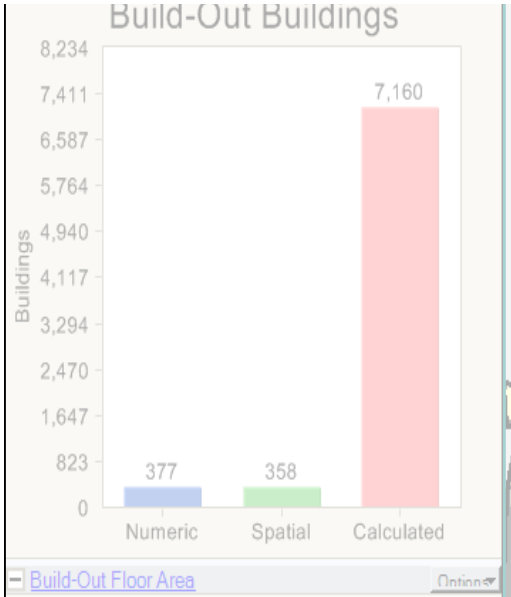
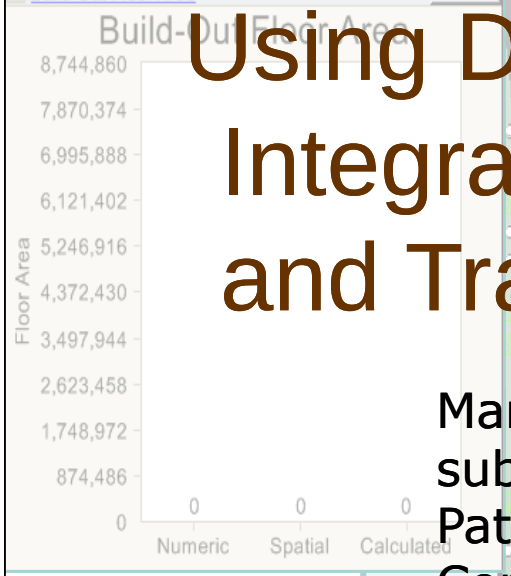




NatureServe

A Network Connecting Science With Conservation

Using Decision Support Tools to Integrate Land Use, Conservation, and Transportation Planning

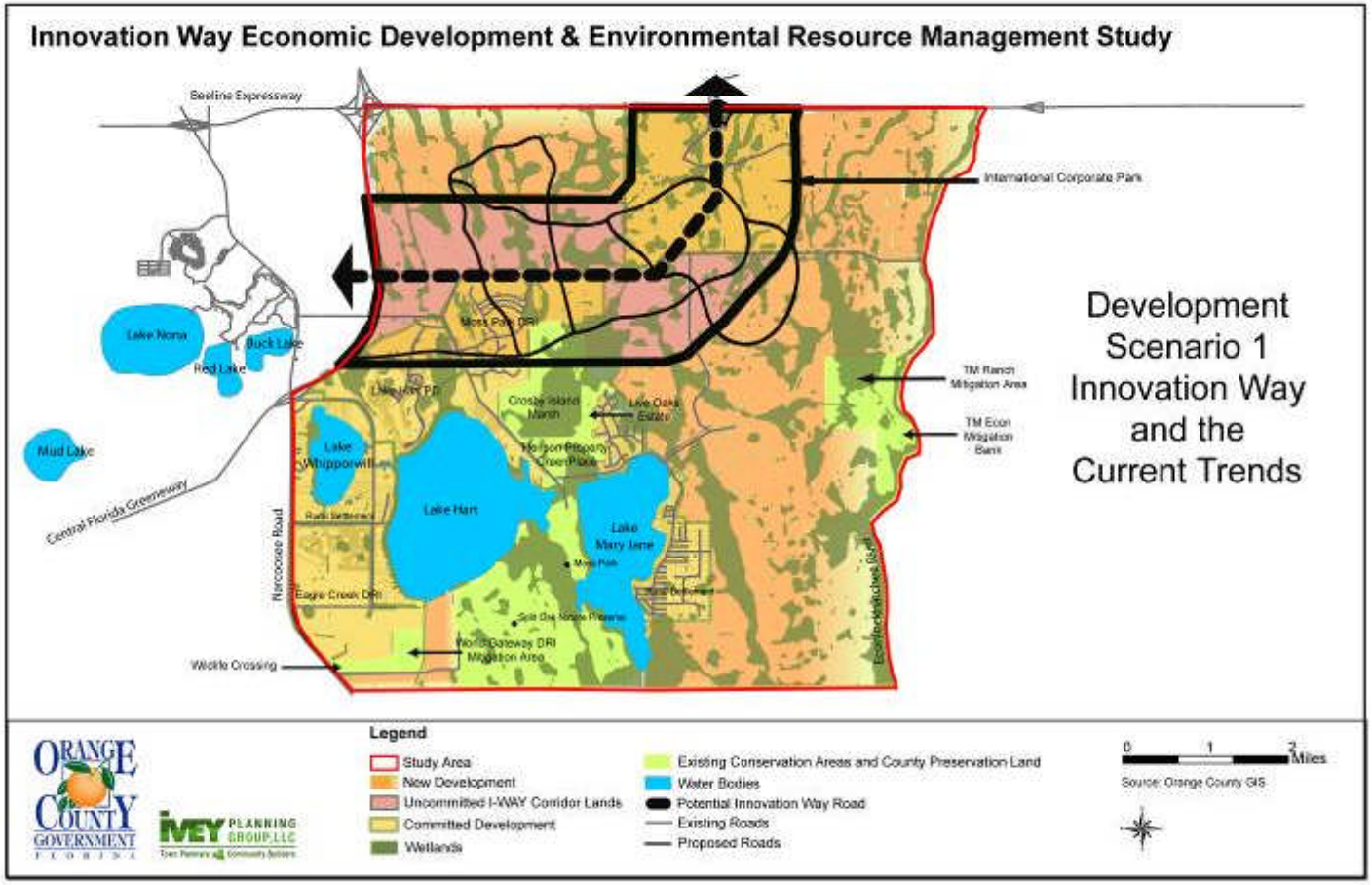
Marie Venner, Venner Consulting, Inc.,
substituting for:
Patrick J. Crist, PhD, Manager, NatureServe,
Conservation Planning Services

