

Are the Waves Worth it?

Exploring the socio-economic landscape of surfing in the Gulf of Maine

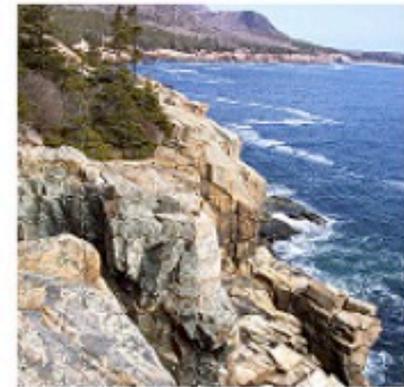
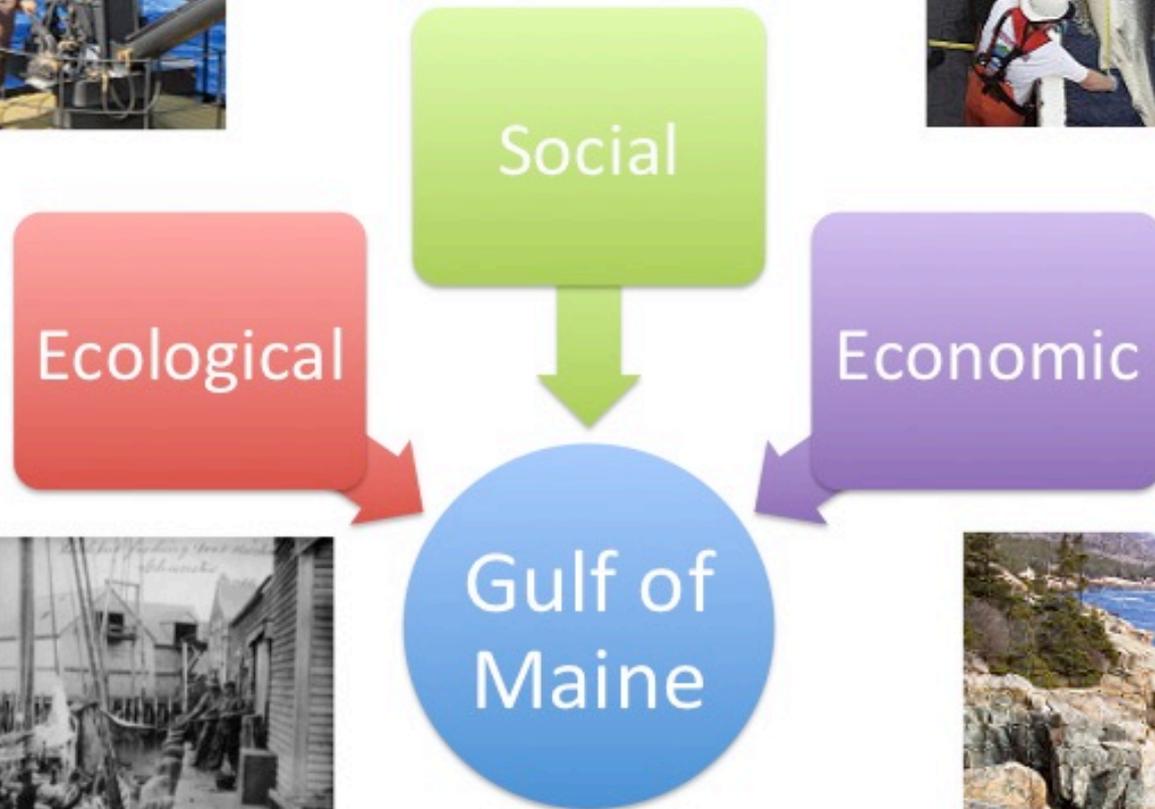
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The Gulf of Maine is a Social-Ecological System



System



Photos: NOAA Photo Library

Surfers are an important but little understood component of this system



About Us

Safe Beaches & Shellfish

Beach Closures

Shellfish Closures

The Future of Dams

Videos

Education

Volunteer

Job Openings

Links

Data Discovery Center

Safe Beaches & Shellfish

As long-term trends indicate worsening coastal pollution, this research will inform choices and provide a promising model for interactions between science and decision-making. The Safe Beaches and Shellfish project, a three year study and \$6 million award from the National Science Foundation, is the first collaboration through the New England SusTainability Consortium (NEST).

