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A Standardized Framework to Assess the Condition and Stresses of Estuary Ecosystems at Regional Scales

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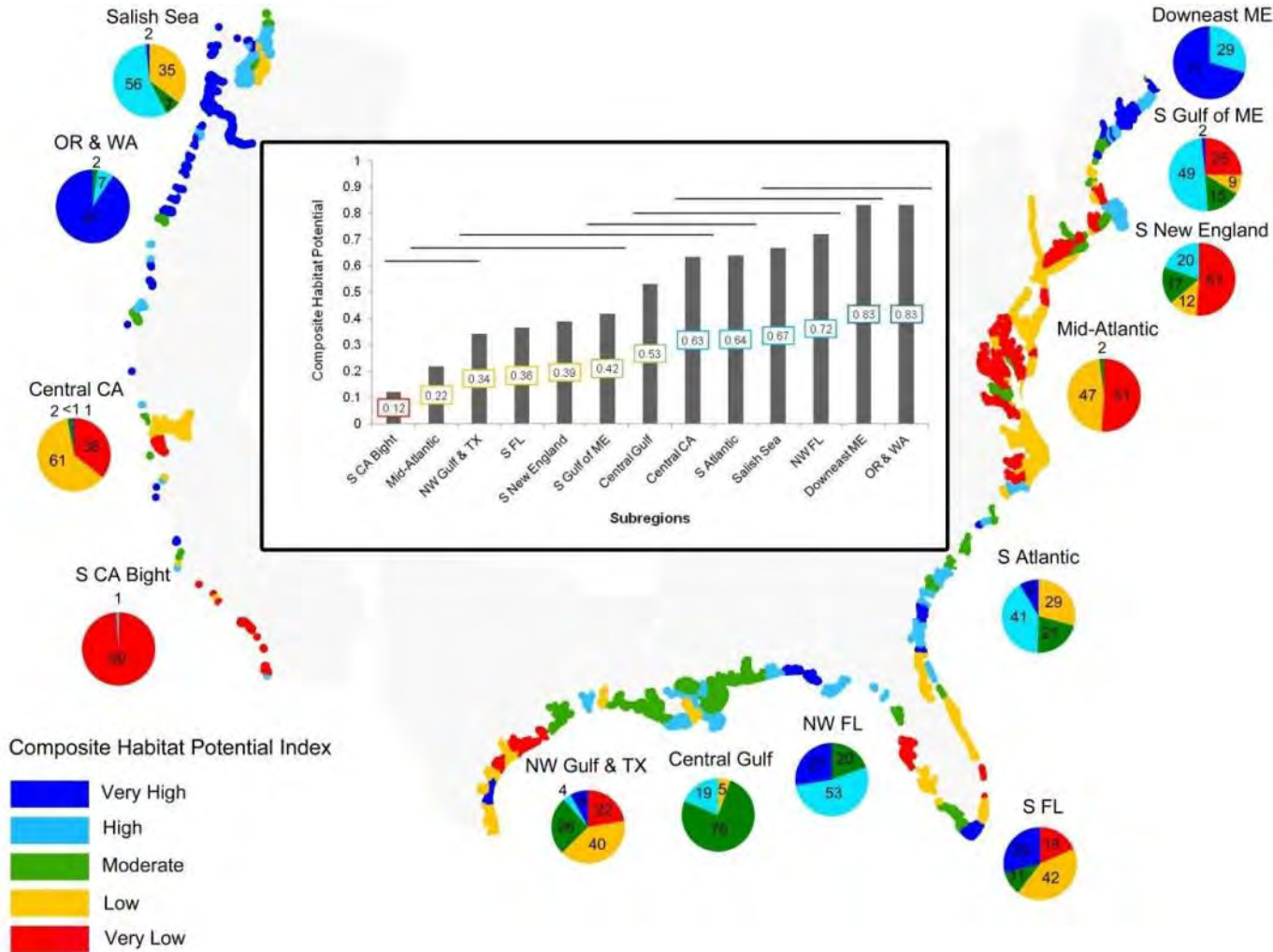
Restore America's Estuaries 7th National Summit on Coastal and Estuarine Restoration
November 4, 2014

Goals of the National Coastal Assessment

- Provide national perspectives on fish habitat condition
- Build on previous efforts
- Illustrate scope and effectiveness of habitat conservation activities over time
- Complement and support regional assessment efforts

