



# Facilitating Planning Across the Land-Sea Interface

## Through Interoperation of Three Decision Support Tools

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*SeaGrant Texas*

Doug Walker  
*Placeways*

## Coastal GeoTools 2009

Patrick Crist  
*NatureServe*



# The Vision . . .

- A planner proposes a future land use scenario and obtains . .
- An assessment of the effects on terrestrial, freshwater, and marine ecosystems, allowing . . .
- Scenario modification that maximizes goal achievement across sectors and ecosystems.



A Tools Demonstration Project of the EBM Tools Network

A global network dedicated to the application of tools to facilitate coastal-marine ecosystem-based management through:

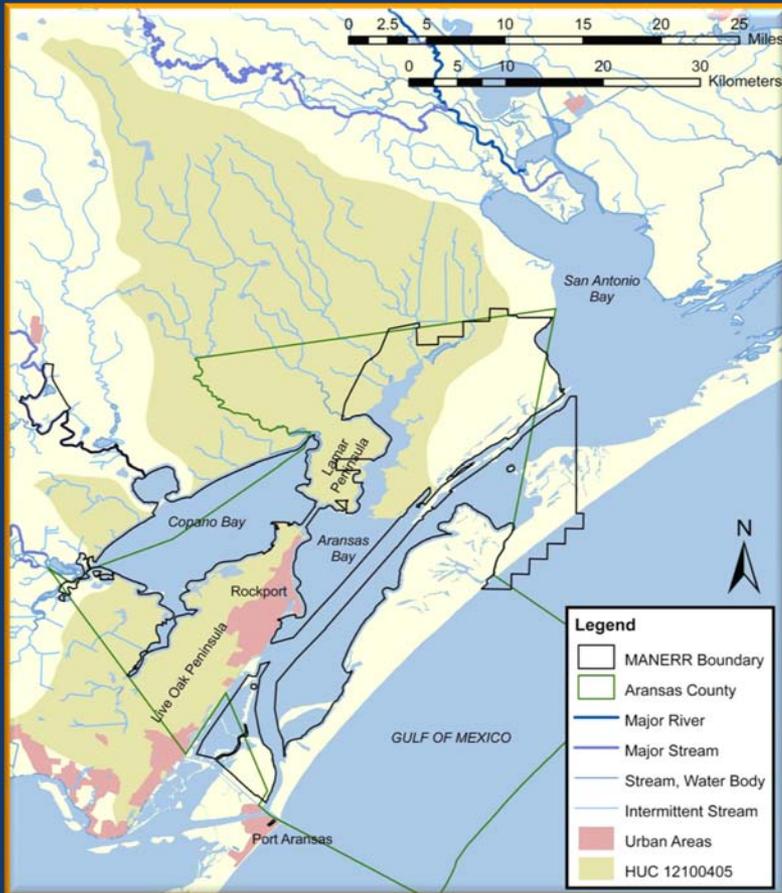
- Increased awareness of tools
- Increased tool availability and tool interoperability
- Better tool application through training and best practices guidance

# Project Objectives

- ▣ Demonstrate the linkage of 3 EBM tools to address integrated land-sea planning
- ▣ Create a documented methodology for the integration and interoperability of these tools
- ▣ Assist Aransas County with analyses to demonstrate the need for increased land use planning authority

# Mission-Aransas NERR case study

A resource-based rural but growing region seeking an EBM approach to planning linking land use and estuary health



Mangroves



Open Bay



Oak Motte



Urban



Riparian



Beaches



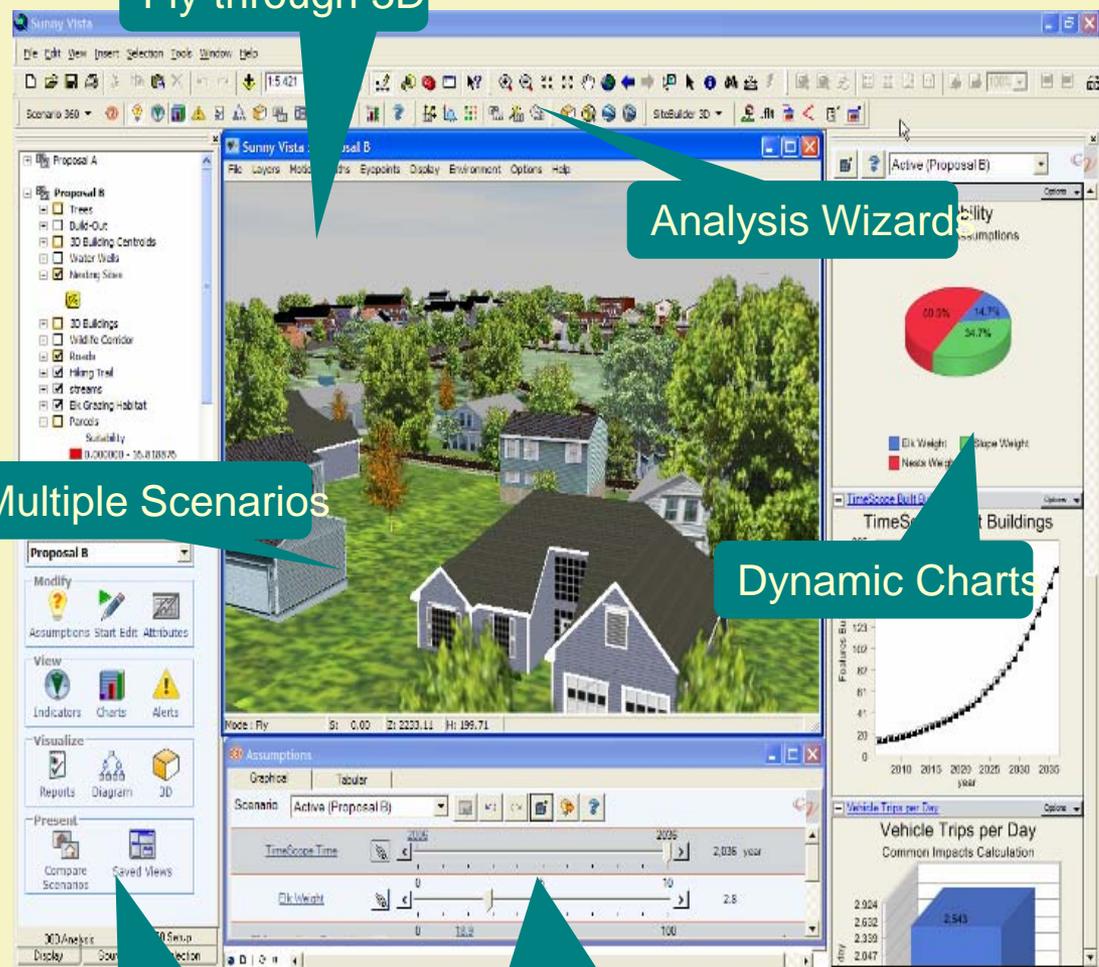
# TOOLS OVERVIEW

- ❑ **CommunityViz: Placeways**
- ❑ **NatureServe Vista: NatureServe**
- ❑ **N-SPECT: NOAA CSC**

Note: all three tools are ArcView 9.2 Extensions

# communityviz

- ❑ A land use planning, indicators modeling, & visualization software
- ❑ Thousands of users in North America and 40 other countries
- ❑ Fully supported; commercial quality
- ❑ Used by non-profits, for profits, landowners, and all levels of government
- ❑ Taught at dozens of universities
- ❑ Retail prices from \$379 - \$850



Fly-through 3D

Analysis Wizard

Multiple Scenarios

Dynamic Charts

Intuitive Interface

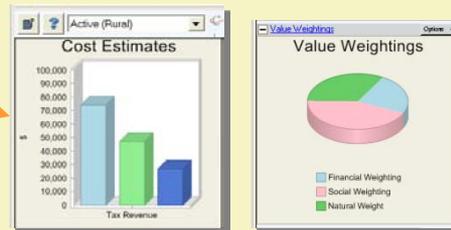
Interactive Controls

# CommunityViz Typical Process

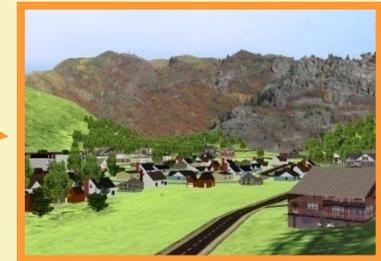
Create land use scenarios



Create indicators measuring impacts (economic, social, environmental)



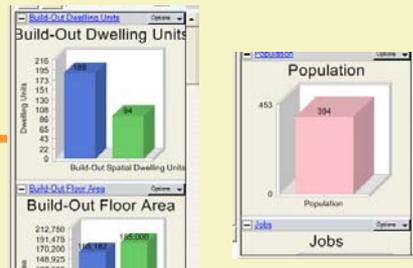
Create 3D visual models



Choose preferred plan



Project impacts into the future



Experiment interactively and see changes



# About NatureServe Vista

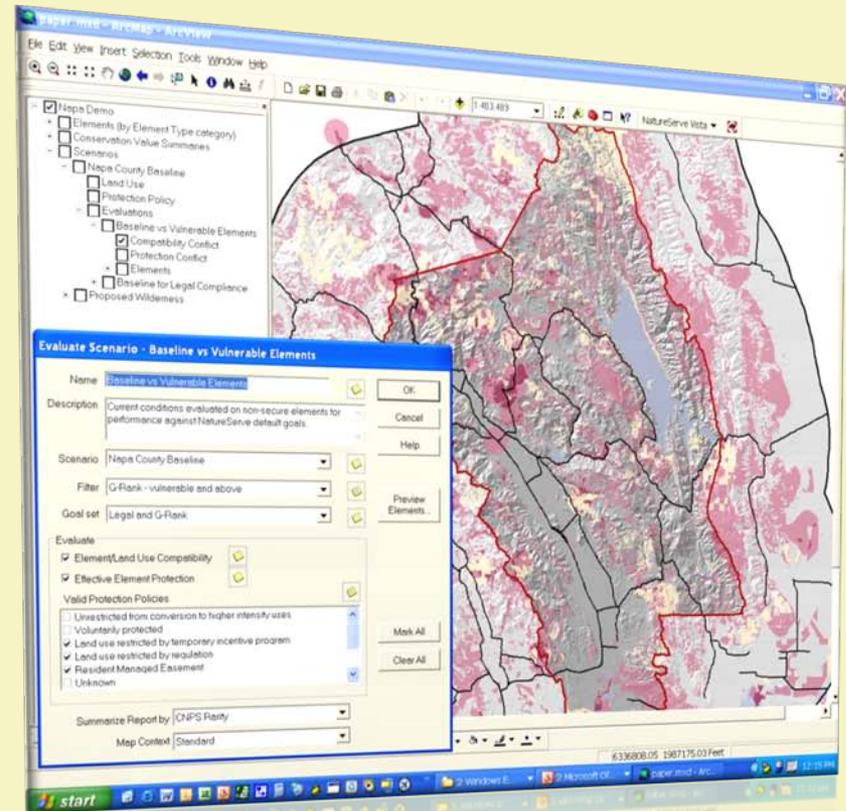
a \$3.8M investment in good planning



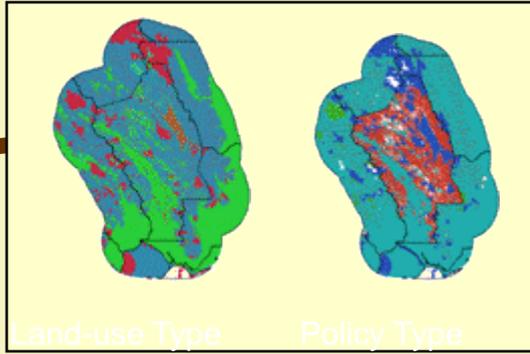
SURDNA  
FOUNDATION



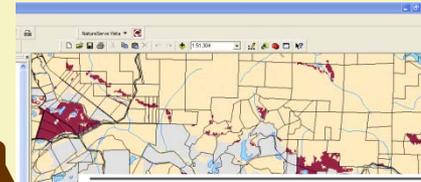
- A conservation integration software for assessment and planning
- Provides automation, documentation, & repeatability of the planning process
- Supports both conservation experts & planners/managers of all sectors
- Based on market research, applies commercial grade design and engineering & endowment (in good years) to maintain it
- Full integrated help manual, live technical support, available training in person or by web



