Decision Support for Conservation Assessment and Planning in a Landscape Context

Results of a DoD Legacy Grant

NatureServe
A Network Connecting Science With Conservation

NatureServe VISTA®

Summary: How did we get here

- 2014-15 Legacy Grant
  - demonstrate use of species distribution modeling (SDM) for rare and imperiled species
  - NatureServe Vista ArcGIS extension for current and future threats assessment
- 2015 NatureServe continued development
  - Demonstrate integration of sea level rise
  - Demonstrate prioritization and planning capabilities at landscape and site levels

Agenda

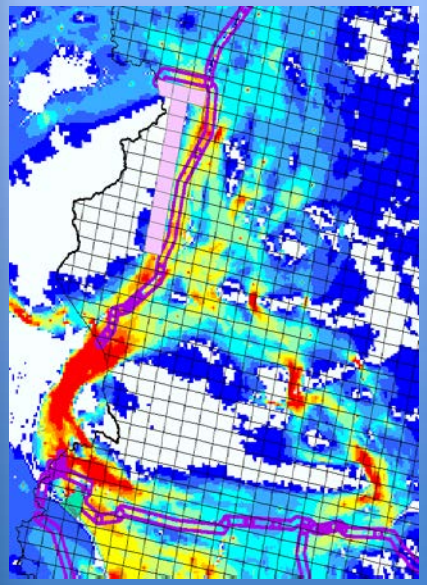
- Overview of Vista
- Live demonstration of Eglin AFB Vista project

Conservation on the land, in the water, anywhere on the globe

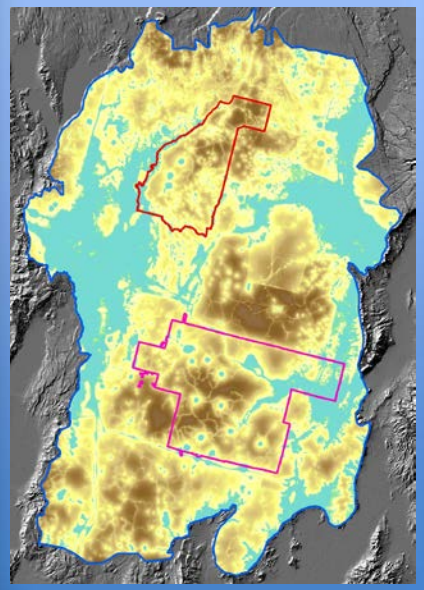
NatureServe VISTA

Conservation & Climate Change

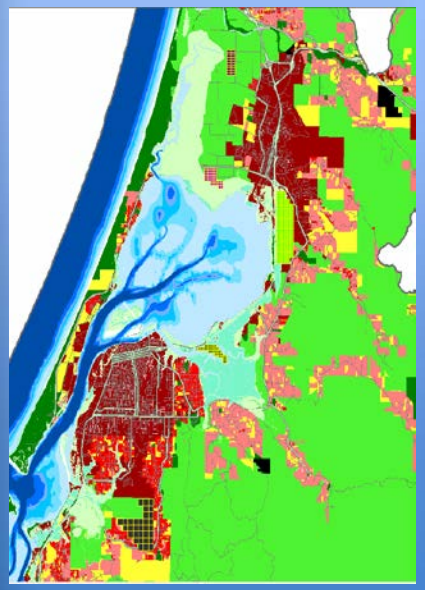
Land Use & Infrastructure



Public Land Management



Coastal/Marine



Our funders: $4M development & endowment

DORIS DUKE CHARITABLE FOUNDATION

The Nature Conservancy — Protecting nature. Preserving life.™

SURDNA FOUNDATION

Pulte Homes

the David & Lucile Packard FOUNDATION

Chevron

e ENVIRONMENTAL DEFENSE finding the ways that work

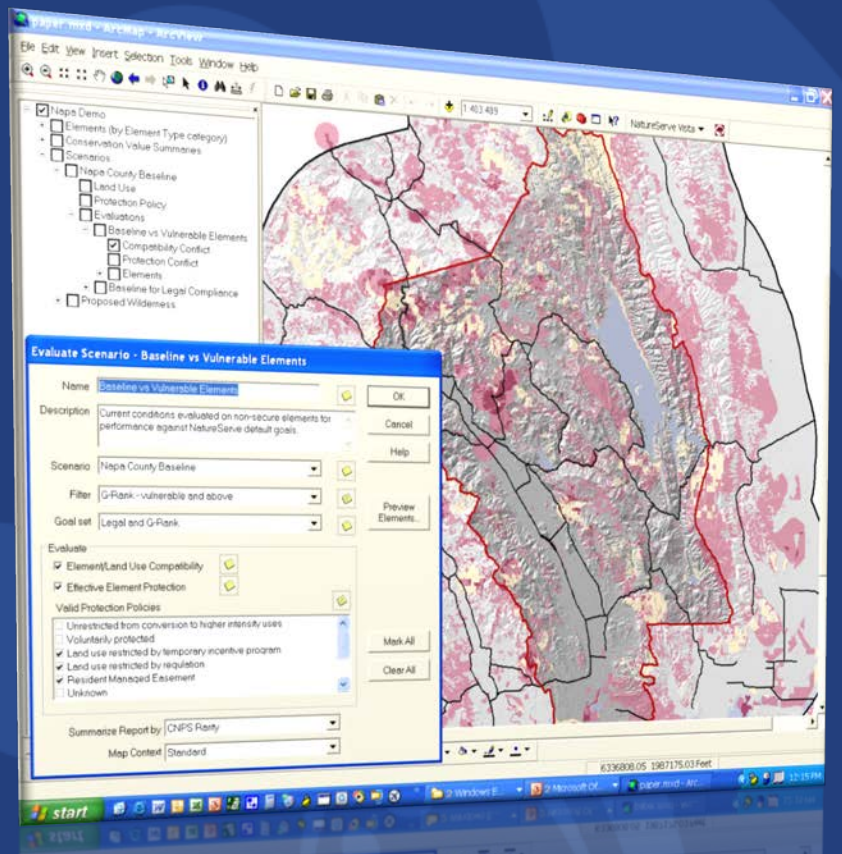
GEORGIA DEPARTMENT OF NATURAL RESOURCES

NASA

U.S. FISH & WILDLIFE SERVICE

NATIONAL SYSTEM OF PUBLIC LANDS — U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

Vista Basics



Our first pilot for Napa County, CA

- A **Free ArcGIS Extension** maintained for new Esri releases since 2004
- A **broadly capable tool** designed to help integrate conservation with a variety of planning & management activities in the land, air, water.
- Usable by a **variety of skill levels** with proper support
- Full integrated help and available **tech support, training, assistance**
- > 2000 downloads worldwide

What Does Vista Help You Do?

- **Apply well-vetted concepts** from *scenario-based planning*, *cumulative effects assessment*, *mitigation hierarchy, green infrastructure, systematic conservation planning, and ecosystem-based management & climate adaptation*
- **Work at multiple scales:** Vista maintains data at its source resolution so you can move from regional to site scales and back
- **Incorporate expert knowledge**: about biodiversity requirements and sensitivities is the scientific backbone that drives Vista analyses and good planning
- **Define** a variety of **scenarios** that incorporate unlimited issues
- **Evaluate scenarios'** ability to support your goals
- **Create alternatives** at a site specific level or systematically across the planning region
- **Support plan implementation, monitoring, and adaptive management**

Vista Components & Management Questions

Conservation Elements

Where are my features of interest?

- What condition are they currently in?
- How confident is their distribution?
- What are their patterns of diversity, condition, and confidence
- What are their conservation requirements?

Scenarios

What is the pattern of land use and other factors that affect my elements?

- Where is this particular feature?
- What and where are the policies enforcing conservation?
- How much area does each feature occupy

Scenario Evaluation & Site Explorer

How are my elements doing now and in the future?

- Did I meet my element retention/viability goals under this scenario?
- Where are there conflicts preventing me from meeting my goals?
- Where will this element be viable/non-viable?
- What features are impacting my elements?

Where should I act?

- Where are areas of high conflict?
- Where are areas of high value?
- Where are areas of high irreplaceability?

What should I do?

- Is the area in good condition but high threat?
- What are the elements' requirements to be viable?