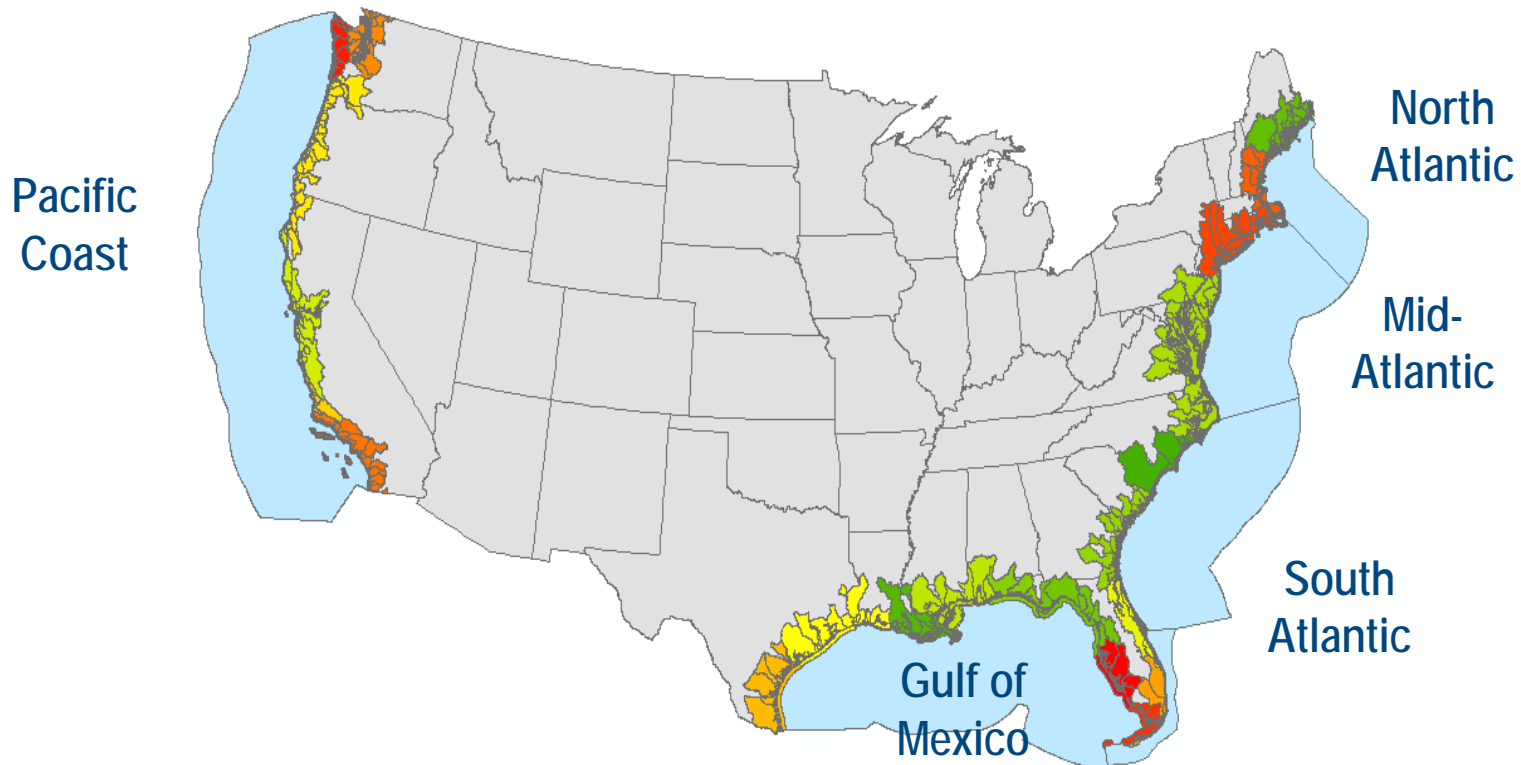


2010 National Estuary Assessment

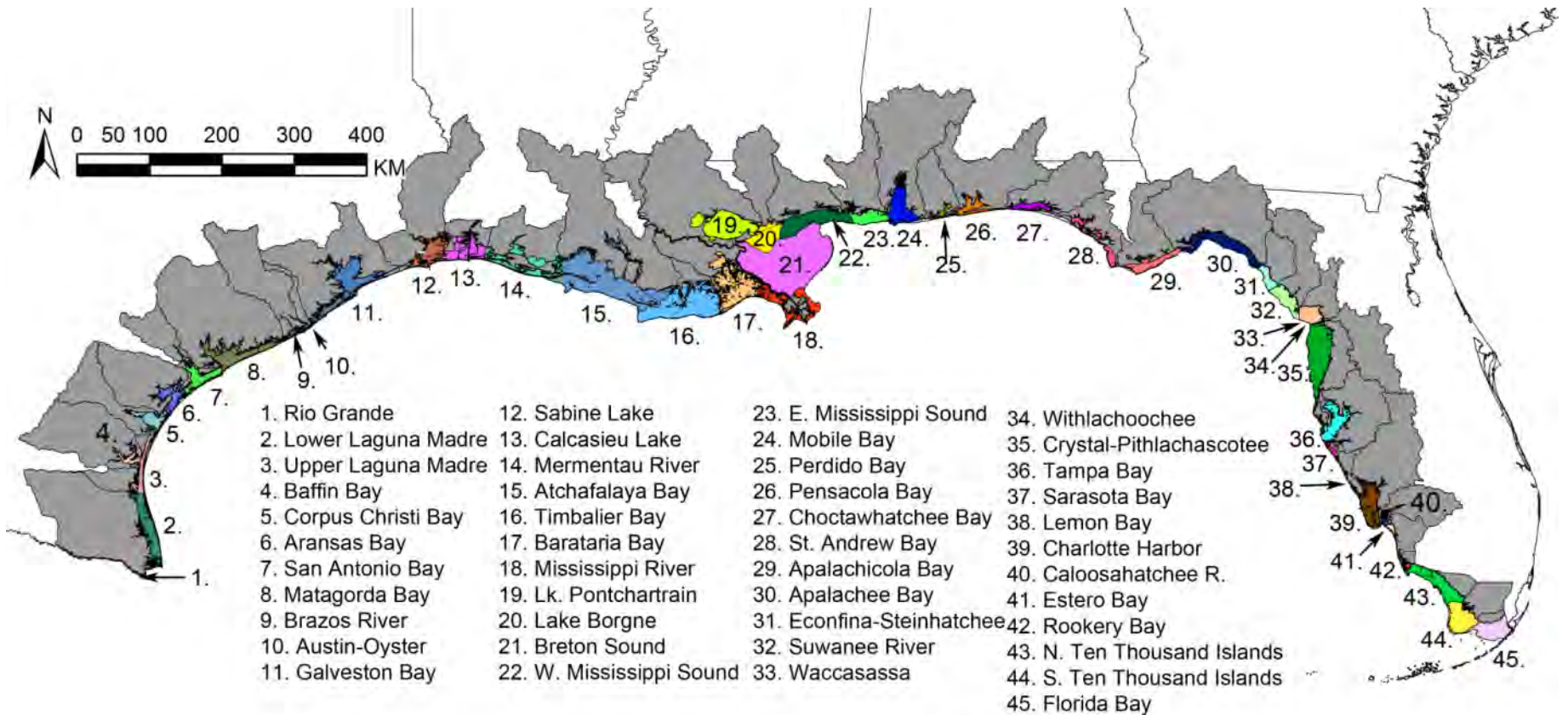


2015 Assessment Approach

- Regional scale
- Add fish/shellfish data
- Use robust models
- Active FHP participation



