

## 1.0 INTRODUCTION

### 1.1 BACKGROUND AND LEGAL MANDATE

This Final Report of the Florida Keys Carrying Capacity Study (FKCCS) is the culmination of efforts to compile, analyze and interpret existing data regarding the ability of the Florida Keys to withstand all impacts of additional land development activities.

The Florida Keys were designated as an Area of Critical State Concern in 1974. Broad goals of this ruling were "...to conserve and protect the natural, environmental, historical and economic resources, the scenic beauty, and the public facilities within the Area of Critical State Concern." The Area of Critical State Concern designation transferred all local Monroe County review and approval rights to the state land-planning agency, the Florida Department of Community Affairs (DCA).

In 1986, Monroe County approved a new comprehensive plan and corresponding land development regulations. The county developed the plan and regulations in response to the Area of Critical State Concern designation, as well as to comply with State of Florida regulations and to maintain a high quality of life in the region. In 1991, the Monroe County Board of County Commissioners ratified the *Monroe County Year 2010 Comprehensive Plan* (the Plan).

Monroe County revised the Plan in 1993 following several legal challenges initiated by the DCA and other private organizations. Ongoing legal proceedings prompted a 1995 Final Order and Recommendation by a Hearing Officer, which resulted in further revisions and final adoption of the Plan in 1996. During final revisions, the Plan adopted a "carrying capacity approach" to growth management.

The Florida Administrative Commission (FAC) issued an Executive Order in 1996 calling for the preparation of a "carrying capacity analysis" for the Florida Keys. The FKCCS fulfills a portion of the state and local government requirements as outlined in FAC Rules. Sections 28-20.100 and 28-19.100 FAC state:

*"The [carrying capacity] analysis shall be based upon the findings adopted by the Administration Commission on December 12, 1995, or more recent data that may become available in the course of the study, and shall be based upon the benchmarks of, and all adverse impacts to, the Keys land and water natural systems, in addition to the impacts of nutrients on marine resources. The carrying capacity analysis shall consider aesthetic, socioeconomic (including sustainable tourism), quality of life and community character issues, including the concentration of population, the amount of open space, diversity of habitats, and species richness. The analysis shall reflect the interconnected nature of the Florida Keys' natural systems, but may consider and analyze the carrying capacity of specific islands or groups of islands and specific ecosystems or habitats, including distinct parts of the Keys' marine ecosystem."*

The goal of the FKCCS, excerpted from FAC Rule 28-20.100, reads as follows:

*“The carrying capacity analysis shall be designed to determine the ability of the Florida Keys ecosystem, and the various segments thereof, to withstand all impacts of additional land development activities.”*

Additionally, Rule 28-20.100 establishes that the carrying capacity study will be implemented by “...the adoption of all necessary [comp] plan amendments to establish a rate of growth and a set of development standards that ensure that any and all new development does not exceed the capacity of the county’s environment and marine system to accommodate additional impacts. Plan amendments will include a review of the County’s Future Land Use Map series and changes to the map series and the “as of right” and “maximum” densities authorized for the plan’s future land use categories based upon the natural character of the land and natural resources that would be impacted by the currently authorized land uses, densities and intensities.”

Therefore, the FKCCS will provide the state and local jurisdictions with an analytical tool and an evaluation of a series of land development scenarios that will support comprehensive plan amendments and revisions to development standards for the Florida Keys.

DCA and the U.S. Army Corps of Engineers (USACE) jointly sponsored the study. Section 528(b) (3) of the Water Resources Development Act of 1996 authorized the USACE to cooperate with a non-federal sponsor to complete the FKCCS, a critical project under the Everglades and South Florida Restoration Programs. The U.S. Congress passed the Water Resources Development Act of 1996, which included legislation directing the Secretary of the Army, through the USACE, to complete a series of Critical Projects associated with the Central and South Florida Restoration Study. The Critical Project authorization required that the project provide independent, immediate, and substantial benefits to the South Florida ecosystem.

## **1.2 DEVELOPMENT OF THE FLORIDA KEYS CARRYING CAPACITY STUDY SCOPE OF WORK**

The development of the Scope of Work (SOW) for the FKCCS began with a cooperative agreement between the DCA and USACE in August 1996. A Steering Committee (SC) and a Technical Advisory Committee (TAC), charged with developing the SOW, included 38 agencies and three individuals. The SC and TAC included all the agencies represented on the Florida Keys National Marine Sanctuary (FKNMS) Water Quality Protection Program (WQPP), as well as area business leaders and intervenors involved in the legal challenges to the Monroe County Comprehensive Plan. Members of the SC and TAC provided knowledge about issues affecting Monroe County.

