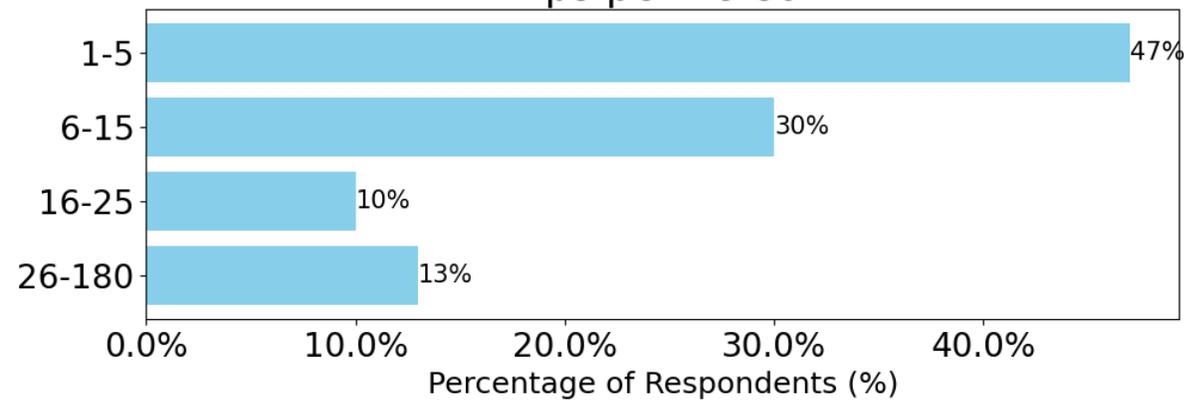
■ Sebago

■ All lakes

Moosehead

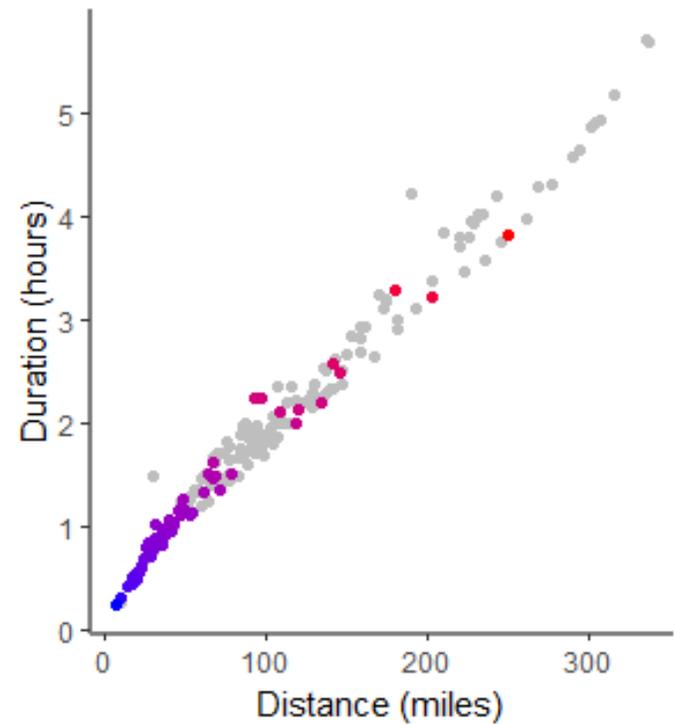