# Vista Supported Process



Scenario Outputs  
baseline, buildout  
trends, alternatives



Evaluation  
Maps &  
Reports

Terrestrial Ecological System (33 elements)				Protected and Compatible		
Name	Distribution Area (hectares)	Occs	Goal Area (hectares)	Occs	Percent of goal	
Caribbean wet montane forest- Sierra Palm alliance	11,965.95	1	2,481 hectares	1	167.33%	
Caribbean wet montane forest- Palo Colorado alliance	3,713.49	1	762 hectares	1	468.46%	
Caribbean seasonal evergreen submontane- lowland forest (young secondary)	97,270.47	1	10,862 hectares	1	10.06%	
Caribbean submontane lowland forest (young secondary)	1,877.22	1	9,482 hectares	1	0.77%	
Caribbean montane submontane karst forest (young secondary)	15,090.96	1	0 hectares	1	100%	
Caribbean montane wet serpentine woodland (young secondary)	1,001.25	1	0 hectares	1	100%	
Caribbean lowland moist serpentine woodland (young secondary)	1,951.38	1	0 hectares	1	100%	
Caribbean lowland dry semideciduous forest (young secondary)	19,810.44	1	7,283 hectares	1	27.81%	
Caribbean lowland dry riparian woodland and forest	1,231.12	1	1,229 hectares	1	7.82%	
Caribbean lowland dry limestone semideciduous forest (young secondary)	3,919.32	1	0 hectares	1	100%	
Caribbean lowland dry limestone semideciduous forest (young secondary)	10,679.4	1	0,500 hectares	1	35.96%	
Caribbean floodplain forest (young secondary)	11,768.58	1	0 hectares	1	100%	
Caribbean montane dry evergreen forest	1,057.78	1	106 hectares	1	87.1%	

**Element Goals**

Name: Mediterranean California Dry-Mes

Goal: 0 sq. meters

0 sq. meters

0 sq. meters

80% of sq. meters

90% of sq. meters

100% of Occurrences

100% of Occurrences

90% of Occurrences

<default>

80% of sq. meters

Apply

Reset to

General Spatial Categories Compatibility

Maintain Primarily for Natural Values

Biodiversity

Natural area

Unknown sp

Maintained Primarily

Intensely managed

Low-density

Unknown sp

Utilized Primarily

Elements, values, & expert knowledge

**Active Keyways**

Element Name Total Protected Area % of Total Response Compatible Area

Indigenous California Earth and Lava Flow	1.37 ac/0.1%	1.37 ac/0.1%	Incompatible	0 ac/0%
Large Montane Pine - Oak Woodland	1,363 ac/0.1%	3.6% ac/0.1%	Incompatible	0 ac/0%
Central California Riparian Woodland	228 ac/0.2%	3.6% ac/0.1%	Incompatible	0 ac/0%
California Annual Grasslands Alliance	4,753 ac/0.4%	1.6% ac/0.0%	Incompatible	0 ac/0%
Central Valley Grasslands Alliance	456 ac/0.4%	6.4% ac/0.6%	Compatible	0 ac/0%
Northern California Woodland	744 ac/0.7%	7.7% ac/0.7%	Incompatible	0 ac/0%
Central Valley Mixed Oak Savanna	2,739 ac/0.2%	3.3% ac/0.1%	Incompatible	0 ac/0%
Southern California Wet Meadows	75 ac/0.1%	2.7% ac/0.0%	Incompatible	0 ac/0%
Sierra Nevada Chaparral	581 ac/0.5%	8.9% ac/0.8%	Incompatible	0 ac/0%
Sierra Nevada California Poppy Steppe	940 ac/0.8%	1.6% ac/0.0%	Incompatible	0 ac/0%

Scenario Composition

Layer: Land Use Policy Type (sq. meters)

Apply

Low intensity working land: Unrestricted from conversion: 1,976,500

High intensity working land: Unrestricted from conversion: 874,500

Review

Override: Mutual area recreation: None

Body-sensitivity conservation

Unknown specific natural use

Low intensity working land

Intensely managed working landscapes

Low-density development

Unknown specific working/occupied use

Mitigation & alternative  
scenario development

**Generate Conservation Solution**

NatureServe VISTA Welcome to the Protection Solution Wizard

**Generate Conservation Solution**

Solution Generation Tool

<Select solution generator>

MAR-VAN

<Describe MAR-VAN>

[Link to MAR-VAN website](#)

SPOT

<Describe SPOT>

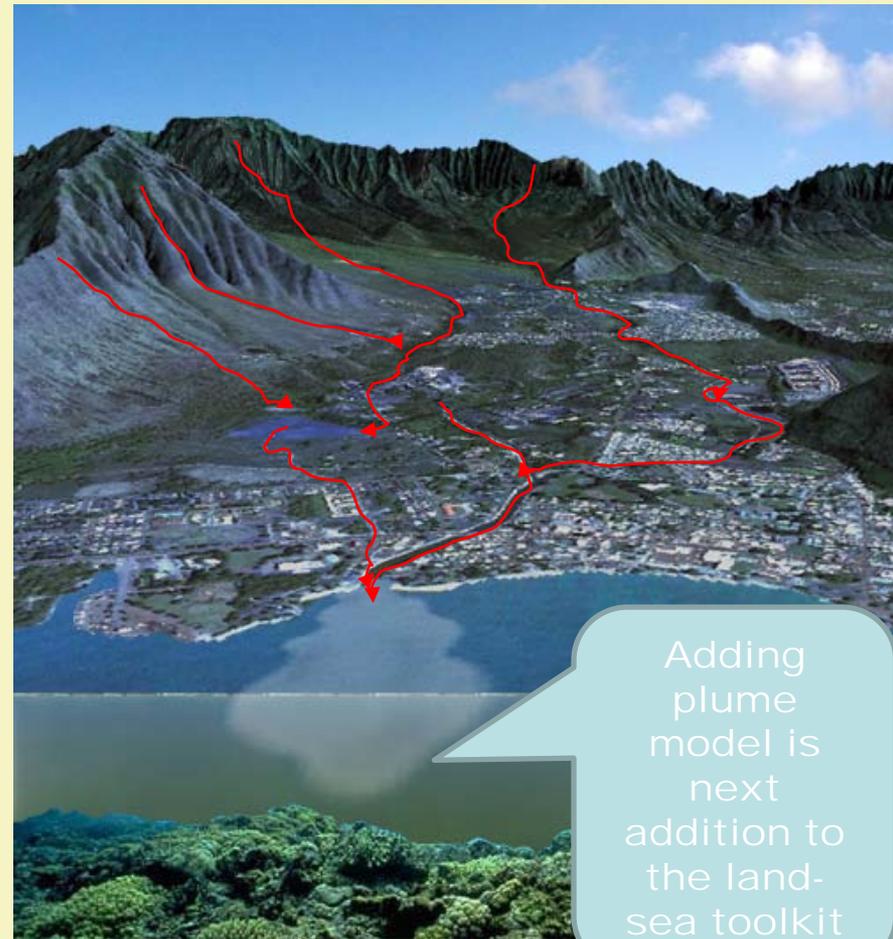
[Link to SPOT website](#)

Optimized  
spatial solution generation  
via interoperating tools

# N-SPECT

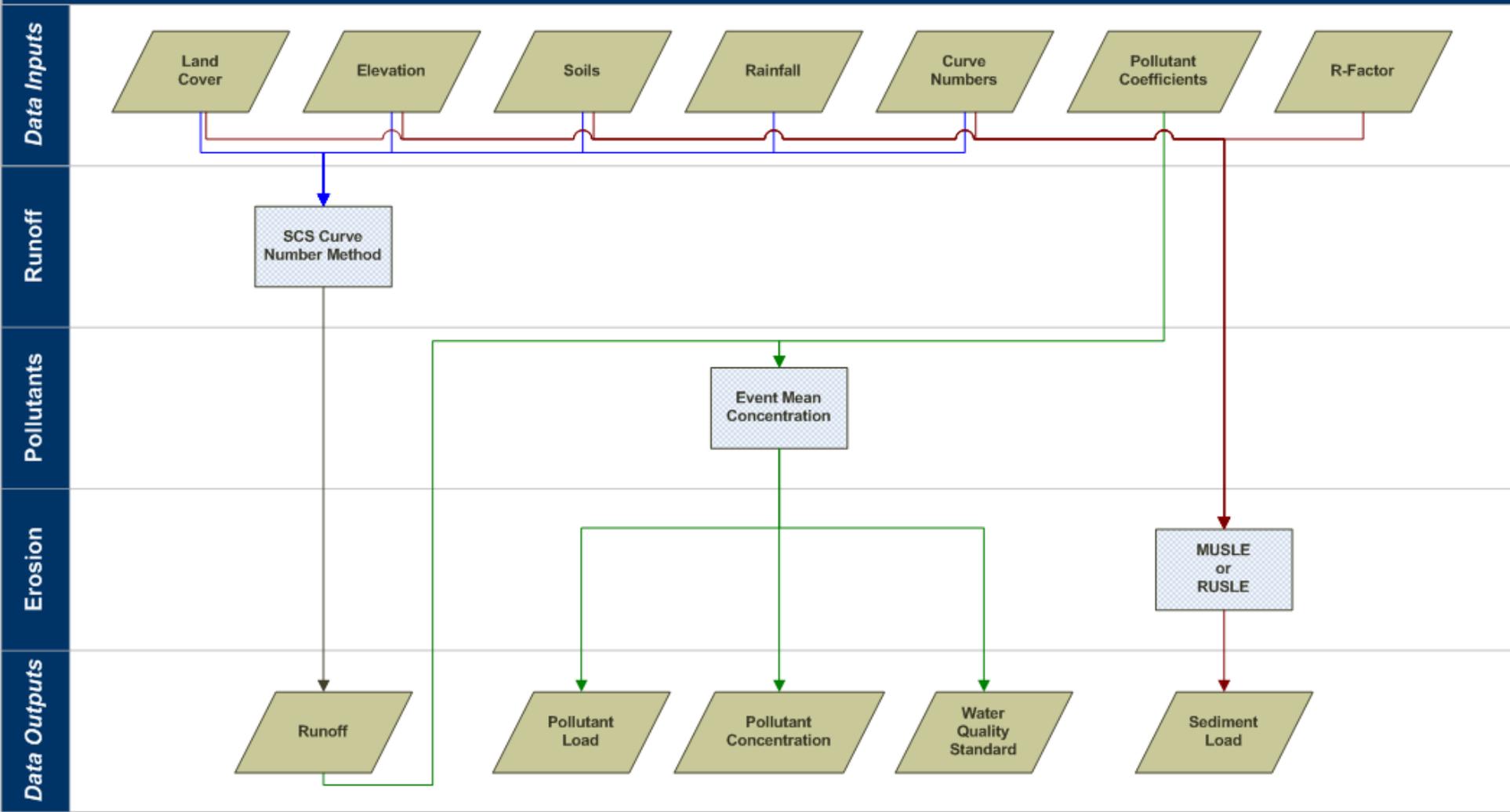
## *Nonpoint-Source Pollution and Erosion Comparison Tool*

- Spatially distributed pollutant and sediment yield model – i.e., *water quality screening tool*
- Estimates runoff, nonpoint-source pollution, and erosion
- Allows user to compare effects of different land use and land cover scenarios on total yields
- Uses land cover, soils, topography, and precipitation input data

