Nest Site Selection of American Oystercatchers on the Upper Texas Coast

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Objectives

- Examine breeding ecology of Oystercatchers in Texas
  - Implement a mark-resighting program
  - Monitor nests to assess reproductive success

- Investigate microhabitat and landscape scale predictors of oystercatcher nest site selection

Habitat Selection

- Occurs at multiple spatial scales (Johnson 1980)
- Difficult to explore experimentally

- Correlative approaches
- Infer selection by comparing measurements from used and random/non-use sites

Habitat Selection

- Compare use vs. non-use (Johnson 1980)

- 2 spatial scales
  - 2nd order selection
    - home range or territory size
  - 3rd order selection,
    - usage made of various habitat components within the home range, in this case the nest site

Monitoring

Nest Microhabitat

- Surveyed live vegetation at nest plots
- Equal number of non-use plots
- Paired t-tests

Nest Microhabitat

- 2012, 74 nests
- n=148
- 15% nests on shell with no vegetation
- Overall nests averaged 30% live vegetation

	Nest Plots		Non-use Plots		*P*-value
	Mean	±SD	Mean	±SD	
Live Vegetation	29.97%	26.12%	30.84%	40.25%	0.843
Shell	64.34%	28.97%	61.18%	43.68%	0.517

Nest Microhabitat

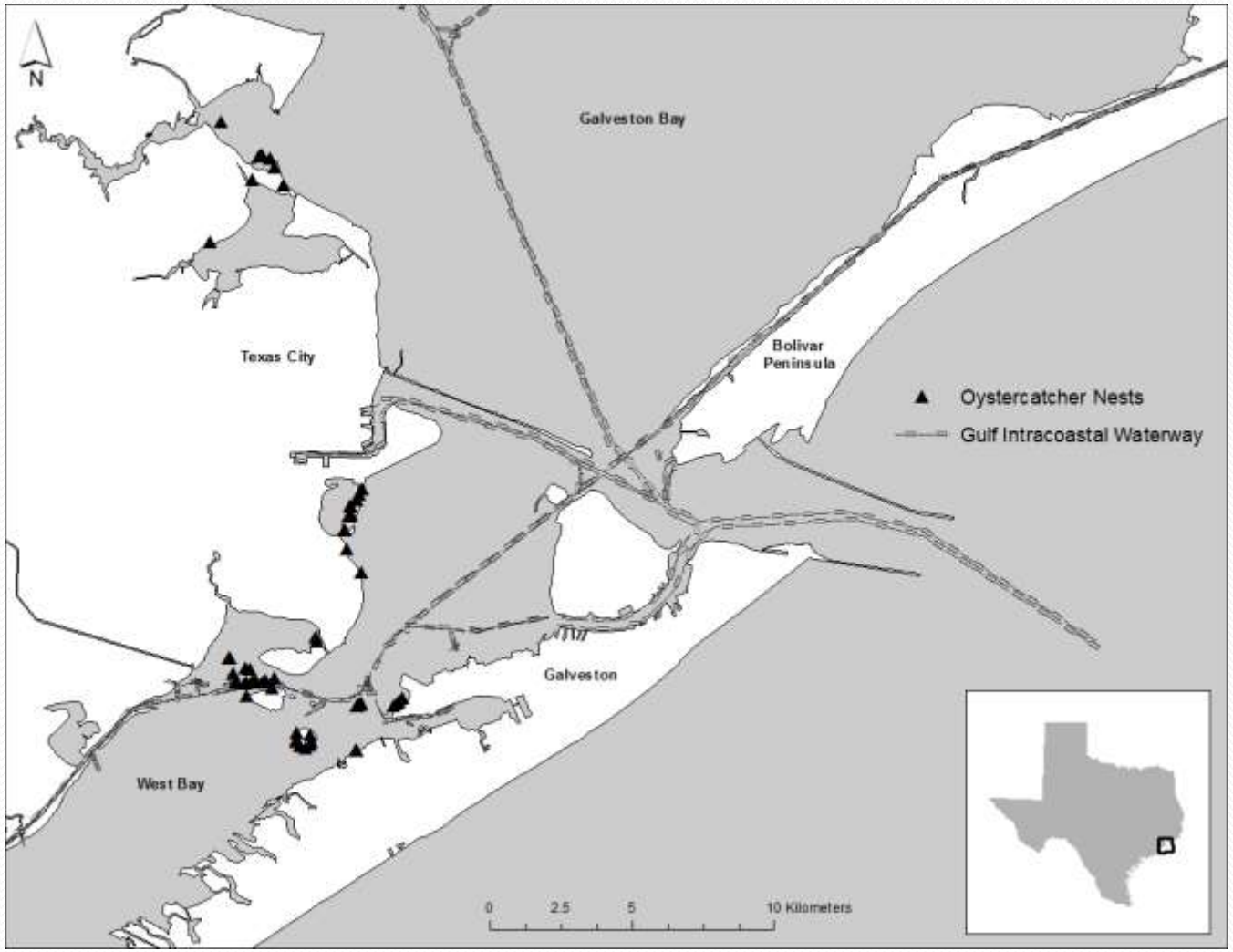
Sea purselane
(*Sesuvium portulacastrum*)