Some Uses of DSS for Integration Conservation & Transportation

- **Proactive planning**
- Least-conflict routing of transportation thru **rapid evaluation of multiple route options, cumulative effects assessment**
- **Integrating multiple objectives** (e.g., transportation, development, conservation) for long-term plans or short-term projects
  - **Evaluating long-term cumulative effects**
  - **Key needs**: Revealing needs/**irreplaceable areas** for any particular objectives across sectors
  - **Mitigation planning**: Revealing options for achieving objectives to mitigate conflicts

Case Study: Florida Large Site Development Planning

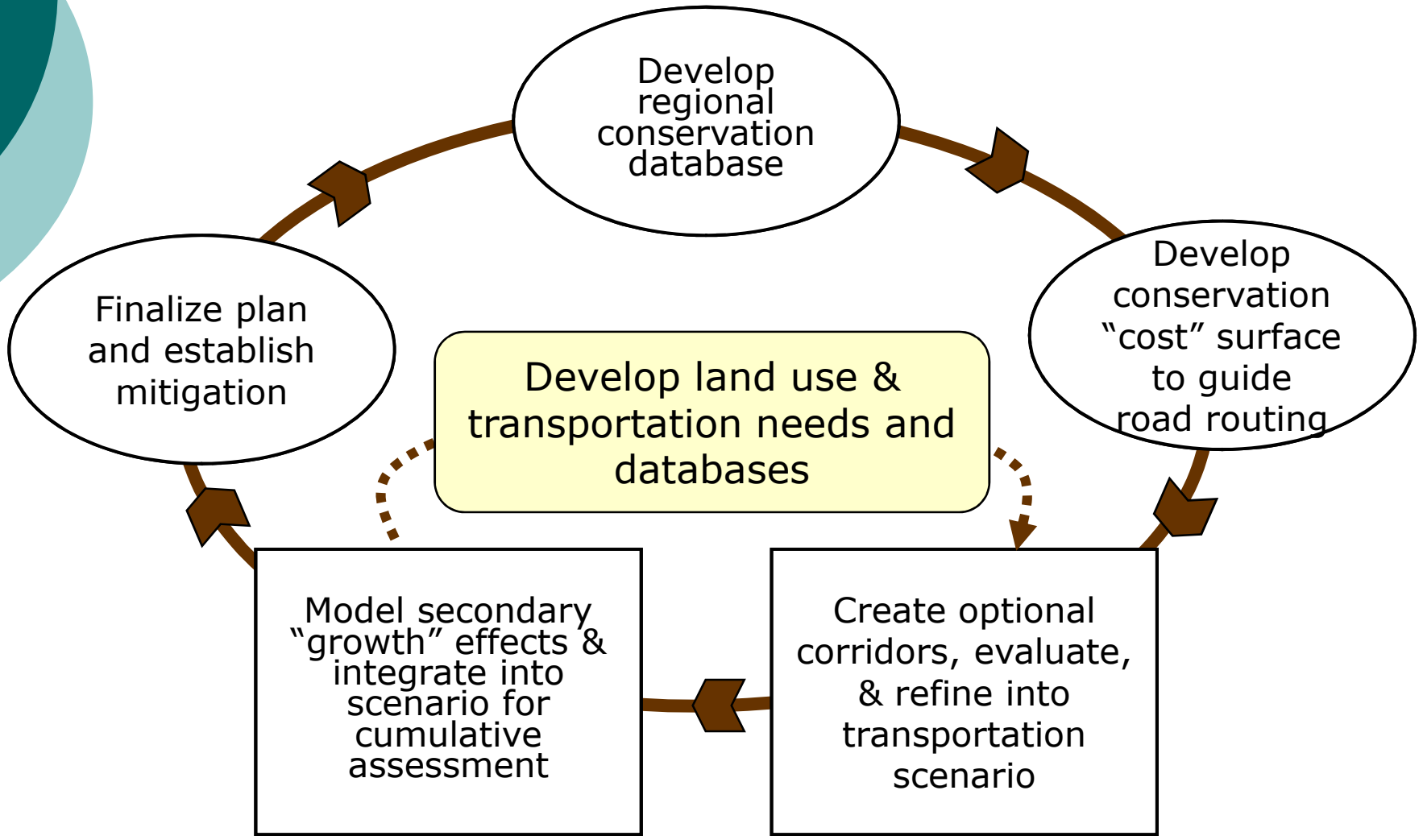
Objective: Plan new tech corridor and mixed use while respecting natural resources