The TAC met for the first time in September 1996 to define the purpose, goals and objectives, concept and approach, and to review an outline for the FKCCS SOW. Utilizing input from the TAC, the study sponsors developed three drafts of the SOW between September 1996 and October 1997. In March/April 1998, the third draft of the SOW underwent peer review by 18

experts from different disciplines, who represented government agencies, academia, and private industry. Following the peer review, the SOW was finalized in September 1998.

The peer review identified some outstanding issues and uncertainties regarding species, ecosystems, relationship of land development activities and the marine environment, water circulation and water quality modeling, and ecosystem modeling. To keep the FKCCS process moving forward, the study sponsors invited a group of 65 technical experts for a technical workshop series to address the uncertainties and refine the study approach in the following areas:

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| 1. | Conceptual Framework                       | May 1999       |
| 2. | Mobilization Workshop                      | June 1999      |
| 3. | Ecosystems                                 | July 1999      |
| 4. | Species of Concern                         | August 1999    |
| 5. | Wastewater                                 | August 1999    |
| 6. | Stormwater                                 | September 1999 |
| 7. | Water Circulation/Water Quality Modeling   | October 1999   |
| 8. | Carrying Capacity Analysis Model Framework | November 1999  |
| 9. | Scenario Development                       | January 2000   |

The workshop reports are included on the FKCCS website at:

<http://www.saj.usace.army.mil/dp/index.html>

Since engaging a Technical Contractor in late 1999, the FKCCS has focused on establishing predictive relationships between “land development activities” and indicators of carrying capacity in order to determine the ability of the Florida Keys ecosystems to withstand all impacts of additional land development. It has also considered socioeconomic issues, quality of life, amount of open space, diversity of habitats, and species richness. The study has been carried out with the understanding that the state and local governments will use it to assist them in adopting all necessary comprehensive plan amendments to establish a rate of growth and a set of development standards that “ensure that any and all new development does not exceed the capacity of the county’s environment and marine system to accommodate additional impacts” (FAC Rule 28-20.100).

In order to address the carrying capacity of the Florida Keys ecosystems and provide support in making countywide comprehensive plan amendments, relationships and results are assessed at the FKNMS scale. Level of effort for the study was apportioned among five key disciplines: terrestrial and marine ecosystems and species, human infrastructure, socio-economics, fiscal, and water issues. Finally, all of the data, relationships, and carrying capacity indicators were integrated using state-of-the-art Geographic Information Systems (GIS) technology in order to build an automated computer model.

With few exceptions, the study team attempted to establish the relationships between development and the environment based upon the findings adopted by the Administration Commission on December 12, 1995 and other data that became available since then. Data searches revealed a paucity of specific, peer reviewed scientific information to support the establishment of defensible carrying capacity criteria or of clear predictive relationships between land development activities and some of the study parameters. For example, while a voluminous and rapidly growing body of scientific literature addresses the marine environment in the Florida Keys (for a recent review, see Porter and Porter 2002), virtually no study shows undisputable connections between development and water quality, the distribution and health of benthic communities, or fisheries productivity in the FKNMS that would allow for establishing predictive relationships.

Overall, the current peer-reviewed scientific information proved insufficient to develop a comprehensive carrying capacity analysis framework that would allow for undisputable determinations of whether future development scenarios fall within the carrying capacity of the Florida Keys (discussion in NRC 2002). Yet the study and the impact assessment model clearly document several untenable effects of development on the environment in the Florida Keys and will provide solid technical support for decisions on comprehensive plan amendments and development standards in the Keys.

### **1.3 ORGANIZATION OF THE REPORT**

This Final Report of the FKCCS presents the technical basis for the study, including its two main technical tools, the Carrying Capacity/Impact Assessment Model (CCIAM) and the Routine Planning Support Tool (RPST, an Internet application). The report addresses stakeholders input, including comments from the National Research Council.

The FKCCS has greatly benefited from stakeholders comments and observations made throughout the execution of the study. The National Research Council (NRC) provided an independent review of the CCIAM (NRC 2002) commissioned by the USACE and the DCA. The following agencies and organizations also provided written comments on recent FKCCS reports: U.S. Environmental Protection Agency (EPA), Florida Fish and Wildlife Conservation Commission (FWC), Florida Department of Environmental Protection (FDEP), Florida Keys Aqueduct Authority (FKAA), 1,000 Friends of Florida, The Ocean Conservancy and World Wildlife Fund (jointly), the South Florida Water Management District (SFWMD), the Florida Keys Citizens Coalition (FKCC), and the Environmental & Land Use Center, Inc., writing on behalf of five non-governmental organizations (NGOs).

Section 2.0 describes the study methods and process. Section 3.0 describes the CCIAM and the RPST. Section 4.0 discusses the scenario evaluation and results. Finally, Section 5.0 offers conclusions of the study, discusses the implementation, and presents recommendations to further the efforts to date. Additionally, appendices include maps, previous FKCCS reports, acronyms, and a glossary.