CLIP
Critical Lands & Waters Identification Project
What is CLIP?

- **Statewide Natural Resource Spatial Database**
- **Prioritizes Biodiversity, Landscapes, & Water**
- **Identifies Florida’s “Green Infrastructure”:** e.g., the critical concept that ecosystem function, biodiversity, and the health of human communities are inextricably linked.
- **Century Commission and Cooperative Conservation Blueprint decision support**
What CLIP Offers

- Uses established planning data
- Priorities and combinations based on expert consensus
- Transparent process and data structure
- Tool to help identify tradeoffs
- Flexible, can incorporate new data
CLIP Timeline

2006:
Century Commission asked for CLIP

2006 – 2008:
CLIP Database version 1.0 development; coordination with Cooperative Conservation Blueprint

July 1, 2008 - Fall 2008:
CLIP priorities complete; Gather input on CLIP; focus on Blueprint
Technical Advisory Group

Purpose: Develop consensus data and methods

• Experts on Florida natural resources and GIS analysis

• Organizations represented:
  - FDEP
  - FNAIL
  - FWC
  - BDA
  - DOF
  - Rayonier
  - TNC
  - WMDs
  - UF
  - UCF
  - FSU
  - FDOT
Resource Categories & Core Data

**Biodiversity**
1. Strategic Habitat Conservation Areas
2. Biodiversity Hotspots
3. Rare Species Habitat Conservation Priorities
4. Under-Protected Natural Communities

**Landscapes**
1. Ecological Greenways
2. Landscape Integrity

**Surface Water**
1. Significant Surface Waters
2. Natural Floodplain
3. Wetlands
Biodiversity Category
Ecosystem Services

- Biodiversity important for functioning ecosystems
- Chan et al. (2006) indicated areas important for biodiversity conservation may serve as a good surrogate for identifying areas most important for protecting ecosystem services.
- “Selling out on Nature” by McCauley in Nature 2006: “Nature has an intrinsic value that makes it priceless, and this is reason enough to protect it.”
Biodiversity: SHCAs

Strategic Habitat Conservation Areas were developed by FWC to identify gaps in the existing statewide system of wildlife conservation areas, and to inform ongoing land acquisition and conservation efforts. FWC modeled areas of habitat that are essential to sustain a minimum viable population for focal species of terrestrial vertebrates that were not adequately protected on existing conservation lands.

Strategic Habitat Conservation Areas
- Priority 1 - highest
- Priority 2
- Priority 3
- Priority 4
- Priority 5 - lowest
Because SHCAe do not address species richness, FWC also developed Biodiversity Hotspots to identify areas of overlapping vertebrate species habitat. FWC created a statewide potential habitat model for each species included in their analysis. In some cases only a portion of the potential habitat was ultimately designated as SHCA for each species. The Biodiversity Hotspots layer includes the entire potential habitat model for each species and provides a count of the number of species habitat models occurring at each location. The highest number of focal species co-occurring at any location in the model is 13.
The FNAIHAB model was designed explicitly to identify areas important for species habitat based on both species rarity and species richness. FNAI mapped occurrence-based potential habitat for 248 species of plants, invertebrates, and vertebrates, including aquatic species. For most species, suitable habitat was mapped only in the vicinity of known occurrences, so that if the state acquires lands based on these priorities they will be assured of protecting a known population of the species. The model is prioritized to reflect both species rarity and species richness. The model was re-prioritized for the CLIP process.

Rare Species Habitat Conservation Priorities
- Priority 1- Highest
- Priority 2
- Priority 3
- Priority 4
- Priority 5
- Priority 6
Biodiversity: FNAI Under-protected Natural Communities

This data layer was created by FNAI specifically for the Florida Forever statewide environmental land acquisition program. It is intended to map high priority natural communities that are under-represented on existing conservation lands (Fig. 4). FNAI mapped the statewide range of 11 natural community types: upland glades, pine rocklands, seepage slopes, scrub, sandhill, tropical hardwood hammock, upland hardwood forest, pine flatwoods, dry prairie, coastal uplands, and coastal wetlands.