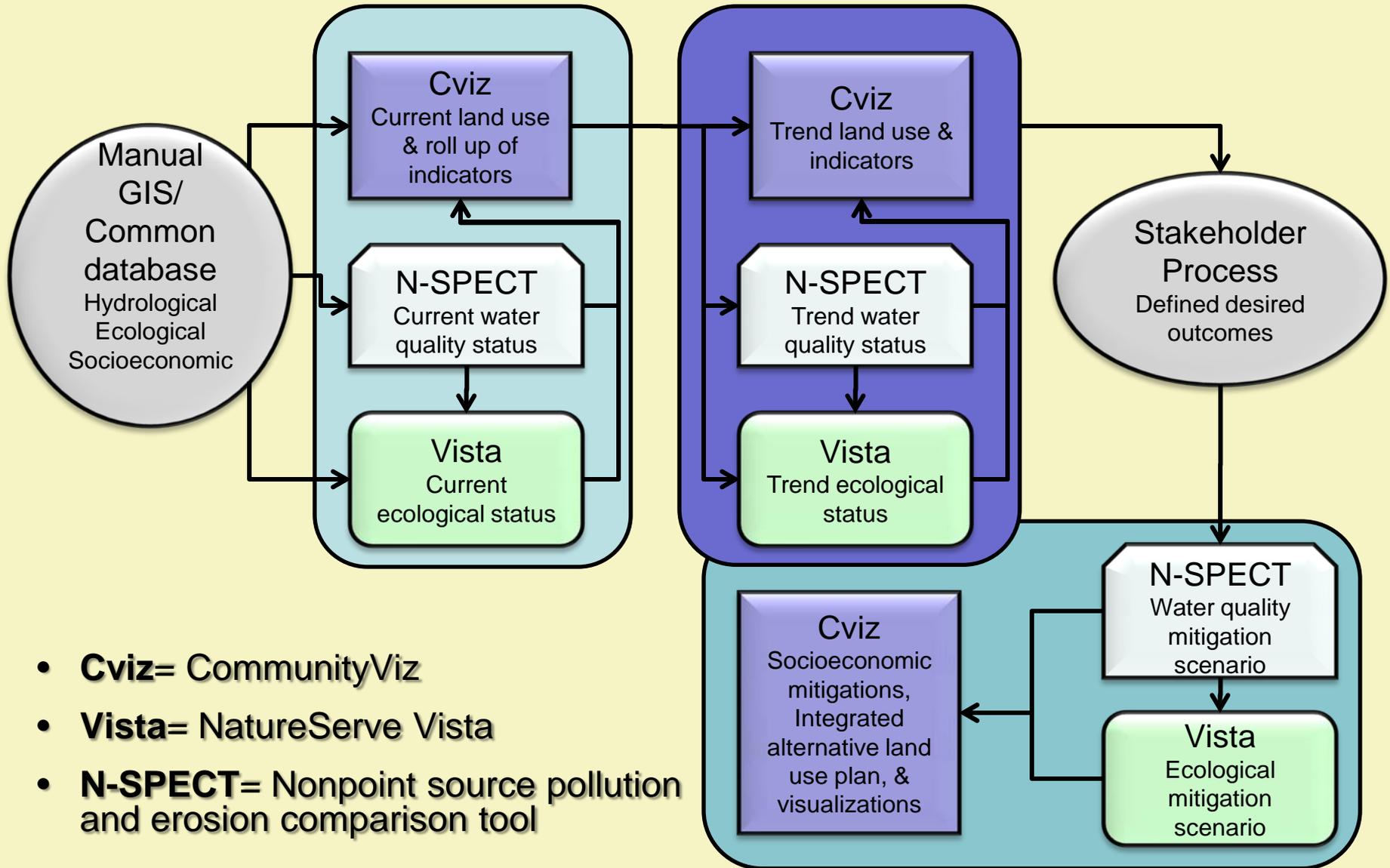


# N-SPECT Process Diagram

## Nonpoint-Source Pollution and Erosion Comparison Tool (N-SPECT)



# The Land-Sea DST Workflow



- **Cviz**= CommunityViz
- **Vista**= NatureServe Vista
- **N-SPECT**= Nonpoint source pollution and erosion comparison tool

# Vista: Defining Conservation Elements

- ▣ Elements are the features of conservation interest
- ▣ A key activity is to capture expert knowledge in the database
  - What is the range of turbidity levels compatible with sea grass habitat health
  - What is a min viable occurrence
  - What is min viable condition threshold
  - What should be the project region retention goal

Coastal Live Oak – Redbay series  
Photo courtesy of Sally Morehead



Whooping Crane  
Photo courtesy of Rick Tinnin



Kemp's Ridley sea turtle  
Photo courtesy of Tony Amos



Seagrass  
Photo courtesy of Ken Dunton



**Name** Seagrass  
**Description** based on noaa benthic mapping (2004-2007)  
**Measurement by:** Area

[Back to top](#)

# Vista Example Element Report

## Categories

<a href="#">S-Rank</a>	<a href="#">Not Applicable (SNA)</a>	A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
<a href="#">G-Rank</a>	<a href="#">Not applicable (GNA)</a>	A conservation status rank is not applicable because the element is not a suitable target of conservation activities. A rank is not assigned for one of the following reasons: Hybrid (species)—The element represents an interspecific hybrid judged to be without conversation value. Note, however, that hybrid-derived species are ranked, and hybrids may be ranked if they are believed to have conservation value. Domestic Origin (species)—The element is a product of domestication or cultivation. Ruderal, Invasive, Managed/Modified, or Cultural (ecological communities)—Communities in one of these categories are not judged to have conservation value
<a href="#">Element Type</a>	<a href="#">Coastal / Marine Community (C-M)</a>	
<a href="#">High Order Rank</a>	<a href="#">Ecological</a>	

[Back to top](#)

## Distribution Statistics

<b>Total Occurrences</b>	9548
<b>Total area</b>	22,643.85 acres

[Back to top](#)

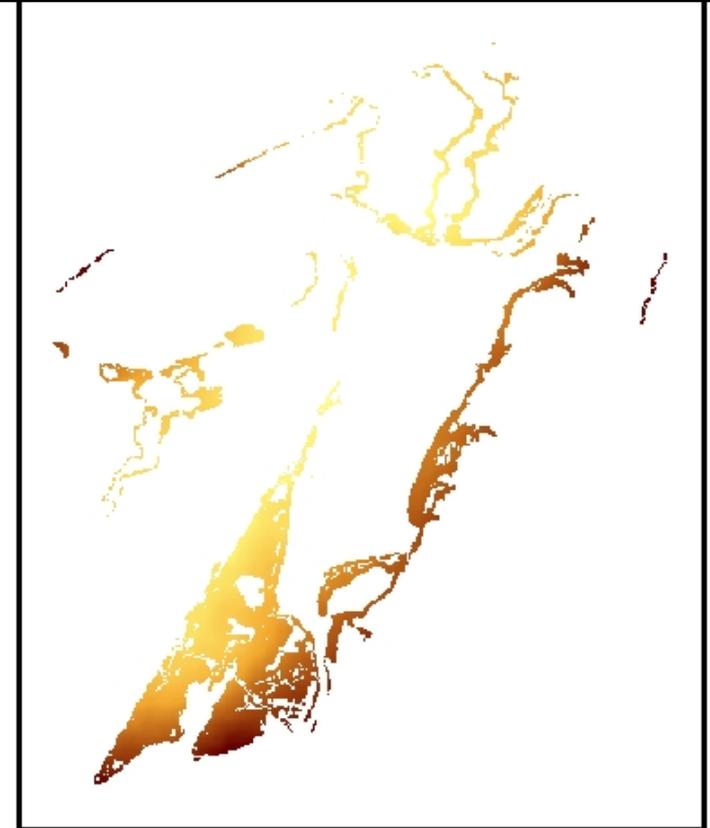
## Spatial Attributes

<b>Distribution Source:</b>	srv_huc
<b>Viability/Integrity Source:</b>	Raster: aq_lil_norm
<b>Confidence Source:</b>	Single value: 0.8
<b>Cell Size (for raster conversions):</b>	0.25 acres

[Back to top](#)

## Compatible Land Uses:

- Total Suspended Solids/0 - 12 mg/L
- Total Suspended Solids/13 - 26 mg/L
- Maintain Primarily for Natural Values/Natural area recreation and open space
- Maintain Primarily for Natural Values/Biodiversity conservation
- Maintain Primarily for Natural Values/Unknown specific natural use



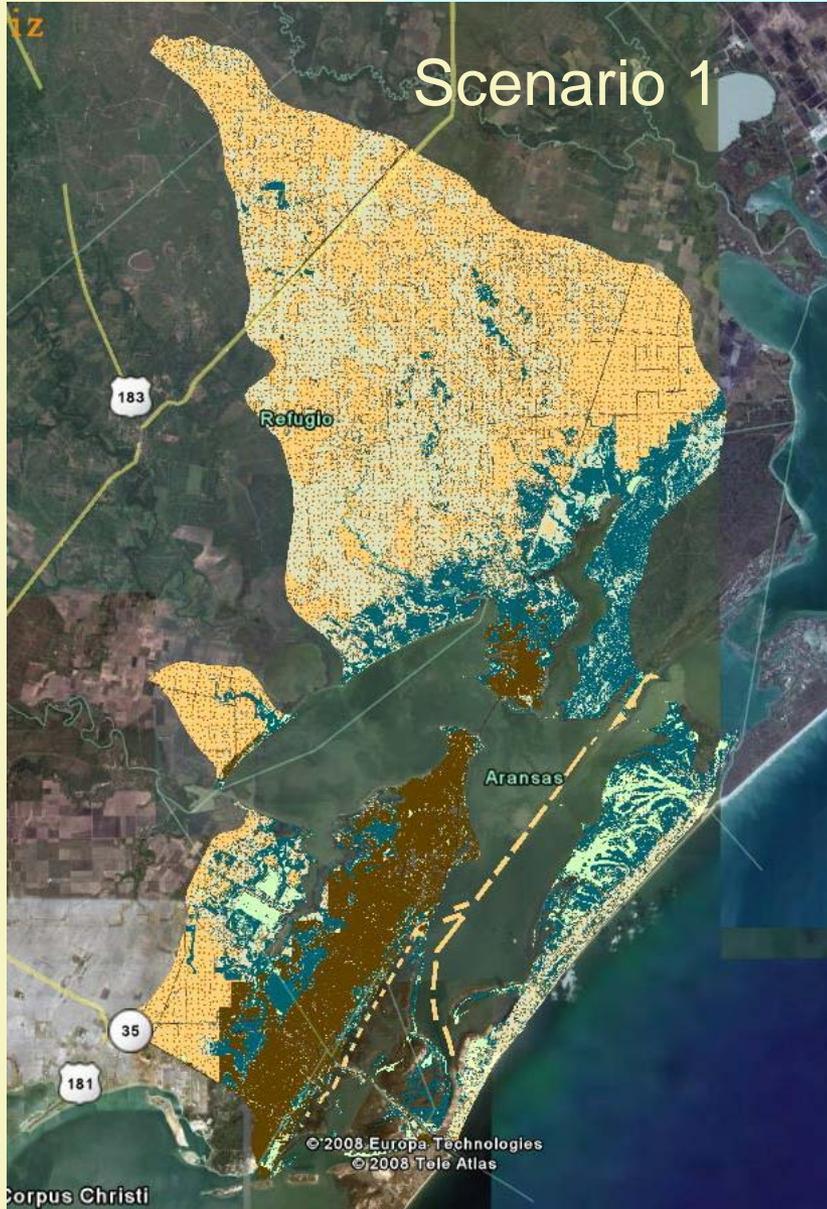
[Metadata](#)

