Critical Lands and Waters Identification Project (CLIP)

Version 2.0

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Executive Summary

Introduction

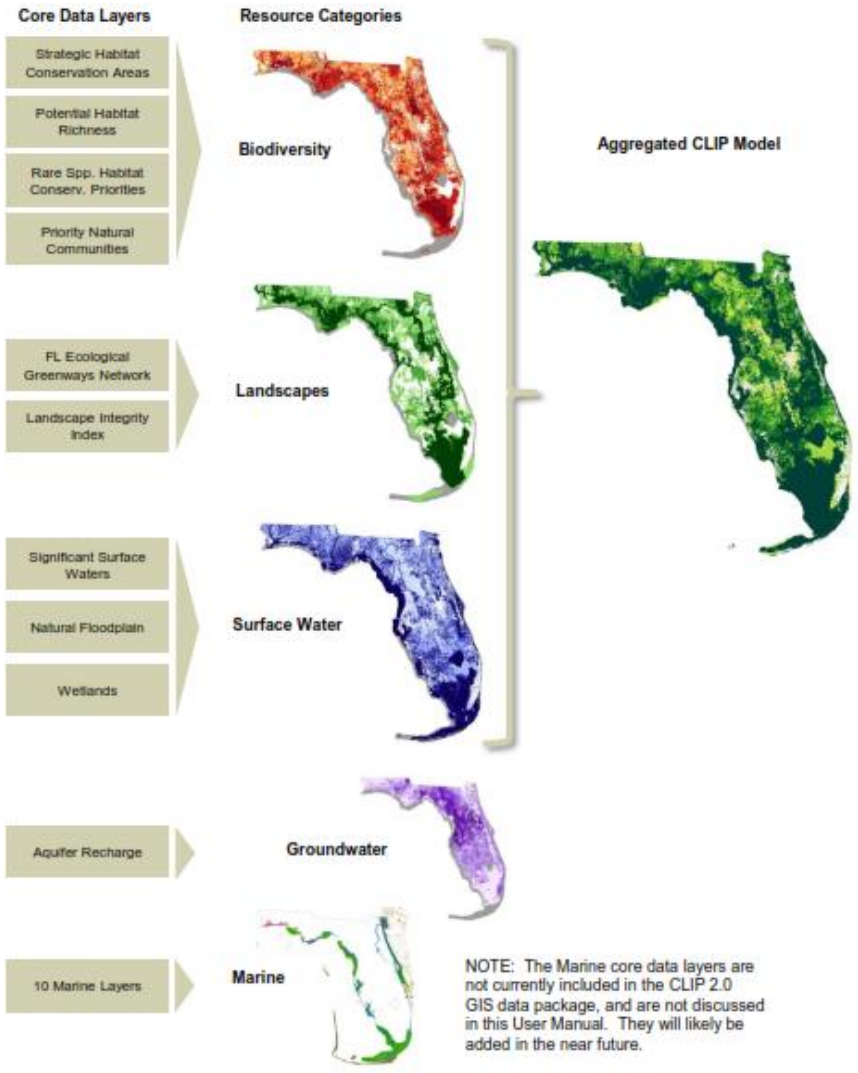
This report details the ongoing maintenance and enhancement of the Critical Lands and Waters Identification Project (CLIP), a Geographic Information Systems (GIS) database and analysis of statewide natural resource conservation priorities in Florida. CLIP was originally designed as a tool for identifying the state's most important conservation priorities to support the efforts of the Century Commission for a Sustainable Florida, and the Florida Fish and Wildlife Conservation Commission's Cooperative Conservation Blueprint (CCB). The original outcome of this project was CLIP Version 1.0, released in 2008 and updated in 2011 as CLIP Version 2.0. The results and methodology of this update are summarized below. The full technical report, data tutorial, data request form, and online map viewer are available at the Florida Natural Areas Inventory CLIP project website: http://www.fnai.org/clip.cfm.