Building Block: Conservation Elements

Biodiversity

- Species
- Ecosystems
- Habitats & Communities

Already identified priority areas

“Enduring features/land facets”

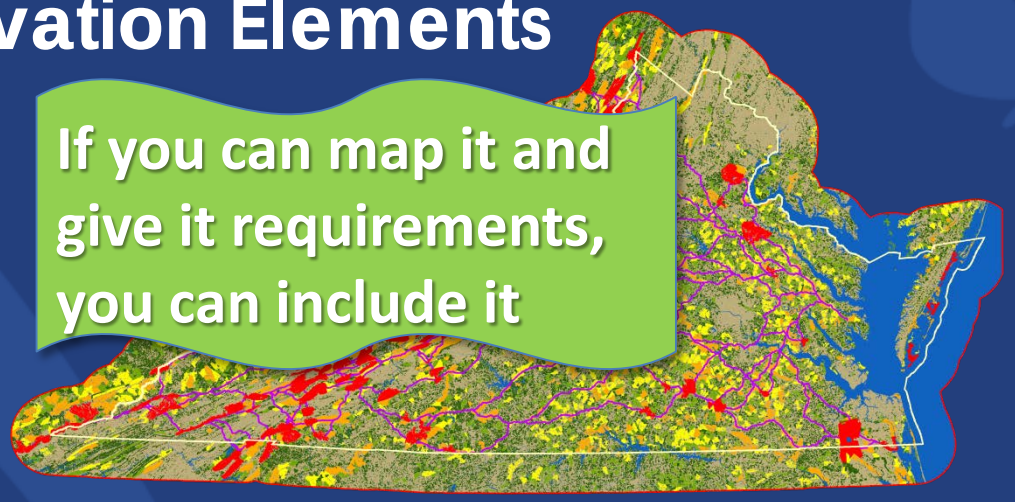
Climate refugia areas

Cultural Elements

- Critical infrastructure, e.g., escape routes
- Archaeological & cultural sites
- Environmental justice areas
- Recreation areas

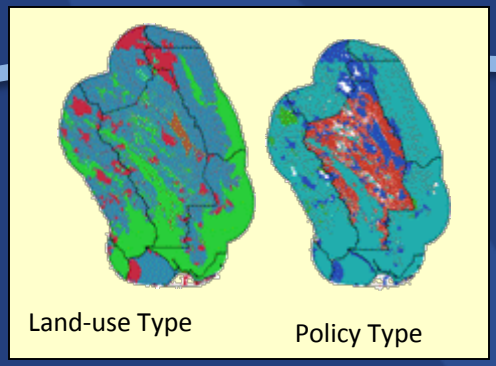
Hazard zones

Other land uses/Training ranges in multi-objective planning when also entered in scenarios

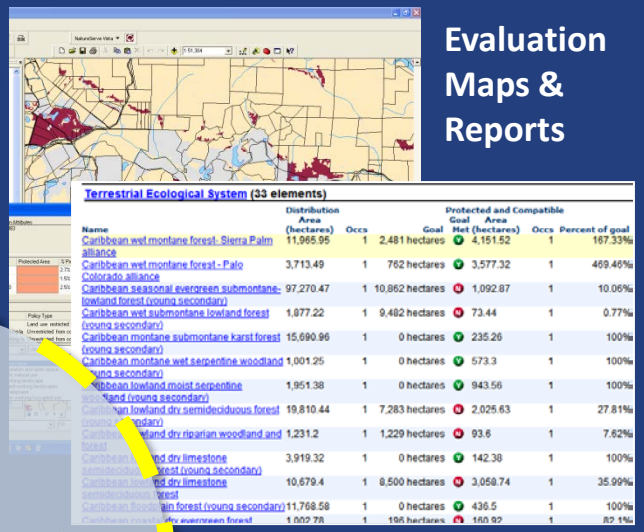


Vista Supported Analytical Process

Conservation Value Summary



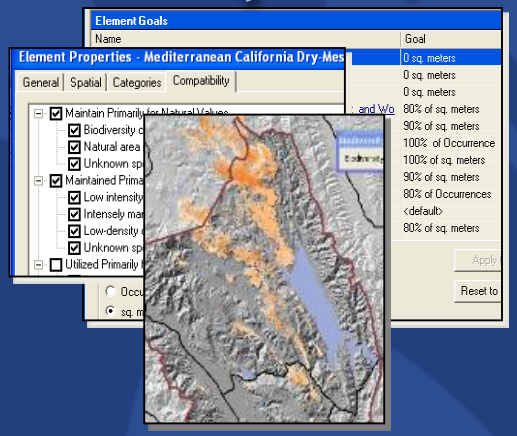
Cumulative Effects Models



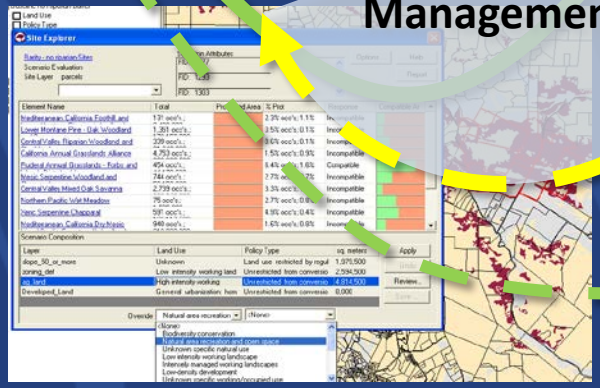
Evaluation Maps & Reports

Scenario Outputs baseline, buildout, trends, alternatives & new plan

Adaptive Management Cycle



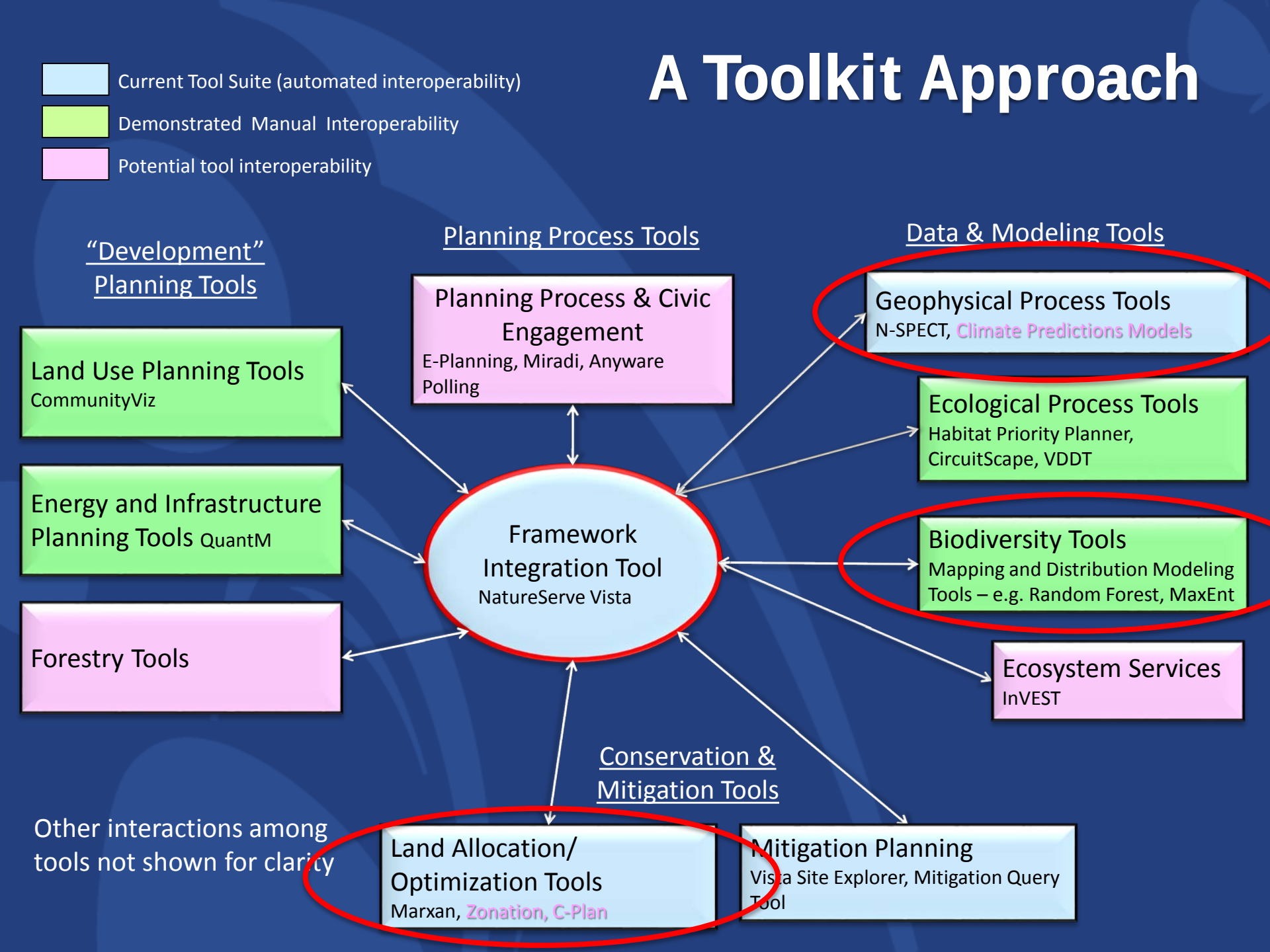
Elements, values, & expert knowledge



Mitigation & alternative scenario development

Optimized spatial solution generation via interoperating tools

A Toolkit Approach



Ongoing Implementation & Adaptive Planning

- In seconds, evaluate any proposed action for any site (e.g., training, facility, restoration, etc.)
- Find “next best” alternatives when new situations override the plan
- Update projects with new/revised data and science
  - Maintain a baseline situation and trends over time
  - Refresh analyses and update the plan

