FLORIDA KEYS
CARRYING CAPACITY STUDY

Carrying Capacity/Impact Assessment Model and Routine Planning Tool – Maintenance Manual

March 2003

This report was prepared by URS Corporation (formerly Dames & Moore, Inc.), for the U.S. Army Corps of Engineers and the Florida Department of Community Affairs. Funds for this study were provided under U.S. Army Corps of Engineers Contract No. DACW17-99-D-0058, Delivery Order 12, Test CCAM.

Table of Contents

List of Acronyms

CAMA	Computer Assisted Mass Appraisal
CCIAM	Carrying Capacity/Impact Assessment Model
GUI	Graphical User Interface
MCPA	Monroe County Property Appraiser's
RPT	Routine Planning Tool
VBA	Visual Basic for Applications

Section 1

Purpose and Organization of this Manual

This manual provides the steward of the Carrying Capacity/Impact Assessment Model (CCIAM) and Routine Planning Tool (RPT) with technical information to maintain and update these two applications. Other significant documentation includes the header information within the Visual Basic for Applications (VBA) code, the user's manual, and the Florida Keys Carrying Capacity Study Final Report. This maintenance manual is organized into twelve sections:

- Introduction to the Florida Keys Carrying Capacity Study
- Overview of the Carrying Capacity/Impact Assessment Module
- Overview of the Routine Planning Tool
- Computing Specifications
- Directory Structure
- Naming Conventions
- Installation Procedures
- CCIAM Architecture
- CCIAM Updates
- RPT Architecture
- RPT Updates
- List of Supporting Documentation

Note: The FKCCS metadata files are provided under separate cover.

Introduction to the Florida Keys Carrying Capacity Study

In 1986, a new comprehensive plan and corresponding land development regulations were approved for Monroe County. They were developed 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 Commissioners ratified the *Monroe County Year 2010 Comprehensive Plan* (the Plan).

The Plan was revised 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 the Hearing Officer, which resulted in further revisions and final adoption of the Plan in 1996. During final revisions of the Plan, a "carrying capacity approach" to growth management was adopted. 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."*

The Carrying Capacity/Impact Assessment Model (CCIAM) and Routine Planning Tool (RPT) were created as part of the FKCCS. This manual documents the technical details of these two applications.

Section 3

Overview of the Carrying Capacity/Impact Assessment Model (CCIAM)

The CCIAM is a spatial model, built using ArcGIS 8.1 and automated with VBA, which evaluates the end-state effects of land use scenarios on the natural and social systems of the Florida Keys. The CCIAM analysis is triggered by changes in the land use GIS layer. The user defines these changes, as alternative land use scenarios, through the Graphical User Interface (GUI) to modify land use patterns and specify stormwater and wastewater treatment types. Users of this model include planners from Monroe County, the South Florida Regional Planning Council, the Florida Department of Community Affairs, as well as, other stakeholders involved with the county's comprehensive planning process.

The CCIAM is expected to be run during reviews of the Monroe County comprehensive plan, which may occur annually or less frequently. Outputs from the CCIAM include geodatabase feature classes and tables, Arc Info coverages, and Arc Info grids. These outputs are summarized into two HTML reports. First, the Scenario Report is a compilation of carrying capacity indicators and other information that can be interpreted to derive an assessment of the user-defined scenario. The Scenario Report is the primary reporting mechanism for the CCIAM. It is intended to be a stand-alone document that can provide the planner with the information he or she needs to evaluate their scenario. Explanatory text is included in the Scenario Report to assist the planner in interpreting the results produced by the CCIAM. Second, the Model Output Listing is a report that compiles all of the outputs generated by the CCIAM. The Model Output Listing accompanies the Scenario Report to provide supporting information resulting from the CCIAM. It is organized by CCIAM modules and has limited explanatory text.

Overview of the Routine Planning Tool (RPT)

The Routine Planning Tool (RPT) is an ArcIMS application that is intended for more frequent use by planners and the public. It provides wide access to the pertinent information compiled during the FKCCS and the various scenarios run through the CCIAM. The RPT functions with ArcIMS, a Java servlet connector (Servlet Exec), Microsoft's web server (MS IIS), and serves an HTML viewer using an image map service. It is a light weight application served over the Internet and is not intended to serve as the model itself. However, data resulting from the CCIAM can be provided to the planners and the public through this application. If warranted, additional data layers can easily be added to this application. The RPT is a by-product of the overall FKCCS effort; and, therefore, minimal customizations were made to the ArcIMS default application.

Section 5

Computing Specifications

5.1 CCIAM

The CCIAM functions using a desktop personal computer that is networked to a GIS data server and has access to ArcInfo 8.1 and Spatial Analyst licenses.

ESRI recommends the following system requirements for a desktop computer using ArcInfo 8.1 (http://arconline.esri.com/arconline/sysreqs.cfm?R=many&PID=1):

Platform:	Intel based PC, 400MHz minimum, 650MHz recommended
OS:	Windows 2000 (fully supported), SP1 and SP 2 optional
Memory/RAM:	128 minimum, 256 recommended
Hard Drive Space:	ArcInfo Desktop 8.1: 540MB NTFS, 754MB FAT ArcInfo Workstation 8.1: 695MB NTFS Disk spaces do not include the 50MB of system drive space needed for installation. (Typically C:\Winnt\System32)
Networking:	Simple TCP/IP, Network Card or Microsoft Loopback Adapter

However, the CCIAM was developed using the following computing infrastructure and the contractor recommends at least this level of computing power:

Desktop Personal Computer

Platform:	HP P4, 1.7 GHZ
OS:	Windows 2000
Memory/RAM:	512 MB RAM BUS
Hard Drive Space:	20 GB

Networking:	100BT, access to ArcInfo 8.1 and Spatial Analyst licenses.
GIS Data Server	
Platform:	HP LC 2000 Dual P3/866 Mhz, RAID 5
OS:	Windows 2000
Memory/RAM:	1,512 MB DRAM
Hard Drive Space:	80 GB
Networking:	Fiber optic networking capabilities
Other:	Tape back up system or an equivalent back up plan

Note: Microsoft Access and Excel 2000 are required (Microsoft Office 2000) in order for the CCIAM to run. Access is required for the geodatabases, and Excel is required for the Hurricane Evacuation and Canal modules.

5.2 RPT

The RPT is a lightweight ArcIMS application that serves interactive maps using an HTML viewer and an image map service. The RPT was developed using the following computing infrastructure:

Web Server:	Microsoft IIS
Java Servlet:	Servlet Exec
Mapping Software:	ArcIMS 3.1
OS:	Windows NT Server 4.0
Hard Drive Space:	20 GB
Networking:	Internet Service Provider or access to a T1 connection

Directory Structure

The CCIAM, all of the input data, and all of the results are contained within the \FKCCS directory. This directory contains five subdirectories:

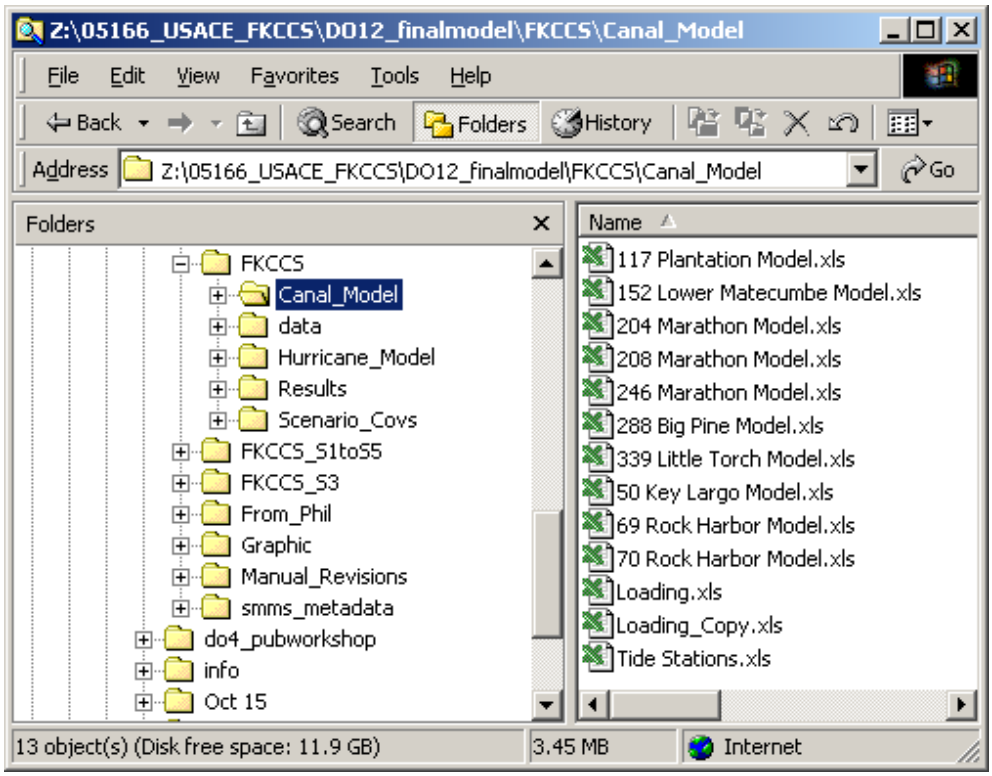
- Canal_Model
- Data
- Hurricane_Model
- Results
- Scenario_Covs

The map document file, FKCCS.mxd, contains the VBA code to run the GUI, analysis, and reporting of results. The FKCCS.mxd is the "model" and it refers to all of the directories within the \FKCCS directory. It must be located in \FKCCS in order for the CCIAM to execute correctly. Additional information regarding the contents of the FKCCS.mxd is in Section 9.5.

