

Life's a Beach, and I Can't Even Play in the Sand:

An integration of economic, qualitative, and geophysical data to assess the challenges of managing public beach accessibility under a regime of coastal erosion and sea level rise

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Increasing Demand + Limited Supply = Coastal Management Problems!!

- **Demand for beach access**
 - how to distribute this common resource
- **Lack of accessibility and quality amenities**
 - maintaining quality accessibility
- **Valuation of beach access depends on preferences**
- **Interaction of access and beach nourishment is poorly understood**



Public Beach Access NC, 2004



Overall, Beach Nourishment Seems to Positively Influence Property Values

(Thomas and Gabriel, 1987; Rinehart, 1995; DNREC, 1995; Blackwell, et al. 2001; Gopalakrishnan, 2011; Landry and Hindsley, 2011)



**Before and after photos of the 2011 Nags Head,
NC Beach Restoration Project.**

Coastal Science and Engineering

Research Objectives:

- 1. How the value of coastal property is sensitive to changes in local environmental quality**
 - Better understand the interaction between access and nourishment
 - Clarify how access contributes to recreational WTP for wider beaches
- 2. Implications on land-use and coastal decision-making**
 - to communicate to the public how nourishment projects must be financed and
 - how to justify varying proportions of monetary fees required by differing beach users

Hedonic Market Models

Revealed preference method

Used to estimate the DOLLAR value of non-marketed goods
(i.e. – beach width, public beach access, view-scape, school district)

To estimate you need:

- Data on sales prices and housing characteristics
- Info concerning the non-marketed good you are trying to value!

Estimated via regression analysis

- $\ln(\text{Sale Price}) = \beta_0 + \beta_1 \times \text{HouseAge} + \beta_2 \times \text{ACRES} + \beta_3 \times \text{BeachWidth} + \beta_4 \times \text{Distance} + \beta_4 \times \text{Size of Access} + \dots + \epsilon_i$

“A hedonist strives to maximize net pleasure” –Wiki 😊

Data

1. Residential housing sales in Dare County, NC

- Tax assessor
 - Dare = 1996-2011
 - 18,314 unique home addresses
- Each year of sales assessed separately (initially)

2. Aerial photography & GIS layers

- National Agriculture Imagery Program (NAIP!)
 - 1998, 2006, 2008, 2009, 2010
- NCDENR
 - 2004 public access
- Dare County Tax Mapping Office
 - Road network

1998 housing sales 1998 imagery (NAIP)