Gulf Demonstration Project



General assessment steps

Step 1: Refine geospatial framework

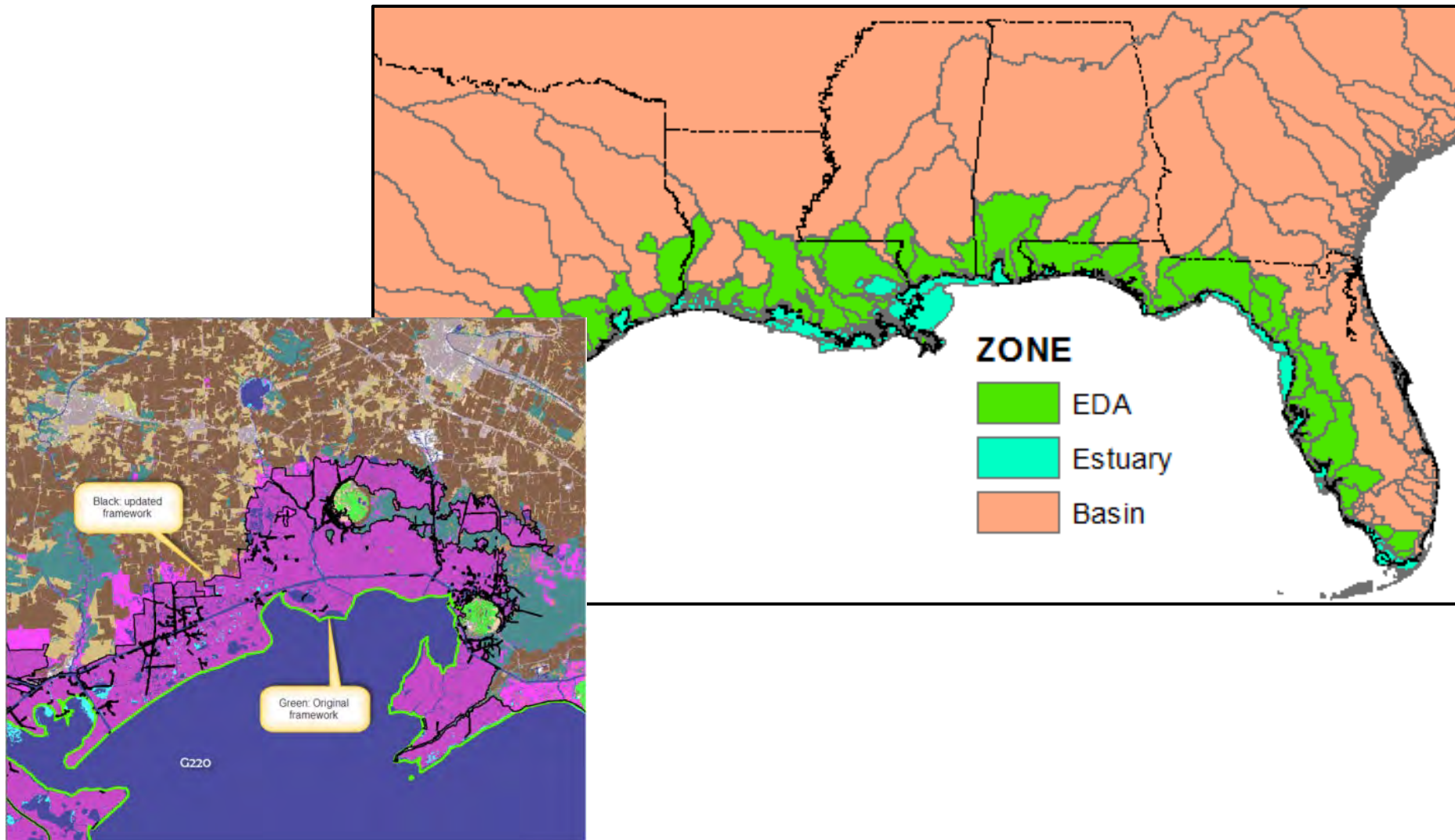
Step 2: Assemble and evaluate data

Step 3: Indicator screening

Step 4: Multi-stressor modeling

Step 5: Synthesize and map results

Step 1: Geospatial Framework



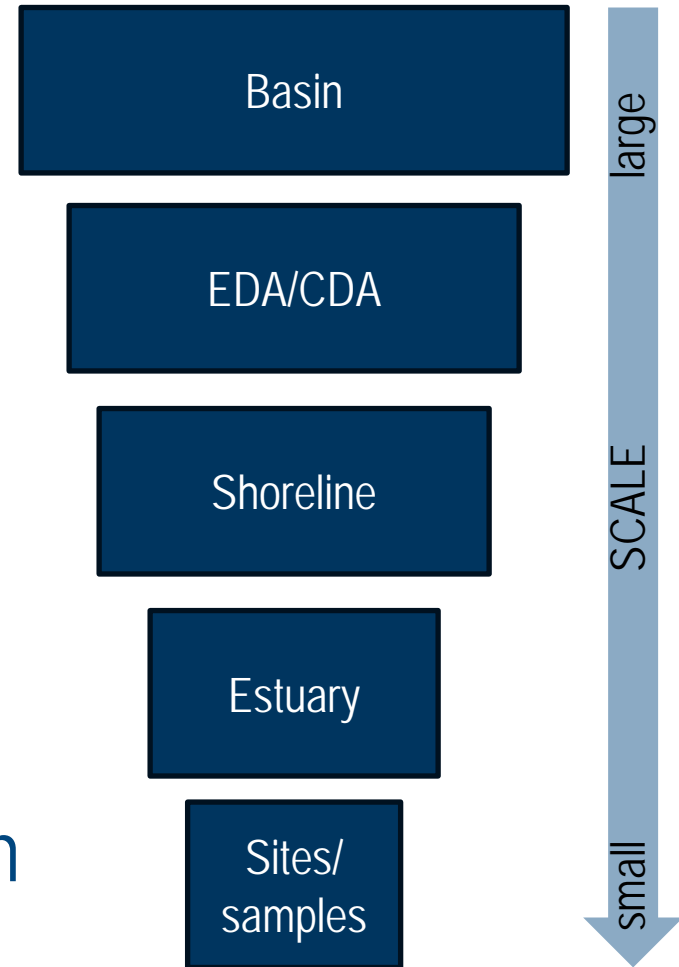
Step 2: Assemble data

Landscape stressors

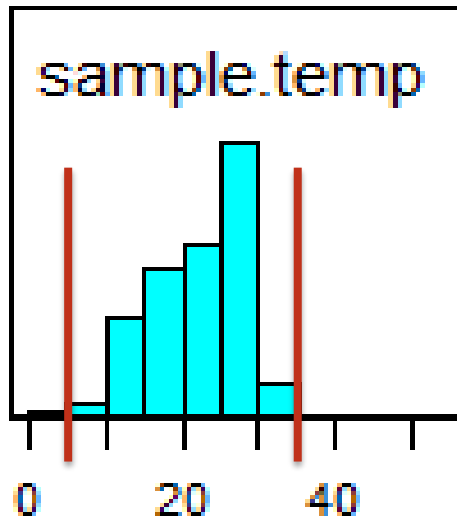