Under-protected Natural Communities

- Upland Glade (G1)
- Pine Rockland (G1)
- Scrub - Central Ridges (G2)
- Scrub - Off Ridges (G2)
- Tropical (Rockland) Hammock (G2)
- Dry Prairie (G2)
- Seepage Slope/Bog (G3)
- Sandhill (G3)
- Sandhill Upland Lake (G3)
- Coastal Uplands (G3)
- Upland Hardwood (G4)
- Pine Flatwoods (G4)
- Mangrove - Salt Marsh (G5)
Landscape Category
Ecosystem Services

• Identifies the largest, most intact areas in the state.
• “Catch-all” category regarding ecosystem services including water quality and quantity, storm protection, flood control/water storage, carbon sequestration, soil maintenance, resource-based recreation, etc.
Landscape: Florida Ecological Greenways Network

The Florida Ecological Greenways Network model was created to delineate the ecological component of a Statewide Greenways System plan developed by the DEP Office of Greenways and Trails, under guidance from the Florida Greenways Coordinating Council and the Florida Greenways and Trails Council. This plan guides GO Transit acquisition and conservation efforts, and promotes public awareness of the need for and benefits of a statewide greenways network. It is also used as the primary data layer to inform the Florida Forever conservation lands acquisition program regarding the location of the most important conservation corridors and large, intact landscapes in the state.

**Ecological Greenways**
- Priority 1 Critical Parcels
- Priority 2 Critical Parcels
- Priority 1
- Priority 2
- Priority 3
- Priority 4
- Priority 5
- Priority 6
Landscape Integrity

The landscape integrity was created by the University of Florida specifically for use in CLIP. The landscape integrity layer is comprised of two related landscape indices assessing ecological integrity based on land use intensity and patch size of natural communities and semi-natural land uses. Please note that this index is intended to primarily characterize terrestrial ecosystems and therefore values for large water bodies are not considered significant.

Landscape Integrity Index

- **10** Highest integrity
- **9**
- **8**
- **7**
- **6**
- **5**
- **4**
- **3**
- **2**
- **1** Lowest integrity

The map shows the distribution of landscape integrity across Florida, with darker colors indicating higher integrity.
Surface Water Category
Ecosystem Services

- Water quality and quantity, storm protection, flood control/water storage, and carbon sequestration.
This data layer was created by FNAI, in consultation with state water resource experts, specifically for the Florida Forever statewide environmental land acquisition program. It is intended to show areas that have statewide significance for land acquisition to protect significant surface waters with good water quality. This data layer is not intended to address surface waters with substantial restoration needs, only surface waters that are currently in a relatively natural condition and are a priority for protecting Florida’s water resources.

Surface Waters

- Priority 1 Highest
- Priority 2
- Priority 3
- Priority 4
- Priority 5
- Priority 6
- Priority 7
Surface Water: Natural Floodplain

The Natural Floodplain data layer was created by FNAI, in consultation with state water resource experts, specifically for the Florida Forever statewide environmental land acquisition program. It is intended to show areas that have statewide significance for land acquisition to protect natural floodplain.
Surface Water: Wetlands

The Wetlands data layer used for the CLIP analysis was developed by FNAI specifically for the Florida Forever statewide environmental land acquisition program. It is based on the National Wetlands Inventory (NWI) dataset developed by the U.S. Fish & Wildlife Service.
CLIP Priorities: A Consensus Approach

- Rules-based (TAG selections of priority levels from each Core data layer)

- Overlay approach: identified additional priorities based on overlap between resource categories (Biodiversity, Landscape, and Surface Water)

= 5 priority classes (P1-P5)
Consensus Prioritization Example

Priority 1 Rules and Overlay

**Biodiversity**
- SHCA: P1, P2
- Hotspots: 8-13 species
- FNAI Habitat: P1, P2
- Natural Communities: S1, S2

**Landscape**
- Greenways: Critical 1, Critical 2

**Surface Waters**
- Surface Waters: P1
- Floodplain: P1
- Wetlands: P1

**Overlay:** P2 for at least 2 of 3 resource categories
Biodiversity Category Priorities

The Biodiversity Resource Category map is an aggregate using the rules-based selections from the four CLIP biodiversity core data layers: Strategic Habitat Conservation Areas, Biodiversity Hotspots, Rare Species Habitat Conservation Priorities, and Underprotected Natural Communities.
Surface Water Priorities

The Surface Water Resource Category map is an aggregate using the rules-based selections from the three CLIP surface water core data layers: Surface Waters, Natural Floodplain, and Wetlands.

Surface Water Resource Category Priorities

- P5
- P4
- P3
- P2
- P1 (highest priority)
Landscape Category Priorities

The Landscape Resource Category map is an aggregate using the rules-based selections from the two CLIP landscape core data layers: Ecological Greenways Network and Landscape Integrity.

Landscape Resource Category Priorities

- P5
- P4
- P3
- P2
- P1 (highest priority)
Consensus
All CLIP Priorities

This map represents the aggregated CLIP priorities. The current version of the CLIP priorities are based on rules-based selections from each of the 9 core data layers within the Biodiversity, Surface Water, and Landscape Resource Categories. and overlap between the Biodiversity, Surface Water, and Landscape Resource Categories.