Live Demo

Example situations:

1. Cumulative effects assessment of scenarios (current, future urbanization, sea level rise)
2. Place installation in a landscape prioritization
3. Identify on-base conflict to be mitigated off-base

Caveats

- This is a demonstration project but used real data
- Only 5 imperiled species assessed
- Did not include local/installation level data

Conclusions, Q&A

- Vista tool available for free download
- All levels of support available
- NatureServe available to partner on ESTCP or Legacy proposals with your installation/region
- Look me up at NMFWA

Contact

Patrick Crist

patrick_crist@natureserve.org

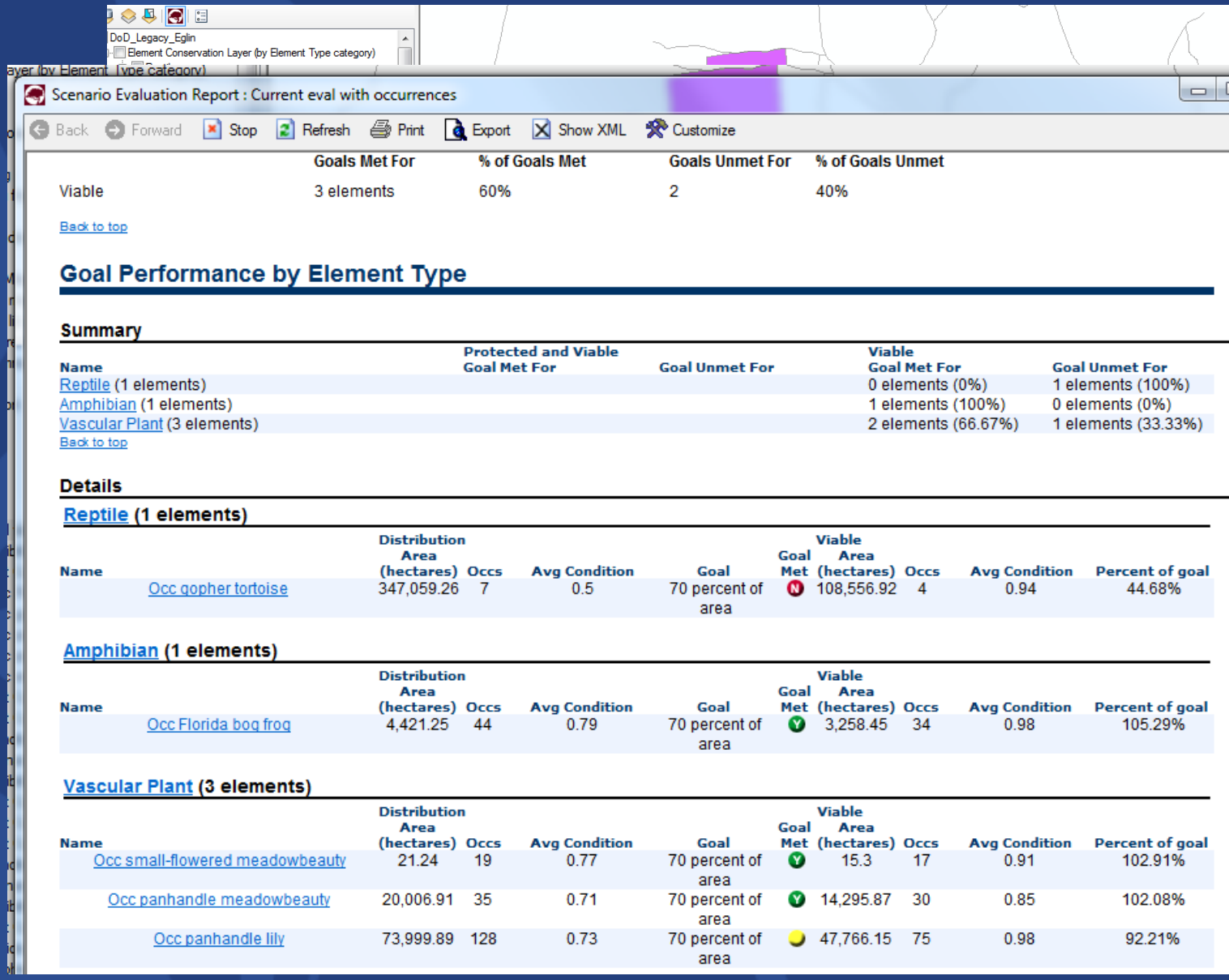
703.797.4810

Screenshots

In Lieu of Live Demo

Current condition assessment

meadow beauty evaluation with overlay (light pink) of FL Forever priorities.



	Goals Met For	% of Goals Met	Goals Unmet For	% of Goals Unmet
Viable	3 elements	60%	2	40%

Back to top

Goal Performance by Element Type

Summary

Name	Protected and Viable Goal Met For	Goal Unmet For	Viable Goal Met For	Goal Unmet For
Reptile (1 elements)			0 elements (0%)	1 elements (100%)
Amphibian (1 elements)			1 elements (100%)	0 elements (0%)
Vascular Plant (3 elements)			2 elements (66.67%)	1 elements (33.33%)

Back to top

Details

Reptile (1 elements)

Name	Distribution Area (hectares)	Occs	Avg Condition	Goal	Goal Met	Viable Area (hectares)	Occs	Avg Condition	Percent of goal
Occ gopher tortoise	347,059.26	7	0.5	70 percent of area	N	108,556.92	4	0.94	44.68%

Amphibian (1 elements)

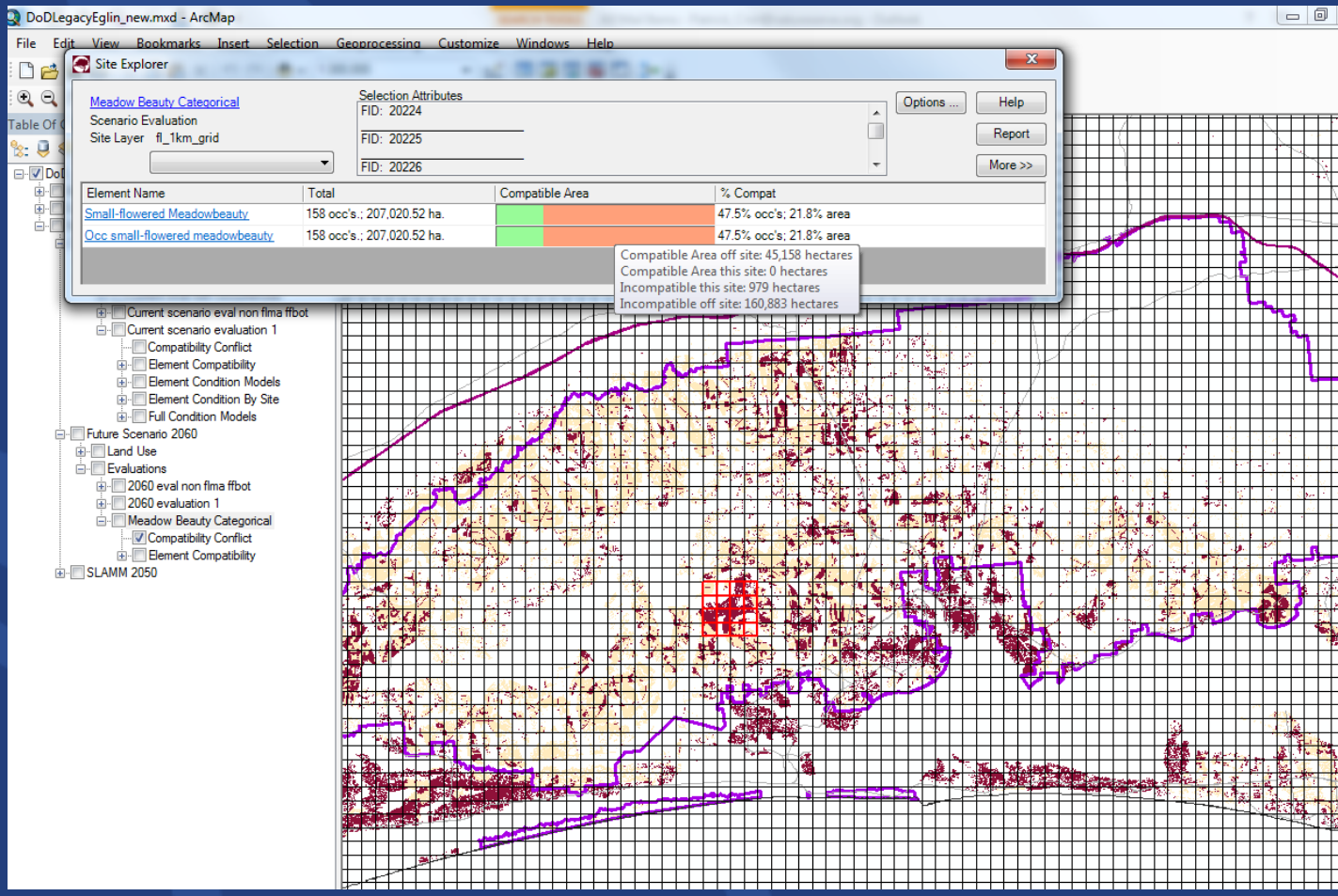
Name	Distribution Area (hectares)	Occs	Avg Condition	Goal	Goal Met	Viable Area (hectares)	Occs	Avg Condition	Percent of goal
Occ Florida bog frog	4,421.25	44	0.79	70 percent of area	Y	3,258.45	34	0.98	105.29%