Local habitat disturbance

Fish community

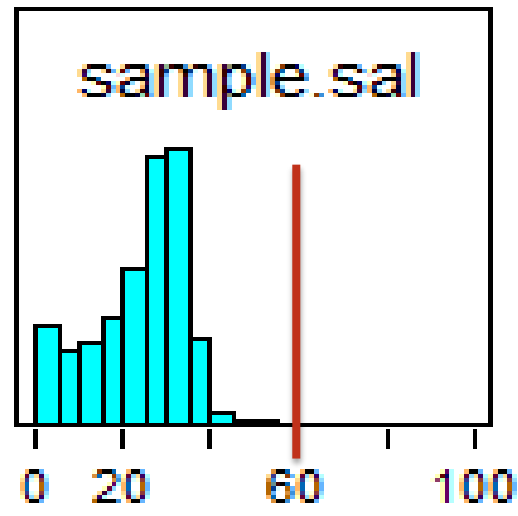
Natural environmental variation



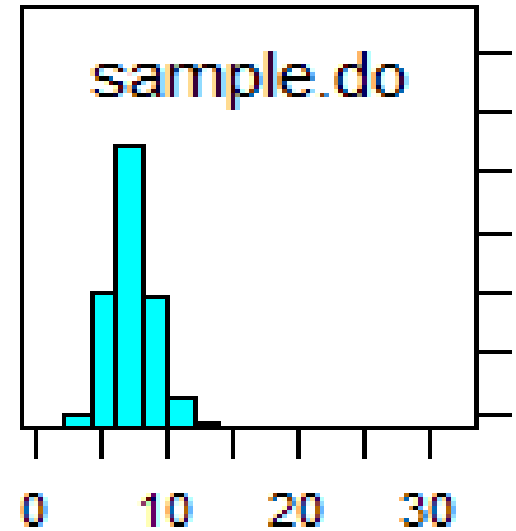
Step 2: Evaluate Data



0 – 55 deg C



0 – 99 ppt



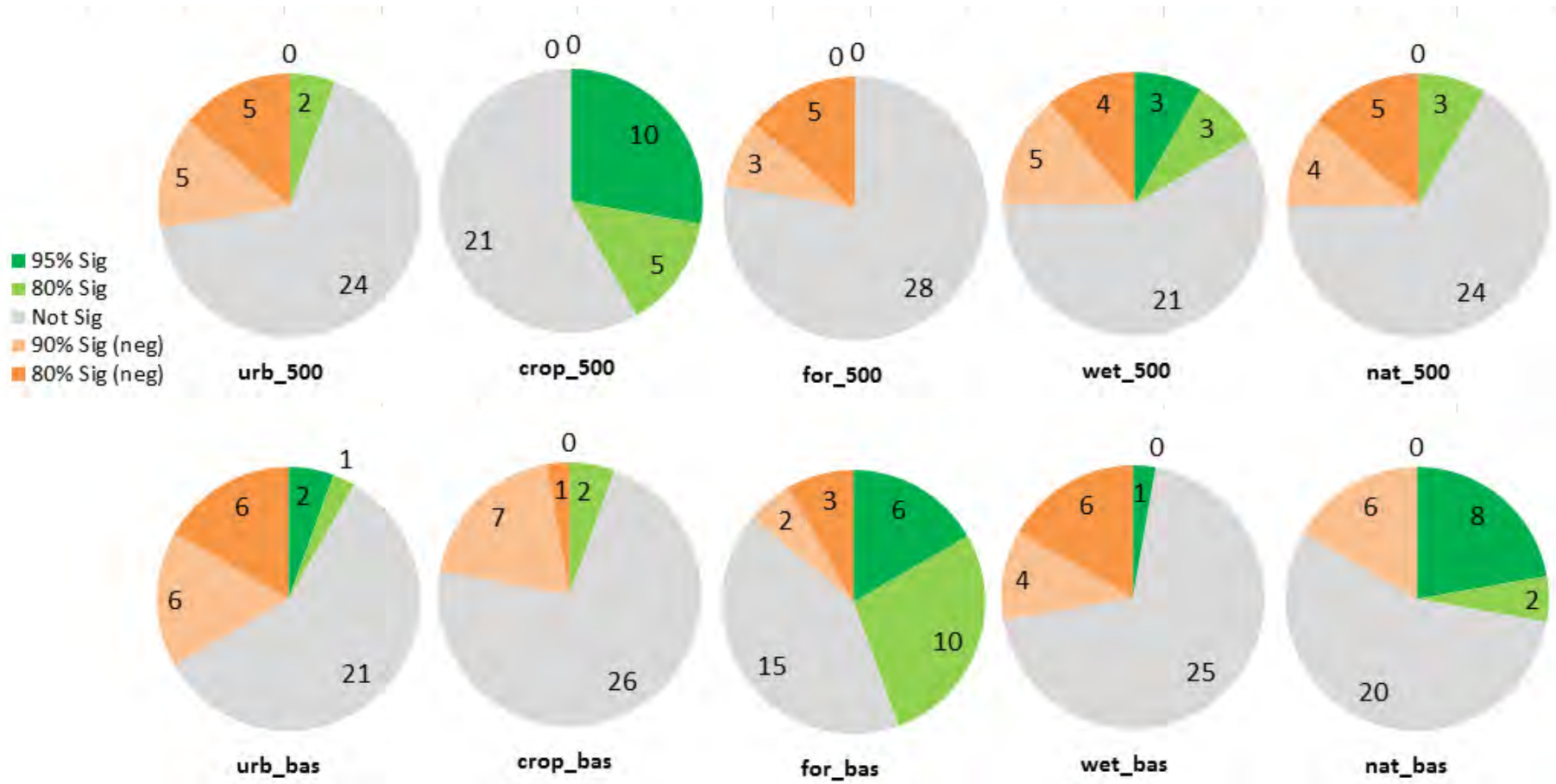
0 – 32 mg/l

Steps 3 & 4: Modeling Approach



- Categorical 'state' variables
- Contributing watershed variables
- Estuary-specific 'random effects'
- Water quality attributes