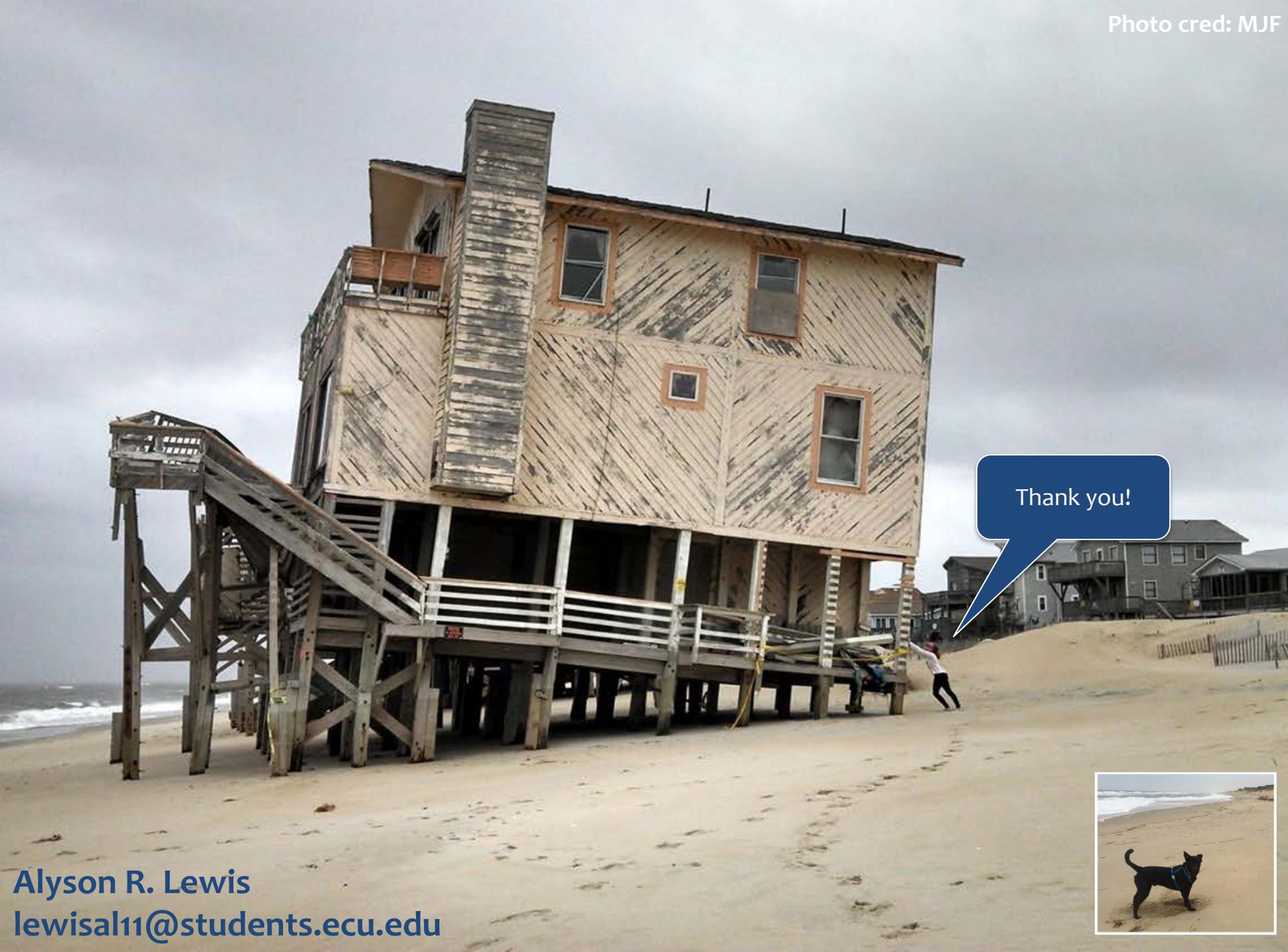
2006 housing sales

2006 imagery (NAIP)



Conclusions

- Tools from Natural Resource Economics can be applied to Coastal Management
- Integrating qualitative, geospatial, and economic data can reflect societal values more efficiently
- Future land-use decision making



