

Sea-level Rise, Coastal Land Prices, and the Strategic Growth of the Refuge System

Background

- Sea-level rise is threatening our 159 coastal refuges.
- Coastal land prices tend to be high.
- We sometimes pay high prices for unsustainable lands.
- Coastal land prices may decline substantially due to sea-level rise and insurance trends.

Strategic Growth and LAPS

- LAPS remains pivotal to Refuge System land acquisition.
- LAPS tends to prioritize coastal refuges for acquisition, and possibly higher-priced lands.
- LAPS (and our overall strategic growth process) may easily be modified to account for sea-level rise.
- LAPS (and our overall strategic growth process) may easily be modified to account for land prices.

Accounting for Sea-level Rise in LAPS

- Develop climate change component for LAPS pursuant to Secretarial Order 3226.
- Begin with most obvious and most readily accounted process: i.e., sea-level rise.
- Preferred approach for adjusting LAPS score:
 - Use SLAMM analysis (rapidly becoming available on refuges) with mid-range IPCC sea-level rise scenario, 100-year projection.
 - Calculate proportion of refuge not projected to convert from terrestrial or tidal to open saltwater .
 - Multiply LAPS score by proportion to obtain adjusted LAPS score.
- Alternative approach. Complete the following tables (example from hypothetical North Carolina refuge provided).

A. Coastal ecology adjustment

Coastal ecology categories	Proportion of acquisition comprised of coastal ecology categories	Ecological adjustment factor	Ecological adjustment
Salt marsh, transitional marsh, tidal flats, ocean beach	.25	400	100
Tidal freshwater marsh, hardwood or cypress swamp, red mangrove, estuarine beach	.25	200	50
Total Adjustment			150

B. Geophysical adjustment

State in which all or most of refuge is located	Ecological adjustment	Geophysical adjustment factor	Final adjustment
ME, NH, MA		0.6	
RI, CT, NY		0.8	
NJ, DE		1.0	
MD, VA, NC	150	1.2	180
SC, GA, FL (Atlantic)		1.4	
FL (Gulf), AL, MS, LA		1.8	
TX		1.5	
CA, OR, WA		1.0	

Final adjustment = 180, which is subtracted from unadjusted LAPS score to produce final LAPS score.

Accounting for Land Prices in LAPS

- Merits of acquisition depend on benefits and costs.
- Benefits accounted for systematically with LAPS; costs not accounted for systematically.
- Costs easier to account for and politically beneficial to account for.
- Suggested, "equal weight" method:
 1. Determine land price/acre range using recent 5-year period (e.g., zero to \$350,000/acre).
 2. Divide project land price by land price range. Multiply dividend by ½ unadjusted LAPS score. Subtract multiplicand to calculate final LAPS score.
 - Example 1, inexpensive land. Unadjusted LAPS score = 650; ½ unadjusted LAPS score = 325. Project price/acre = \$3,500. $\$3,500/\$350,000 = 0.011$. $325 * 0.01 = 3.25$. Final LAPS score = $650 - 3.25 = 646.75$.
 - Example 2, expensive land. Unadjusted LAPS score = 650; ½ unadjusted LAPS score = 325. Project price/acre = \$175,000. $\$175,000/\$350,000 = 0.5$. $325 * 0.5 = 162.5$. Final LAPS score = $650 - 162.5 = 487.5$.

Table 1. Refuges along Atlantic seaboard established pursuant to the Endangered Species Act. (St. Johns National Wildlife Refuge, established for the Dusky seaside sparrow, is not included but is very close to the coastline.)

Refuge	State	Species Established For
Mason Neck	VA	Bald eagle
James River	VA	Bald eagle
Hobe Sound	FL	loggerhead sea turtle, green sea turtle
Archie Carr	FL	loggerhead sea turtle, green sea turtle
Crocodile Lake	FL	American crocodile