6.1 Canal_Model Directory

The \FKCCS\Canal_Model directory contains the canal model Microsoft Excel spreadsheets developed by URS Corporation. The canal model consists of ten canal spreadsheets, one loading spreadsheet, and one tide stations spreadsheets. The application will copy these files, replace the inputs, run the Excel macros, and place the results in the \FKCCS\Results\Canal_Results directory. For a detailed discussion of the Canal model, refer to the Canal Report.

Figure 6-1



6.2 Data Directory

All of the input GIS data required for the CCIAM to operate are located in the \FKCCS\data directory (Table 6-1). These data include both vector and raster datasets. When these data get updated, the dataset name, item definitions in the attribute tables, and location must conform to the current structure.

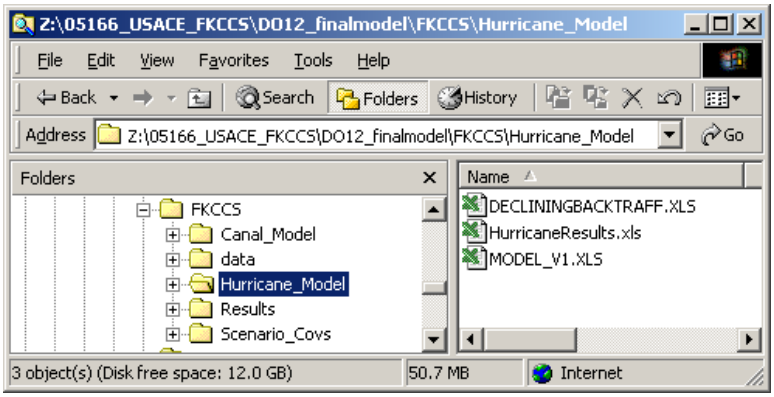
Table 6-1

Dataset Name	File Name in \FKCCS\data
Advanced Identification of Wetlands	adid
Overlay of Advanced Identification of Wetlands and basins	adid_basins
Wasteshed Basins	basins
Overlay of planning units and basins	basins_units
Benthic communities of the Florida Keys	benthics
Overlay of Advanced Identification of Wetlands and basins for the canal module	canal_adidbas
Wasteshed Basins for the canal module	canal_basin
Conservation and Recreational Lands	carl
Grid to re-class unnecessary richness values in the water	clipwater
Topography	fema
Florida Keys Aqueduct Authority Customer Locations	fkaa-pts
Key deer habitat	keydeer
Mile Markers on U.S. 1	milemarkers
Lower Keys marsh rabbit habitat	mrabbit
Municipalities of the Florida Keys	municipality
Monroe County Property Appraiser's Parcels	parcels
Grid of planning units	planunitland
Planning units	planunits
Historical vegetation	primitiveveg
Propeller scars in seagrass	propscars
Silver Rice Rat habitat	ricerat
Species richness grid	rich
Grid of a Euclidean distance from roads	roaddist
Grid of roads	roadgrid
Roadway line work	roads
South Florida mainland	sf_mainland
Official shoreline of the FKCCS	shoreline
FKCCS study area	studyarea
Monroe county subdivisions	subdivisions
Line work for US1	us1
White crowned pigeon habitat	wcp
Potential habitat grids	Species_GRIDS subdirectory with 18 ArcInfo grids, one for each of the 17 species and one for the species richness grid

6.3 Hurricane_Model

The \FKCCS\Hurricane_Model directory contains the Miller Consulting, Inc. Microsoft Excel spreadsheet model and a blank Microsoft Excel spreadsheet (Figure 6-1).

Figure 6-2



The hurricane model is comprised of two related spreadsheets, MODEL_V1.xls and DECLININGBACKTRAFF.xls. Miller Consulting, Inc. has locked both of these spreadsheets so that their macros cannot be accessed by the user. The HurricaneResults.xls is a template spreadsheet where the scenario run's hurricane results are temporarily placed until they are loaded into the \FKCCS\results\SIF.mdb geodatabase.

6.4 Results Directory

The \FKCCS\Results directory is comprised of five sub-directories, plus one directory for each scenario (e.g. c, sg1, etc.) and five geodatabases:

Directories:

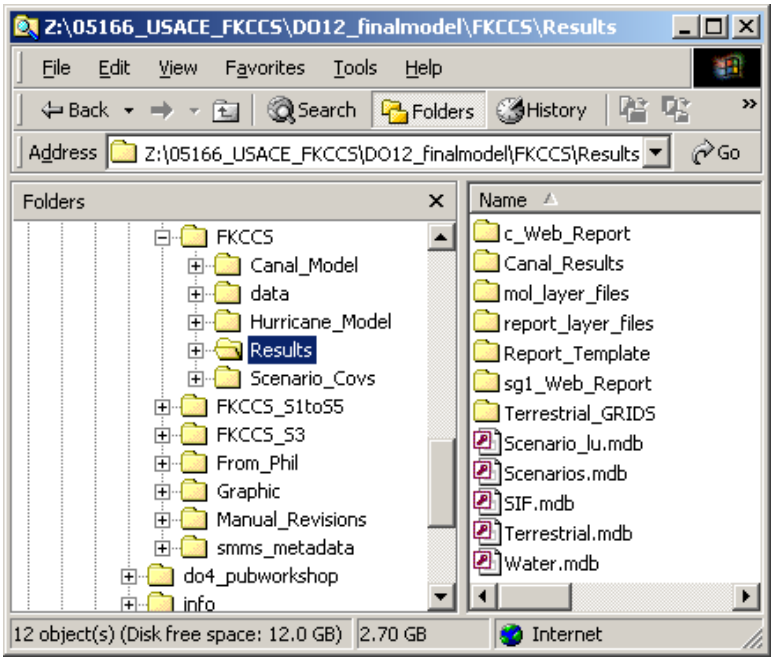
- Canal_Results
- mol_layer_files
- report_layer_files
- Report_Template
- Terrestrial_GRIDS

Geodatabases:

- Scenario_lu.mdb
- Scenarios.mdb
- SIF.mdb
- Terrestrial.mdb
- Water.mdb

In the example below, the c_Web_Report and the sg1_Web_Report are the scenario directories. These two directories contain all of the report results (HTML reports, jpg maps, etc.) for the scenarios.

Figure 6-3



The Canal_Model directory contains the ten Excel spreadsheet canal results and the associated Loading.xls spreadsheet. Each canal spreadsheet is linked to the Loading.xls spreadsheet. To view the canal results, first open the Loading.xls file, then open one of the ten canal .xls files, enable the macros, and go to the Results worksheet to view results. For a more detailed discussion of the canal results, please refer to the canal report.

The web_report directory contains the HTML, XML, XSL, and images required for the two result reports. At the conclusion of the analysis VBA code, the first action of the result reporting code is to copy this entire directory to with a new name of the scenario number.

The mol_layer_files and report_layer_files directories contain the ArcInfo layer files that reference feature classes and grids in the FKCCS\results geodatabases and grid workspaces. These layer files are referenced by the result reporting VBA code to produce maps. Layer files contain the symbology for a dataset. The layer files in the \FKCCS\Results\ mol_layer_files\water_loads directory are created through VBA code, whereas, all the other layer files have been created as static files that do not change with each scenario. The water loads layer files are dynamically created with VBA code on the fly because they require a table join to a feature class before conversion to a layer file. Therefore a simple change of data source will not work with these layer files to accommodate different scenarios.