Step 3: Indicator Screening

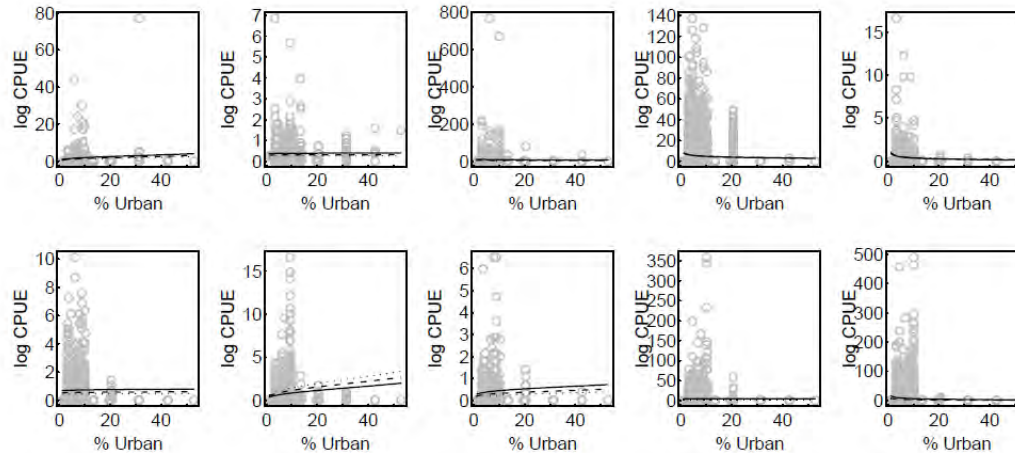


Step 3: Indicator Screening

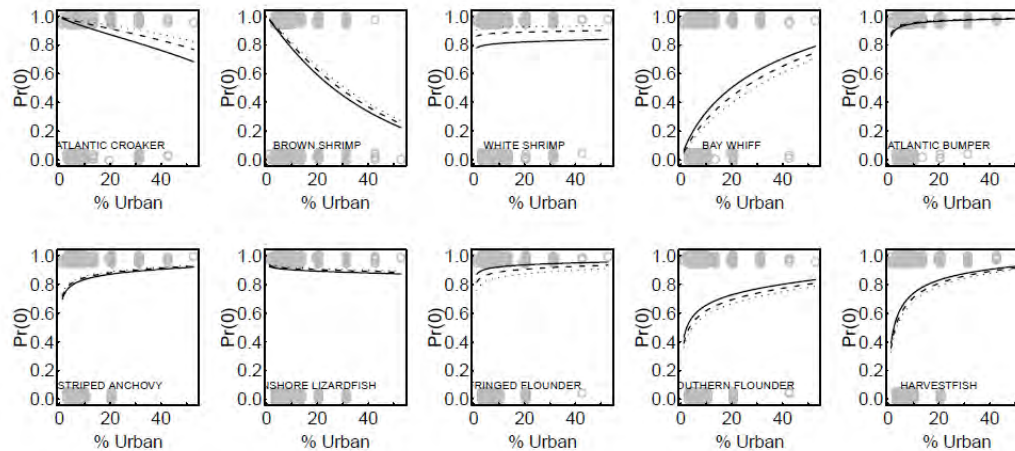
Species Name	Species Name	n-pres	n-estry	urb_500	crop_500	for_500	wet_500	urb_bas	crop_bas	for_bas	wet_bas	nat_500	nat_bas
ATLANTIC CROAKER	<i>Micropogonias undulatus</i>	12511	33	-2.07	1.92	-0.63	0.48	-3.39	1.82	2.41	-2.56	0.07	-0.30
BAY ANCHOVY	<i>Anchoa mitchilli</i>	9330	32	-0.21	0.36	-1.28	1.37	-1.27	0.42	1.56	-1.24	0.49	0.47
BROWN SHRIMP	<i>Farfantepenaeus aztecus</i>	9290	28	-2.45	1.72	-0.60	-0.46	-2.74	1.09	1.81	-2.43	-0.88	-0.68
SPOT	<i>Leiostomus xanthurus</i>	9069	34	-1.36	2.51	-0.03	-1.54	-1.71	-0.30	3.00	-2.81	-1.58	0.21
BLUE CRAB	<i>Callinectes sapidus</i>	8929	37	0.91	2.16	-2.47	-2.00	1.67	0.48	-2.03	0.53	-4.18	-1.93
HARDHEAD CATFISH	<i>Ariopsis felis</i>	8325	34	-0.10	2.77	-1.46	-1.37	-0.61	0.65	1.58	-2.59	-2.42	-1.15
SAND SEATROUT	<i>Cynoscion arenarius</i>	7903	33	1.62	0.02	-2.13	1.33	-0.41	-0.56	0.89	-0.95	-0.03	-0.03
WHITE SHRIMP	<i>Litopenaeus setiferus</i>	6746	25	-2.35	2.31	-0.72	-0.39	-2.92	0.81	2.07	-2.39	-0.89	-0.26
PINFISH	<i>Lagodon rhomboides</i>	6455	40	-1.14	0.53	0.91	-2.70	-0.44	-0.65	1.19	-1.70	-2.00	-0.61
GULF MENHADEN	<i>Brevoortia patronus</i>	4454	31	-0.08	1.27	-1.16	0.63	-0.68	-0.96	0.75	-0.10	-0.04	0.83
SILVER PERCH	<i>Bairdiella chrysoura</i>	4384	32	-1.68	2.59	1.20	-3.50	-0.48	0.36	1.49	-2.91	-2.28	-1.58
GAFFTOP CATFISH	<i>Bagre marinus</i>	4197	30	0.42	2.63	-1.14	-0.29	-0.68	-0.91	1.00	-0.57	-1.04	0.60
BAY WHIFF	<i>Citharichthys spilopterus</i>	3048	24	-2.30	2.16	-0.16	0.10	-2.41	-0.70	2.39	-1.36	0.00	1.47
LEAST PUFFER	<i>Sphoeroides parvus</i>	2842	25	-0.67	0.46	-0.20	1.24	-1.11	-1.21	1.74	-0.14	1.25	2.26
ATLANTIC SPADEFISH	<i>Chaetodipterus faber</i>	2143	30	-0.24	1.07	-2.08	2.68	-0.65	-1.46	0.06	0.57	1.12	0.82
ATLANTIC BUMPER	<i>Chloroscombrus chrysurus</i>	2022	28	-0.30	1.43	-1.07	1.86	-1.86	-1.05	1.33	0.23	1.06	2.21
STRIPED ANCHOVY	<i>Anchoa hepsetus</i>	1727	28	-0.46	0.72	-0.42	1.26	-1.58	-1.84	1.97	0.30	0.94	3.25
INSHORE LIZARDFISH	<i>Synodus foetens</i>	1712	37	0.24	-0.17	-0.23	0.76	-0.06	-3.33	1.12	0.88	0.59	2.72
FRINGED FLOUNDER	<i>Etropus crossotus</i>	1425	27	-1.79	1.35	0.67	1.15	-2.41	-1.53	2.02	-0.35	1.60	2.66
SOUTHERN FLOUNDER	<i>Paralichthys lethostigma</i>	1370	27	-3.40	1.16	-0.12	1.21	-2.69	0.04	1.57	-1.57	1.17	0.15
ATLANTIC STINGRAY	<i>Dasyatis sabina</i>	1369	27	-0.26	2.08	0.67	-2.76	0.01	0.71	0.15	-1.57	-2.15	-1.77
HOG CHOKER	<i>Trinectes maculatus</i>	1330	30	0.93	0.75	0.05	-1.93	0.04	1.63	-0.89	-0.20	-1.82	-1.42
CREVALLE JACK	<i>Caranx hippos</i>	1324	23	-0.48	1.61	-2.11	1.27	-1.30	-1.08	0.63	0.21	0.07	1.13
BLACKCHEEK TONGUEFISH	<i>Symphurus plagiusa</i>	1298	28	0.11	0.21	0.03	-0.69	0.53	-1.61	1.39	-0.72	-0.63	1.06
PIGFISH	<i>Orthopristis chrysoptera</i>	1273	28	-1.18	-0.35	1.10	-0.03	1.09	-1.03	0.11	-0.62	0.72	-0.61
THREADFIN SHAD	<i>Dorosoma petenense</i>	1221	25	0.28	0.20	-1.58	2.49	-1.26	-0.90	1.01	0.48	1.45	2.02
SOUTHERN KINGFISH	<i>Menticirrhus americanus</i>	1175	26	1.75	0.56	-0.05	-1.85	0.92	-0.75	-0.46	0.75	-1.77	0.25
HARVESTFISH	<i>Peprilus paru</i>	1046	24	0.01	0.58	-0.98	1.20	-0.91	-1.89	1.01	0.50	0.60	2.15
ATLANTIC MOONFISH	<i>Selene setapinnis</i>	848	18	-0.22	2.08	-1.75	0.31	-1.64	-1.59	1.90	-0.76	-0.69	1.62