NEST is a regional research partnership focused on strengthening the scientific basis for decision-making regarding the management of coupled coastal systems. NEST mobilizes cutting-edge theory and methods from the emerging field of sustainability science and a range of disciplines to tackle problems related to the closure of shellfish beds and posting of beach advisories due to high levels of pathogenic bacteria in coastal regions. Given that the estimated annual value of coastal recreation amounts to as much as \$20 billion nationally and \$400 million in ME and NH, these coastal closures represent a significant sustainability problem with complex and interacting economic, social



Surfers are more vulnerable to water pollution

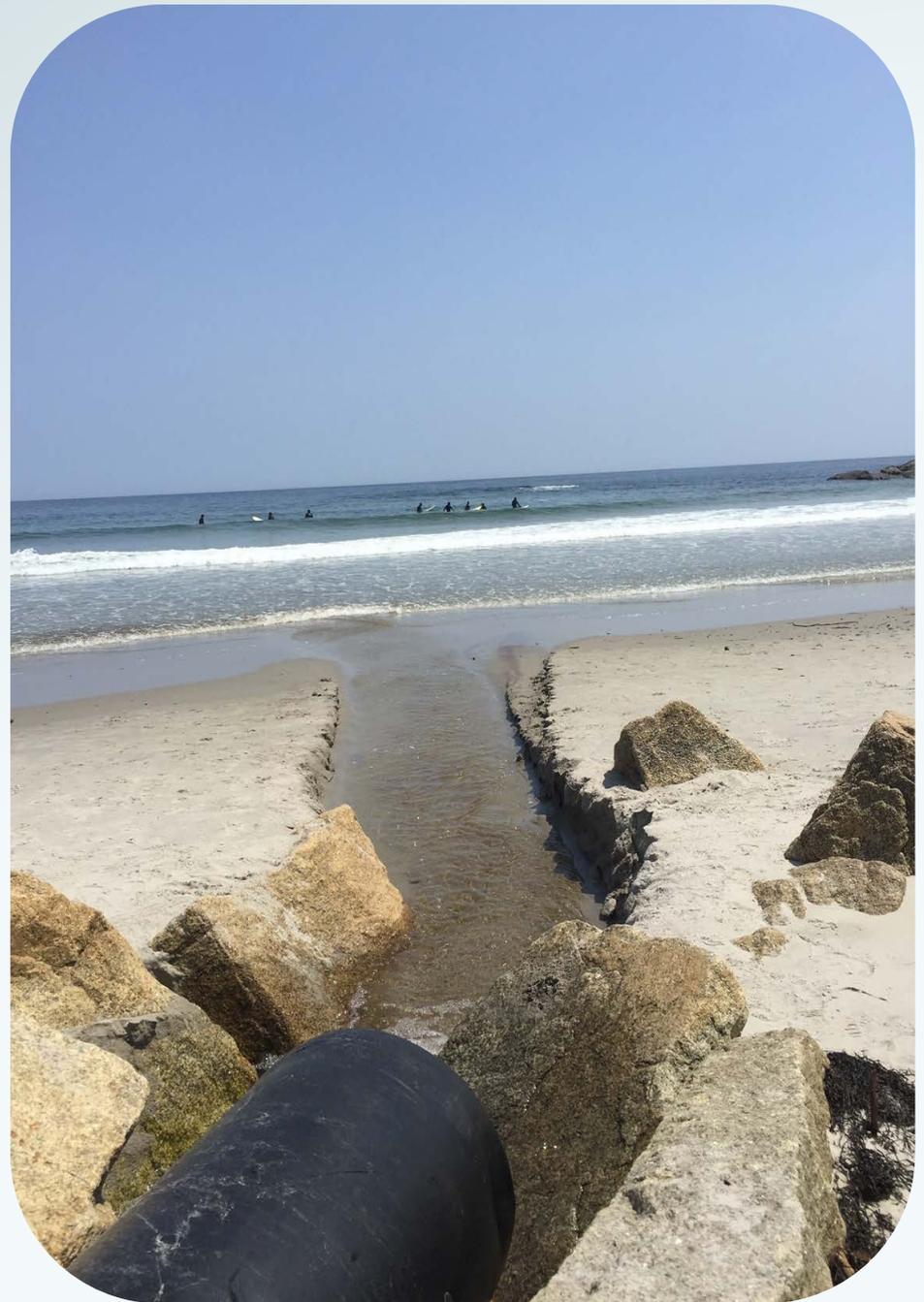
- Surfers go to the beaches more often
- Surfers spend longer periods of time in the water
- Surfers become totally immersed
- Surfer ingest more water
- Surfers can get cuts or scrapes
- Storms bring big waves (and poor water quality) that surfers love to ride



What do we know about surfers?

Surfing literature

- Surfers ingest up to **10X** more water than the average beach goer (Stone et al. 2000)
- Risk and self reported GI illness in PWN surfers (Harding et al. 2014)
- Surfers as stewards of the environment (Lazarow et al. 2009)
- Surfers socio-economic role in coastal communities (Slotkin et al. 2009)



Surfs Up!