The terrestrial_GRIDS directory is an ArcInfo workspace that contains the ArcInfo grids that result from the terrestrial analysis. It contains seventeen potential habitat grids and one species richness grid for each scenario run.

The Scenario_lu.mdb geodatabase contains the feature classes of each scenario's land use layer and summary table. These feature classes are identical to the land use coverages for each scenario in the \FKCCS\scenario_covs directory. The socio-economic module uses an ADO connection to the Scenario_lu.mdb to execute the SQL queries on the feature class. Therefore, each scenario land use coverage is imported into this geodatabase. This geodatabase also contains the US1 feature class used in the GUI spatial queries.

The Scenarios.mdb geodatabase houses all of the user's selections from the GUI and contains no spatial data. Prior to executing the analysis VBA code, all of the user's GUI selections are written to this database.

All of the socio-economic, fiscal, and infrastructure results are located in the SIF.mdb geodatabase. There are no spatial data in this database.

The terrestrial feature classes and statistic tables are housed in the terrestrial.mdb geodatabase. This geodatabase, and the terrestrial_GRIDS workspace, comprise all of the terrestrial results.

The Water.mdb geodatabase contains all of the wastewater, stormwater, potable water and canal feature classes and tables (including cost tables). It also contains twenty lookup tables, ending in LUT.

6.5 Scenario_Covs

The Scenario_covs directory is an ArcInfo workspace that contains each scenario's land use ArcInfo coverage. Once the user completes the Administrative Information form, the parcels coverage in the \FKCCS\data directory is copied to \FKCCS\Scenario_covs and given the scenario prefix as its name. The coverage attributes are changed after the user clicks the change attributes button on the Scenario Selections form. This workspace is referenced by the socio-economic analysis VBA code when it imports the scenario's land use coverage into the \FKCCS\results\SIF.mdb geodatabase.

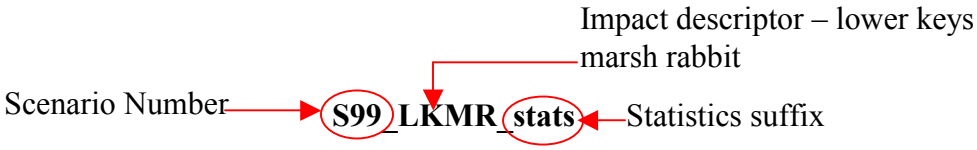
Naming Conventions

All scenario-specific coverages, feature classes, and grids have the scenario number as prefix and an acronym of what the data represent in the model (Figure 7-1).

Figure 7-1

The Terrestrial tabular statistics have the scenario number as a prefix, an identifier for the impact being summarized, and a suffix "_stats" for each table name (Figure 7-2).

Figure 7-2



For selected results and look up tables, an additional identifier is used to denote which module or component the impact descriptor references in the database (Figure 7-3, Table 7-1).

Figure 7-3

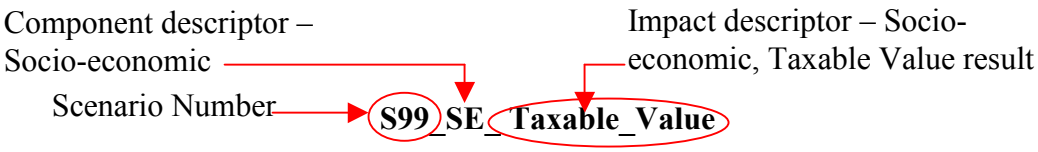


Table 7-1

Component Descriptor in Geodatabase	Reference
SE	Socioeconomic module
F	Fiscal Module
I	Infrastructure Module
SW	Stormwater Module
WW	Wastewater Module
PW	Potable water module
Z	Miscellaneous land use
R	Miscellaneous results
T	Terrestrial Module
RT	Result Terrestrial Module
W	Miscellaneous Water Lookup Tables
RW	Result Water Module
GW	Groundwater
CAN	Canal Result Tables

Each look up table has a prefix representing the CCIAM module or component and a suffix of "_LUT" (Figure 7-4). The module/component prefix is identical to those noted in Table 7-1.

Figure 7-4

CCIAM Installation Procedures

The CCIAM is designed to be contained entirely within the FKCCS directory. Therefore, the installation procedures primarily involve copying the contents of the CCIAM DVD to the server and ensuring that the sub-directories are correctly located within the project directory.

1. Ensure that the hardware and software configuration is compatible with the computing specifications outlined in Section 5.1.

2. The FKCCS.mxd project must have 17 references available to properly execute the model. The first 6 references in Table 8-1 are standard ArcMap references and should automatically be available with all mxd's. The remaining references should be made available by turning them on. If the library is not available, go to \FKCCS\data\Libraries and copy the files into the appropriate directory on the \C: drive of the computer being used to run the CCIAM.

Table 8-1

Location on Local Computer	Reference Name	File Name
NA	Visual Basic for Applications	NA
NA	ESRI Object Library	NA
NA	OLE Automation	NA
NA	Normal	NA
NA	ESRI ArcMap Object Library	NA
NA	Microsoft Visual Basic for Applications Extensibility 5.3	NA
C:\WINNT\system32	Microsoft Forms 2.0 Object Library	FM20.dll
C:\arcgis\arcexe81\Bin	ESRI Spatial Analyst Extension Object Library	EsriSpatialExt.olb
C:\arcgis\arcexe81\Bin	ESRI Spatial Analyst Shared Object Library	EsriSpatialShared.olb
C:\Program Files\Common Files\System\ado\	Microsoft ActiveX Data Objects 2.5 Library	msado15.dll
C:\Program Files\Microsoft Office\Office\	Microsoft Excel 9.0 Object Library	EXCEL9.OLB
C:\Program Files\Common Files\Microsoft Shared\DAO\	Microsoft DAO 3.6 Object Library	dao360.dll

Table 8-1 (Continued)

Location on Local Computer	Reference Name	File Name
C:\arcgis\arcexe81\Bin	ESRI Coverage Resource Library	CovRes.dll
C:\arcgis\arcexe81\Bin	ESRI UIControls	UIControls.dll
C:\arcgis\arcexe81\Bin	ESRIutil automation server	strings.dll
C:\Program Files\Common Files\System\ado\	Microsoft ActiveX Data Objects Recordset 2.5 Library	msador15.dll
C:\WINNT\system32	Microsoft Scripting Runtime	scrrun.dll

3. Copy the contents of the DVD to the server – ensure that the directory structure remains intact. See Section 6 for details regarding the directory structure.

4. Once the contents of the DVD have been placed on the data server, check to ensure that the FKCCS.mxd map document file is located at the top of the \FKCCS directory.

5. Check to ensure that there are five subdirectories within the \FKCCS directory:

    a. Canal_Model

    b. data

    c. Hurricane_Model

    d. Results

    e. Scenario_Covs

6. To ensure that the CCIAM is operational, double-click on the FKCCS.mxd. ArcMap will open and load the FKCCS.mxd into the application.

7. Refer to the CCIAM User's Manual for instructions on the operation of the CCIAM.

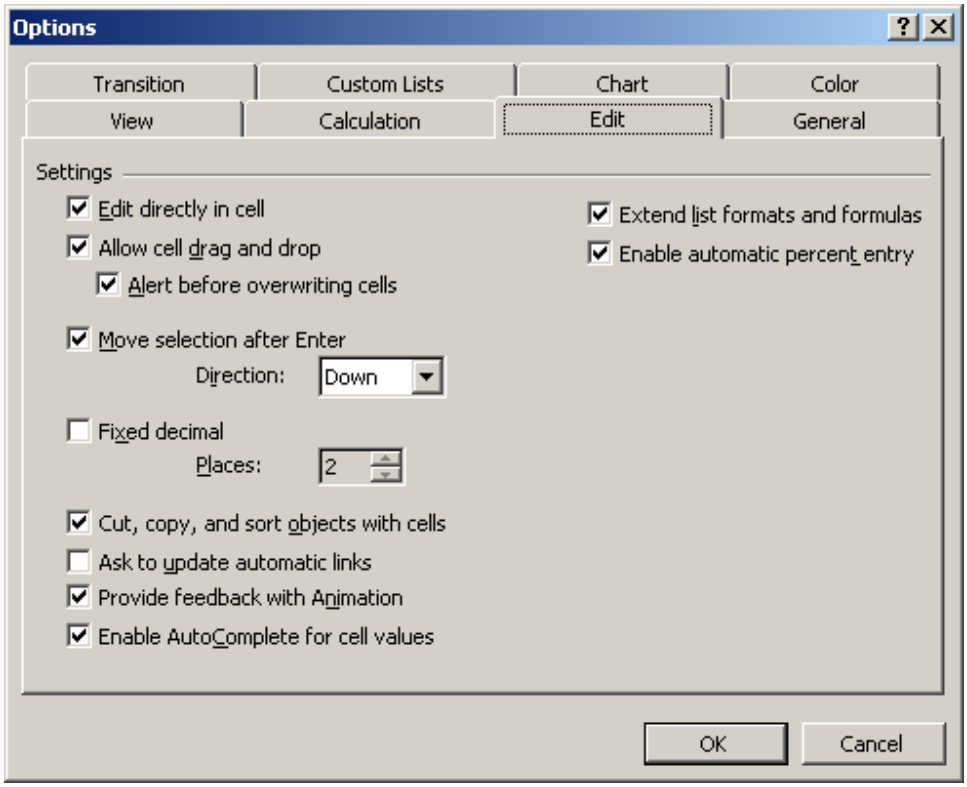
Microsoft Excel Option Settings

The CCIAM uses Microsoft Excel files for both the Hurricane Evacuation and the Canal models. In order for the VBA code to run correctly, the Excel option settings must be set. Open Microsoft Excel, select Tools-Options and the Options window will be displayed.