# Defining Scenarios for Assessment of Ecological & Cultural Goals

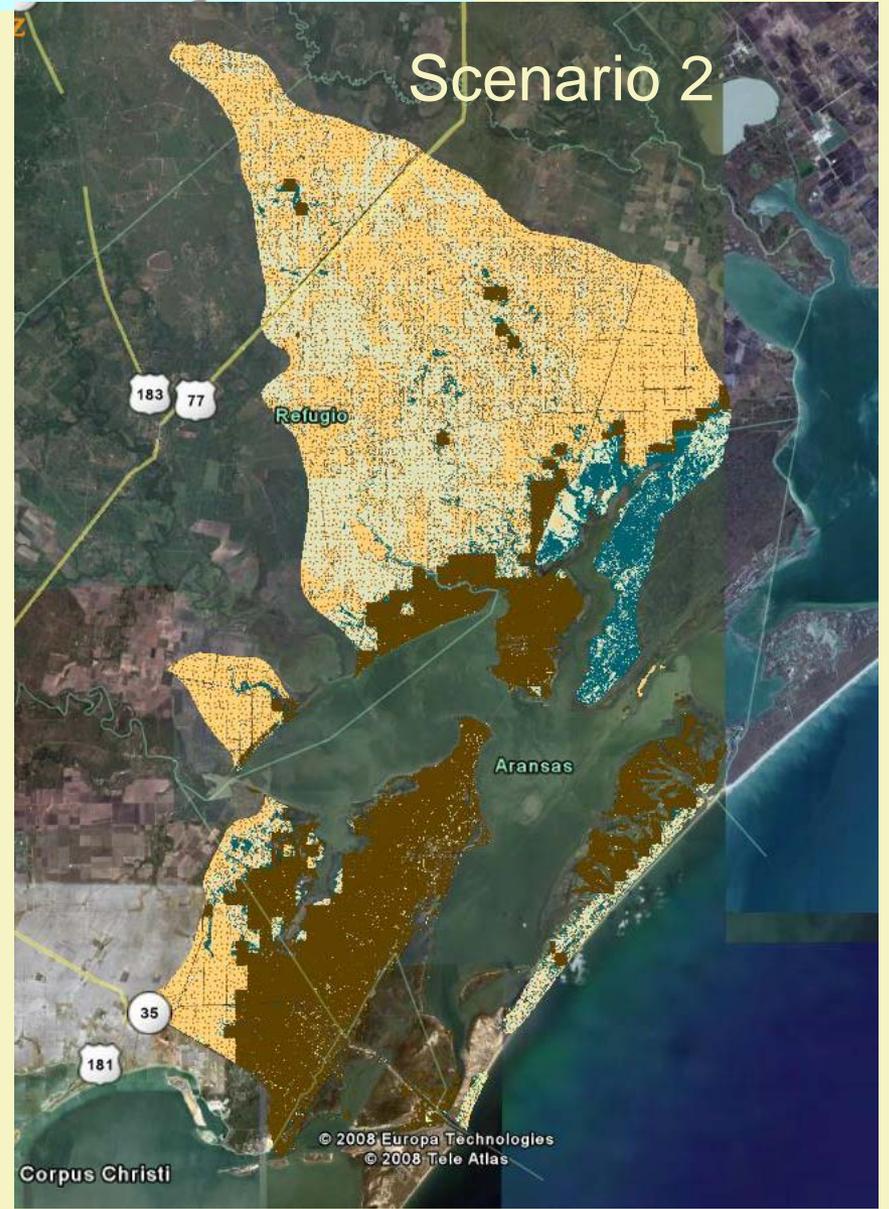
- ▣ Scenarios are used to assess multi-objective goal achievement
- ▣ Scenarios can be:
  - Current situation
  - Plan/policy based future scenario
  - Trend future scenario
  - Alternative plans, proposals, mitigations

	Unknown specific natural use
	Natural area recreation and open space
	Low intensity working landscape
	Intensely managed working landscapes
	Low-density development
	Unknown specific infrastructure use
	Cleared transmission corridor
	Minor road
	Major road
	Major highway
	High intensity working landscape/recreation parks
	General urbanization: homes, commercial, industrial, etc

## Scenario 1



## Scenario 2



## Scenario 1



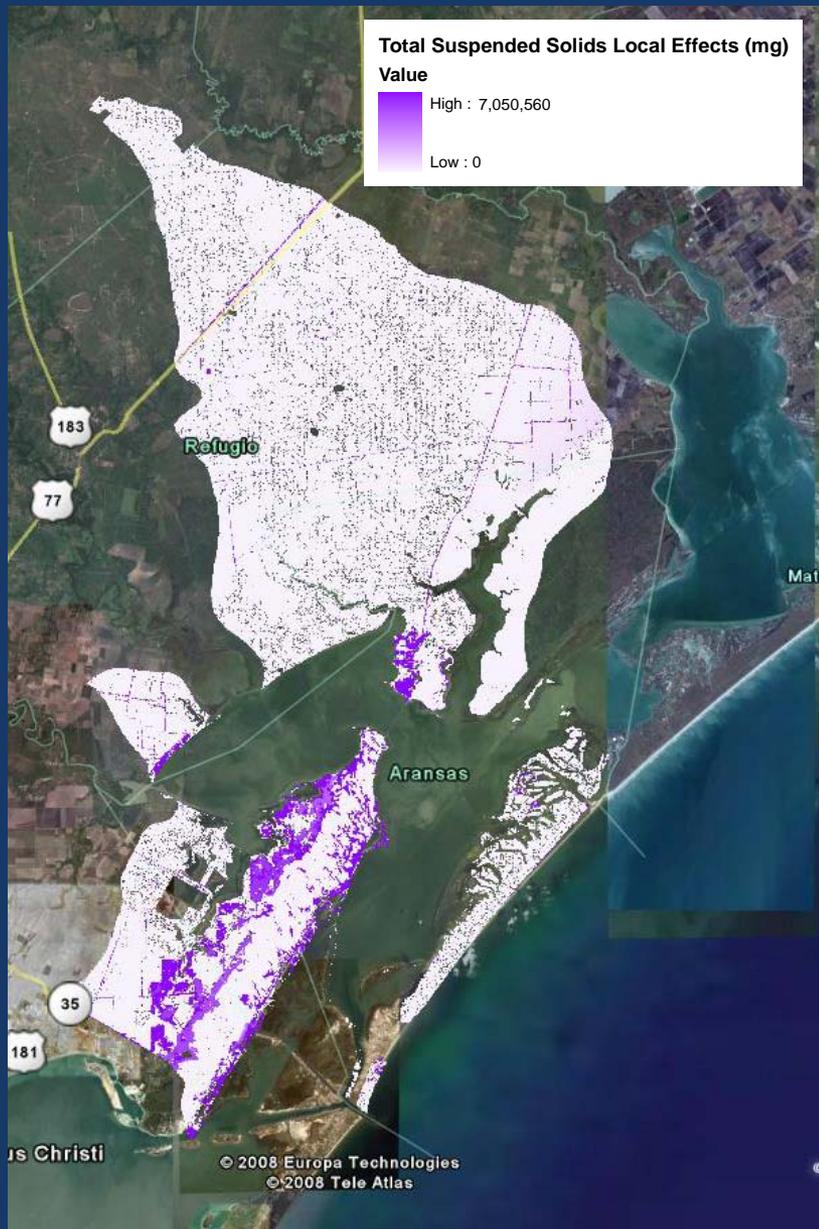
## Scenario 2



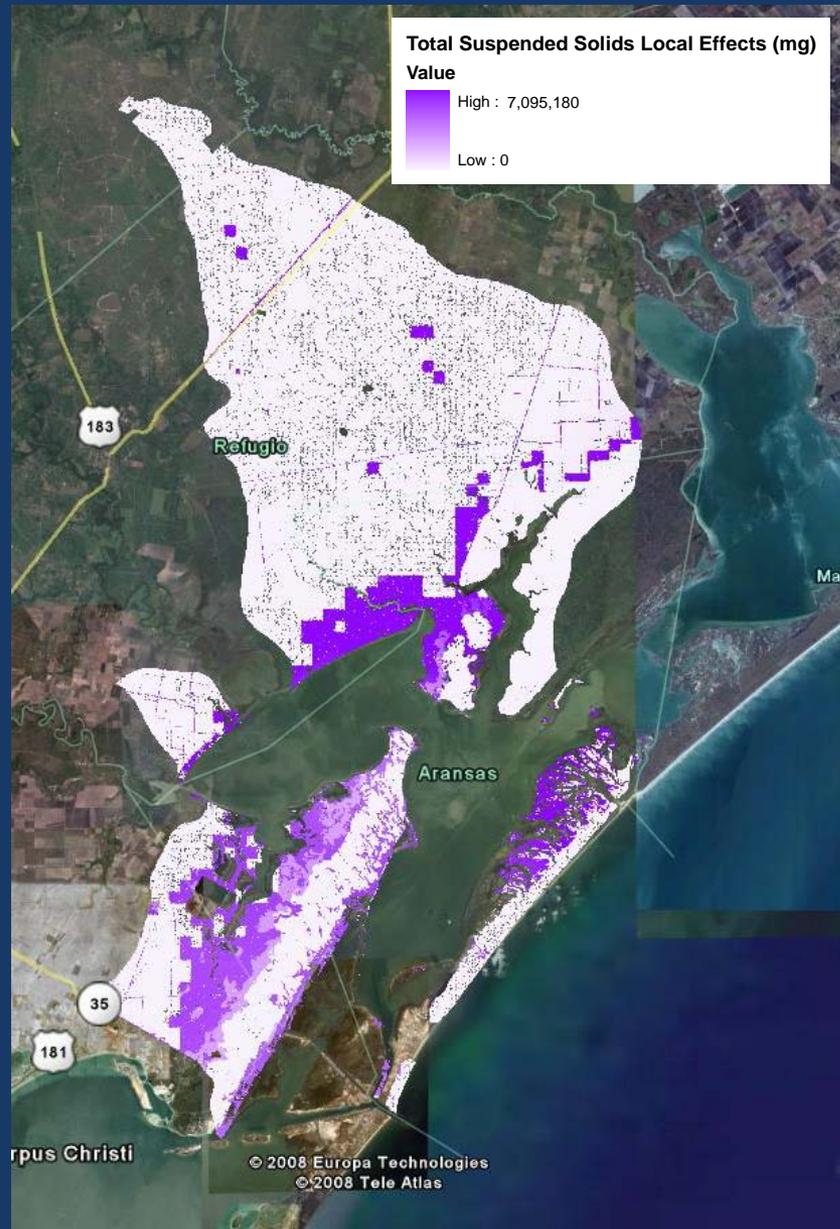
CommunityViz can model development types and building locations at the parcel level