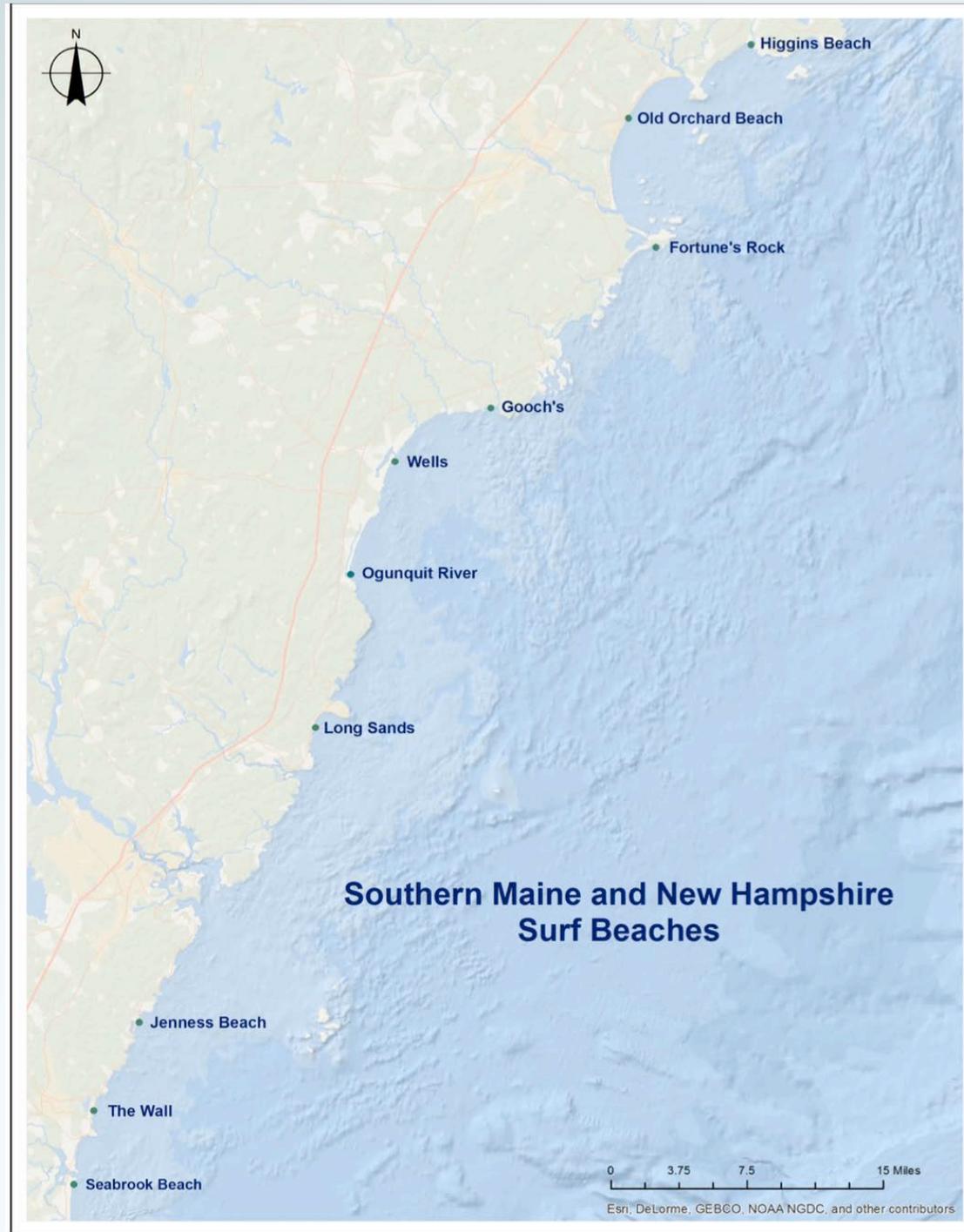
In Northern New England?

Maine

- Higgins
- OOB
- Fortune's Rock
- Gooch's
- Wells
- Ogunquit River Mouth
- Long Sands

New Hampshire

- Jenness Beach
- Bass Beach
- North Hampton
- The Wall
- Seabrook



What can you learn from talking to over 300 surfers?