The CLIP Database is designed to serve as a statewide decision support information system for identifying important opportunities to protect Florida's biodiversity and ecosystems. CLIP is a primary tool for informing the work of the Century Commission, the FWC Cooperative Conservation Blueprint, the Florida Forever environmental land acquisition program, and the recently initiated Landscape Conservation Cooperatives effort launched by the U.S. Fish and Wildlife Service in cooperation with various state and regional partners. It is also suitable as a resource planning guide for various state, regional, and local entities interested in effective natural resource protection and management. Other planning efforts have focused on particular resources, whereas CLIP is intended to provide a broad synthesis of natural resource GIS data to serve as a common foundation for comprehensive identification of statewide conservation opportunities. CLIP offers a transparent compilation and prioritization of available data, a credible process using well documented data based on expert consensus (which was developed working the CLIP Technical Advisory Group), and the flexibility to incorporate new data as it becomes available to develop enhanced identification of natural resource conservation opportunities. Ultimately, CLIP represents a diverse set of data tools to inform decision makers, rather than a single map or conservation plan.

Methods

Like CLIP 1.0, CLIP version 2.0 is a hierarchical database consisting of 20 core natural resource data layers grouped into five Resource Categories: *Biodiversity, Landscape, Surface Water, Groundwater,* and *Marine*. For each of the Biodiversity, Landscape, and Surface Water categories, we developed resource priority models using simple consensus rule-based selections. Those three models were further combined into an "Aggregated" CLIP Priorities model based on both rule-based selections and overlap between resource category priorities. The various resource priority models are broken down into 5 levels of resource significance, with 1 being the most significant for protecting biodiversity, landscape attributes, and high quality surface water resources at the statewide scale. Note that the Groundwater and Marine resource categories are not included in the current Aggregated CLIP Priorities model. All CLIP modeling efforts and major decisions were conducted with review, feedback, and consensus support of a Technical Advisory Group (TAG) consisting of more than 25 members with scientific or technical expertise in Florida natural resources and ecosystems, regional conservation assessment, and/or Geographic Information Systems (GIS).

The following schematic shows the organization of the CLIP data layers.



Maps showing the final Biodiversity, Landscape, Surface Water, and Aggregated Resource Priorities, as well as a table listing the final acreage of each priority from the Aggregated CLIP Resource Priority model are included at the end of this document.

In addition to the assessments for the five primary resource categories, additional preliminary analyses were conducted to explore *Landscape Context, Ecosystem Services*, and *Water Restoration* opportunities.

The *Water Restoration Resource Category* includes available data that could be used to identify degraded surface water resources and areas important for both avoiding additional declines or restoring water quality and hydrologic function. This current Water Restoration analysis is an example and placeholder for future enhancements or additions. The *Landscape Context* analysis is a supporting assessment to identify the integrity and compatibility of landscapes both statewide and in areas supporting high CLIP priorities. This analysis is intended to provide additional information on the current status, potential impacts, and potential management strategies for maintaining or restoring ecological integrity at landscape scales. For example, landscape context can identify where CLIP priority areas are embedded within landscapes with higher or lower threats from existing human land uses or activities. *Ecosystem Services* are addressed using coastal storm protection as an example of a service provided by natural coastal systems. Storm protection refers to the value of natural or rural lands for abating wind and storm surge related to coastal (or large inland water body) storm events such as tropical cyclones or severe cold fronts. Although other ecosystem services are difficult to map, coastal storm protection is one criterion that can be addressed with currently available data.

Finally, an assessment of threats and opportunities from *Sea Level Rise*, *Projected Development*, and *Working Landscapes* was conducted relative to CLIP priorities. These analyses were created by overlaying CLIP priorities over various data related to each category, providing insight into potential synergies or conflicts. The *Sea Level Rise* analysis compared simple bathtub models of sea level rise with Aggregated CLIP high priorities; the *Projected Development* analysis compared the Florida 2060 growth projection with the Aggregated CLIP high priorities; and the *Working Landscapes* compares current agricultural (primarily ranching) and silvicultural land uses to the Aggregated CLIP high priorities.

Discussion

The original CLIP 1.0 database included only three resource categories: Biodiversity, Landscapes, and Surface Water. With the formal completion of the Marine and Groundwater Resource Categories in CLIP 2.0, the CLIP database has now expanded to five Resource Categories with a total of 20 core data layers. However, there was strong consensus among Technical Advisory Group (TAG) members that the Marine and Groundwater categories are fundamentally different from the Biodiversity, Landscape, and Surface Water categories, and as such should not be included in any aggregated priority models. The TAG agreed that attempting to combine spatial priorities for marine and groundwater resources with those of biodiversity, landscapes, and surface water would likely create more confusion than clarity for policymakers, land owners, and the general public.