# N-SPECT

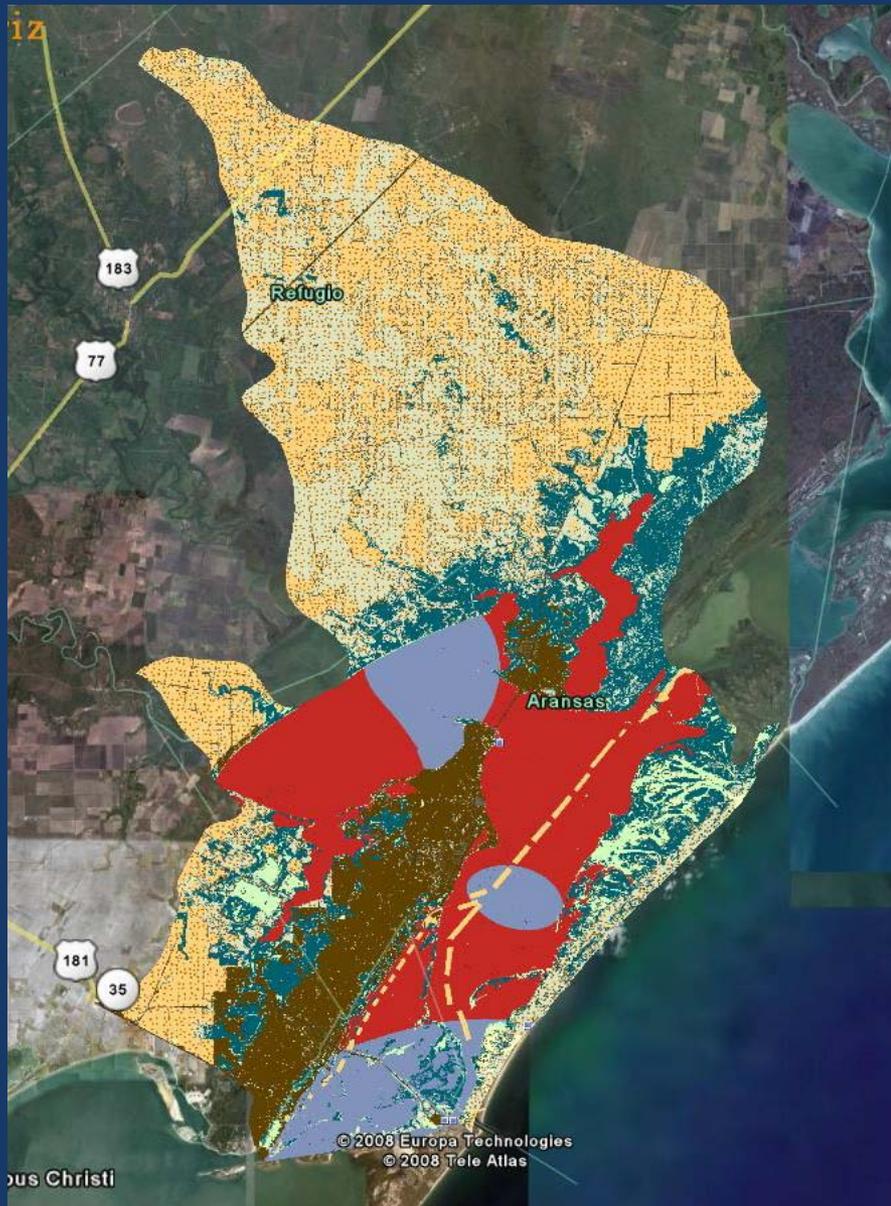
## Scenario 1



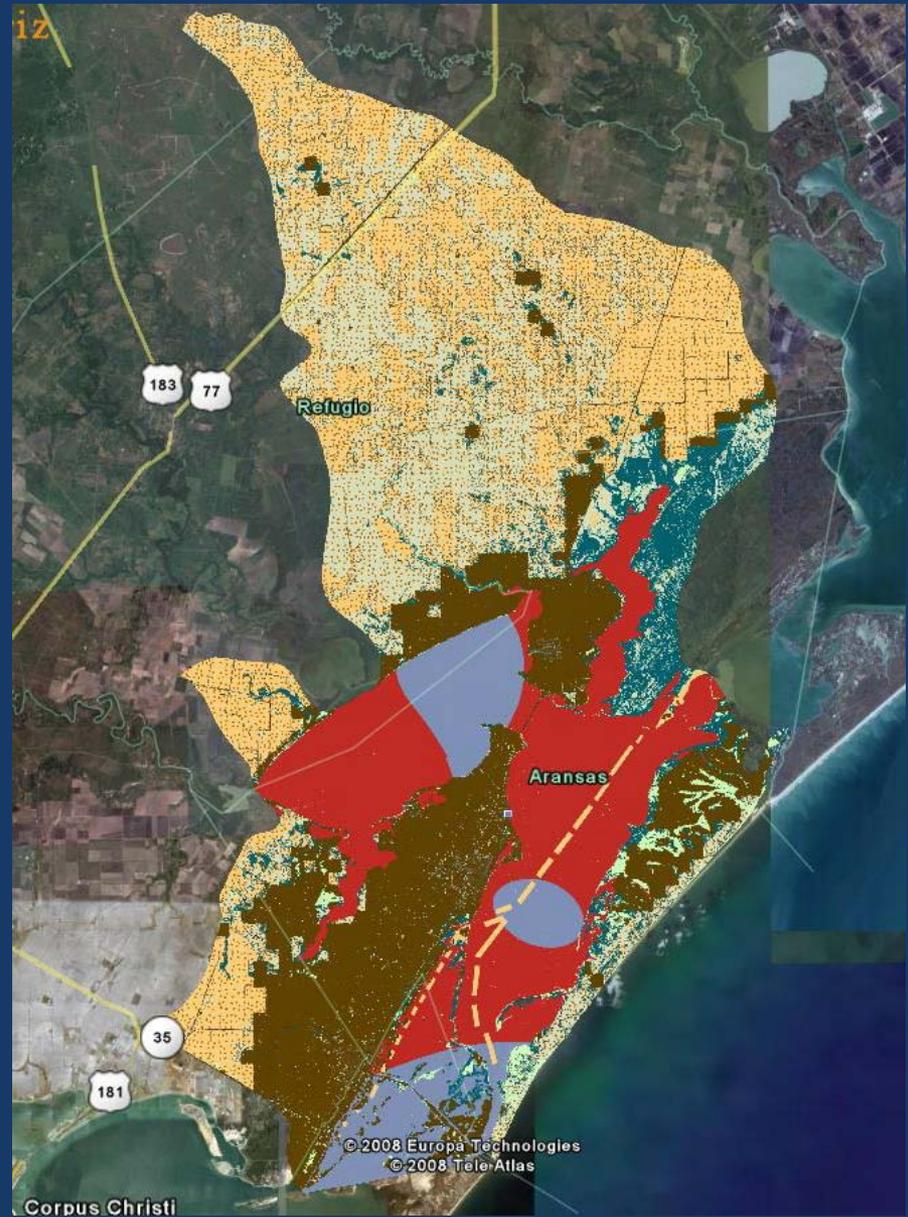
## Scenario 2



# Scenario 1

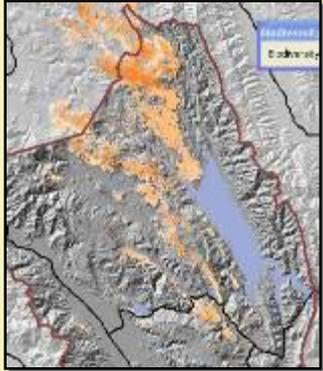


# Scenario 2



# Vista Scenario Evaluation

## Element Conservation Goals



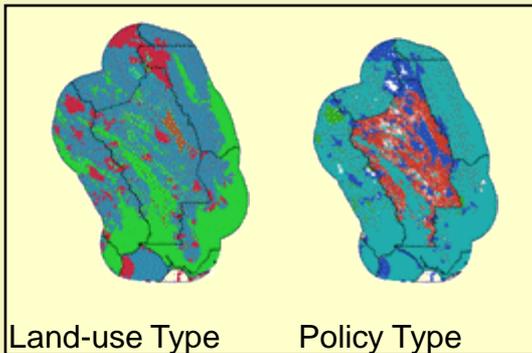
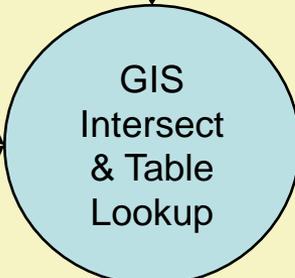
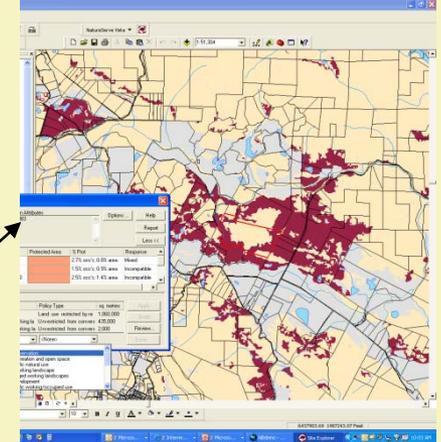
Elements

Element Goals	
Name	Goal
Historic Sites	0 sq. meters
Important Agriculture	0 sq. meters
Viewsheds	0 sq. meters
Mediterranean California Dry-Mesic Mixed Conifer Forest and Wo	80% of sq. meters
Xeric Serpentine Chapparral	90% of sq. meters
Napa Western Flax	100% of Occurrence
Central Valley Mixed Oak Savanna	100% of sq. meters
Mesic Serpentine Woodland and Chapparral	90% of sq. meters
Northwestern Pond Turtle	80% of Occurrences
California Annual Grasslands Alliance	< default >
California Coast Ranges Cliff and Canyon	80% of sq. meters