Vascular Plant (3 elements)

Name	Distribution Area (hectares)	Occs	Avg Condition	Goal	Goal Met	Viable Area (hectares)	Occs	Avg Condition	Percent of goal
Occ small-flowered meadowbeauty	21.24	19	0.77	70 percent of area	Y	15.3	17	0.91	102.91%
Occ panhandle meadowbeauty	20,006.91	35	0.71	70 percent of area	Y	14,295.87	30	0.85	102.08%
Occ panhandle lily	73,999.89	128	0.73	70 percent of area		47,766.15	75	0.98	92.21%

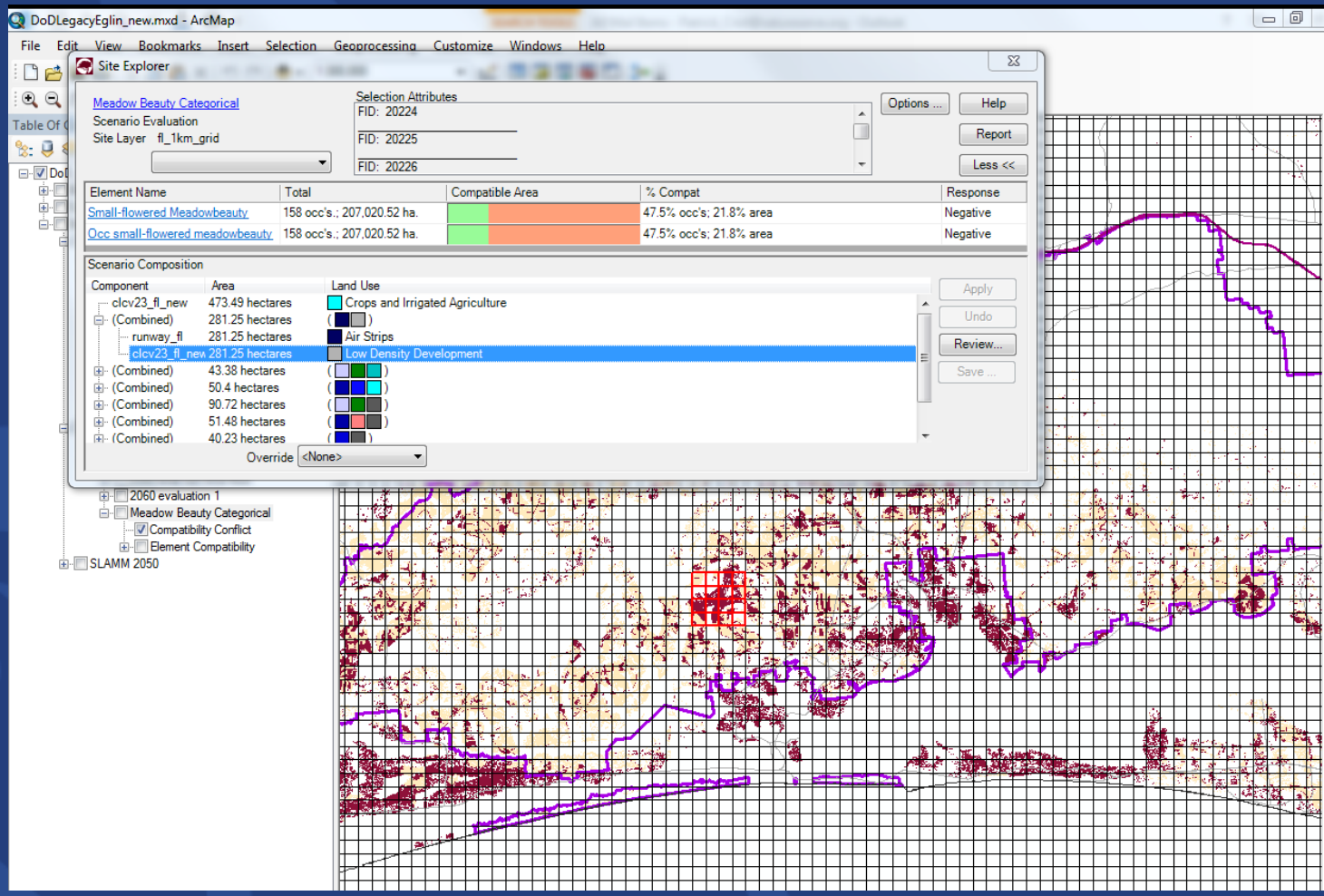
Conflict Identification on base site

Site outlined in red can be queried in Site Explorer to ID elements condition onsite, relative importance of the site, and impacting land uses onsite.