Two settings have to be checked. First, go to the Edit tab and make sure the settings are the same as those displayed below.

Note: The "Ask to update automatic links" check box should NOT be checked.

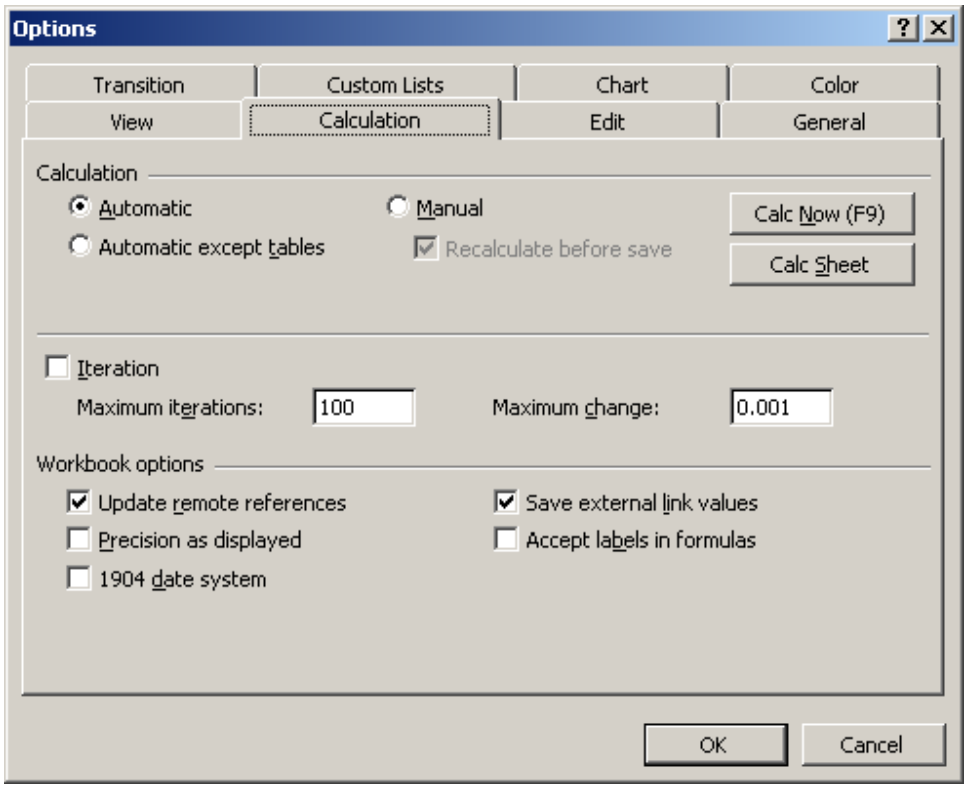
Figure 9-1



Next, go the Calculation tab and make sure the settings are the same as those displayed below.

Note: The option button "Automatic" should be selected, meaning that the calculations in the Hurricane Evacuation model will be made automatically whenever new inputs are entered.

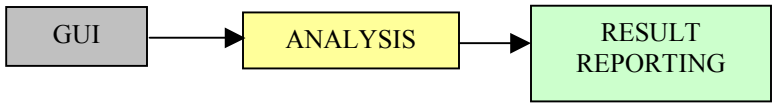
Figure 9-2



CCIAM Modeling Sequence and Structure

The CCIAM executes in three general steps: Graphical User Interface (GUI), analysis, and result reporting (Figure 10-1). All of the VBA code and SQL statements reside in the FKCCS.mxd located in the \FKCCS directory. The look-up tables that are referenced by the CCIAM are located in the geodatabase pertaining to that particular analysis. Additional information regarding the assumptions, mathematics, and rationale for the CCIAM can be found in the various delivery order reports and final report for the study.

Figure 10-1

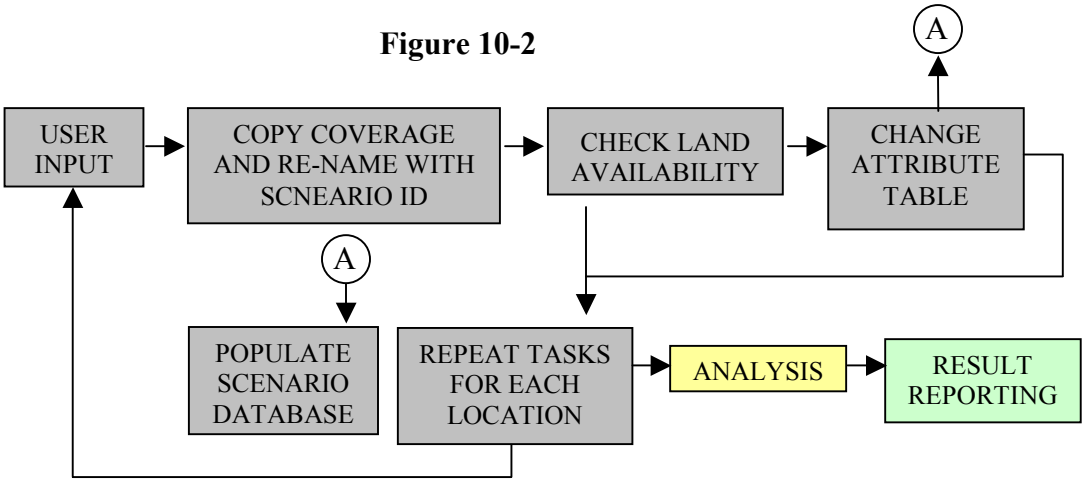


10.1 Graphical User Interface

The GUI completes five tasks (Figure 10-2):

- Collects information from the user through the controls on the forms;
- Checks the land use coverage to ensure that there is enough land available to accommodate the user's selections;
- Copies the land use coverage to the \FKCCS\scenario_covs workspace and names the coverage with the scenario identification number (prefix);
- Changes the land use coverage attribute values accordingly;
- Populates the scenario geodatabase with the user's selections collected from the forms.

Figure 10-2



These five tasks may be repeated depending upon how many locations the user selects to change in their scenario. At the "CHANGE ATTRIBUTE TABLE" step, all items in the land use coverage attribute table with an "_NS" extension have their values changed according to the user's input. The letters "NS" refer to *new scenario*. The items that get changed from GUI selections are noted in Table 10-1.