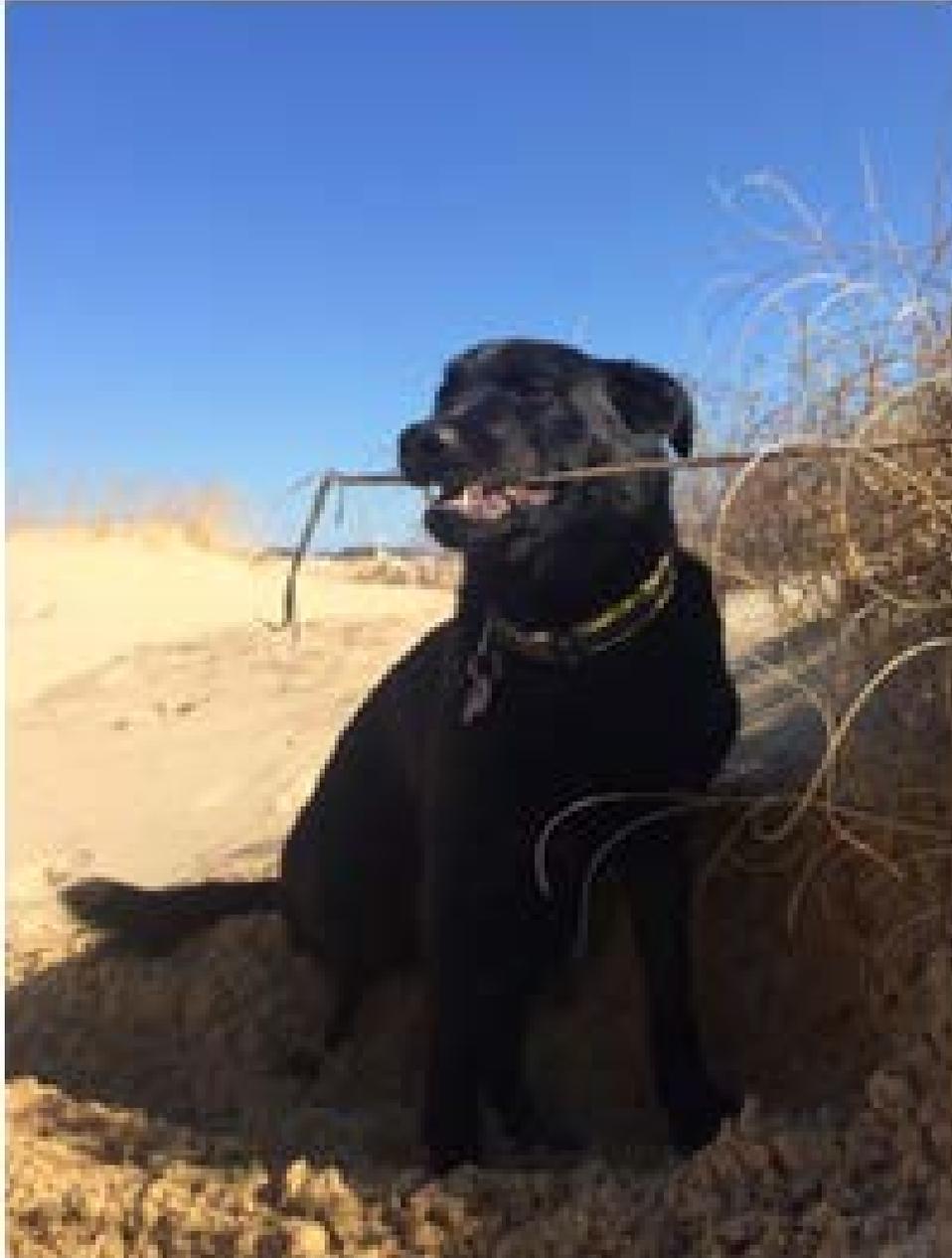
Thank you!



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Pre

- Overall, Beach
(Thomas and Ga
Hindsley, 2011;)
- Recreational
Increased Be
(Brandolini, 200
Whitehead et al,