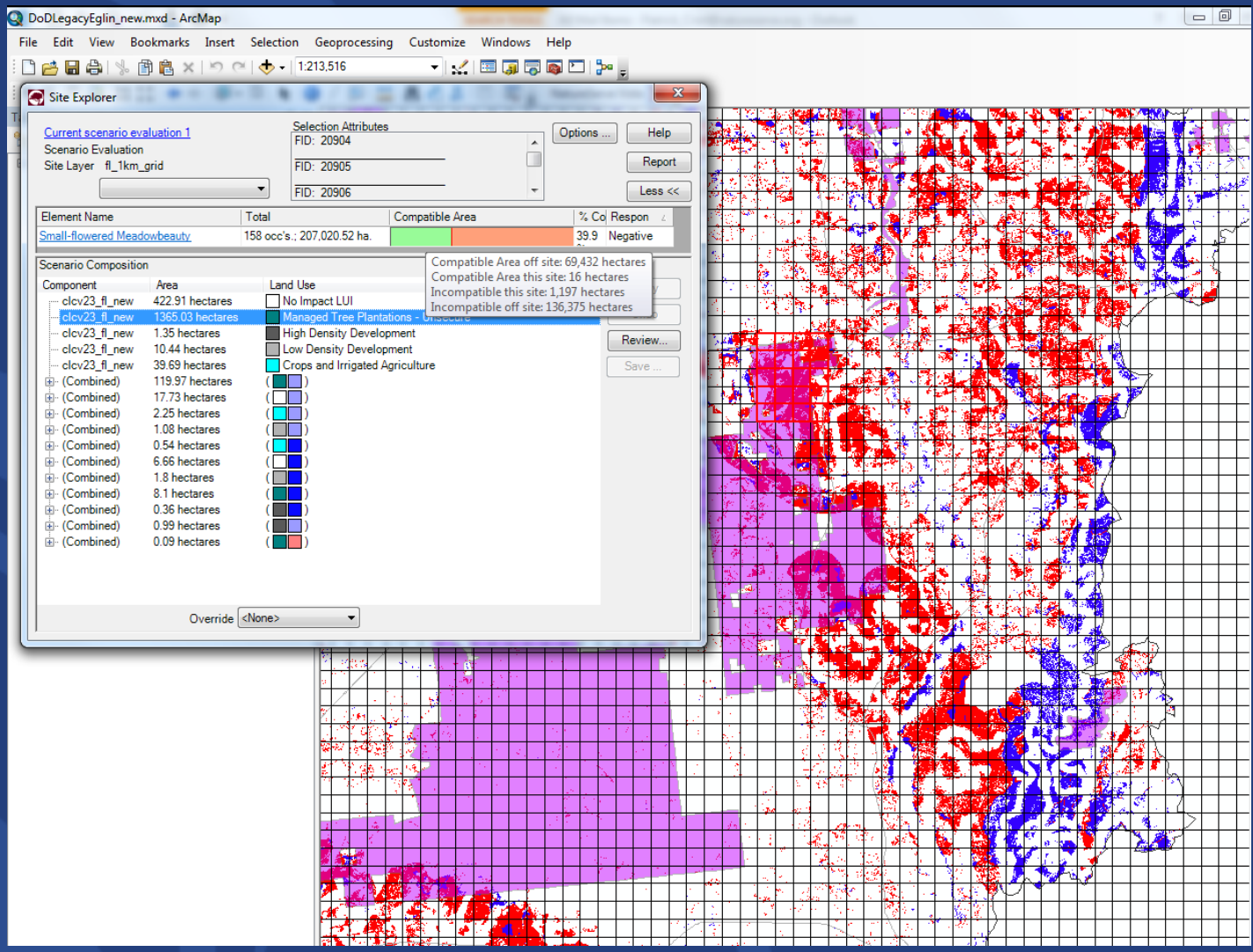
Conflict Identification on base site

Because the impacts are caused by existing are strip and low density development, no onsite mitigation is considered. Instead we'll look for an offsite location.



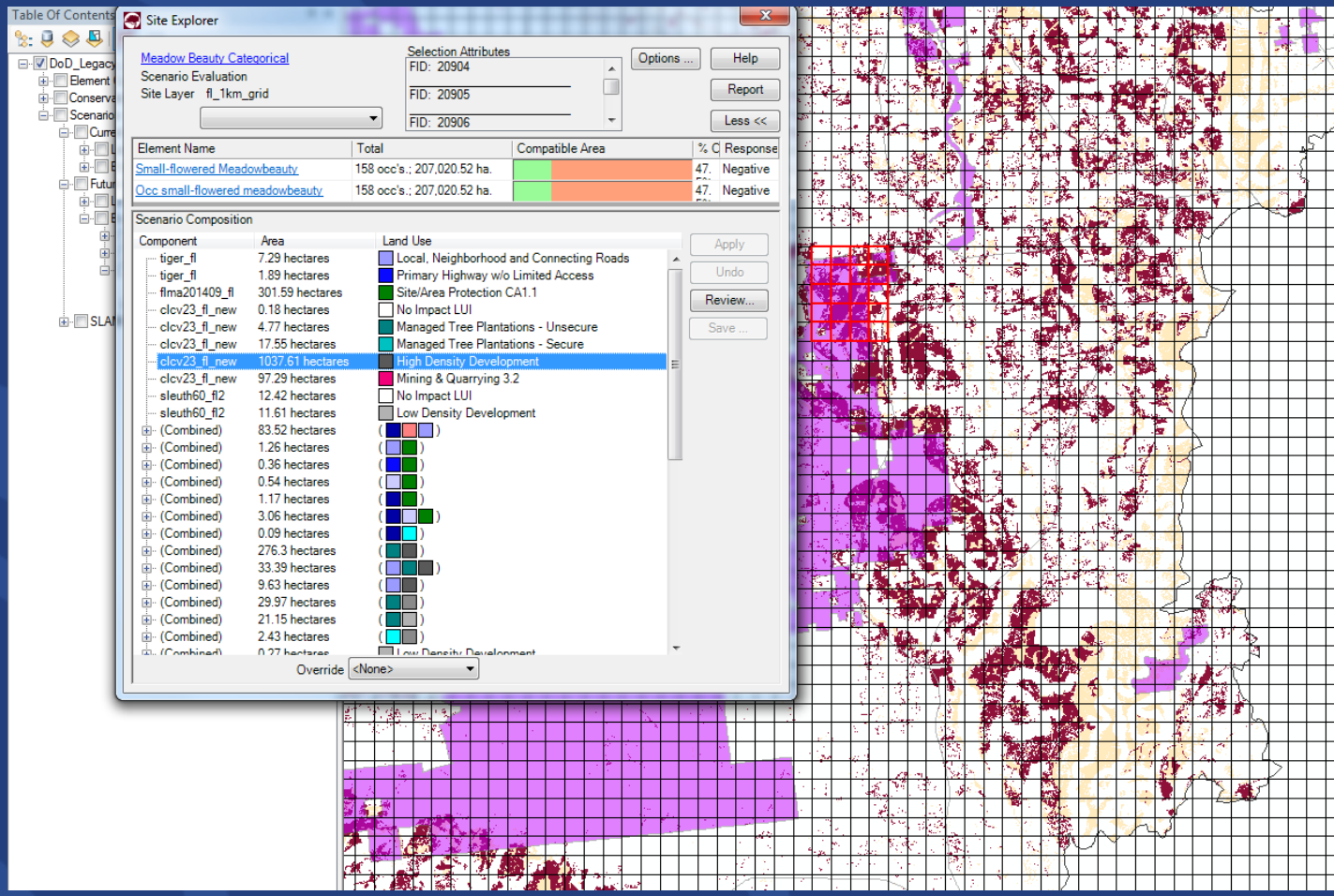
Conflict Identification on Potential Mitigation Site

FL Forever unprotected site outlined in red indicating managed plantation (unsecure) land use is generating low condition scores for meadow beauty.



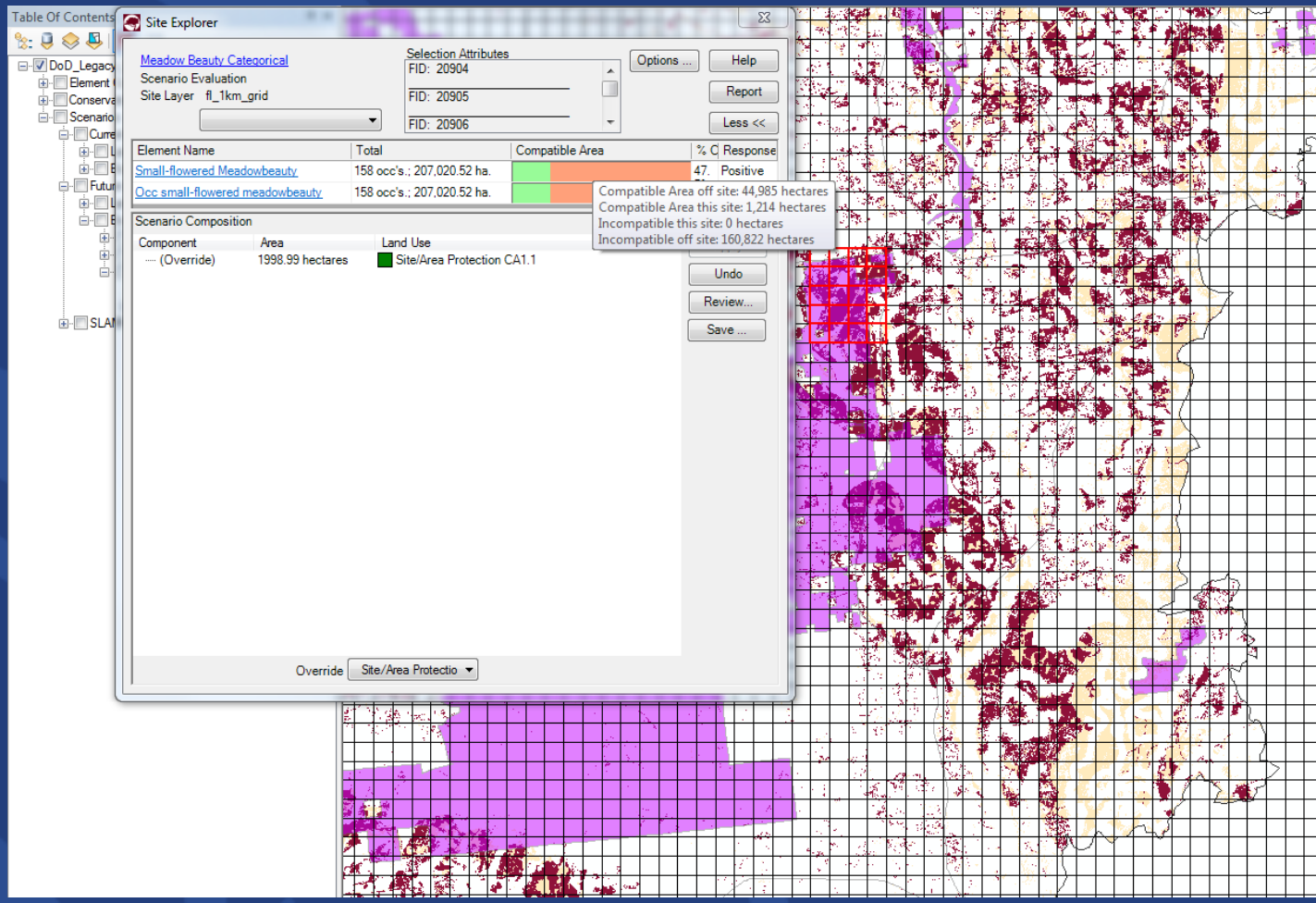
Conflict Identification on Potential Mitigation Site