Step 4: Multi-stressor Modeling

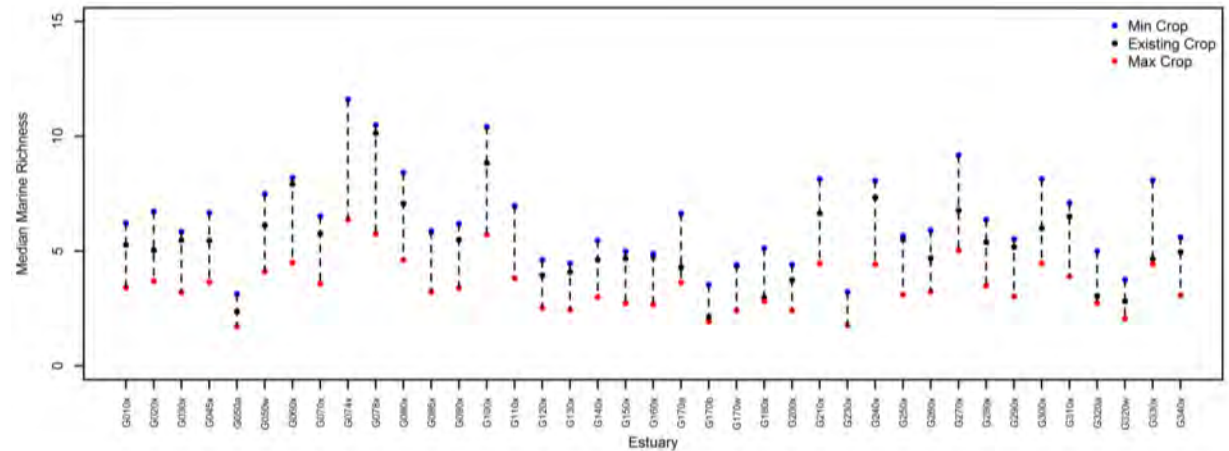
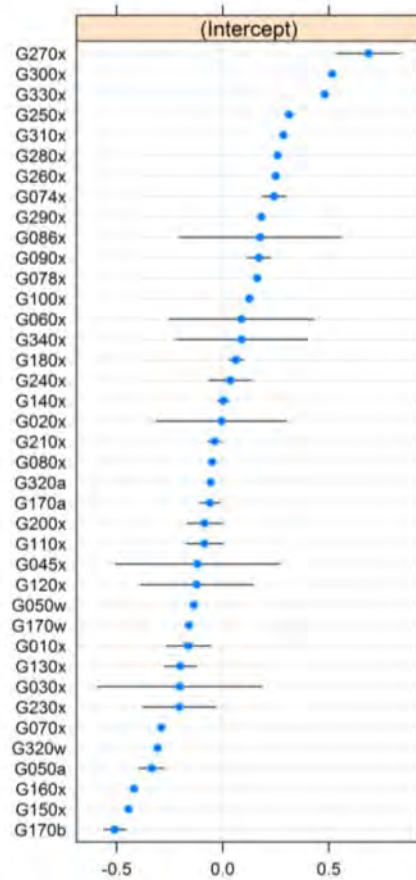
Abundance Model