- Scoping interviews
- Learning from surfers
 - Knowledge informs survey questions



Intercept Survey

10 questions

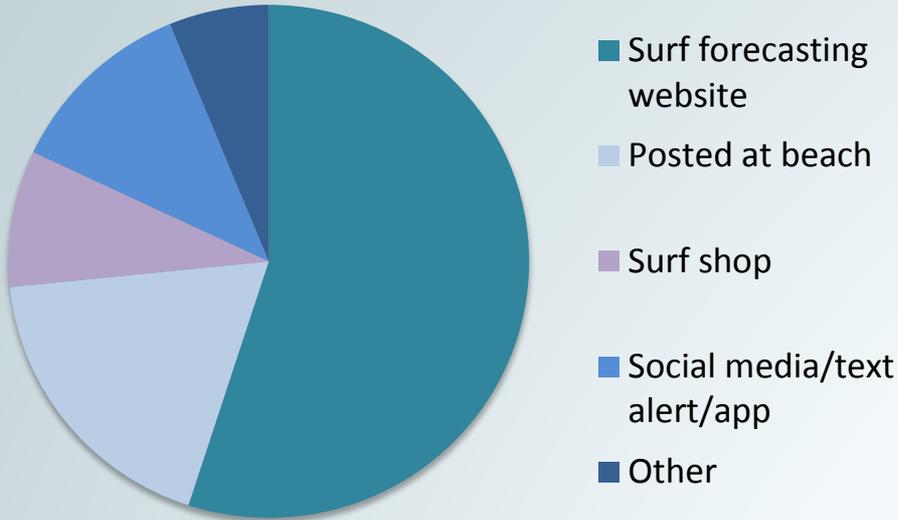
Demographics

Beach and conditions

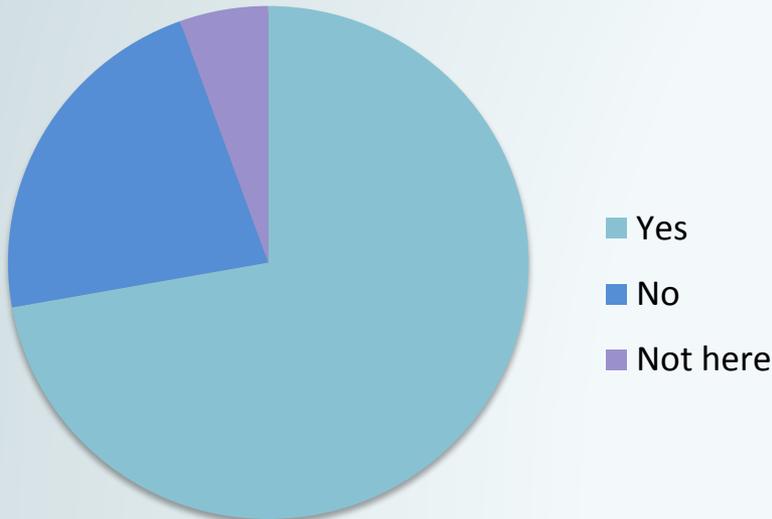


Surfers want to know about water quality at their local surf spot

Surfers want to know about water quality through...

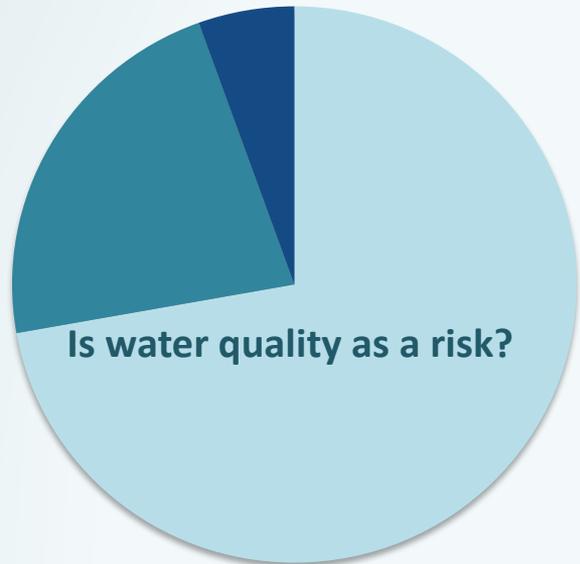
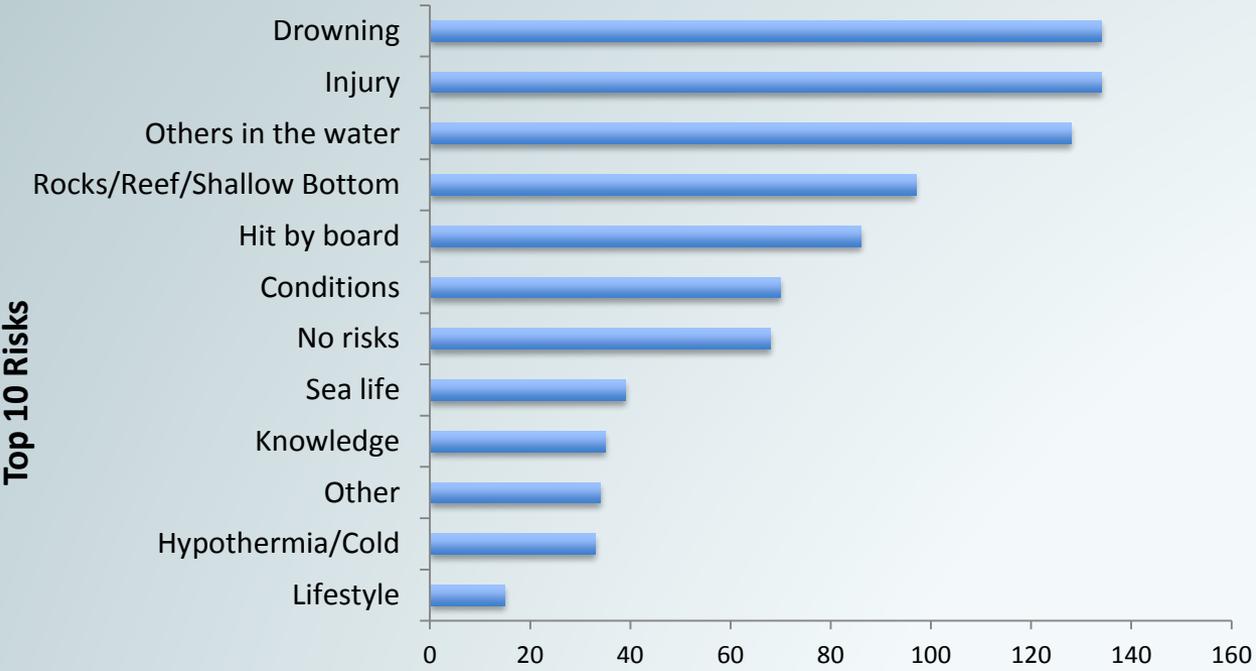