Innovation Way Technology Corridor

- Orange Co, FL
- 33,884 acres

Example Process of Regional Assessment & Planning



About the Tools

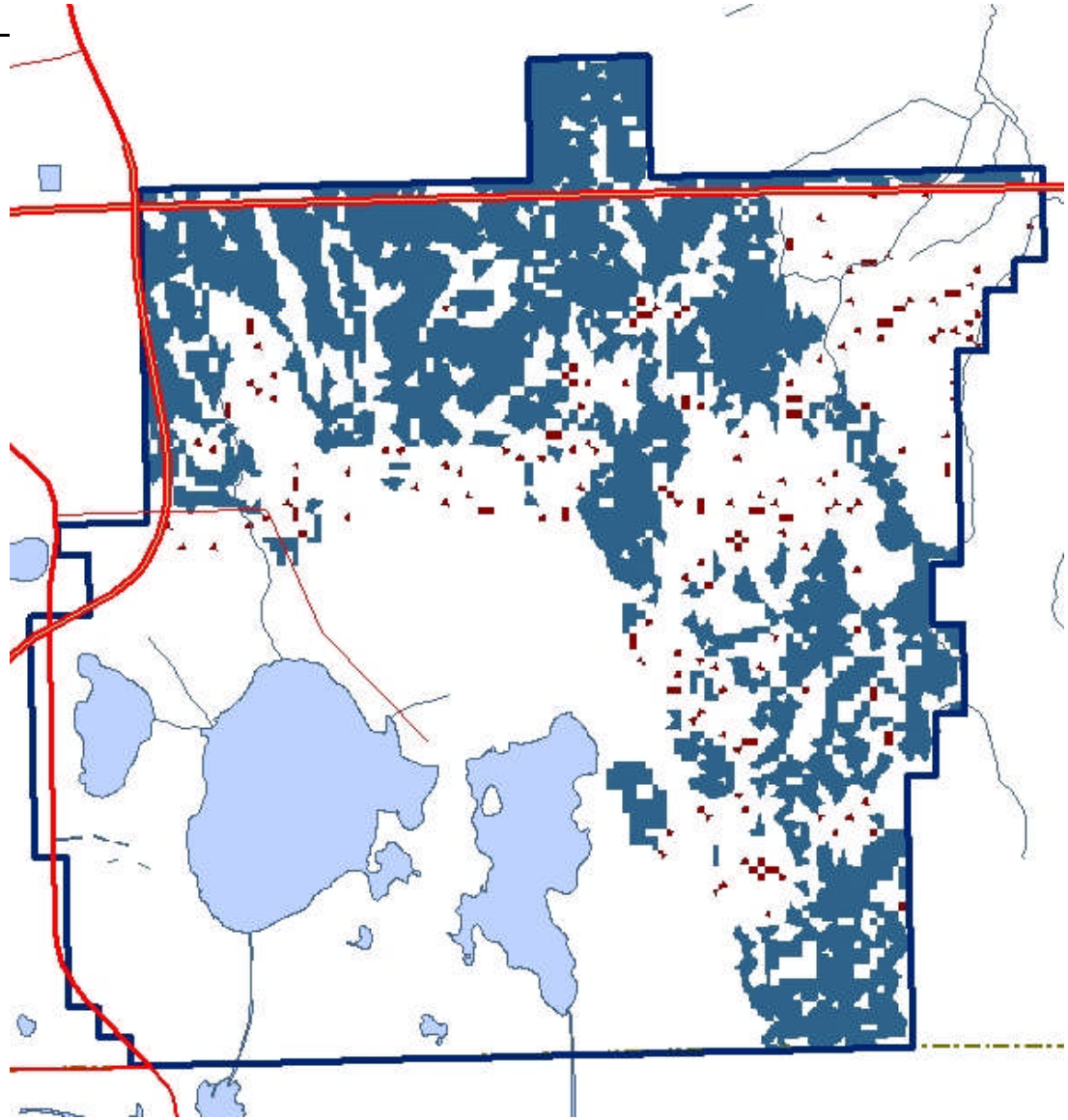
- Quantm: transportation **route optimization tool minimizes road costs given constraints** (e.g. environmental, socioeconomic, earthwork)
- CommunityViz: land use planning framework tool that provides **urban growth modeling, 3D visualization, and integration of multiple indicators**
- NatureServe Vista: conservation framework tool that provides expert knowledge capture for elements of **green infrastructure planning and integration with other sector planning and assessment**

These are leading tools selected for this demonstration, other tools may be available to conduct individual parts of the analyses.

Vista: Representing Conservation Elements & Their Requirements

Example: Red Cockaded Woodpecker, a Federal Endangered Species with required protection