Zero Model



Step 4: Community Metric Modeling

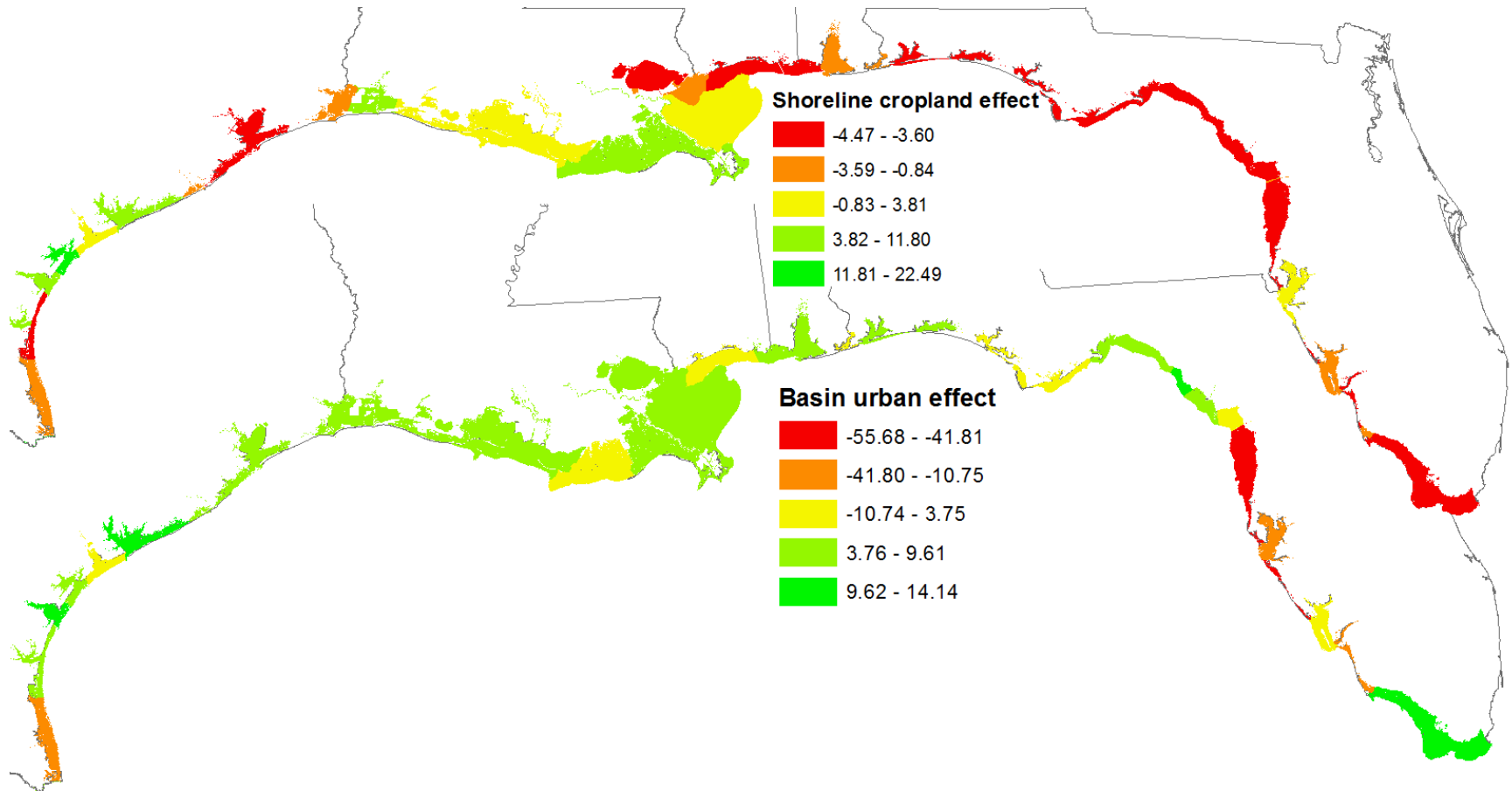


Step 5: Priority Management Questions

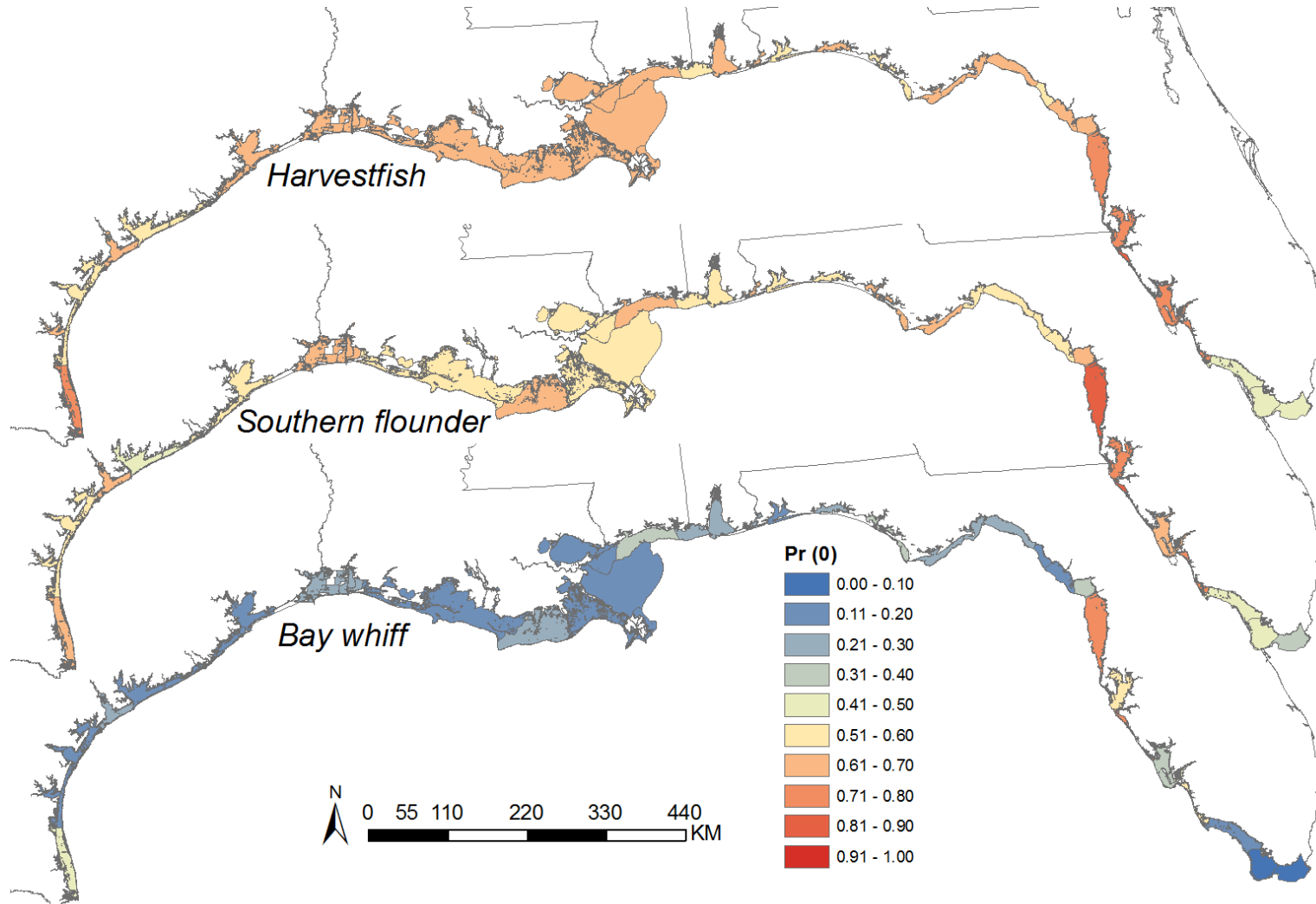
1. What are the relative conditions of estuaries across the region?
2. Where are intact and degraded habitats located?