It was also noted in comparing CLIP 1.0 to CLIP 2.0, that there was a reduction of certain resource values in CLIP Priorities 1 and 2 due to data revisions and rule changes. There was also a pronounced shift in the balance in representation among the three original resource categories. In part as a response to these changes, it was generally agreed that the three Resource Category Priority models (Biodiversity,

Landscape, Surface Water), are at least as important individually than the Aggregated Priorities model. The possibility of further classifying resource priorities according to potential conservation strategies was also explored as an alternative means of aggregating data from each resource category. In this approach, CLIP resources are classified by potential conservation strategy (e.g., acquisition & active management, landowner incentives, planning & zoning, etc.) to give further clarity to desired conservation outcomes, beyond simple conservation priority classes.

When using CLIP to inform local or regional conservation planning, the authors recommend using individual CLIP core data layers relevant to a specific project, together with additional data suitable for the location or issues of concern, and consulting CLIP resource category and aggregated priority models as checks against the analysis to avoid gaps in natural resource values identified. In addition, the CLIP resource category and aggregated priority models are more relevant at state to regional scales, whereas individual core data layers are potentially useful at all scales. *Overall, it is important that CLIP 2.0 be used as a natural resource inventory; a database of 20 distinct core resource layers, rather than simply a single map of conservation priorities (i.e., the Aggregated Priorities map). Although the Aggregated CLIP Priorities synthesis is a useful indicator of collective priorities for Biodiversity, Surface Water Resources, and Landscapes, it does not include all CLIP core data and does not address all relevant resource priorities at state, regional, and local scales.*

<u>Recommendations</u>

- The CLIP database should continue to be maintained to incorporate new or revised core data layers as they become available.
- Users should look beyond the Aggregated CLIP Priorities model to incorporate Resource Category Priorities and core data layers into analyses and decision-making.
- Data and policies available to inform Climate Change, Water Restoration, and Ecosystem Services continue to evolve – those analyses should continue to be developed.
- Continue to encourage more coordinated updates to state land cover data (particularly FLUCCS) and increased coordination in classification of natural land cover types. In general, there is good will among staff from the water management districts and DEP to increase coordination of these efforts, but no formal steps have been taken. This remains a strong need for the benefit of a broad spectrum of users of land cover data across Florida.
- This version of CLIP includes a simple user tutorial to facilitate appropriate uses of CLIP at state, regional, and local scales. However, in future versions, with appropriate funding, other tools such as offline or enhanced online data viewers, ArcGIS analysis tools or extensions, and other decision support tools and information should be considered to further increase the utility of the CLIP database.
- CLIP data are relevant to regional natural resource assessments, including visioning efforts that project trends and develop strategies to encourage development patterns that avoid impacts to important natural resources. CLIP could be used as a starting point for identifying state and regionally significant natural resource areas. At the same time, use of CLIP data, and comparison to any available regional data, may serve as a useful means to determine other potential gaps in CLIP data and to enhance future iterations of the CLIP database. Regional visioning could include statewide CLIP priorities and various overlays, incorporation of additional natural resource and other data for identifying regional and local conservation priorities.

- State or regional growth projection modeling combined with potential impacts from sea level rise (and possibly other climate change impacts) could also be done in conjunction with CLIP data to assess the impacts of various development (such as more or less density of residential development) and conservation (such as protection of more or less CLIP priorities). This alternative futures modeling could help determine the potential impacts of future growth and how various growth management and conservation policies would affect development impacts. Such modeling could also lead to revisions in future CLIP core data layers and prioritization.