Conservation Goal:   Percent  
 Units:  
 Occurrences  
 sq. meters

Apply | Reset to

## Evaluation Maps



Scenario Outputs

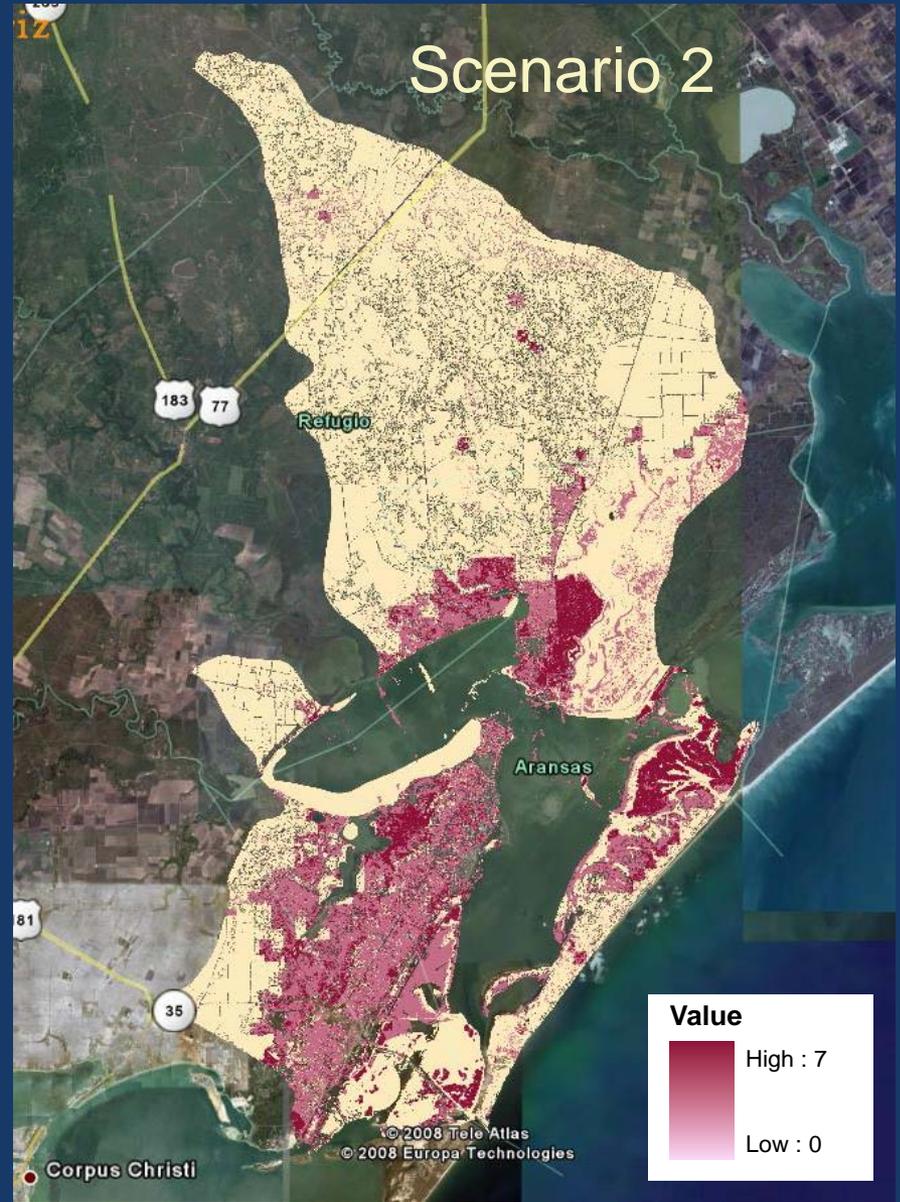
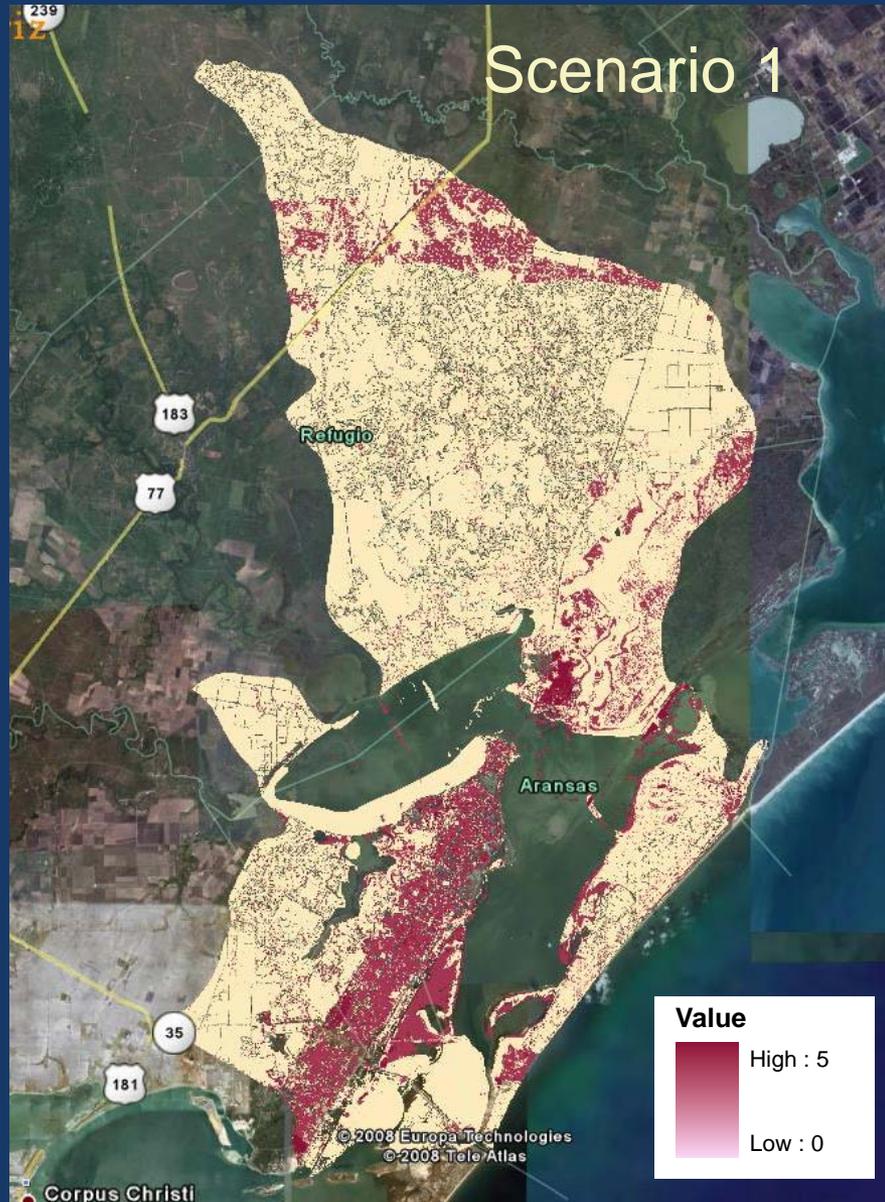
Goal Performance by Element						
Elements (14 elements)						
Name	Distribution Area (acres)	Occs	Protected and Compatible			
			Goal	Net Area (acres)	Percent of goal	
<a href="#">Wetlands</a>	4,134.7	422	40 percent of	1,910.2	145	15.52%
<a href="#">Watersheds: Priorities 4-2</a>	7,095.1	167	40 percent of	3,121.2	58	109.93%
<a href="#">Watersheds: Priority 2</a>	4,832.5	84	60 percent of	1,893.2	24	65.92%
<a href="#">Watersheds: Priority 2</a>	224	40	70 percent of	30.3	7	19.32%
<a href="#">Woodsrck</a>	4,392.1	297	50 percent of	1,257.2	34	57.27%

Evaluation Report

Element Properties - Mediterranean California Dry-Mes			
General	Spatial	Categories	Compatibility
<input checked="" type="checkbox"/>			Maintain Primarily for Natural Values
<input checked="" type="checkbox"/>			Biodiversity conservation
<input checked="" type="checkbox"/>			Natural area recreation and open space
<input checked="" type="checkbox"/>			Unknown specific natural use
<input checked="" type="checkbox"/>			Maintained Primarily for Working/Occupied Natural Landscape
<input checked="" type="checkbox"/>			Low intensity working landscape
<input checked="" type="checkbox"/>			Intensely managed working landscapes
<input checked="" type="checkbox"/>			Low-density development
<input checked="" type="checkbox"/>			Unknown specific working/occupied use
<input type="checkbox"/>			Utilized Primarily for Infrastructure

Element Response To Land Use/Activity

# Vista Scenario Evaluation: Compatibility Conflict Map. Red = locations of elements that haven't met goals and are in conflict with the scenario land use



## Overall Scenario Performance

# Vista Example Scenario Report



### All Elements (40 Total)

	Goals Met For	% of Goals Met	Goals Unmet For	% of Goals Unmet
Compatible	15 elements	37.5%	25	62.5%

[Back to top](#)

### Goal Performance by Element

#### Elements (40 elements)

Name	Distribution Area (acres)	Occs	Goal	Compatible		Occs	Percent of goal
				Goal Met	Area (acres)		
<a href="#">Shoreline</a>	12,309.75	6960	80 percent of area	✓	11,446	6004	116.23%
<a href="#">Thierets skullcap</a>	22.75	2	100 percent of area	✗	11.25	2	49.45%
<a href="#">Tharps rhododon</a>	222.5	1	100 percent of area	✗	47.75	1	21.46%
<a href="#">Jaguarundi (high precision)</a>	1,391.25	2	40 percent of area	✗	237.5	2	42.68%
<a href="#">Texas Scarlet Snake (low precision)</a>	3,568.25	1	100 percent of area	✗	2,106.25	1	59.03%
<a href="#">Gulf Saltmarsh Snake (low precision)</a>	18,340	1	40 percent of area	✓	16,755.75	1	228.4%
<a href="#">Texas diamondback terrapin</a>	20,307.25	6	90 percent of area	✓	19,996.25	6	109.41%
<a href="#">Gulf Saltmarsh Snake (good precision)</a>	1,283.5	6	40 percent of area	✓	1,158.75	6	225.7%
<a href="#">Tall dodder</a>	111.5	2	90 percent of area	✗	65.5	2	65.27%
<a href="#">Snowy plover</a>	1,055.75	1	40 percent of area	✓	676.5	1	160.19%
<a href="#">Seacoast Blustem Gulf-dune Paspalum series</a>	1,207.25	4	40 percent of area	✓	980.25	4	202.99%
<a href="#">Green Sea Turtle</a>	3,094.75	1	90 percent of area	✓	2,944	1	105.7%
<a href="#">Seagrass</a>	22,617.25	5229	100 percent of area	✗	11,091.75	3184	49.04%
<a href="#">Plains gumweed</a>	8	1	100 percent of area	●	7.25	1	90.63%
<a href="#">Rookeries</a>	10,907.25	31	100 percent of area	●	9,988.25	30	91.57%
<a href="#">GLO and TPWD coastal preserve areas</a>	1,823	7	100 percent of area	✗	1,554	7	85.24%
<a href="#">Piping plover</a>	10,444	4	90 percent of area	✗	7,885.5	4	83.89%
<a href="#">Peregrine falcon</a>	2,093	2	40 percent of area	✓	1,921	2	229.46%
<a href="#">Wetland</a>	78,342.25	16968	100 percent of area	✗	68,180.75	12041	87.03%
<a href="#">Coastal gay-feather (low precision)</a>	2,220.75	2	100 percent of area	●	2,206.25	2	99.35%
<a href="#">Bilvalve reef</a>	3,057.5	630	80 percent of area	✗	562	152	22.98%
<a href="#">Welder machaeranthera</a>	54.75	14	100 percent of area	✗	22.75	10	41.55%
<a href="#">Stream network</a>	429.25	109	100 percent of area	✗	384.5	104	89.57%
<a href="#">National Audubon Society Waterbird Sanctuaries</a>	635	5	100 percent of area	✗	361	5	56.85%
<a href="#">Coastal gay-feather (high precision)</a>	91.5	4	100 percent of area	✗	17.5	3	19.13%
<a href="#">Aquatic beds</a>	3,572	1267	100 percent of area	●	3,434.5	1116	96.15%
<a href="#">Mangroves</a>	2,025.5	728	80 percent of area	✓	1,988.5	699	122.72%
<a href="#">Black-spotted Newt</a>	5,435.25	1	100 percent of area	✗	2,617.5	1	48.16%
<a href="#">Live Oak</a>	67,907.75	242491	70 percent of area	●	43,922.25	155122	92.4%
<a href="#">Wright's Yellowshow</a>	264	1	30 percent of area	✓	161.25	1	203.6%
<a href="#">Grasslands</a>	37,019.75	14568	70 percent of area	✓	27,726	10855	106.99%
<a href="#">Whooping Crane</a>	28,287.5	1	100 percent of area	✗	20,382.25	1	72.05%
<a href="#">Forestland</a>	122,804	38892	70 percent of area	✓	96,873.25	26280	112.69%
<a href="#">Bald eagle</a>	674.75	1	40 percent of area	✓	290.75	1	107.73%
<a href="#">Atlantic Hawksbill turtle</a>	249.75	1	90 percent of area	✓	241.5	1	107.44%
<a href="#">Attwater's Greater Prairie Chicken</a>	26,109.25	3	100 percent of area	✗	13,476.5	3	51.62%

- [Settings](#)
- [Element evaluation details](#)
- [Map](#)

**Settings**

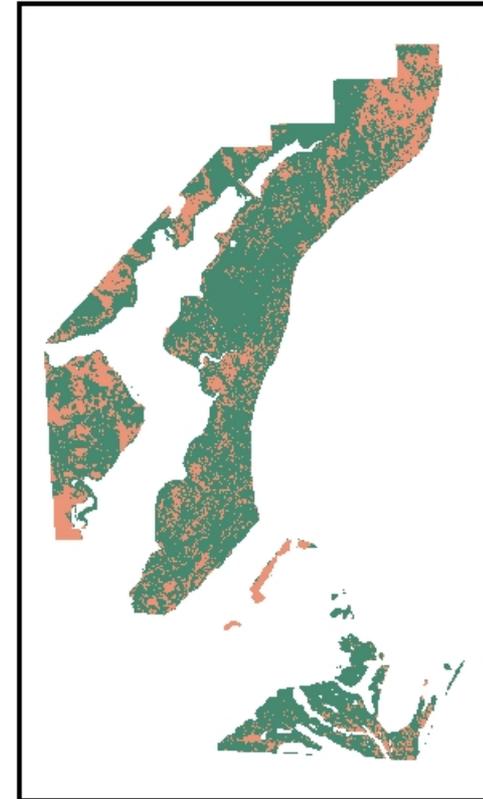
**Element** [Whooping Crane](#)  
**Evaluation:** [Development Scenario 1 - Ecological](#)  
**Filter:** [Ecological Elements](#)  
**Scenario cell size:** 0.25 acres  
**Element cell size:** 0.25 acres  
**Goal:** 100 percent of area

[Back to top](#)