Water pollution and the decision to surf...



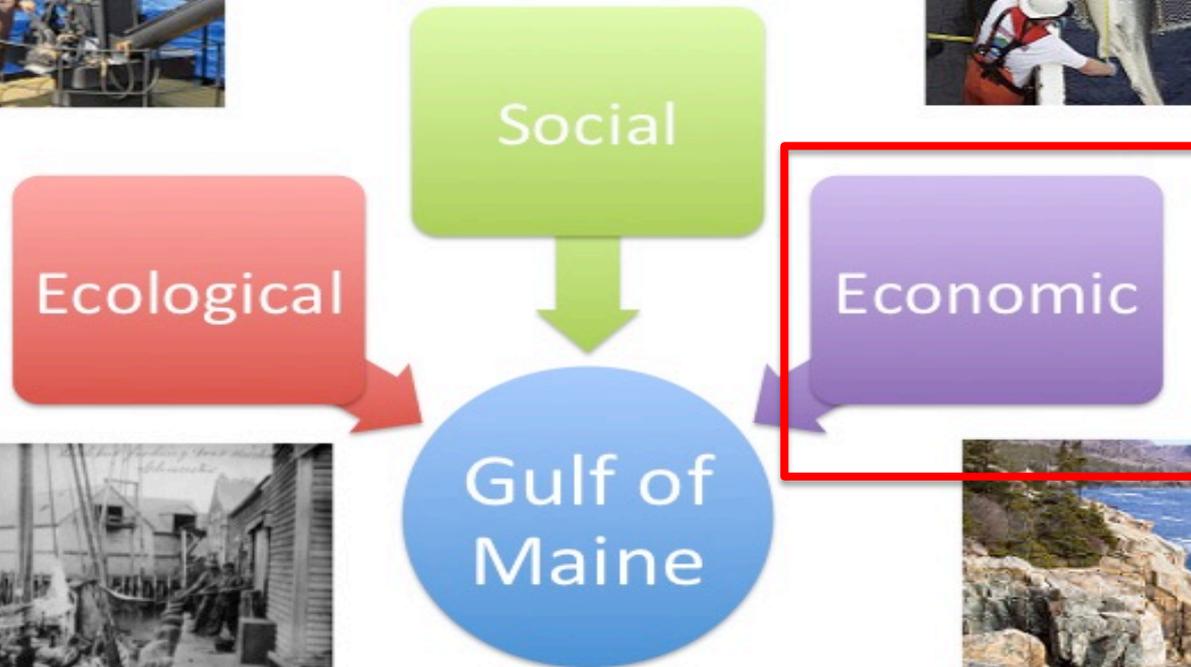
Water quality is a risk to some surfers

Survey Respondents



- Yes
- No
- Not here

The Gulf of Maine as a Social- Ecological System...