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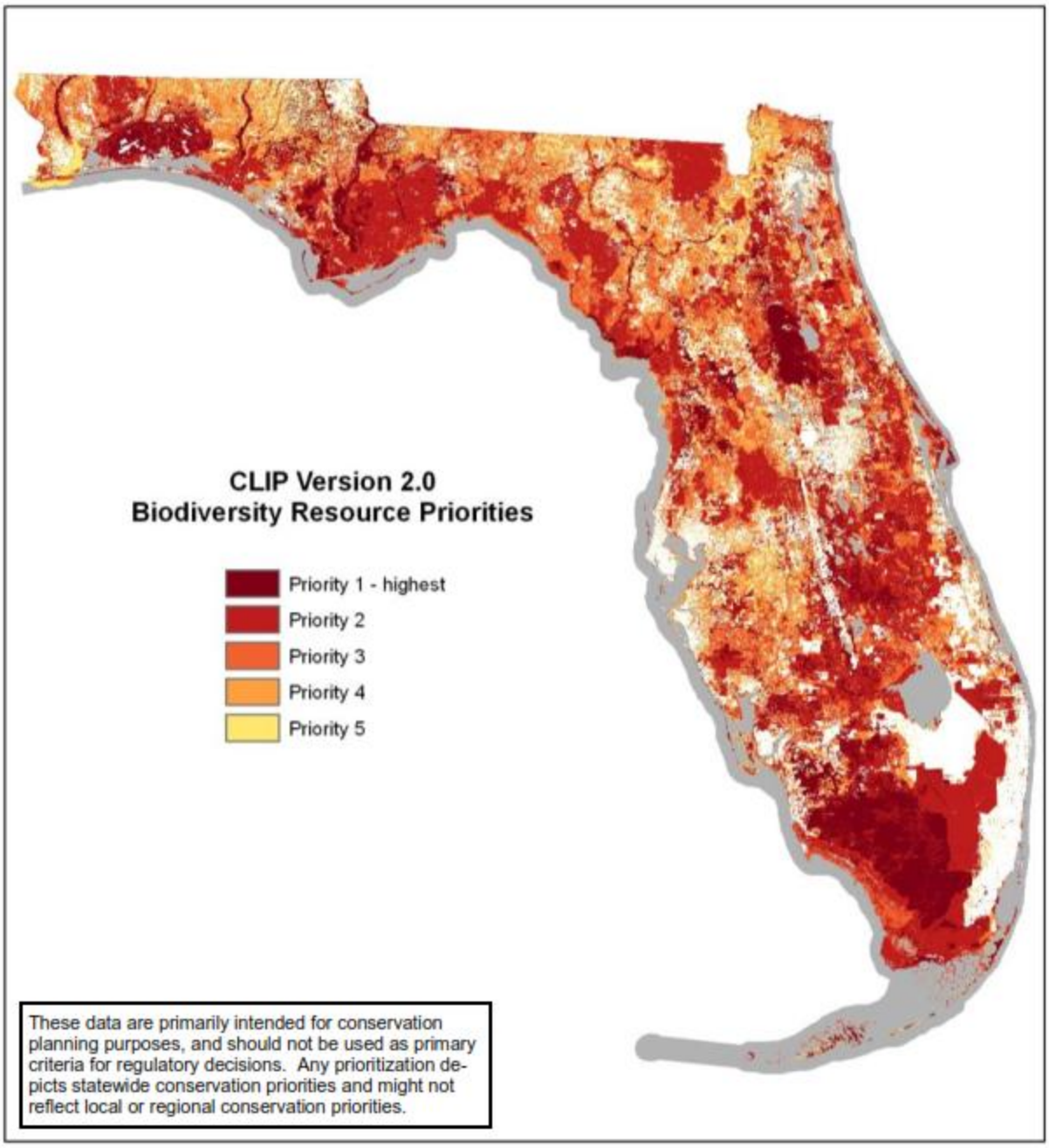
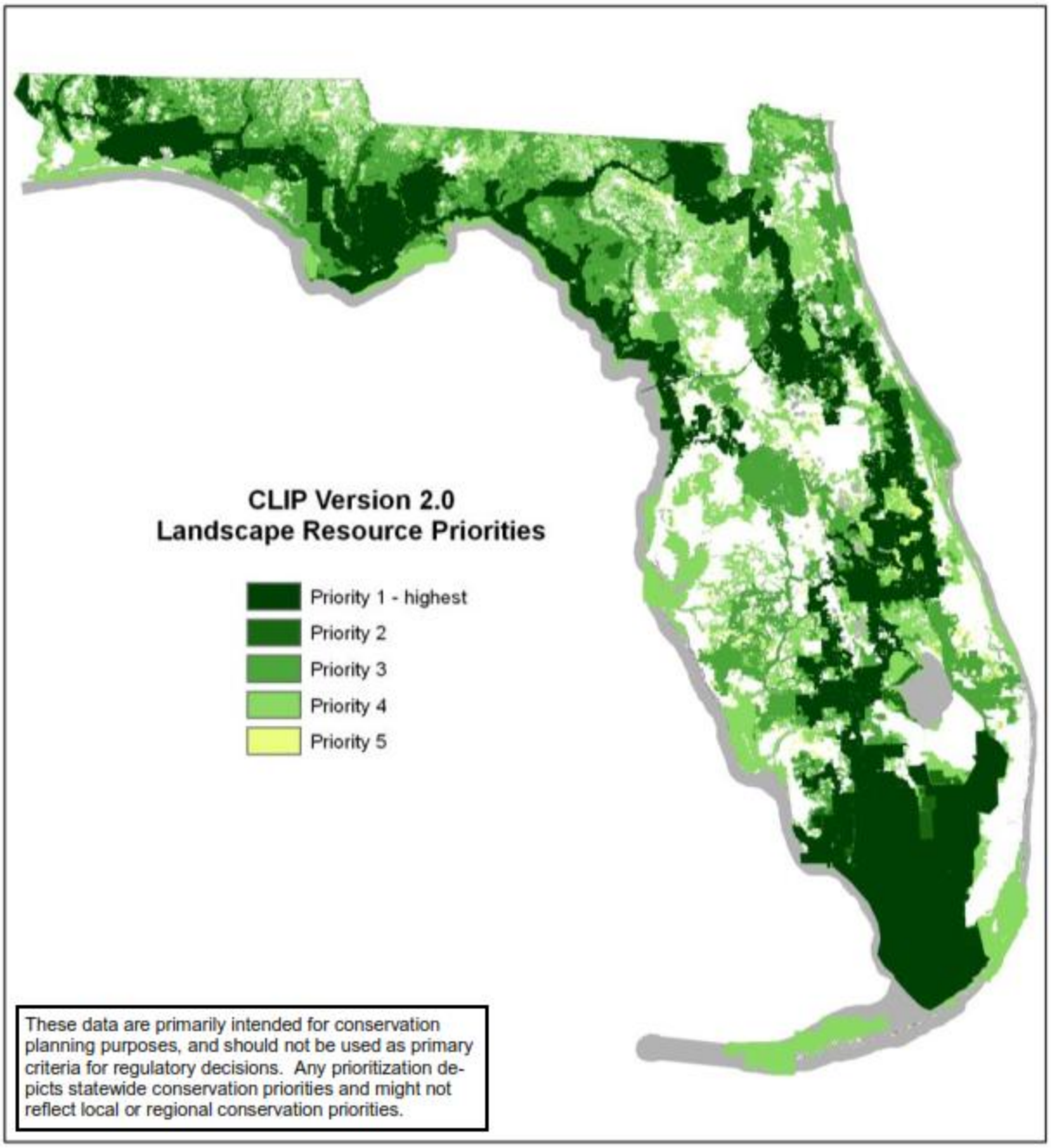