Trips per Person

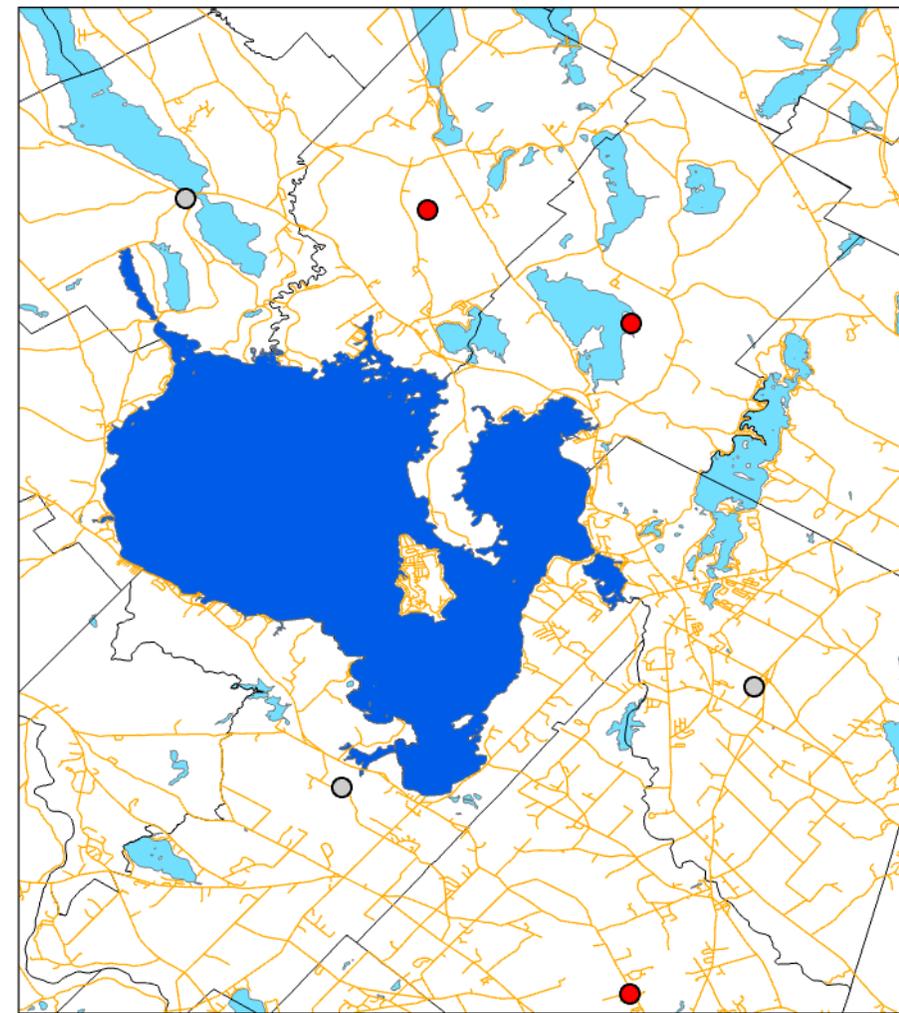
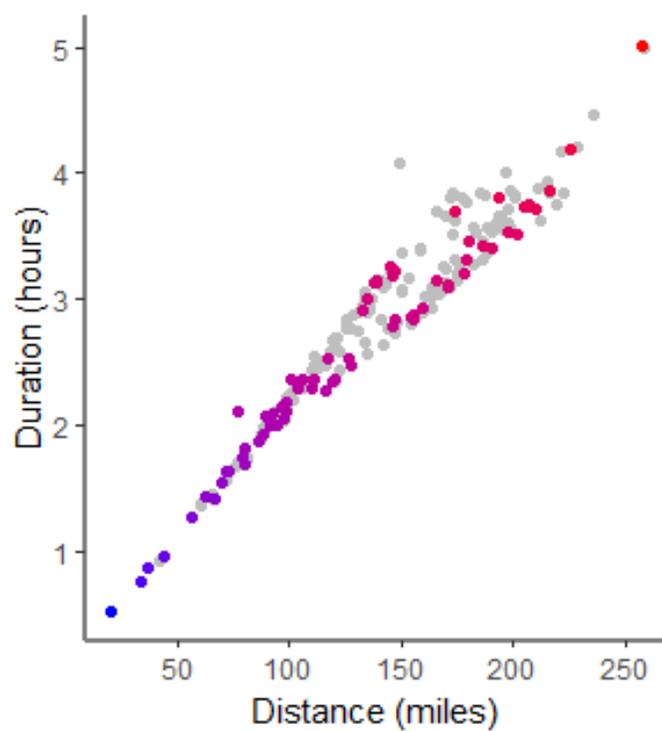