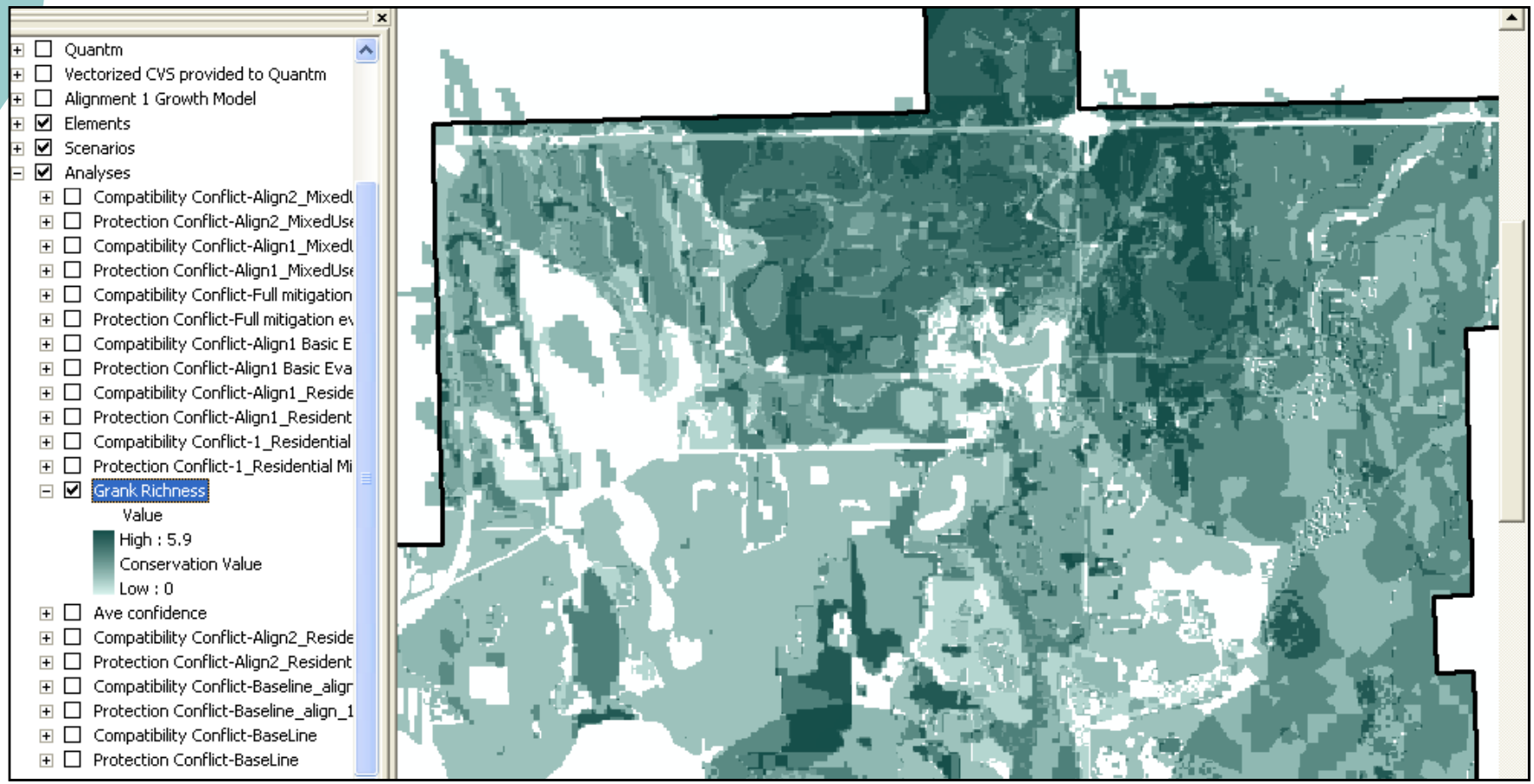
- Distribution based on potential habitat
- Expert input of minimum required patch size and compatible land uses



Blue occurrences meet adequate size requirements, red areas are below minimum size but still may provide habitat.