**Element evaluation details**

<b>Element</b>	<a href="http://aldo/Elements/WhoopingCrane8216780.html?name=WhoopingCrane">http://aldo/Elements/Whooping Crane8216780.html? name=Whooping Crane</a> Whooping Crane
<b>Name</b>	Whooping Crane
<b>Total</b>	1 occ's.; 28,287.5 ac.
<b>Selection</b>	1 occ's.; 28,287.5 ac.
<b>Selection Average CV</b>	0.305
<b>Selection Minimum CV</b>	0.144
<b>Selection Maximum CV</b>	0.464
<b>Goal</b>	100% of acres
<b>Response</b>	Mixed
<b>Viable</b>	1 occ's.; 28,287.5 ac.
<b>% Viable</b>	100% occ's; 100% area
<b>Selection Viable</b>	1 occ's.; 28,287.5 ac.
<b>Selection %Viable</b>	100% occ's; 100% area
<b>Chart: Viable Occurrences</b>	
<b>Chart: Viable Area</b>	
<b>Compatible</b>	1 occ's.; 20,382.25 ac.
<b>% Compatible</b>	100% occ's; 72.1% area
<b>% of Goal: Compatible</b>	72.05%
<b>Selection Compatible</b>	1 occ's.; 20,382.25 ac.
<b>Selection % Compatible</b>	100% occ's; 72.1% area
<b>Selection % of Goal, Compatible</b>	72.05%
<b>Chart: Compatible Occurrences</b>	
<b>Chart: Compatible Area</b>	

[Back to top](#)



[Metadata](#)

- [Settings](#)
- [Element evaluation details](#)
- [Map](#)

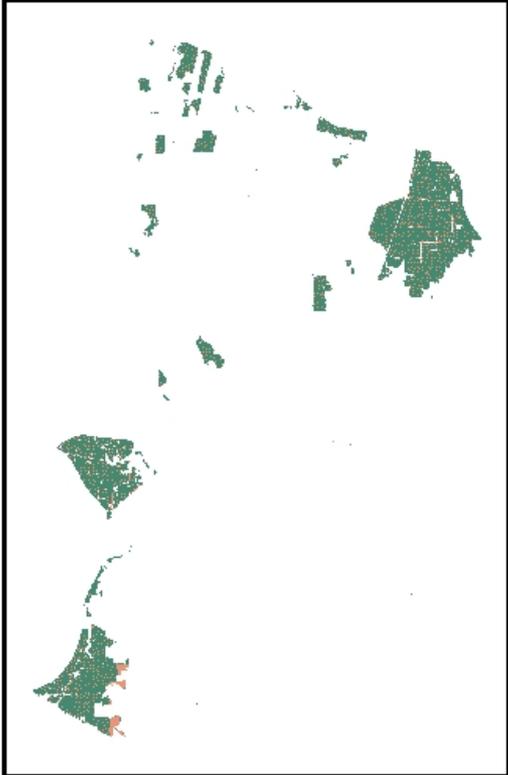
## Settings

Element [Cultivated cropland](#)  
 Evaluation: [Development Scenario 1 - Socioeconomic Socioeconomic Elements](#)  
 Filter:  
 Scenario cell size: 0.25 acres  
 Element cell size: 0.25 acres  
 Goal: 50 percent of area

[Back to top](#)

## Element evaluation details

Element [Cultivated cropland](#)  
<http://aldo/Elements/Cultivated cropland875730717.html?name=Cultivated cropland>  
 Cultivated cropland  
 464 occ's.; 51,338.25 ac.  
 464 occ's.; 51,338.25 ac.  
 0.192  
 0.026  
 0.407  
 50% of acres  
 Mixed  
 464 occ's.; 51,338.25 ac.  
 100% occ's; 100% area  
 464 occ's.; 51,338.25 ac.  
 100% occ's; 100% area  
**Chart: Viable Occurrences**  
**Chart: Viable Area**  
 Compatible  
 393 occ's.; 44,349 ac.  
 84.7% occ's; 86.4% area  
 172.77%  
 Selection Compatible  
 393 occ's.; 44,349 ac.  
 84.7% occ's; 86.4% area  
 172.77%  
**Chart: Compatible Occurrences**  
**Chart: Compatible Area**



[Back to top](#)



# Assessing Results

- Site Explorer (Vista) provides context for site to determine mitigation need and opportunity
- But need to mentally connect aquatic features to terrestrial impacts

Site Explorer
✕

CViz Traditional Aquatic2

Scenario Evaluation

Site Layer ebm\_huc\_grid

Selection Attributes

FID: 1082

FID: 1083

FID: 1084

Options ...

Help

Report

Less <<

Element Name	Total	Compatible Area	% Compat	Response
<a href="#">TPWD boat ramps</a>	34 occ's.; 10,770 sq. m.	<div style="width: 52.9%; background-color: #90EE90; border: 1px solid #ccc;"></div>	52.9% occ's; 52.4% area	Mixed
<a href="#">Shoreline</a>	4,517 occ's.; 19,965,090 sq.	<div style="width: 82.2%; background-color: #90EE90; border: 1px solid #ccc;"></div>	82.2% occ's; 86.4% area	Mixed
<a href="#">Mud and Tidal Flats</a>	513 occ's.; 44,294,880 sq. m.	<div style="width: 87.3%; background-color: #90EE90; border: 1px solid #ccc;"></div>	87.3% occ's; 90% area	Mixed
<a href="#">Pasture and Hay</a>	7,747 occ's.; 318,226,260 sq.	<div style="width: 95.3%; background-color: #90EE90; border: 1px solid #ccc;"></div>	95.3% occ's; 98.1% area	Mixed
<a href="#">Oyster beds</a>	643 occ's.; 11,993,910 sq. m.	<div style="width: 95.5%; background-color: #90EE90; border: 1px solid #ccc;"></div>	95.5% occ's; 92.9% area	Mixed
<a href="#">Seagrass beds</a>	185 occ's.; 81,718,260 sq. m.	<div style="width: 90.3%; background-color: #90EE90; border: 1px solid #ccc;"></div>	90.3% occ's; 94.7% area	Mixed
<a href="#">Grasslands</a>	15,207 occ's.; 143,836,740	<div style="width: 92.1%; background-color: #90EE90; border: 1px solid #ccc;"></div>	92.1% occ's; 94.1% area	Mixed
<a href="#">Forestland</a>	24,298 occ's.; 495,361,950	<div style="width: 93.7%; background-color: #90EE90; border: 1px solid #ccc;"></div>	93.7% occ's; 96.7% area	Mixed
<a href="#">Texas Diamondback Terrapin</a>	6 occ's.; 82,150,200 sq. m.	<div style="width: 100%; background-color: #90EE90; border: 1px solid #ccc;"></div>	100% occ's; 97.1% area	Mixed
<a href="#">Cultivated cropland</a>	461 occ's.; 208,293,540 sq.	<div style="width: 0.2%; background-color: #90EE90; border: 1px solid #ccc;"></div>	0.2% occ's; 0% area	Mixed
<a href="#">Beach access points</a>	29 occ's.; 9,180 sq. m.	<div style="width: 27.6%; background-color: #90EE90; border: 1px solid #ccc;"></div>	27.6% occ's; 26.5% area	Mixed
<a href="#">Wetland</a>	15,777 occ's.; 458,668,830	<div style="width: 22.5%; background-color: #90EE90; border: 1px solid #ccc;"></div>	22.5% occ's; 30.5% area	Mixed
<a href="#">Live Oak and Parks</a>	252,856 occ's.; 274,900,920	<div style="width: 90.7%; background-color: #90EE90; border: 1px solid #ccc;"></div>	90.7% occ's; 89.2% area	Mixed
<a href="#">Boat Ramps</a>	16 occ's.; 4,920 sq. m.	<div style="width: 18.8%; background-color: #90EE90; border: 1px solid #ccc;"></div>	18.8% occ's; 19.5% area	Mixed
<a href="#">GLD Coastal leases (point locations)</a>	407 occ's.; 135,780 sq. m.	<div style="width: 29.5%; background-color: #90EE90; border: 1px solid #ccc;"></div>	29.5% occ's; 27.8% area	Mixed
<a href="#">Black-spotted Newt (low precision)</a>	1 occ's.; 101,255,730 sq. m.	<div style="width: 100%; background-color: #90EE90; border: 1px solid #ccc;"></div>	100% occ's; 56.2% area	Mixed

Scenario Composition

Layer	Land Use	sq. meters
Traditional_Landuse	Biodiversity conservation	87,540
Traditional_Landuse	Natural area recreation and open sp	1,241,280
Traditional_Landuse	Low-density development	2,385,150
Traditional_Landuse	Unknown specific infrastructure use	57,960
Traditional_Landuse	Cleared transmission corridor	24,360
Traditional_Landuse	Minor road	93,660
Traditional_Landuse	Major road	406,380
Traditional_Landuse	Major highway	142,320
Traditional_Landuse	General urbanization: homes, comm	4,215,780
tss_dev_poly	13 - 26 mg/L	6,134,070
tss_dev_poly	>27 mg/L	1,100,760

Apply

Undo

Review...

Save ...

Override <None>

# Creating Alternative Scenarios & Site Mitigations

**Site Explorer**

Traditional Aquatic  
Scenario Evaluation  
Site Layer: ebm\_huc\_grid

Selection Attributes  
FID: 1070  
FID: 1071  
FID: 1154

Element Name	Total	Compatible Area	% Compat
TPWD boat ramps	34 occ's.; 10,770 sq. m.		29.4% occ's; 29.2% area
Marinas	9 occ's.; 11,040 sq. m.		0% occ's; 0% area
Submerged Areas	4,829 occ's.; 34,829,250 sq. m.		91.5% occ's; 92.1% area
Tharps rhododon	3 occ's.; 12,566,550 sq. m.		33.3% occ's; 83.2% area
Seagrass beds	185 occ's.; 81,718,260 sq. m.		87% occ's; 19.1% area
Forestland	24,298 occ's.; 495,361,950 sq. m.		97.5% occ's; 97.9% area
Wetland [not CCAP]	7,721 occ's.; 302,800,320 sq. m.		99.5% occ's; 93.7% area
Agricultural and Grasslands	15,613 occ's.; 670,373,880 sq. m.		93.9% occ's; 98.2% area
Rookeries	31 occ's.; 44,158,080 sq. m.		100% occ's; 89.8% area
Beach access points	29 occ's.; 9,180 sq. m.		3.4% occ's; 3.3% area
Wetland	9,707 occ's.; 274,523,610 sq. m.		98.5% occ's; 97.3% area
Live Oak and Parks	3 occ's.; 200,501,940 sq. m.		100% occ's; 79.2% area
GLD Coastal leases [point locations]	407 occ's.; 135,780 sq. m.		4.4% occ's; 5.2% area
Black-spotted Newt [low precision]	1 occ's.; 101,255,730 sq. m.		100% occ's; 28% area

Predicted increase in goal achievement w/land use change

- Specify alternative uses for the site & view immediate results. Save results to create alternative scenario

Element Name	Total	Compatible Area	% Compat	Response
TPWD boat ramps	34 occ's.; 10,770 sq. m.		29.4% occ's; 29.2% area	Incompatible
Marinas	9 occ's.; 11,040 sq. m.		0% occ's; 0% area	Incompatible
Submerged Areas	4,829 occ's.; 34,829,250 sq.		91.7% occ's; 92.1% area	Compatible
Tharps rhododon	3 occ's.; 12,566,550 sq. m.		33.3% occ's; 91% area	Compatible
Seagrass beds	185 occ's.; 81,718,260 sq. m.		87% occ's; 19.6% area	Compatible
Forestland	24,298 occ's.; 495,361,950		97.5% occ's; 97.9% area	Compatible
Wetland [not CCAP]	7,721 occ's.; 302,800,320 sq.		98.8% occ's; 93.6% area	Incompatible
Agricultural and Grasslands	15,613 occ's.; 670,373,880		94.1% occ's; 98.2% area	Compatible
Rookeries	31 occ's.; 44,158,080 sq. m.		100% occ's; 90.2% area	Compatible
Beach access points	29 occ's.; 9,180 sq. m.		3.4% occ's; 3.3% area	Incompatible
Wetland	9,707 occ's.; 274,523,610 sq.		97.6% occ's; 97.1% area	Incompatible
Live Oak and Parks	3 occ's.; 200,501,940 sq. m.		100% occ's; 79.8% area	Compatible
GLD Coastal leases [point locations]	407 occ's.; 135,780 sq. m.		4.4% occ's; 5.2% area	Incompatible
Black-spotted Newt [low precision]	1 occ's.; 101,255,730 sq. m.		100% occ's; 29.2% area	Compatible