CLIP Priorities
- P5
- P4
- P3
- P2
- P1 (highest priority)
Consensus Priority 1 & 2

This map represents the P1 and P2 priority levels of the aggregated CLIP priorities with existing conservation lands included on top of the CLIP priorities. The current version of the CLIP priorities are based on rules-based selections from each of the 9 core data layers within the Biodiversity, Surface Water, and Landscape Resource Categories and overlap between the Biodiversity, Surface Water, and Landscape Resource Categories

CLIP P1 and P2 Priorities with Existing Conservation Lands

- Existing conservation lands
- P1
- P2
- P1 in submerged lands/state waters
- P2 in submerged lands/state waters
CLIP Report

- CLIP Database
- Methods and Results
- Data Gaps/Additional Analyses Needs
- Recommendations for Maintaining CLIP
- Overlays
  - Agriculture/Silviculture
  - Population/Development Growth
  - Transportation Planning
CLIP High Priorities and Projected Growth from the Florida 2060 Model

- CLIP Priority 1 and 2 in 2020 Projected Growth
- Other 2020 Projected Growth
- Other 2040 Projected Growth
- Other 2060 Projected Growth
- Other CLIP Priority 1 and 2
- Existing development
Priorities Overlay Agriculture and Silviculture

CLIP High Priorities and Agriculture and Silviculture Lands

- Other CLIP Priority 1 and 2
- Other agriculture
- CLIP Priority 1 and 2 in Other Agriculture
- CLIP Priority 1 and 2 in Pasture/Ranchland
- Other Pasture/Ranchland
- CLIP Priority 1 and 2 in Silviculture
- Other Silviculture
1 & 2 Priorities
1 mile Developed Land

CLIP High Priorities and Areas within 1 mile of Existing Intensive Development

- Other Areas within 1 mile of existing development
- CLIP Priority 1 and 2 within 1 mile of existing development
- Other CLIP Priority 1 and 2
CLIP Future Database

- Complete marine resource category
- Complete groundwater resource category
- Explore water resource restoration category
- Conduct landscape context analysis
- Develop additional information on ecological services and create value-added assessments
- Assess relationship with climate change
The Marine Resource Category map is a combination of the three current marine core data layers: Seagrass, Hardbottom/Coral, and Shoreline Complexity. This resource category is currently a placeholder for future marine resource analyses and prioritization planned for the next version of the CLIP database. Therefore, the Marine resource data is NOT currently aggregated with the data from the Biodiversity, Landscape, and Surface Water Resource Categories to create the CLIP Aggregated Priorities.

Marine Resource Category

- Hardbottom/Coral*
- Seagrass beds

Shoreline Complexity

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*Hardbottom/Coral represents only limited locations where surveying has been conducted for these resources.
The Groundwater Resource Category map is a combination of the FAVA Floridan, Intermediate, and Surficial Aquifer vulnerability models. This resource category is currently a placeholder for more detailed groundwater layers to be produced in the next version of the CLIP database. Therefore, the Groundwater resource data is NOT currently aggregated with the data from the Biodiversity, Landscape, and Surface Water Resource Categories to create the CLIP Aggregated Priorities.

Groundwater Resource Category

- Less Vulnerable
- Vulnerable
- More Vulnerable

Miles

0 25 50 100 150 200
Water Restoration Category
Example: Kissimmee River

Kissimmee River Restoration (11-28-2001)
Photograph courtesy of Paul J. Whalen
Landscape Context Index Example

Distance from Intensive Land Use

Legend
- Open water
- Distance Ranks
  - 1 (Worst)
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10 (Best)

Derived from: Water Management District
Ecosystem Service
Example:

Valuation of New Jersey’s Natural Capital and Ecosystem Services
(From Costanza: http://www.uvm.edu/giee/)
Florida Ecological Greenways Network and Sea Level Rise
CLIP Future Planning

- Develop partnership and process for maintaining and enhancing CLIP (MOU)
- Establish a CLIP Inter-Agency Policy Advisory Committee (IPAC)
- Develop strategy for regular statewide updates to land use data (or other data)
- Work with agencies and organizations at all scales to make CLIP a common foundation for conservation planning statewide
- Provide guide to using CLIP data and additional expertise to regional and local entities to facilitate regional visioning and conservation planning.
CLIP Report, Database & Viewer

http://www.centurycommission.org
CLIP Next Steps

Cooperative Conservation Blueprint

CLIP is the first step
- Expert science product
- A unified GIS application
- Stands alone

Blueprint
- Builds on CLIP
- Cross links with social & economic priorities
- Creates GIS overlay