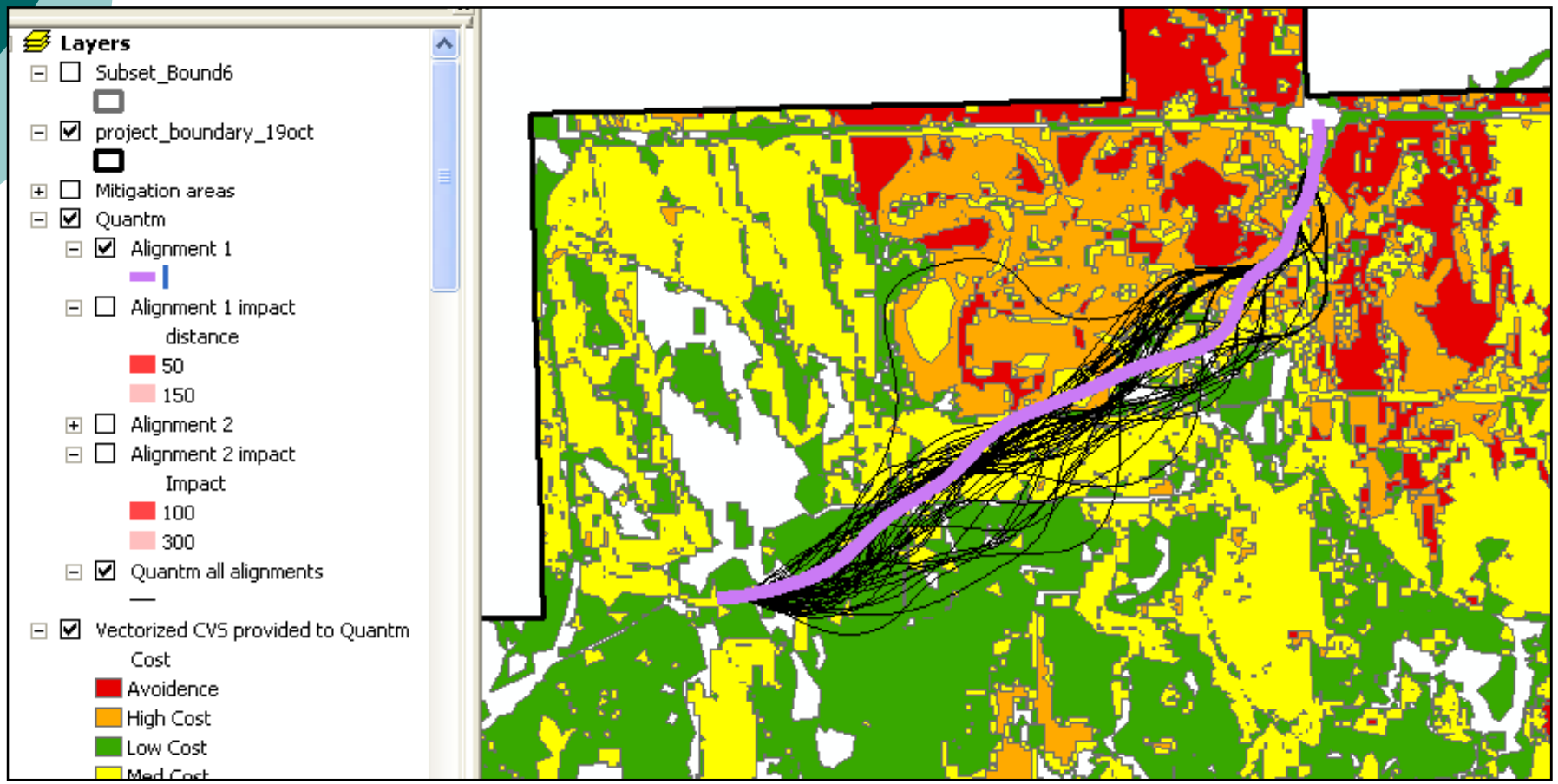
Depicting Conservation Values

Vista conservation value summary. **Overlays and combines attributes of conservation elements** to provide **relative value scores**



Integrating Transportation Planning

Categorized Vista output **used as input to Quantm road routing optimization** software (black lines indicate 50 optional alignments and purple indicates best performing option)



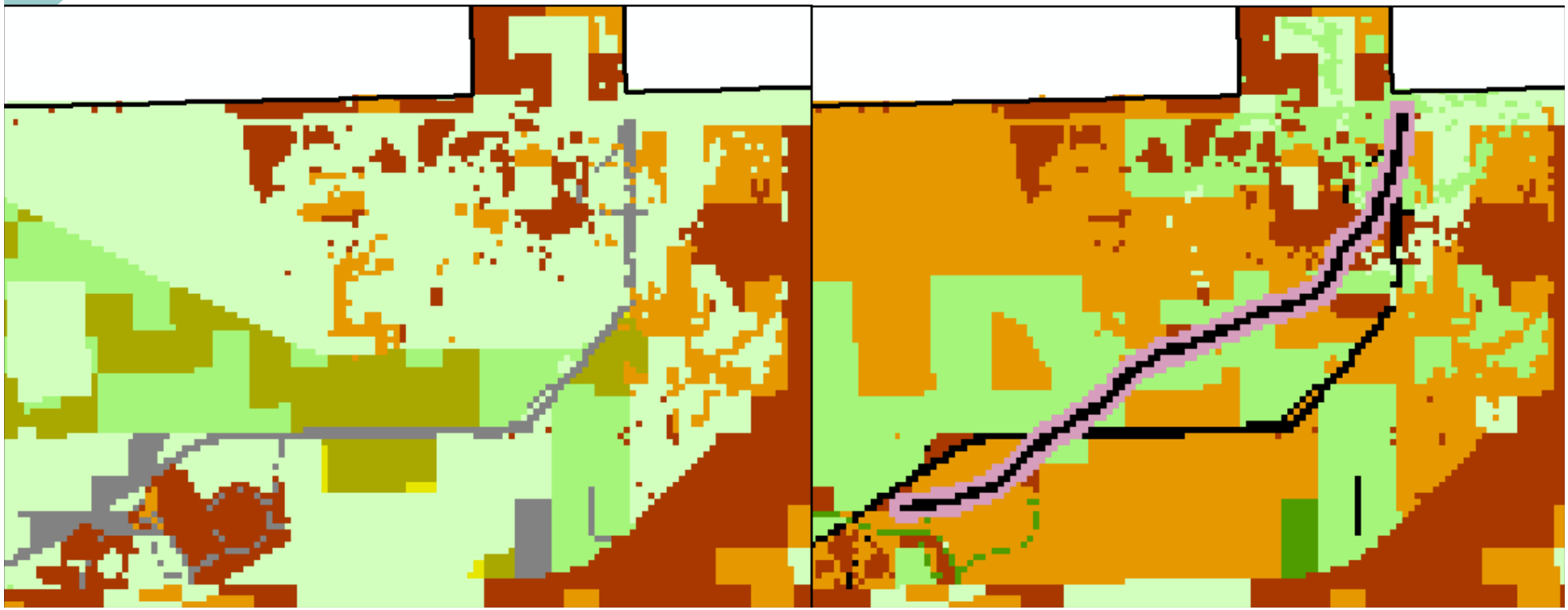
Integrating Land Use Planning

- Unknown specific natural use
- Natural area recreation and open space
- Unknown specific working/occupied use
- Low intensity working landscape
- Low-density development
- Minor road
- Unknown specific high intensity use
- High intensity working landscape/recreation parks
- General urbanization: homes, commercial, industrial, etc