Carolina wolfberry
(*Lycium carolinianum*)

Sea ox-eye daisy
(*Borrichia frutescens*)

Saltwort
(*Batis maritima*)

Landscape


N
Galveston Bay
Texas City
Bolivar Peninsula
Oystercatcher Nests
Gulf Intracoastal Waterway
Galveston
West Bay
0
2.5
5
10 Kilometers

Landscape

Landscape data acquired in GIS analysis	Unit	Abbreviation	Potential Influence
Distance to oyster reefs	m	Oyster	Species distribution limited by the availability of intertidal shellfish beds for foraging (American Oystercatcher Working Group *et al.* 2012; Tomkins 1954)
Substrate (shell, rock, sand)	%	Shell	Nest scrapes in sandy substrate, shell rakes, or tide rack in marsh habitat (Lauro and Burger 1989, Winn 2000)
Distance to beach access points	m	Beach	Disturbance from human recreational activity and elevated predation from predators augmented by human activities (Sabine et al. 2008; Schulte et al. 2010)
Distance to Intracoastal Waterway	m	GIWW	Disturbance from recreational and commercial boat traffic, increased potential of nest overwash from boat wakes (McGowan and Simons 2006; Thibault 2008)
Distance to urban landcover	m	Urban	Lower nest survival and higher chick mortality in sites with high human disturbance (McGowan and Simons 2006; Sabine et al. 2008)
Elevation	m	Elevation	Nests typically on slightly elevated sites, low nests very susceptible to tidal flooding (American Oystercatcher Working Group et al. 2012; Virzi 2008)

Landscape

- NLCD
- DEM
- Oyster reefs
- Gulf Intracoastal waterway
- Beach access points

Landscape

- Goal: AIC_c
- Univariate logistic regression for each variable
- All were significant, except beach access
- Eliminated distance to beach access points from further analysis

Landscape

- Correlation matrix to explore relationships of habitat variables
- Did not include highly correlated variables ($r \geq 0.60$ or $r \leq -0.60$)

Covariate	Oyster	GIWW	Urban	Shell	Elevation
Oyster	1.00	0.535	0.052	-0.366	0.433
GIWW		1.00	-0.070	-0.256	0.160
Urban			1.00	-0.299	-0.029
Shell				1.00	-0.230
Elevation					1.00

Landscape

Model	ΔAICc	*w*	Number of parameters	-2LL
Shell + Oyster + Urban	**0**	**0.44**	**4**	**62.01**
Shell+ Oyster + Urban + Elevation + GIWW	1.26	0.23	6	58.79
Shell+ Oyster + Urban + Elevation	1.35	0.22	5	61.14
Shell + Oyster + GIWW	4.22	0.05	4	66.23
Shell + Oyster	4.87	0.04	3	69.05
Shell + Oyster + Elevation	6.71	0.02	4	68.72
Oyster	43.2	<0.001	2	109.51
Shell	56.94	<0.001	2	123.25
null	117.37	<0.001	1	185.76

Results

- Best supported model
- Negative relationship
  - Distance to oyster reefs
  - Distance to urban landcover
- Positive Relationship
  - % shell substrate
- Confirms that distribution is limited by availability of intertidal areas supporting shellfish beds

Discussion

- Nest microhabitat
- Did not find any differences
- Based on what we measured microhabitat composition does not seem to be as important in selection as the landscape scale

Discussion

- Landscape scale
- Oyster reefs and the presence of shell substrate for nesting are important factors in determining how oystercatchers select their nest sites.
- Conservation and restoration

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Questions?