Examining future scenario, it is modeled to have conversion from plantation to high density development



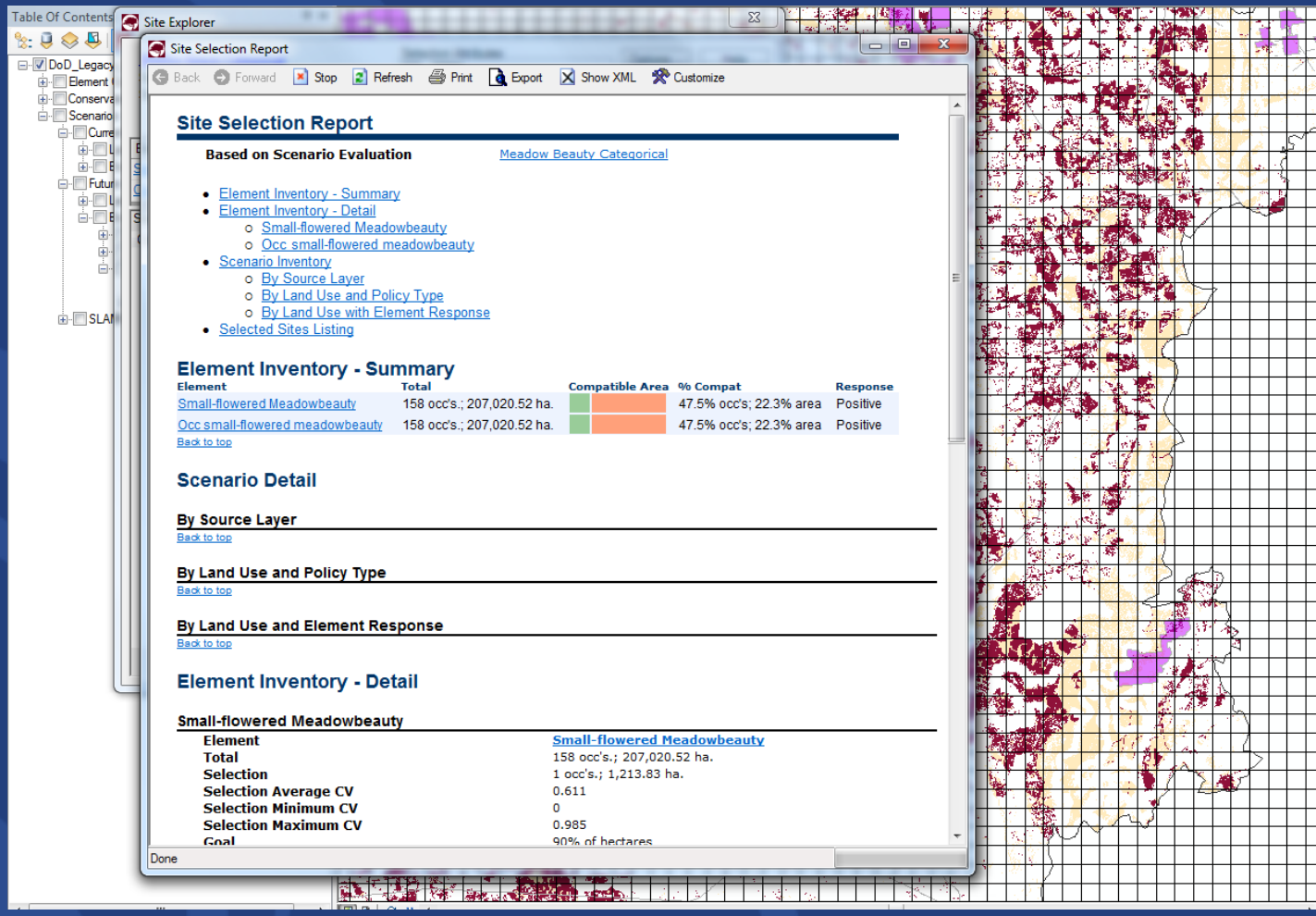
Proposing Land Use Change for Potential Mitigation Site

Selected site is investigated for conflict and then an alternative site use is selected (e.g., purchase for conservation). It is also possible to add implementation mechanisms to attribute the site with the land use and the mechanism (e.g., REPI purchase)



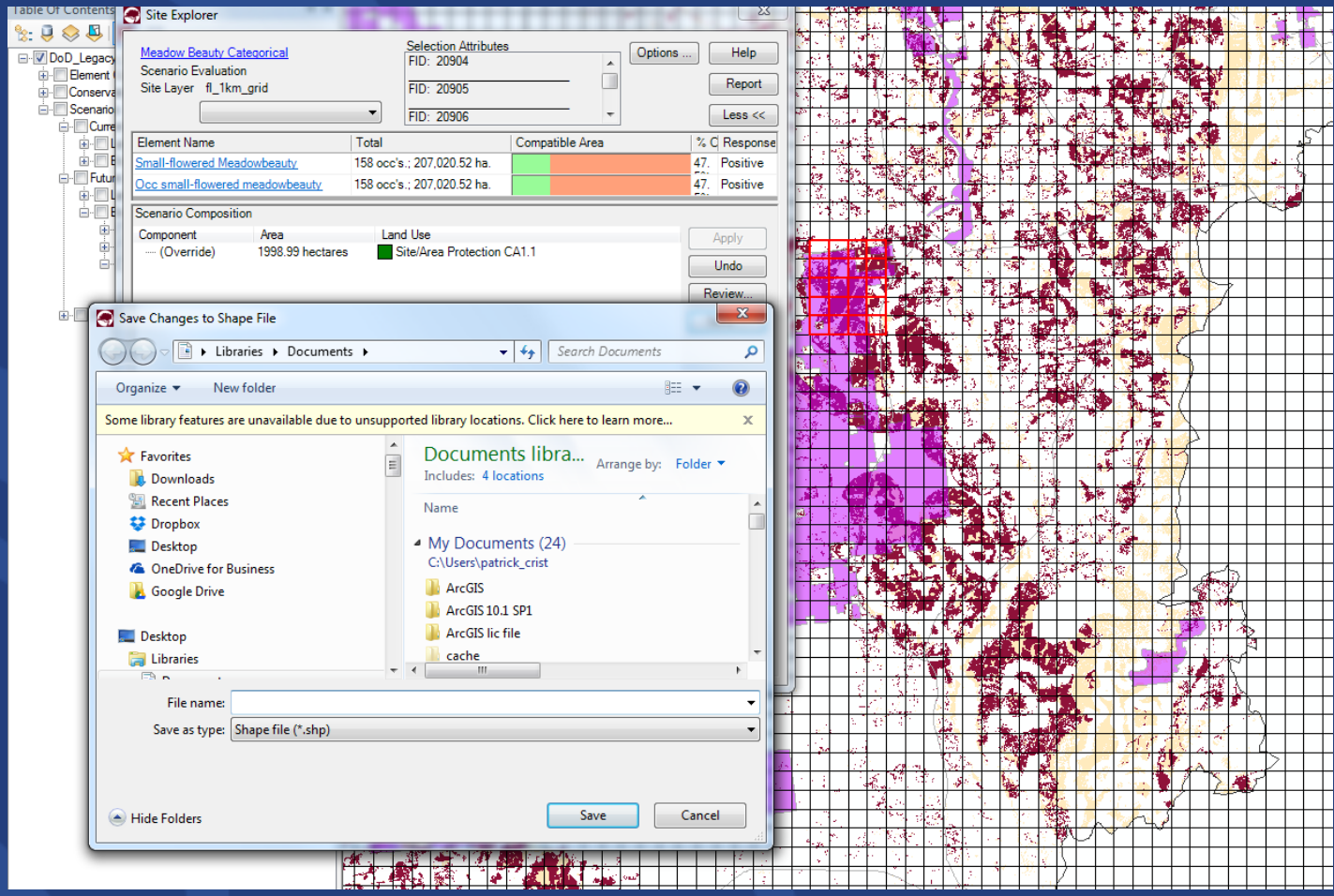
Proposing Land Use Change for Potential Mitigation Site: Report

A one-click report can be generated of whatever was in Site Explorer at the time so the original results or in this case, the proposed changes.