Table 10-1

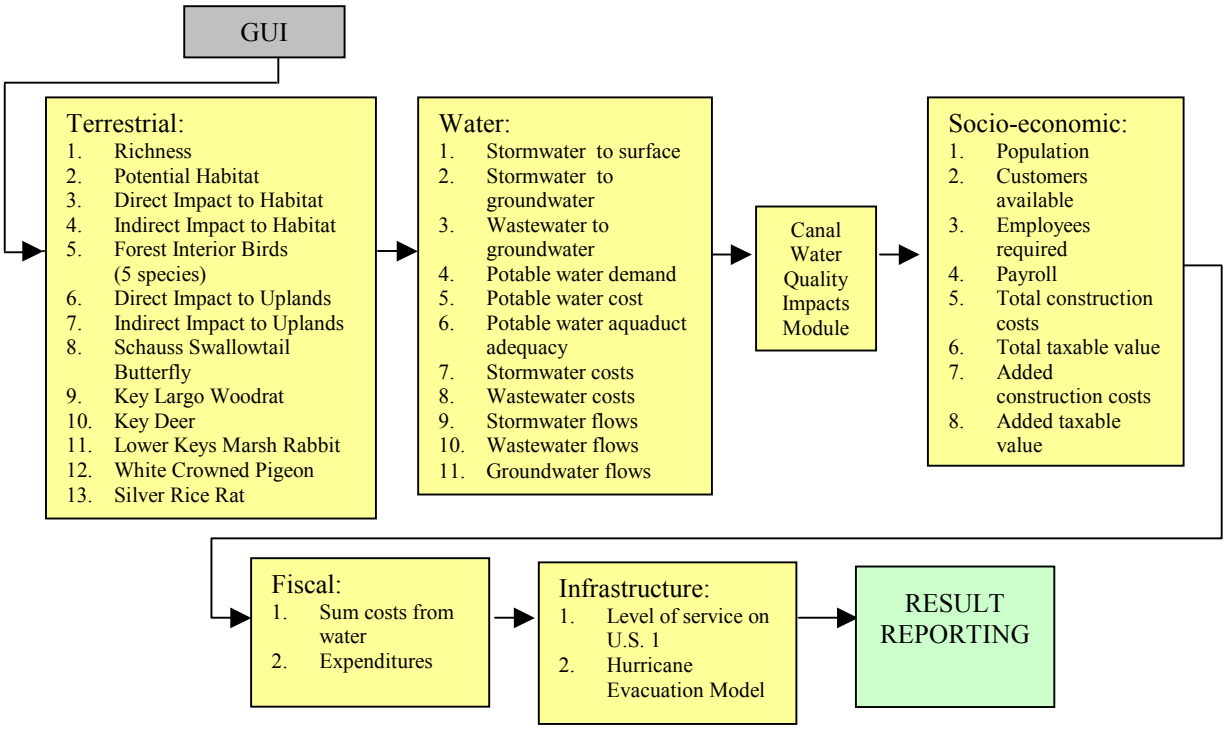
Attribute in Coverage	Description
LU_NS	Land Use
DU_NS	Residential Dwelling Units
DENSITY_NS	Residential Density
GFA_NS	Non-residential Gross Floor Area
FAR_NS	Non-residential Floor Area Ratio
WWT_NS	Wastewater Treatment Type
EDU_NS	Equivalent Dwelling Unit
HOTELROOM_NS	Hotel Rooms

10.2 Analysis

The analysis VBA code executes all of the spatial and mathematical operations of the CCIAM. While the CCIAM is comprised of analysis modules (terrestrial, water, socio-economic, fiscal, infrastructure, and canals), the VBA code is also organized into modules. Further discussions will refer to the CCIAM analysis modules as "analysis modules" and references to the VBA code will be "VBA modules."

The order of analysis module execution is: terrestrial, water, canals, socio-economic, fiscal, infrastructure, and hurricane (Figure 10-3). Each module is further broken down into components. The components specific to a module are itemized in the order they are executed with the module box.

Figure 10-3



Note that the arrows in Figure 10-3 do not represent dependencies, or data transfers, between analysis modules. Information regarding the placement and structure of the data resulting from the analysis modules is provided in Section 6. The following analysis module descriptions briefly outline the process and data used for each computation in the CCIAM.

Terrestrial Module

Species richness - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected, converted to a temporary grid as a recordset, reclassified to zero and multiplied with the ROADGRID grid. This temporary grid is added to the CLIPWATER grid and then multiplied with the species rich grid located in FKCCS\data. The resulting grid is placed in FKCCS\results\species_grids. Zonal statistics are created using the

PLANUNITLAND grid and the resultant richness grid. This statistics table is placed in the terrestrial geodatabase located in FKCCS\results\terrestrial.mdb.

Potential Habitat (17 species) - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected, converted to a temporary grid as a recordset, reclassified to zero, multiplied with the ROADGRID grid. This temporary grid is added to the CLIPWATER grid and then multiplied with each species' potential habitat grid located in FKCCS\data\species_grids. The resultant grid is placed in FKCCS\results\species_grids.

Direct Impacts to Habitat - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected to create a recordset. A UNION operation is performed with this selected record set and the ADID coverage located in FKCCS\data. The CODE_NS field for those areas that became developed is updated with a value of '8'. The resultant feature class is located in FKCCS\results\terrestrial.mdb. SQL statements summarize the data and place a statistics table in FKCCS\results\terrestrial.mdb.

Indirect Impacts to Habitat - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected, converted to a temporary grid as a recordset, and a EUCLIDEAN DISTANCE operation is performed. The recordset is multiplied with the ROADDIST grid and then reclassified to one. A UNION operation is performed with the recordset and the ADID coverage located in FKCCS\data. The CODE_NS field for those areas that became developed is updated with a value of '8'. The resulting feature class located in FKCCS\results\terrestrial.mdb. SQL statements summarize the data and place a statistics table in FKCCS\results\terrestrial.mdb.

Forest Interior Birds (5 species) – SQL statements are executed using the scenario's ADID feature class located in FKCCS\results\terrestrial.mdb and the T_HAB_REQ_LUT located in FKCCS\results\terrestrial.mdb to generate individual statistics tables for each species. These tables are located in FKCCS\results\terrestrial.mdb. Note that the ADID feature class referred to here has already been created in the Direct Impacts to Habitat analysis.

Direct Impacts to Uplands - SQL statements are executed using the scenario's ADID feature class located in FKCCS\results\terrestrial.mdb and the T_UPLANDS_LUT located in FKCCS\results\terrestrial.mdb to generate the statistics table. This table is located in FKCCS\results\terrestrial.mdb. Note that the ADID feature class referred to here has already been created in the Direct Impacts to Habitat analysis.

Indirect Impacts to Uplands - SQL statements are executed using the scenario's indirect impacts to ADID feature class located in FKCCS\results\terrestrial.mdb and the T_UPLANDS_LUT located in FKCCS\results\terrestrial.mdb to generate the statistics table. This table is located in FKCCS\results\terrestrial.mdb. Note that the in direct impacts to ADID feature class referred to here has already been created in the Indirect Impacts to Habitat analysis.

Schauss Swallowtail Butterfly - SQL statements are executed using the scenario's ADID feature class located in FKCCS\results\terrestrial.mdb to select hammocks within the species' range and generate a statistics table. This table is located in FKCCS\results\terrestrial.mdb. Note that the ADID feature class referred to here has already been created in the Direct Impacts to Habitat analysis.

Key Largo Woodrat - SQL statements are executed using the scenario's ADID feature class located in FKCCS\results\terrestrial.mdb to select hammocks within the species' range and generate a statistics table. This table is located in FKCCS\results\terrestrial.mdb. Note that the ADID feature class referred to here has already been created in the Direct Impacts to Habitat analysis.

Key Deer - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected to create a recordset. A UNION operation is performed with this selected record set and the KEYDEER coverage located in FKCCS\data. The HABITAT attribute for those areas that became developed is updated with a value of '0'. The resultant feature class is located in FKCCS\results\terrestrial.mdb. SQL statements summarize the data and place a statistics table in FKCCS\results\terrestrial.mdb.

Lower Keys Marsh Rabbit - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected to create a recordset. A UNION operation is performed with this selected record set and the LKMR coverage located in FKCCS\data. The HABITAT attribute for those areas that became developed is updated with a value of '0'. A spatial query is performed to select additional habitat patches that are within 500 meters of developed areas. The RISK attribute for those records is updated with a value of '1'. The resultant feature class is located in FKCCS\results\ terrestrial.mdb. SQL statements summarize the data and place two statistics tables in FKCCS\results\terrestrial.mdb.

White Crowned Pigeon - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected to create a recordset. A UNION operation is performed with this selected record set and the WCP coverage located in FKCCS\data. The ADULT and JUV attributes for those areas that became developed is updated with a value of '0'. The resultant feature class is located in FKCCS\results\terrestrial.mdb. SQL statements summarize the data and place juvenile and adult statistics tables in FKCCS\results\terrestrial.mdb.

Silver Rice Rat - Developed parcels from the scenario land use coverage in FKCCS\scenarios are selected to create a recordset. A UNION operation is performed with this selected record set and the RICERAT coverage located in FKCCS\data. The HABITAT attribute for those areas that became developed is updated with a value of '0'. A spatial query is performed to select additional habitat patches that are within 500 meters of developed areas. The RISK attribute for those records is updated with a value of '1'. The resultant feature class is located in FKCCS\results\terrestrial.mdb. SQL statements summarize the data and place two statistics tables in FKCCS\results\terrestrial.mdb.