3. What are key stressors to the system?



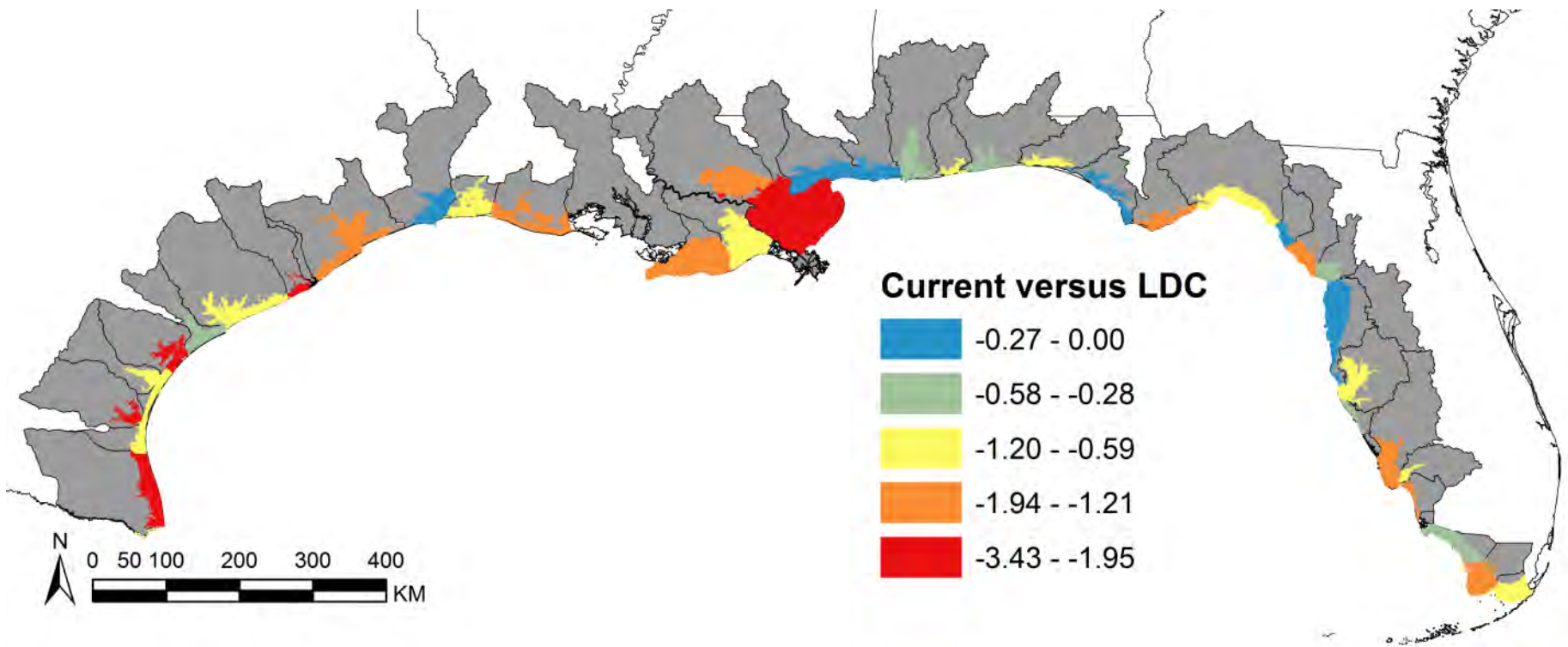
Step 5: Map Results



Step 5: Map Results



Step 5: Map Results



Next Steps

1. Ongoing Gulf assessment



2. Pacific Coast assessments



The Nature Conservancy





Want to get involved?

Contact me at Kristan.Blackhart@noaa.gov