CommunityViz growth model on right

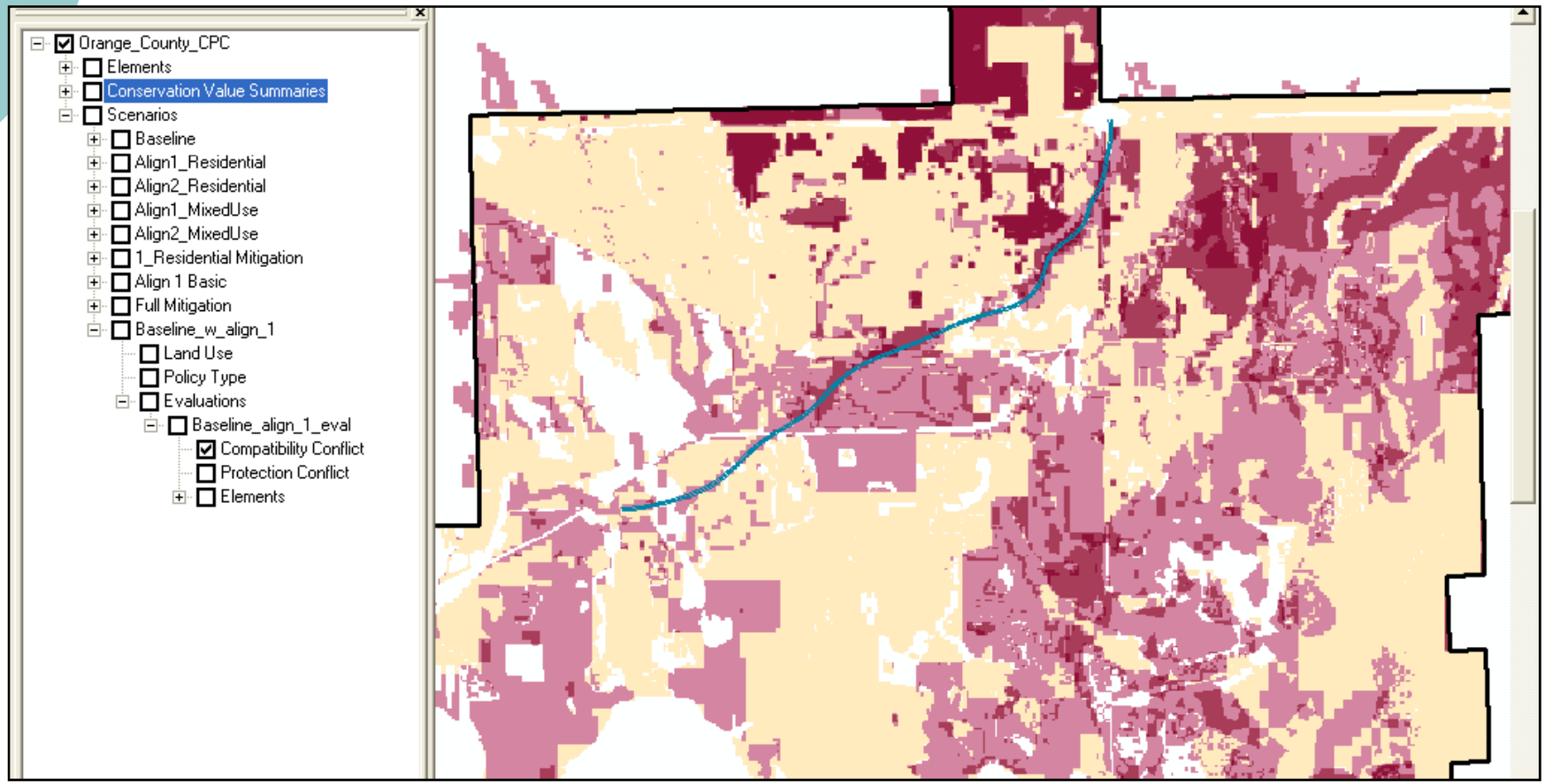
Current land use map indicating mostly green space

Growth model map indicating substantial new urbanization



Evaluating Transportation Impacts

Road corridor imported and evaluated in Vista. Compatibility conflict map for current land use with new proposed road. **Pink-red colors represent and index of number of conservation elements in conflict with the land use/infrastructure preventing goal achievement**



Evaluating Transportation Impacts

All tools provide reports. Example Vista report on **quantitative goal achievement for conservation objectives**