Water

Stormwater to Surface Loads – A UNION operation is performed with the scenario land use coverage located in FKCCS\scenarios and the ADID_BASINS coverages located in FKCCS\data that produces a new feature class named ADBas, located in FKCCS\results\water.mdb. SQL statements are executed using this feature class to calculate the stormwater surface loads and place the statistics table in FKCCS\results\water.mdb. Note that various look up tables are used in these SQL statements. These look up tables are itemized in Section 9.4 of this manual. If BMPs are selected by the user then the loads are reduced according to those selections using the W_SWBMP_LUT look up table. The BMP reductions are applied on a per-planning-unit basis. If the stormwater master plan is selected by the user then the loads are reduced according to the "Retention" BMP in the W_SWBMP_LUT look up table and is applied to all planning units. Note: BMP reductions are ONLY applied to records which show a land use change and are uplands (these records make up a small subset of the total stormwater records).

Stormwater to Groundwater Loads - SQL statements are executed using the feature class created in the Stormwater to Surface Loads operations to calculate the stormwater surface loads and places the statistics table in FKCCS\results\water.mdb. Note that various look up tables are used in these SQL statements. These look up tables are itemized in Section 10.4 of this manual.

Wastewater to Groundwater Loads - A UNION operation is performed with the scenario land use coverage located in FKCCS\scenario_covs and the BASINS coverage located in FKCCS\data to produce a feature class located in FKCCS\results\water.mdb. SQL statements are executed using this feature class to calculate the wastewater to groundwater loads and place the statistics table in FKCCS\results\water.mdb. Note that various look up tables are used in these SQL statements. These look up tables are itemized in Section 10.4 of this manual. If the wastewater master plan is selected by the user, then the wastewater treatment types are changed accordingly during the land use change phase of the GUI operation.

Potable Water Demand – SQL statements are executed using various look up tables and dwelling unit data from the WW_Ground Table located in FKCCS\results\water.mdb. Statistics tables are placed in FKCCS\results\water.mdb. The look up tables are itemized in Section 10.4 of this manual.

Potable Water Costs – SQL statements are executed using various look up tables that are itemized in Section 10.4 of this manual. Statistics tables are placed in FKCCS\results\water.mdb.

Potable Water Aquaduct Adequacy – SQL statements are executed using various look up tables that are itemized in Section 10.4 of this manual. Statistics tables are placed in FKCCS\results\water.mdb.

Stormwater and Wastewater Costs - SQL statements are executed using various look up tables that are itemized in Section 10.4 of this manual. Statistics tables are placed in FKCCS\results\water.mdb.

Stormwater, Wastewater, and Groundwater Flows – SQL statements are executed for each of the flow calculations using the feature classes noted in the analysis to calculate each load. Statistics tables are placed in FKCCS\results\water.mdb.

Socio-economic

The scenario land use coverage located in FKCCS\scenario_covs is converted to a feature class and placed in FKCCS\results\scenario_lu.mdb. All of the socio economic SQL statements are performed on this feature class. The resulting statistics tables are placed in the SIF.mdb geodatabase. Note that various look up tables are used in these SQL statements. These look up tables are itemized in Section 10.4 of this manual.

Fiscal

SQL statements are executed using data from the water cost analysis and the socioeconomic module to produce government costs tables in the SIF.mdb geodatabase. Note that various look up tables are used in these SQL statements. These look up tables are itemized in Section 10.4 of this manual.

Infrastructure

Level of Service on U.S. 1 – SQL statements summarize acreages of residential and tourist-related land uses from the scenario land use feature class located in FKCCS\results\scenario_lu_mdb and calculate the level of service along the roadway. The resulting statistics table is placed in the SIF.mdb geodatabase.

Hurricane Evacuation Model – This is a Microsoft Excel spreadsheet model created by Miller Consulting, Inc. It has been locked by Miller and can not be modified except for those cells that accept changes from the user. SQL statements summarize dwelling unit data and pass these data to the appropriate cells in the spreadsheet. The model also requires input from the user that is obtained through the CCIAM GUI. Once this information is passed to the model, it runs, and SQL queries are executed to summarize the results into a table located in the SIF.mdb geodatabase.

Canal Impacts

This model consists of eleven Excel spreadsheets, ten canal spreadsheets and one Loading spreadsheet. The code used in the canal model is very similar to that used in the wastewater/stormwater module. The parcels are unioned with the canal_basin and the canal_adidbas coverages, rather than the basins and adid_basins coverages, as used in the water code. The resulting two feature classes, named xx_Can_Basins and xx_Can_ADBas, are then used to calculate the canal stormwater and wastewater loads and flows per watershed ID. The final result tables are named xx_Can_WW_Final and xx_Can_SW_Final (where xx represents the unique scenario ID or prefix). The data in these two tables serve as the inputs into the canal Loading.xls spreadsheet. The feature classes and tables for the canal model are located in the Water.mdb geodatabase.

The second part to the canal model involves copying the results from the WW and SW final tables into the Loading.xls file (load and flow data per watershed ID), then doing a save as, saving the file as xx_Loading.xls. Next, each individual canal Excel file is opened, the macros enabled, the link established (with xx_Loading.xls), and the Model_Reset and

Flush_Model Excel macros are run. The file is then saved using the new scenario prefix (example: sg1_208 Marathon Model.xls, where sg1 represents the scenario prefix). This is repeated ten times, once for each canal Excel spreadsheet.

For a more detailed discussion of the canal model, please refer to the canal report.

Additional information regarding each analysis module can be found in the delivery order report pertaining to that part of the FKCCS and the FKCCS Final Report. However, module information specific to the operation and management of the CCIAM is noted in Table 10-2.

Table 10-2

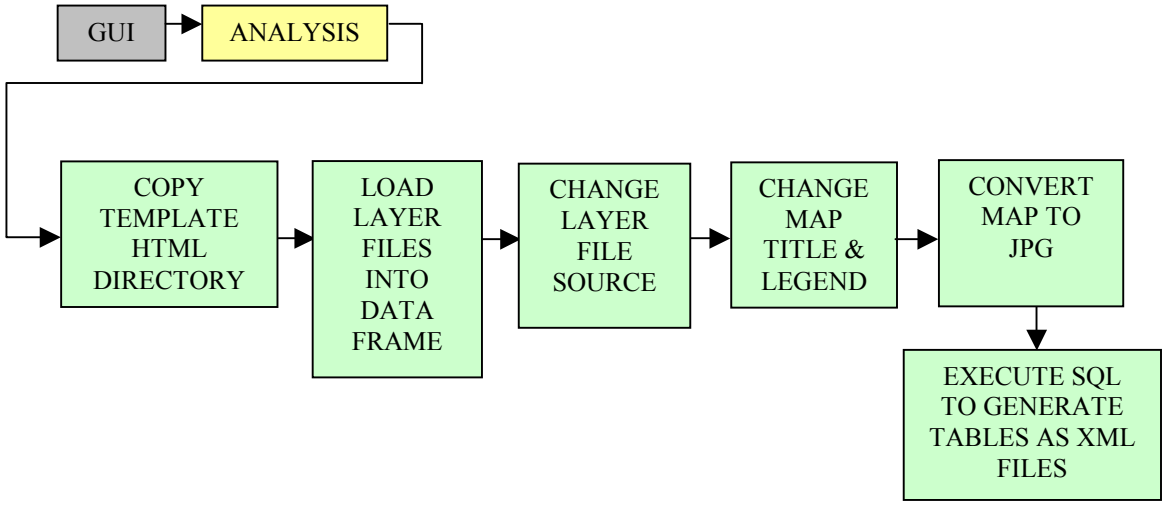
Analysis Module	Operation/Maintenance Comment
Terrestrial	• Most computationally intensive • Overlay analyses result in feature classes • Raster analyses result in ArcInfo grids
Water	• Two spatial overlay processes occur that result in feature classes. The remaining analysis is performed using SQL statements. • Wastewater requires data from the land use attributes EDU_NS and WWT_NS • Stormwater BMPs requires data from user input from GUI • Master plan implementation requires data from user input from GUI
Socio-economic	Scenario land use coverage converted to feature class prior to executing SQL statements.
Fiscal	• Requires taxable value data from the land use feature class • Requires cost data from water module • Requires population data from socio-economic
Infrastructure	Hurricane Evacuation Model is a MS Excel spreadsheet model that is external to the CCIAM. It requires data from user input in the GUI and residential dwelling units.
Canal Impacts	This model consists of 11 Excel spreadsheets, 10 Canal spreadsheets, and 1 Loading spreadsheet. It requires the wastewater and stormwater loads and flows by watershed ID as inputs.

There is not a one-to-one relationship between analysis modules and VBA modules. A VBA module may be used by more than one analysis module. Table 10-4 in Section 9.5 itemizes each VBA module and where it is used in the CCIAM.