Distance vs Time

Sebago Lake



Moosehead



Visited lakes

○ No

● Yes

■ Sebago

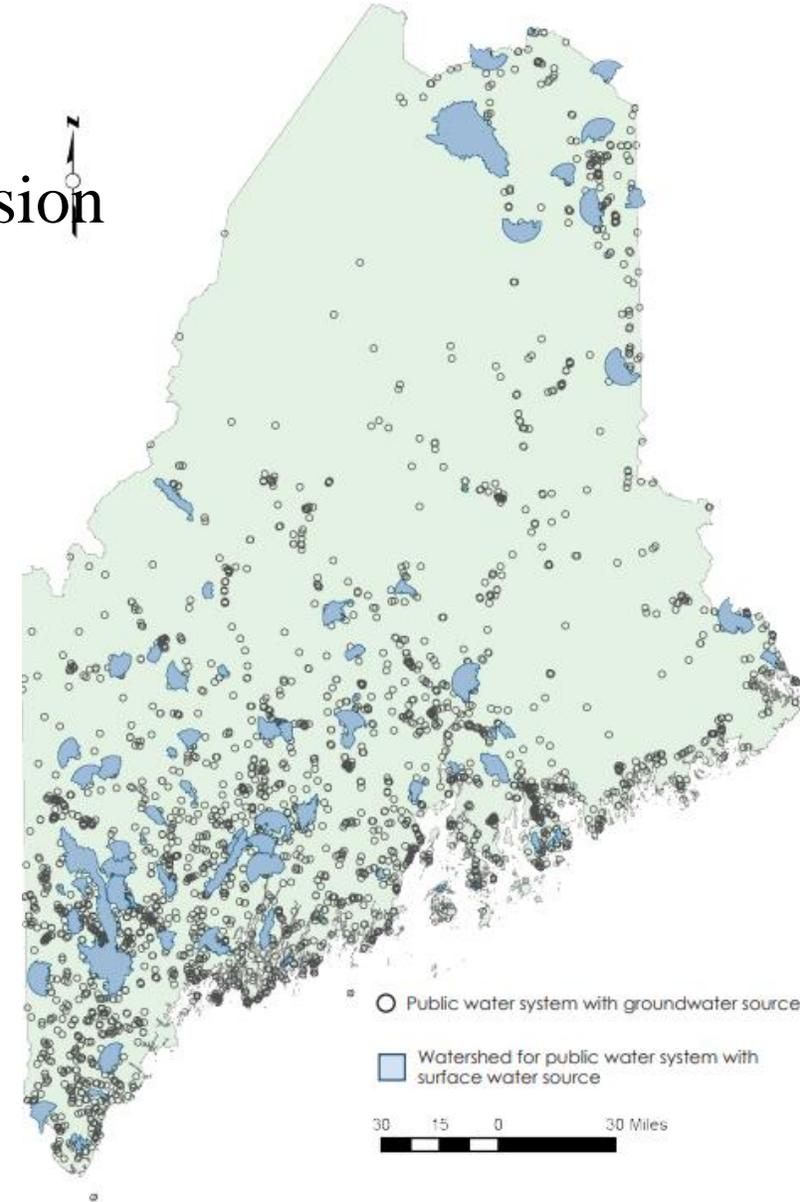
— National Highway

Net Economic Estimates

	Sebago Lake	Moosehead Lake	All lakes in Maine
Per trip per capita per lake	\$29.88	\$43.48	\$33.80
Predicted Trips /yr	4.6	3.3	13.3
Visit rates	15.8%	6.4%	76.7%
Net economic value (\$/yr)	\$31 million	\$13 million	\$501 million
EPA water quality ladder (2 degree degrade)			6% ↓ or \$33 mil ↓

Drinking Water

- 2020-21 Annual Reports to ME Public Utilities Commission
- ~ 45 ME water districts with surface water source
 - Serves a population of ~435,000
- Data on total water consumption and revenue
 - Residential, industrial & commercial users
- Mean net value: $\$765/p/yr = \334 million/yr
- Mean expenditure: $\$290/p/yr = \126 million/yr