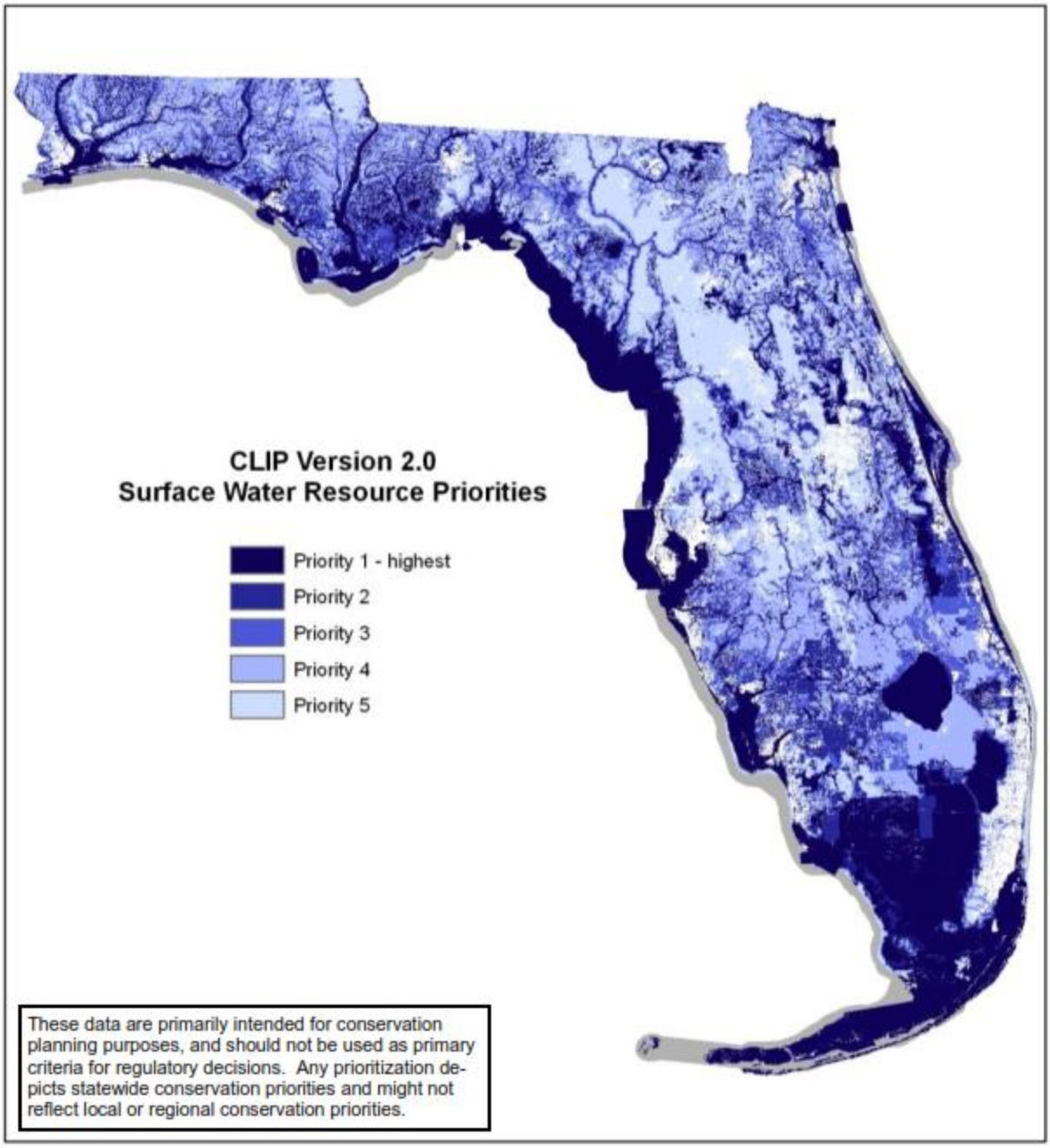