Saving site result

User is prompted to save the shapefile with the new attributes that can be integrated into the scenario to re-evaluate the landscape with that change and/or create a new implementation plan.

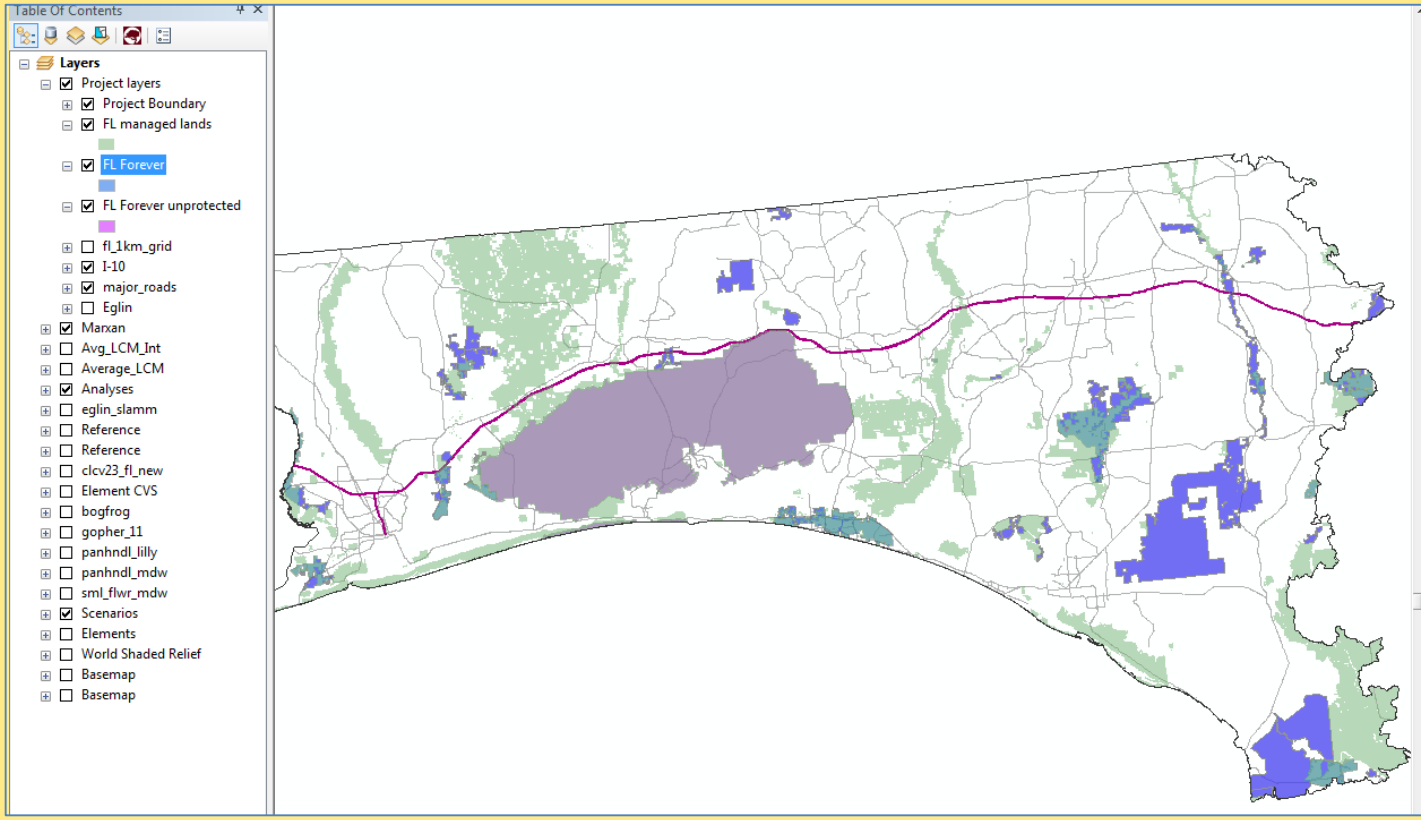


Landscape prioritization

Prioritization can be used to help create an entire network, determine how “irreplaceable” any particular site is for conservation, and to guide individual conservation or development projects to highest gain, lead impact decisions

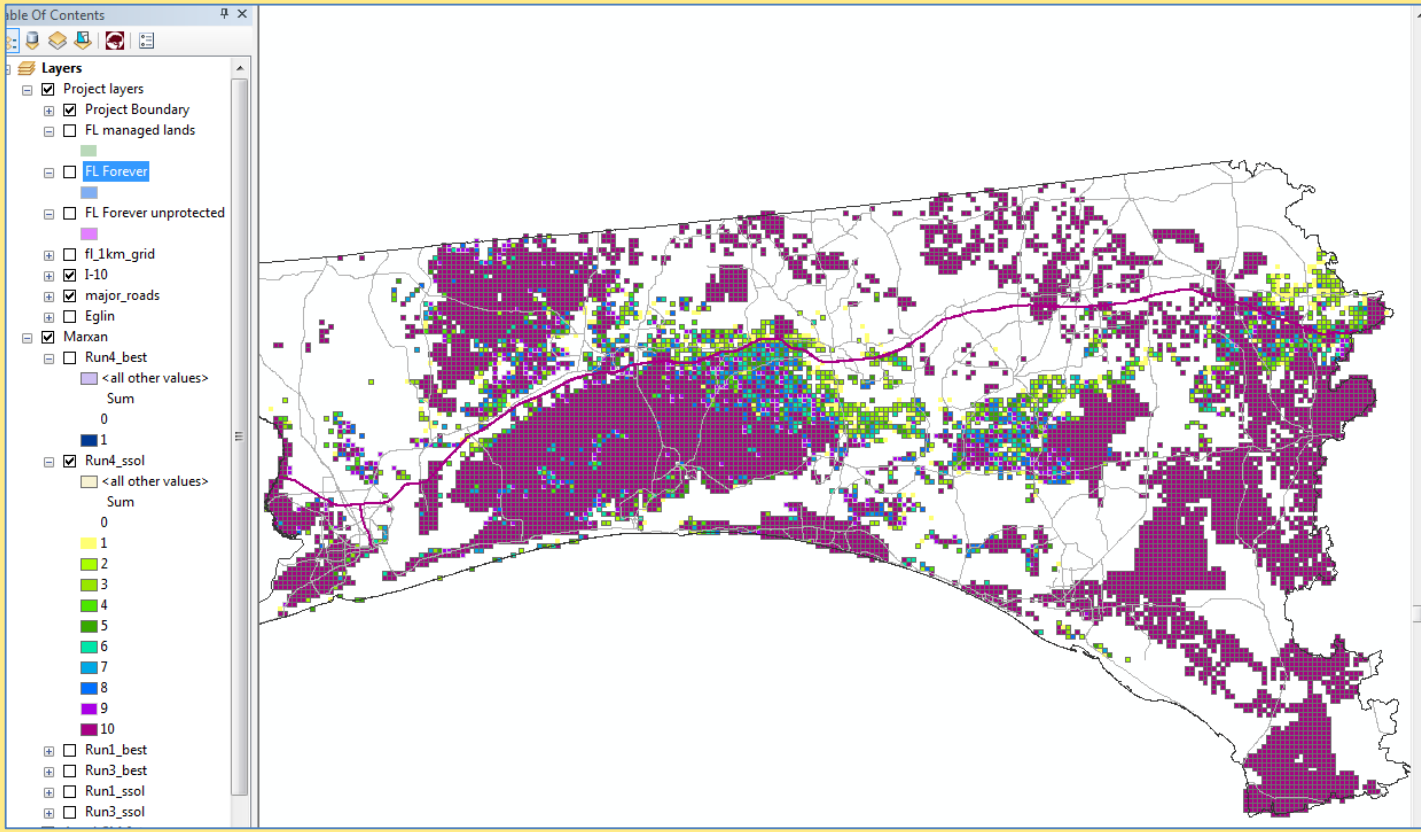
Existing protected and priority lands

We locked in the FL Forever priorities and unprotected lands into our prioritization of the selected Eglin target species.