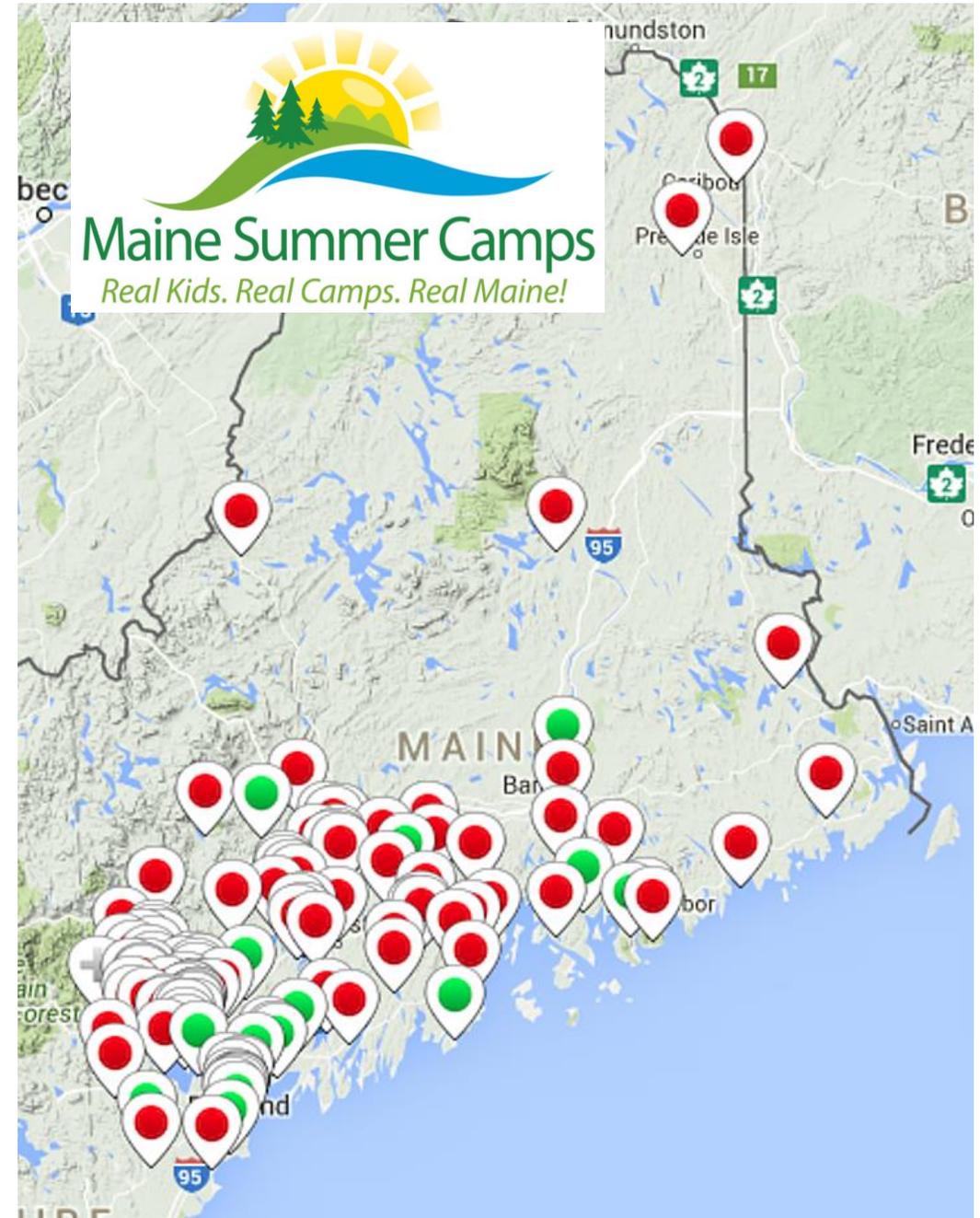
Summer Camps

91 summer camps on lakes and ponds

~48,000 campers/yr

- Net value = \$311/camper/wk
- Tuition cost = \$2,262/camper/wk
- Travel + Visit cost = \$1,304/camper/wk

- Net econ value: \$15 mil/yr
- Direct expenditure: \$170 mil/yr



Type of Use	Estimate
Net Economic Value (\$/yr)	
Recreation Uses	\$501,076,953
Water Consumption	\$333,844,580
Summer Camp Uses	\$14,820,008
Lake-front Properties	\$13,304,850,817
Total Net Economic Values	\$14,154,592,359
Direct Expenditures/Sales (\$/yr)	
Recreation	\$1,010,457,930
Water Consumption	\$126,056,224
Summer Camps	\$169,683,283
Lake-front Properties	\$780,535,539
Total Direct Expenditures	\$2,086,732,977
Direct and Indirect Sales (\$/yr)	
Total Direct and Indirect Sales	\$3,028,715,531

Lakefront Property Values



\$13 billion

Summer Camps



\$15 million

Recreation



\$501 million

Water Consumption



\$334 million

Acknowledgements