10.3 Result Reporting

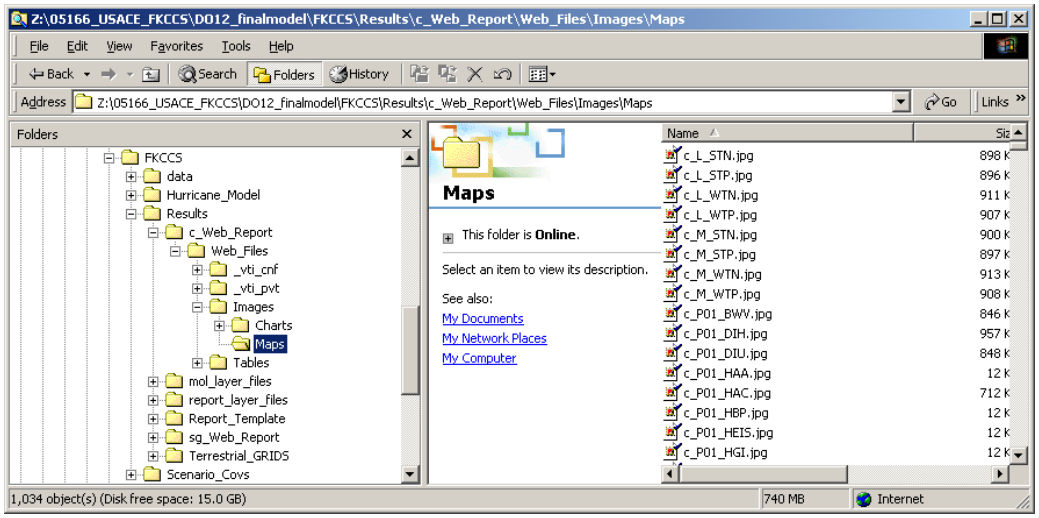
CCIAM results include maps, tables, and charts. The result reporting VBA code and SQL queries build these outputs dynamically for each scenario (Figure 10-4).

Figure 10-4



Upon completion of the analysis portion of the CCIAM, a blank HTML directory template is copied to the FKCCS\results directory and renamed to the scenario identification number (Figure 10-5).

Figure 10-5



The layer files in the \FKCCS\Results\mol_layer_files\water_loads directory are created through VBA code, whereas, all the other layer files have been created as static files that do not change with each scenario. The water loads layer files are created with VBA code dynamically because they require a table join to a feature class before conversion to a layer file. Therefore a simple change of data source will not work with these layer files to accommodate different scenarios.

A predetermined map layout and design is populated with the symbolized data. Map titles and legends are changed using VBA and ArcObjects. The layout is then exported as a JPG to the webreport\web_fields\ images\maps directory.

When the FKCCS.mxd is opened, it will have zero layers in the Data View. In the Layout View, the project will have a data frame, neat line and FKCCS logo. These three objects should never get deleted from the Layout View. When the user runs the GUI, three base layer files (Planning_Units.lyr, us1.lyr, and Roads.lyr) and the xx_lu coverage will be automatically added to the table of contents.

A series of SQL statements are executed to generate statistics tables that are formatted for the Scenario Report and Model Output Listing. These tables are not physical tables in the geodatabases. Once the SQL query is executed the recordset is immediately converted to XML and placed in the XML directory. The data to produce the tables for the two reports are

generated as part of analyzing the scenario. Therefore, it is unnecessary to create another large set of formatted tables for the HTML reports.

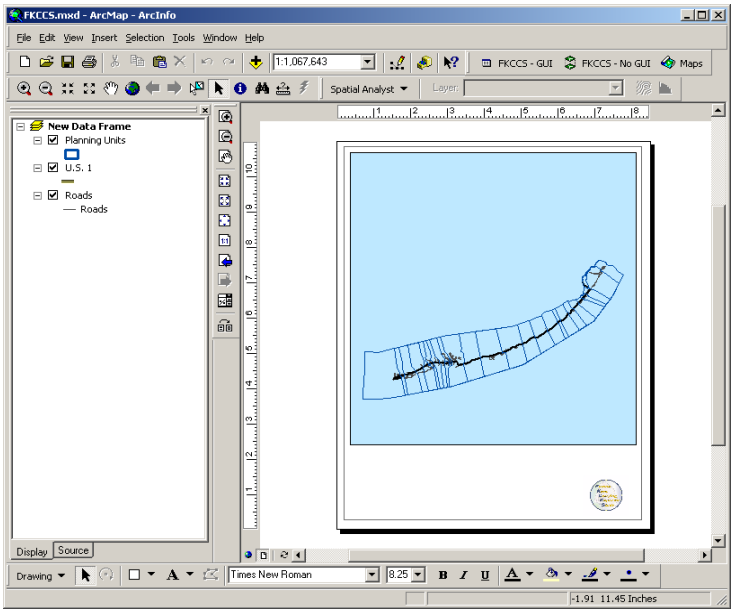
The two HTML documents (Scenario Report and Model Output Listing) are located in \webreport. They have been built using HTML, JavaScript, and XML Stylesheets that point to the JPGs and XML files located in the appropriate sub-directories. These two HTML documents, and their supporting sub-directories of data constitute the reports generated for each scenario. Each report can be printed. It is suggested that the Scenario Report be provided to the planners in both hardcopy and digital format. The Model Output Listing can be printed; however, it is envisioned that this report and all of its components be written to CD-ROM and simply accompany the Scenario Report.

After the FKCCS CCIAM code is run (either with or without the GUI), the last step is to run the map creation code.

Note: * As mentioned in the User's Manual, the creation of Jpeg maps had to be separated from the CCIAM due to limitations with the ESRI JpegExporter object.

When the Jpeg map generating code is run (using the "Maps" button), the code will delete all previous layers in the table of contents and add the three base layers as shown in Figure 10-6.

Figure 10-6



10.4 Look Up Tables

The CCIAM references 63 look up tables. Each look up table conforms to the naming convention outlined in Section 7. The CCIAM is designed so that each coefficient, or look up value, can be easily updated with more current data. Therefore, no thresholds are "hard coded" into the model, but are located in tables that are referenced by the VBA code. Table 10-3 briefly describes the location and purpose of each look up table in the CCIAM.

Table 10-3

Geodatabase	Look-up Table	Description
scenario_lu	Z_LuPC_LUT	Land Use / PC code cross reference for pre-processing the parcel data
scenario_lu	Z_Zones_LUT	Zoning / PC code cross reference for pre-processing the parcel data
scenario_lu	Z_HabitatOSR_LUT	Habitat development ratio for pre-processing the parcel data
scenario_lu	RZ_Pugeo_LUT	Planning unit / key segment cross reference
scenario_lu	RZ_Result_LUT	Planning unit / key segment, used for cross tab queries
scenario_lu	R_Feature_Class_List_LUT	List of feature classes to load for median calculation
scenario_lu	R_HabitatList_LUT	Lost of habitat categories
scenario_lu	R_KeySegment_LUT	List of key segments
scenario_lu	R_LYRLIST_LUT	List of layer files to process
scenario_lu	R_PlanUnitList_LUT	List of Planning Units
scenario_lu	Z_Ave_EDU_LUT	List of average dwelling units for non residential parcels.
scenario_lu	Z_PrimeVeg_LUT	List of primitive vegetation types by RE2 (69,745 unique RE2 numbers).
scenario_lu	Z_RE2_DuplicatesOnly_LUT	List of duplicate RE2 numbers (RE2 numbers with a count greater than 1).
SIF	F_Existing_Expenditures_CC_LUT	Current conditions expenditures (millions of dollars)
SIF	F_Capital_Annualized_LUT	Annual debt payment (millions of dollars)
SIF	F_Gov_Expenditures_LUT	Gov. expenditures by jurisdiction (millions of dollars)
SIF	F_School_Cost_LUT	Constants used in school costs
SIF	H_TouristDU_LUT	Percent tourist dwelling units by evacuation zone
SIF	I_Length_of_US1_LUT	Length of US1 by planning unit (miles)
SIF	I_LOS_LUT	LOS thresholds for US 1 (miles per hour)

Table 10-3 (Continued)