Map 1: Biodiversity Resource Priorities
(Figure 21 in Technical Report)



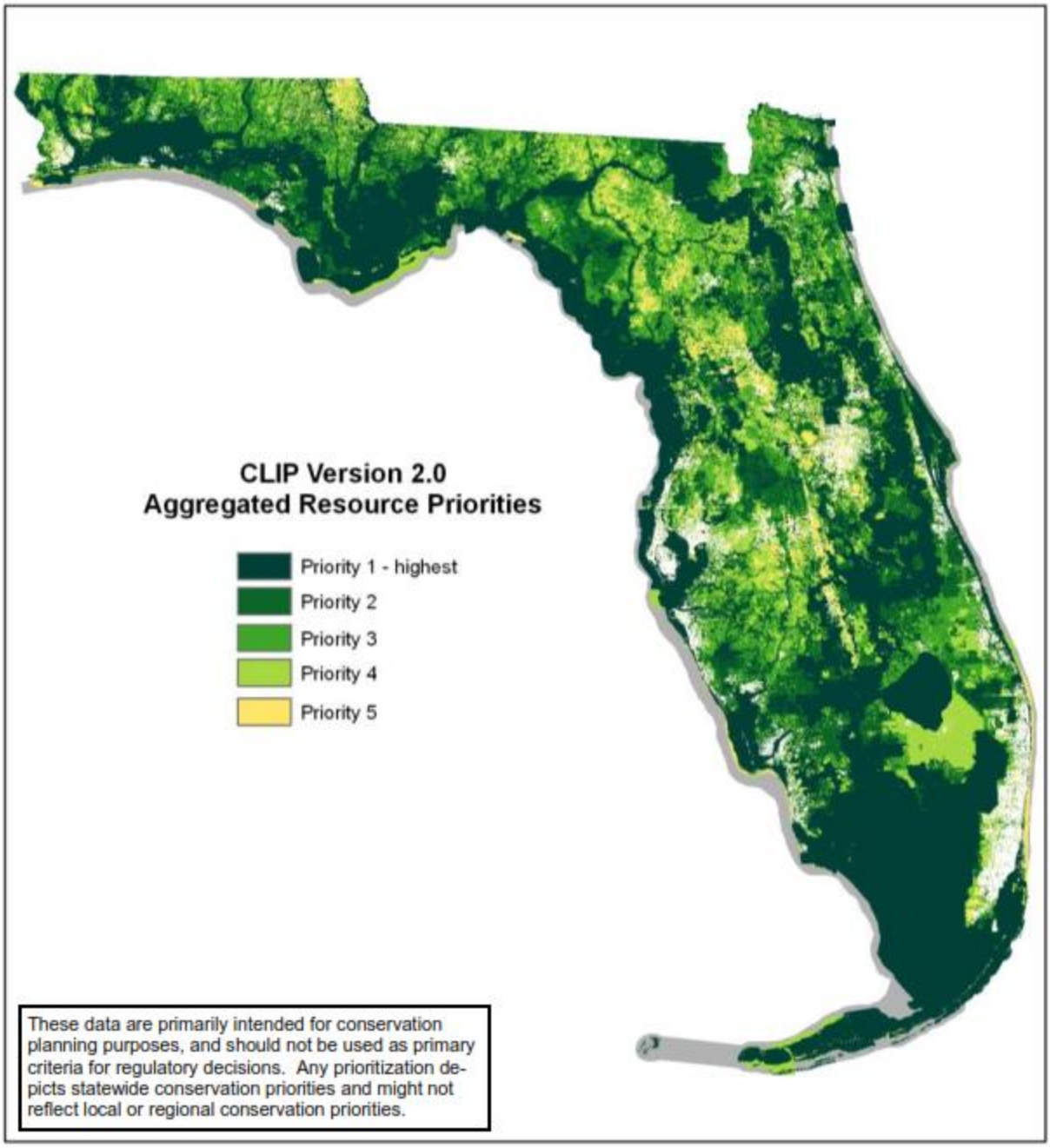
Map 2: Landscape Resource Priorities

(Figure 22 in Technical Report)



Map 3: Surface Water Resource Priorities

(Figure 23 in Technical Report)



Map 4: Aggregated Resource Priorities
(Figure 24 in Technical Report)

Version 2.0

	Total Acres	Land	Conservation Lands	Private Lands	Private Up-lands
Priority 1	18,312,370	14,053,022	8,565,170	5,487,851	3,242,866
Priority 2	6,781,560	6,492,697	1,271,194	5,221,503	3,554,615
Priority 3	5,972,002	5,809,119	104,013	5,705,106	4,837,205
Priority 4	5,732,592	5,125,458	51,732	5,073,726	4,722,949
Priority 5	1,349,011	1,123,953	1,112	1,122,841	1,098,457
Total	38,147,534	32,604,249	9,993,221	22,611,027	17,456,093
Priority 1-2	25,093,929	20,545,719	9,836,364	10,709,354	6,797,482

Version 1.0

	Total Acres	Land	Conservation Lands	Private Lands	Private Up-lands
Priority 1	21,565,782	17,361,939	9,477,510	7,884,429	4,805,895
Priority 2	3,648,964	3,604,590	240,489	3,364,101	2,389,076
Priority 3	5,404,912	5,634,227	172,034	5,462,193	4,576,578
Priority 4	4,334,769	4,069,593	43,026	4,026,568	3,851,717
Priority 5	1,122,381	1,029,881	1,485	1,028,396	1,013,034
Total	36,076,809	31,700,230	9,934,544	21,765,687	16,636,300
Priority 1-2	25,214,746	20,966,529	9,717,999	11,248,530	7,194,971

Acreage of Resource Priorities by Land Use from the Aggregated Resource Priority Model: Comparison of CLIP 1.0 and CLIP 2.0

(Table 5 in Technical Report)