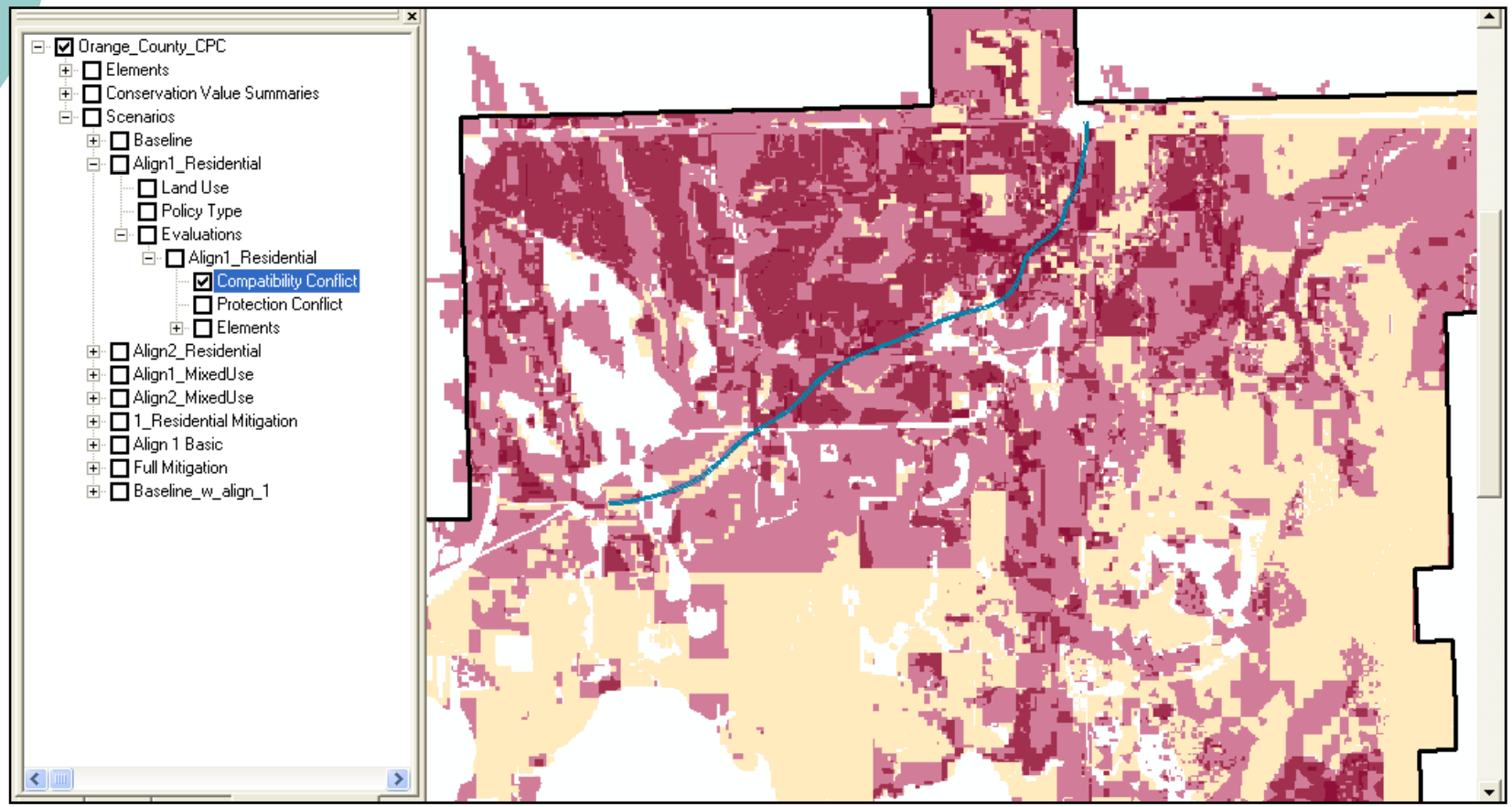
Goal Performance by Element

Elements (14 elements)

Name	Distribution Area (acres)	Occs	Protected and Compatible Goal	Goal Met	Protected and Compatible Area (acres)	Occs	Protected and Compatible Percent of goal	Compatible Goal Met	Compatible Area (acres)	Occs	Compatible Percent of goal
Wetlands	4,134.7	426	40 percent of area	Y	1,910.6	145	115.52%	Y	2,672.1	267	161.57%
Watersheds Priorities 4-6	7,098.1	167	40 percent of area	Y	3,121.2	58	109.93%	Y	3,397.2	66	119.65%
Watersheds Priority 3	4,832.5	84	60 percent of area	N	1,893.9	24	65.32%	N	2,046.5	33	70.58%
Watersheds Priority 2	224	40	70 percent of area	N	30.3	7	19.32%	N	125.4	16	79.97%
woodstork	4,393.1	297	50 percent of area	N	1,257.9	94	57.27%	◐	2,173.8	166	98.96%
sandhill	1,023.9	27	60 percent of area	N	277.6	6	45.19%	Y	639.7	20	104.13%
gopher frog	16.1	1	80 percent of area	Y	16.1	1	125%	Y	16.1	1	125%
red-cockaded woodpecker	7,573.4	7	60 percent of area	N	927.3	2	20.41%	N	3,190.4	3	70.21%
celestial lily	2,803.4	6	80 percent of area	N	571.3	6	25.47%	N	1,965.5	6	87.64%
scrub	973.3	603	50 percent of area	N	9.6	6	1.97%	N	118.5	112	24.35%
bald eagle	1,915.7	7	40 percent of area	Y	1,324	3	172.78%	Y	1,324	3	172.78%
Florida sandhill crane	9,452.7	123	70 percent of area	N	2,050.7	58	30.99%	N	2,709.9	70	40.95%

Evaluating Cumulative Impacts

Imported & evaluated CommunityViz urban growth model and Quantm road into Vista to evaluate cumulative impacts. Pink-red colors represent and index of number of conservation elements in conflict with the land use/infrastructure