Photos: NOAA Photo Library

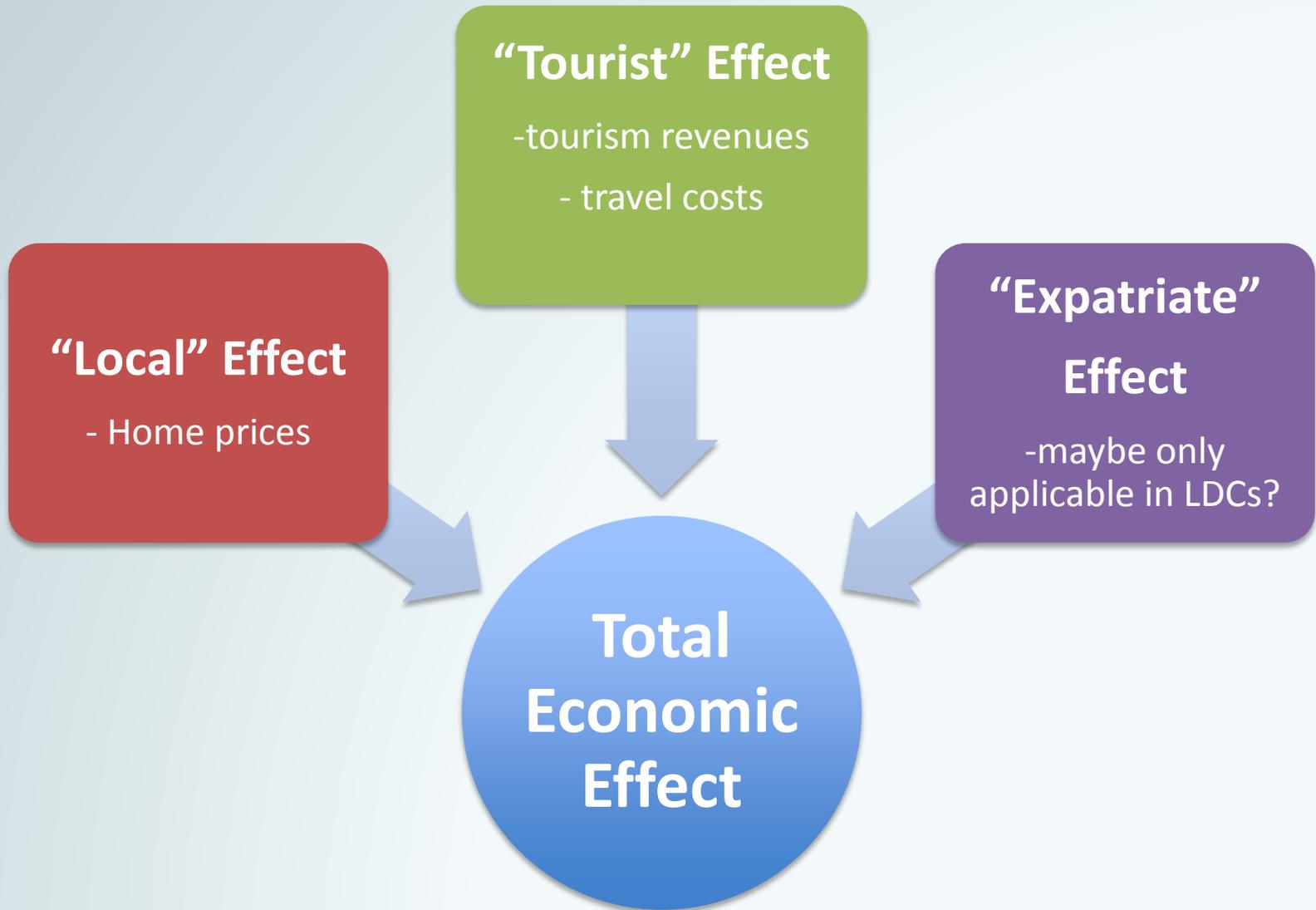


How does surfing fold into the economic components of the system?

SurfEcon (aka Surfonomics) so far...

- *Market Effects*
 - Tourism and construction revenues
 - Economic multipliers
- How do we uncover *non-market* economic effects for surfing?
 - Revealed Preference Methods
 - Travel Cost
 - Nelson and Lazarow (2007)
 - **Hedonic Price**
 - Scorce, et al. (2015)

How does surfing effect the economy?