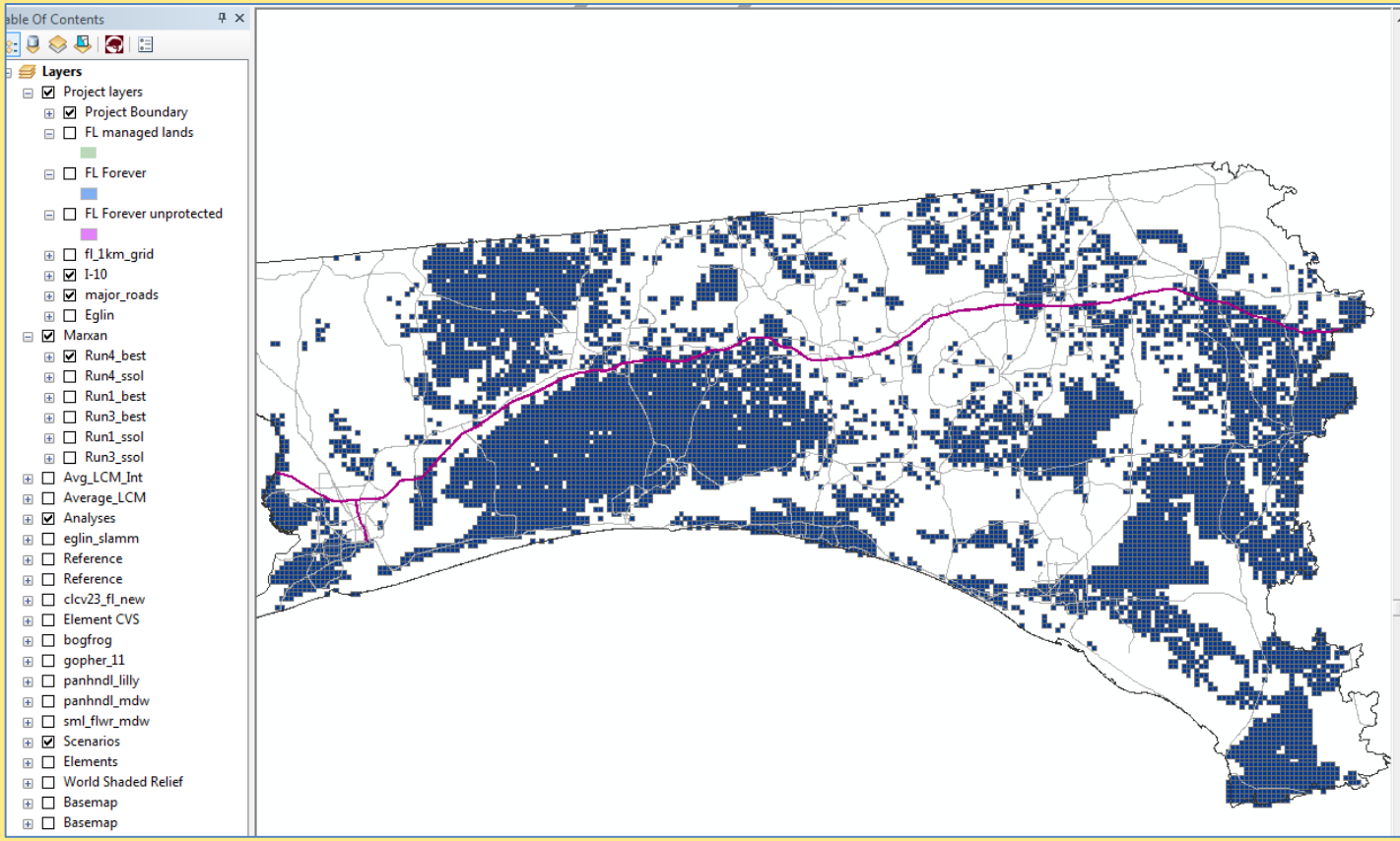
Relative Irreplaceability

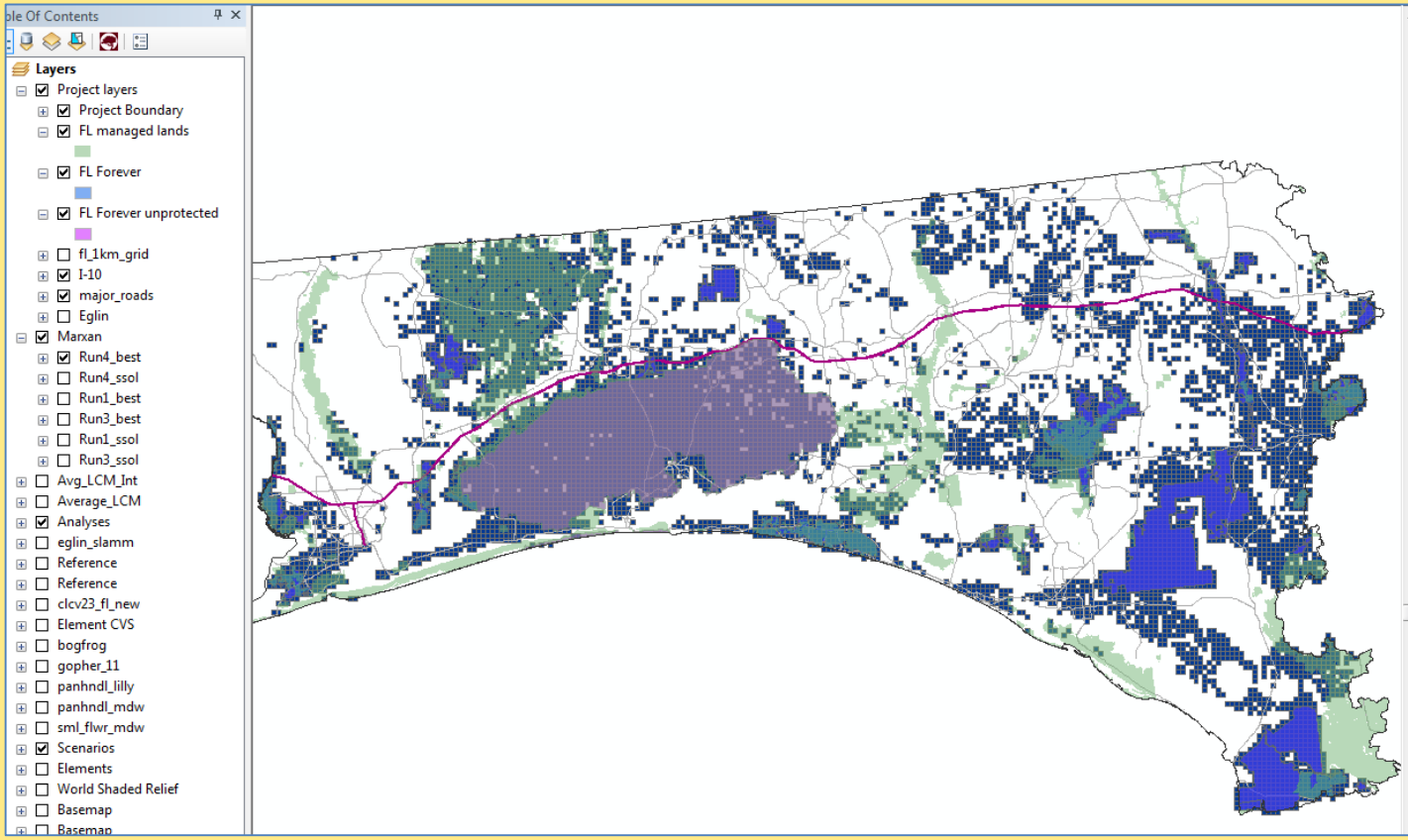
This Marxan “sum of solutions” result indicates the number of times a site unit was selected for a conservation network. Low numbers (yellows-greens) have relatively low scores and are therefore replaceable with other options. Higher scores (blues to purples) are increasingly irreplaceable meaning that purple areas are required for the solution (note again that many of these areas were “locked in” to all solutions.



Best of runs

This Marxan "best of runs" shows the most efficient result (keeping in mind we locked in the FL Forever areas).



Best of runs with FL Forever Lands

This Marxan "best of runs" shows the most efficient result (keeping in mind we locked in the FL Forever areas). It is overlaid with those FL Forever lands to indicate correspondence .