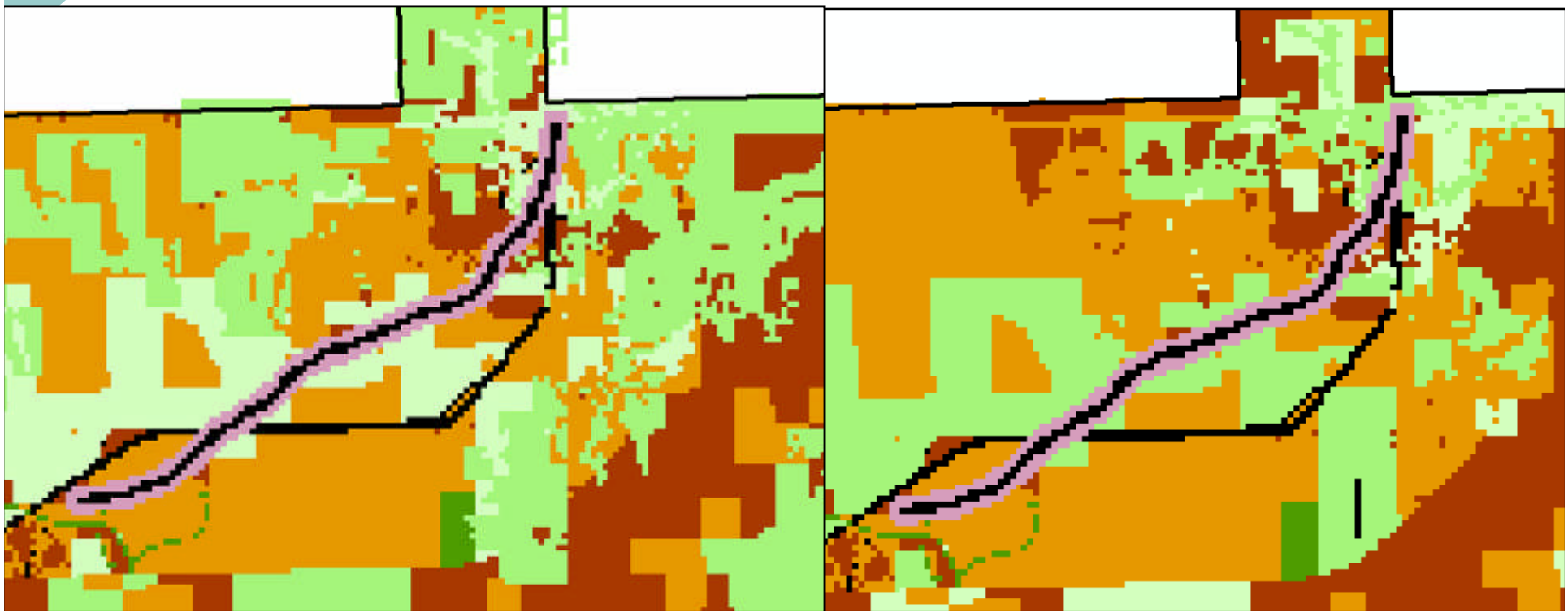


Developing Mitigation Scenarios

Unknown specific natural use
Natural area recreation and open space
Unknown specific working/occupied use
Low intensity working landscape
Low-density development
Minor road
Unknown specific high intensity use
High intensity working landscape/recreation parks
General urbanization: homes, commercial, industrial, etc

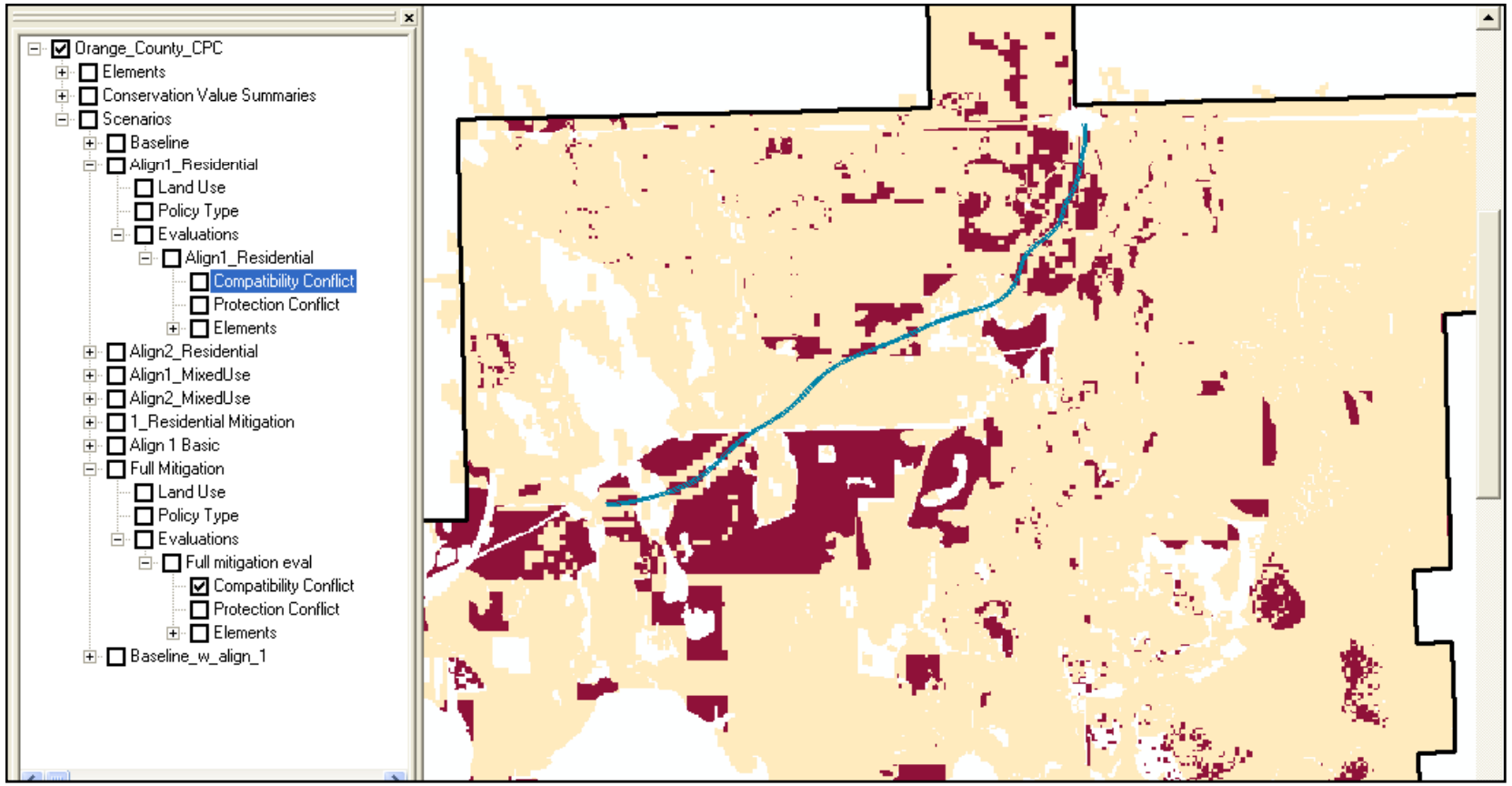
Vista mitigation scenario

CommunityViz growth model on right & Vista mitigation scenario Growth model map indicating substantial new urbanization



Evaluating Cumulative Impacts

Compatibility conflict map for mitigated scenario. Remaining conflict (red) indicates a **management conflict between a shrubland and forest to support an endangered species**. Such **remaining conflicts must be resolved over larger spatial extents.**



Iterative Analytical Process