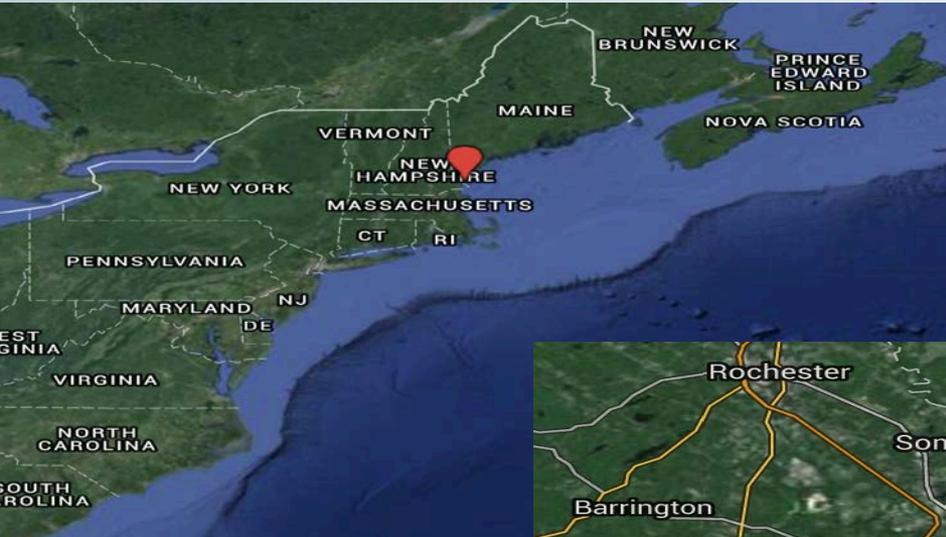
The Hedonic Method

- Intuition: “Market price of a good reflects value of attributes of that good” (Rosen, 1974)



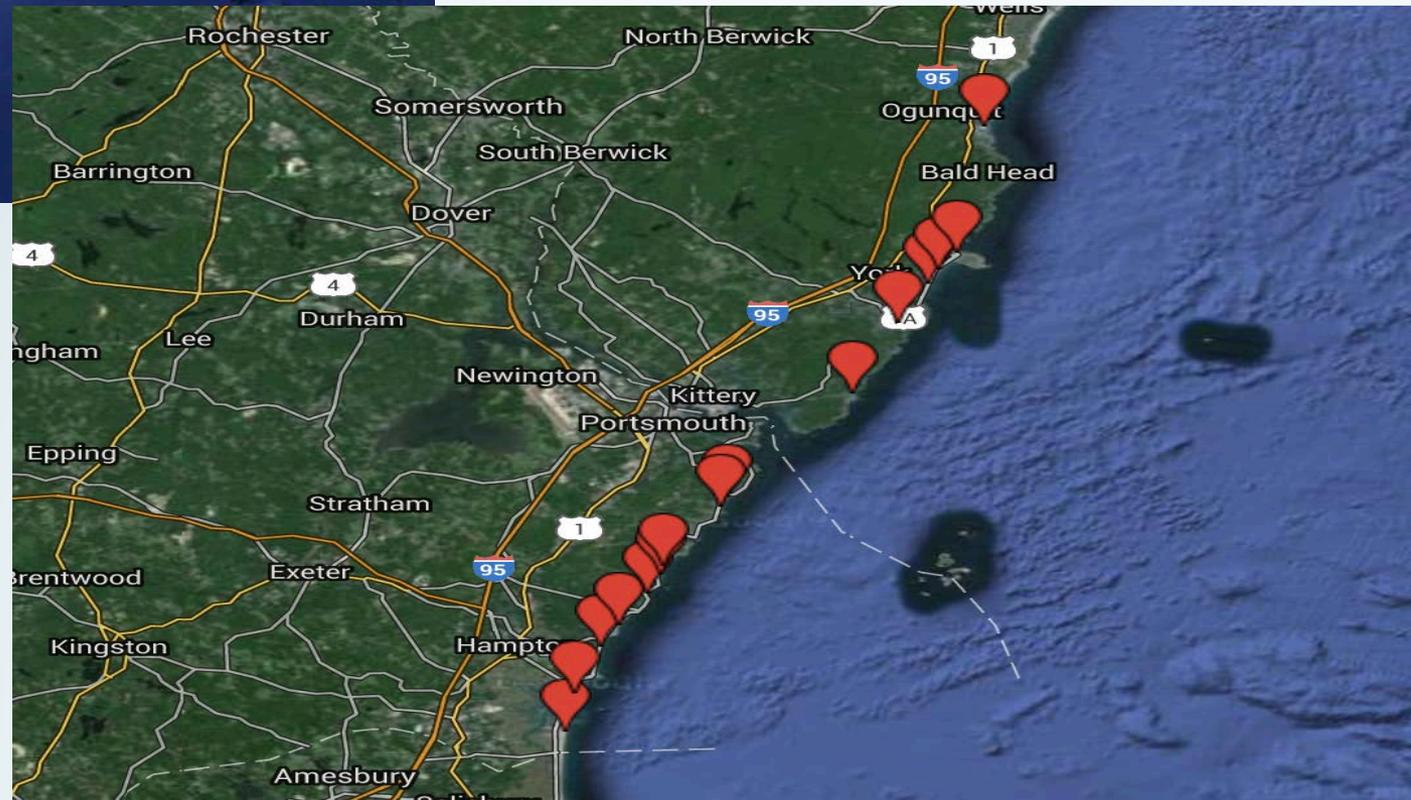
Home price = f(Structural Characteristics, Environmental Amenities, Community Characteristics)