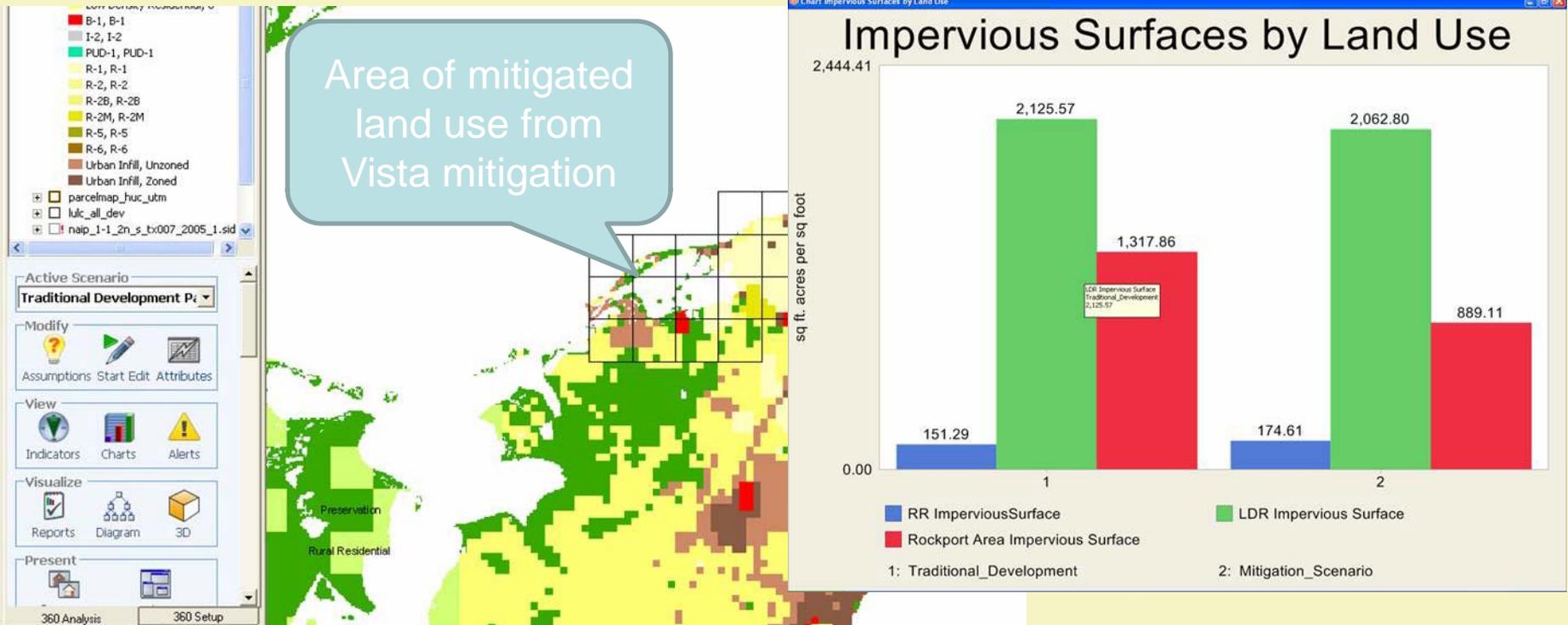
Scenario Composition

Layer	Land Use	sq. meters
(none)	Natural area recreation and open space	119,970
dredgesites_utm_huc	Natural area recreation and open space	149,580
pipesglo_buf1m	Natural area recreation and open space	420
highway_buf15m	Natural area recreation and open space	70,140
countyrd_paved_buf10m	Natural area recreation and open space	178,050
unclassified_rds_buf8m	Natural area recreation and open space	20,550

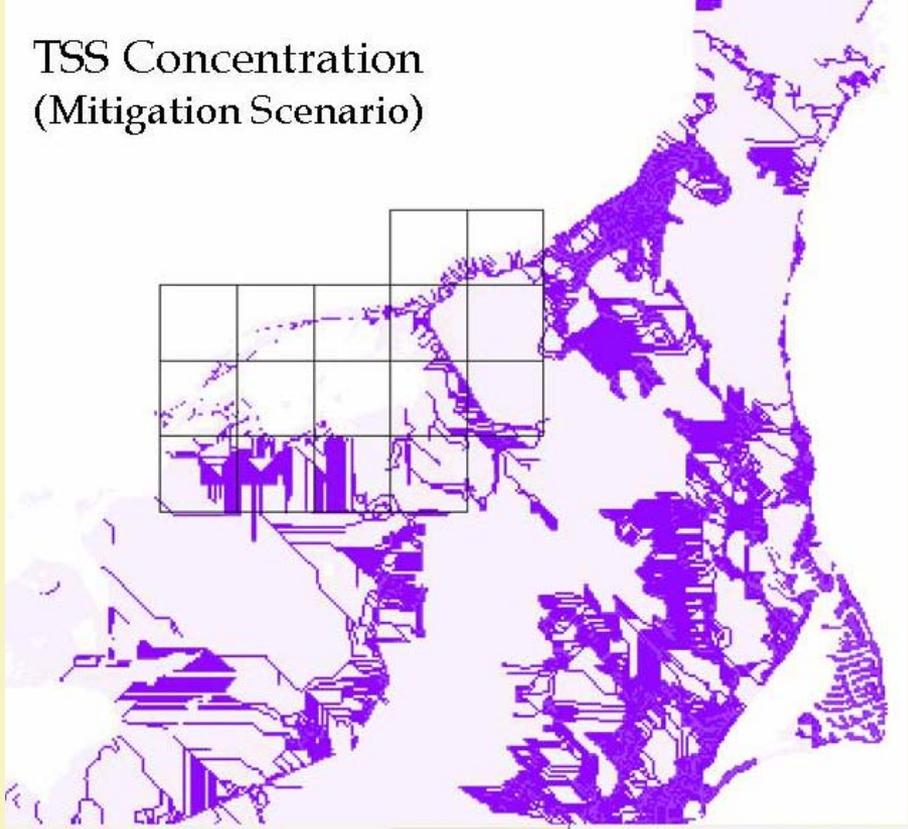
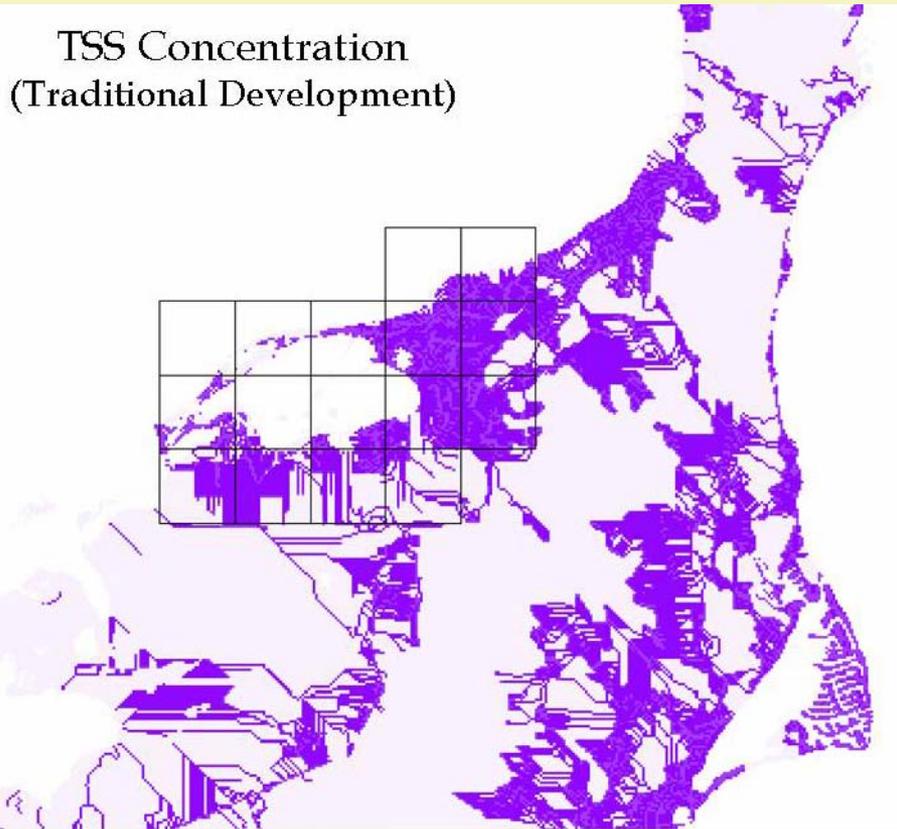
Buttons: Apply, Undo, Review..., Save ...

# Integrate and Re-analyze in CommunityViz

- Site mitigation from Vista in new CommunityViz scenario with indicators.

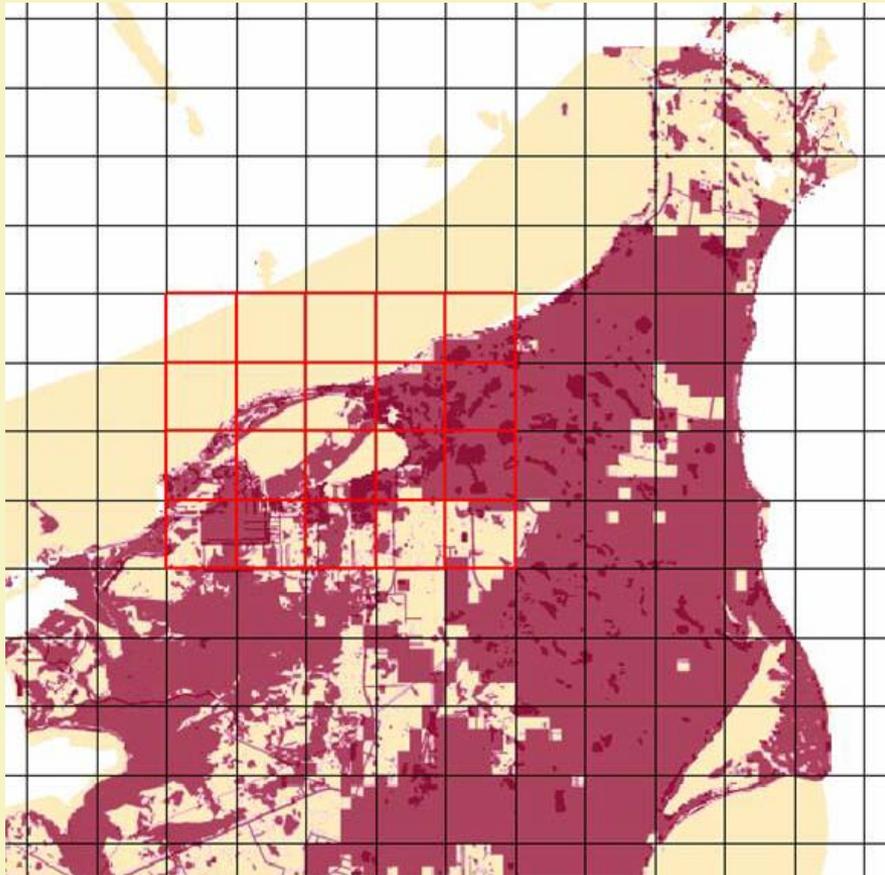


# Integrate & Re-Analyze in N-SPECT



# Re-Analyze in Vista

**Traditional Development Conflicts**



**Mitigated Scenario Conflicts**



# Status & Next Steps

- Regional training for practitioners April 2009
- Project evaluation and workflow revision
- Develop & publish interoperability guide on [ebmtools.org](http://ebmtools.org)

# Conclusions

- Demonstrate the linkage of 3 decision support tools to address integrated land-sea planning 
- Create a documented methodology for the integration and interoperability of these tools 
- Assist Aransas County with analyses to demonstrate the need for increased land use planning authority 

## For more Information

-  [www.communityviz.org](http://www.communityviz.org)
-  [www.natureserve.org/vista](http://www.natureserve.org/vista)
-  <http://www.csc.noaa.gov/nspect>