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ah, 2011; Landry and

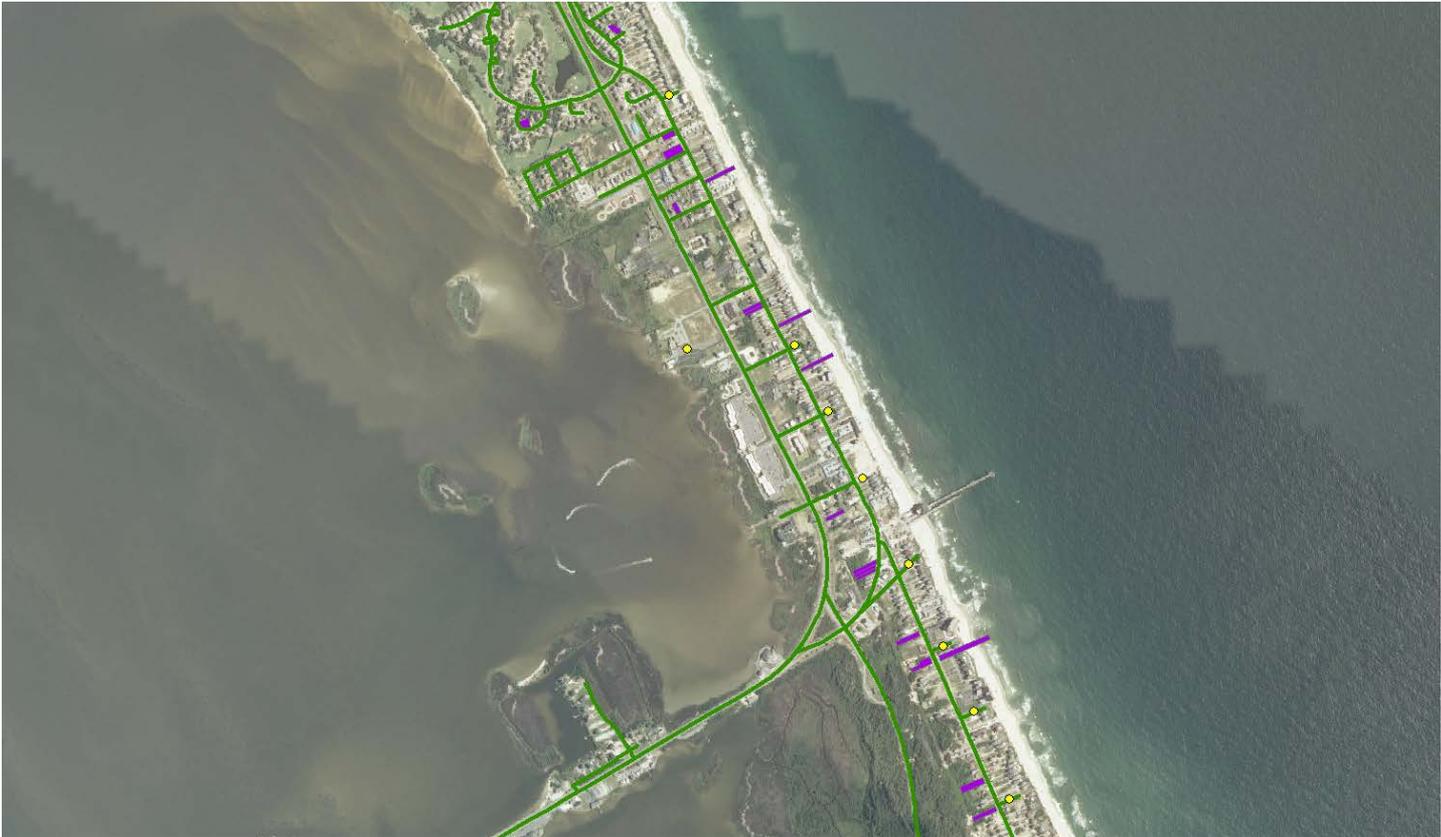
ch Access and

Oh, 2008; Phillip, 2010;

Dare County:

2010 Imagery (NAIP); 2010 Housing Sales

Access (2004; NCDENR); Road network (Dare County Tax Mapping Office)



1. Residential housing sales

1. Parcel ID#/Address
2. Sale year and month
3. Sale price
4. Bedrooms/bathrooms
5. Square footage
6. Lot size
7. Condo/house/apartment/trailer?
8. Neighborhood?

2. Aerial photography/GIS layers

1. Beach width
2. distance to nearest beach access
 1. Driving or walking?
 2. Road network
3. Size of public access
4. Within buffer?

3. Other:

1. Parking fees?
2. Bathroom/shower facilities
3. Lifeguard



Recreational Value Estimates Show People are Willing to Pay for Beach Access and Increased Beach Quality

(Brandolini, 2009; King, 2001; Parsons et al, 2000; Leeworthy, 1990; Lew, et al. 2008; Chi-Ok Oh, 2008; Phillip, 2010; Whitehead et al, 2010; Bin, Crawford, Kruse, and Landry , 2008)

Kitty Hawk, NC
January 24, 2016
Daniel Pullen Photography