Study Area: Coastal New Hampshire and Maine



New Hampshire:
9 beaches (6 “surfable”)

Maine:
6 beaches (4 “surfable”)



Summary Statistics (Full Sample)

		N	Mean	SD	Min	Max
Structural Characteristics	Price (\$2015)	2267	450,637.90	315,258.80	44,394	3,532,598
	Age	2267	49.36	47.69	0	446
	Lot (SqFt)	2267	42,861.90	118,699.40	436	3,202,531
	House (SqFt)	2267	2,138.08	978.54	474	8,854
	Water View (=1)	2267	0.09	0.28	0	1
	# Stories	2267	1.73	0.60	1	3
	Basement(=1)	2267	0.85	0.36	0	1
	# Rooms	2267	7.30	1.89	2	21
	# Bedrooms	2267	3.23	0.88	1	12
	Garage (=1)	2267	0.75	0.43	0	1
# Bathrooms	2267	2.44	1.03	1	9	
Distance to Beach/Surf	Distance (km)	2267	4.43	3.74	0	20
	Surf (=1)	2267	0.64	0.48	0	1
Location	Hampton	2267	0.34	0.47	0	1
	Kittery	2267	0.17	0.38	0	1
	Rye	2267	0.17	0.37	0	1
	Seabrook	2267	0.14	0.34	0	1
	York	2267	0.19	0.39	0	1

Hedonic Model

(Full Sample and Select Cities)

Table 1: Estimates using Natural Log of Home Price (\$2015)

		I: Full	II: Hampton	VI: York
Structural Characteristics	Age	-0.000507**	-0.000511	0.000268
	Lot (SqFt)	6.19E-08	4.63E-08	1.87E-08
	House (SqFt)	0.000208***	0.000232***	0.000209***
	Water View (=1)	0.374***	0.203*	0.319***
	# Stories	0.0386**	0.0505*	0.054
	Basement	0.102***	0.119***	-0.00484
	# Rooms	-0.00712	0.00049	-0.0216
	# Bedrooms	0.0183	0.00857	0.0272
	Garage (=1)	0.0974***	0.126***	0.0814*
	# Bathrooms	0.113***	0.0689**	0.137***
Environmental Amenities	Distance to Beach (km)	-0.0315***	-0.0293***	-0.0131***
	Surf (=1)	0.0136	-0.263***	0.163***
Location	Kittery	0.0588		
	Rye	0.379***		
	Seabrook	-0.0134		
	York	0.1000***		
	Constant	11.94***	12.17***	11.93***
	r2	0.66	0.612	0.623
	N	2267	765	428

Hedonic Model

(by Distance to Beach)

Table 2: Estimates using Natural Log of Home Price (\$2015) by Distance to Beach (km)

		<1	<5	<10
Structural Characteristics	Age	-0.000652	-0.000398*	-0.000507**
	Lot (SqFt)	-2.95E-06	9.37E-08	9.63E-08
	House (SqFt)	0.000297***	0.000221***	0.000212***
	Water View (=1)	0.147	0.339***	0.350***
	# Stories	0.026	0.0231	0.0304*
	Basement	0.192**	0.0866***	0.0987***
	# Rooms	0.0504	0.000572	-0.00243
	# Bedrooms	-0.0263	0.00523	0.00689
	Garage (=1)	0.0862	0.119***	0.115***
	# Bathrooms	-0.00284	0.101***	0.116***
Distance	Distance (km)	-0.346**	-0.0932***	-0.0663***
	Surf (=1)	-0.0656	0.00665	0.00176
Location	Kittery	0.898*	0.0986	0.154***
	Rye	0.381***	0.346***	0.342***
	Seabrook	0.185*	0.181***	0.0839**
	York	0.0606	0.106***	0.0992***
	Constant	12.21***	12.10***	12.04***
	r ²	0.696	0.679	0.681
	N	251	1420	2019

Surfing helps us understand social, economic, and ecological components of an important Coastal System

- Findings from interviews and surveys are being used to inform water quality testing and communication protocols
- Findings from hedonic analysis are finding significant positive and negative effects in isolated areas around Coastal NH and ME
- Broadly supports the importance of integrating key stakeholders into sustainability science research
- Surfer citizen science pilot



Acknowledgements

Surfers!

NEST colleagues



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