Geodatabase	Look-up Table	Description
SIF	I_Regression_Coef_LUT	Regression coefficients for traffic equation
SIF	SE_ConstCosts_LUT	Socioeconomic cost coefficients
SIF	SE_DemoCoef_LUT	Socioeconomic demographic coefficients
SIF	SE_Employment_Coef_LUT	Socioeconomic population/employment coefficients
SIF	SE_FloorArea_LUT	Socioeconomic gross floor area coefficient
SIF	SE_MCPD_LUT	Socioeconomic Monroe County census statistics
SIF	SE_PropertyValues_LUT	Taxable value coefficients
SIF	SE_PU_LUT	List of planning units
SIF	SE_WageRates_LUT	Annual wage rates
SIF	SE_Construction_Cost_CC_LUT	Current conditions construction costs
SIF	SE_Population_CC_LUT	Current conditions population
SIF	SE_Taxable_Value_CC_LUT	Current conditions taxable value
SIF	RI_Pugeo_LUT	Planning unit / key segment cross reference
SIF	RI_Result_LUT	Planning unit / key segment, used for cross tab queries
terrestrial	T_Adid_LUT	ADID vegetation types
terrestrial	T_Hab_Req_LUT	Forest interior birds habitat thresholds
terrestrial	T_Indirect_ReMap_LUT	Remap table to reclassify indirect impacts grid
terrestrial	T_Uplands_LUT	Upland vegetation threshold
terrestrial	RT_Pugeo_LUT	Planning unit / key segment cross reference
terrestrial	RT_Result_LUT	Planning unit / key segment, used for cross tab queries
terrestrial	RT_Rich_LUT	Planning unit number reference in xx_rich_stats table
water	W_EDU_LUT	GPD per EDU by Planning unit
water	W_EMC_LUT	EMC and RC values by major land use & load type
water	W_GWRed_LUT	Groundwater reduction applied to saturated & unsaturated
water	W_LU_LUT	Major land use category by land use description
water	W_Pollcon_LUT	Pollution concentration by wastewater treatment type
water	W_PU_LUT	Reference list of planning units
water	W_PUWS_LUT	Reference list of planning unit / watershed ID combinations

Table 10-3 (Continued)

Geodatabase	Look-up Table	Description
water	W_PW_Aquaduct_LUT	Aqueduct Adequacy template (in geographic order)
water	W_PW_Variables_LUT	Potable water and cost constants
water	W_Rainfall_LUT	Rainfall data, this table is presently not used in the CCIAM
water	W_SW_Public_Costs_LUT	Public stormwater cost values
water	W_SWBMP_LUT	Stormwater BMP reduction values
water	W_SWDCIA_LUT	Stormwater reduction values, presently not used in the CCIAM
water	W_US1_Flows_LUT	US1 stormwater flows in GPD
water	W_US1PPD_LUT	US 1 stormwater loads in pounds per day
water	W_Var_LUT	Water load constants
water	W_WS_LUT	Reference list of watersheds
water	W_WW_Costs_LUT	Wastewater cost coefficients by treatment
water	W_WW_MP_Costs_LUT	Wastewater costs when implementing MP
water	W_PW_Existing_EDUs_CC_LUT	Sum of EDU's by planning unit for current conditions
water	RW_Pugeo_LUT	Planning unit / key segment cross reference
water	RW_Result_LUT	Planning unit/key segment, used for cross tab queries

10.5 Description of VBA modules in the FKCCS.mxd

The FKCCS.mxd is an ArcGIS 8.1 map document file that houses 31 VBA modules. These VBA modules perform all of the functions of the GUI, analysis, and reporting of results. Where possible, global variables are declared and repeatedly used throughout the code. In addition, some VBA modules are called in multiple instances to execute the model. Table 10-4 itemizes the VBA modules and provides a brief description of the VBA module's use in the model. Note that each VBA module has a header with descriptive information and each procedure within the module is documented with a bulleted description of the action.

Table 10-4

CCIAM Step	Module Name	Description	Number of Procedures/ Functions
GUI	a_Save_Scenario_to_Access	Save GUI selections to the scenarios.mdb	14
GUI	a_modFromQuery	Get the land use "From" selection set	6
GUI	a_modParamCode	Form opening and closing sequence	4
GUI	a_ChangeTo_Method2	Change the “NS” fields in the “xx_lu” parcels coverage.	32
Analysis & GUI	a_modPublicSettings	Listing of public functions and procedures used throughout the CCIAM.	19
Analysis	a_Create_Water_Layer_Files	Creates layer files for SW and WW loads	9
Analysis	a_Analysis_Module	Contains the union procedure	1
Analysis	a_Fiscal_Stats	Calculates all the fiscal statistics	11
Analysis	a_Hurricane_Evac	Runs the Hurricane Excel spreadsheet	4
Analysis	a_Level_of_Service	Calculates the level of service statistics	5
Analysis	a_Main_Module	Used to call the main procedures	1
Analysis	a_modFunctions	Contains 3 functions, e.g. get developed parcels	8
Analysis	a_Soc_Economic_Mod	Import the land use coverage into scenario_lu; Call main Socio procedures	1
Analysis	a_Socio_Economic_Stats	Calculates all the socio economic statistics	27
Analysis	a_Terrestrial_Impacts_Rest	Create indirect impact rasters	11
Analysis	a_Terrestrial_Mod_Rest	Call terrestrial union and statistic procedures	2
Analysis	a_Terrestrial_Species_Rest	Create habitat species feature classes for LKMR, Rice Rat, WCP	8
Analysis	a_Terrestrial_Stats_Mod_Rest	Run SQL's to create terrestrial statistic tables	15
Analysis	a_Water_Module_Rest	Perform 2 water unions; Call main water procedure	1
Analysis	a_Water_Stats_Rest	Calculates all the water loads, flows, potable water, and costs	42
Analysis	a_Canal_Mod_Rest	Calculate the canal wastewater and stormwater loads and flows by watershed ID.	23

Table 10-4 (Continued)

CCIAM Step	Module Name	Description	Number of Procedures/ Functions
Analysis	a_Canal_Run_Excel	Run the 10 Excel canal models and create new Excel. results.	3
Result Reporting	Result_Create_JPG_Files_ Median	Create jpg maps median and values	40
Result Reporting	Result_Gen_Folders	Create reporting directory structure for new scenario, copy template HTML files to web report directory	2
Result Reporting	Result_Infra_SQL	Create XML tables for SIF	16
Result Reporting	Result_LU_SQL	Create XML table for Scenario_lu	5
Result Reporting	Result_Scenarios_SQL	Create XML tables for Scenarios	2
Result Reporting	Result_Terr_SQL	Create XML tables for Terrestrial	12
Result Reporting	Result_Water_SQL	Create XML tables for Water	8
Result Reporting	Result_XMLQueries	Call all XML table generating modules	4
Result Reporting	Result_Run_Map_Creation	Calls jpg creation procedures	2

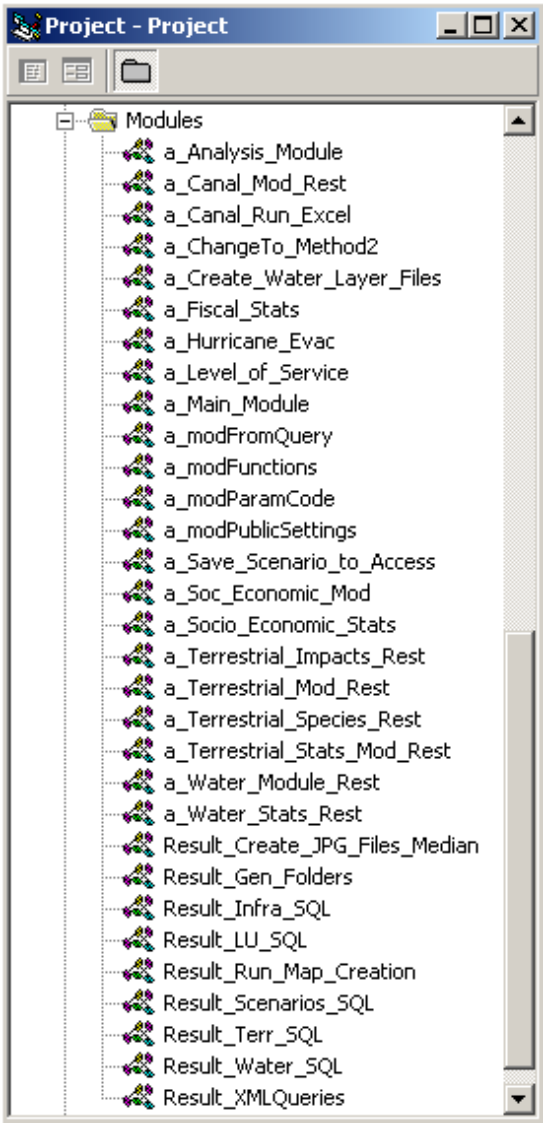
Note: The "_Rest" at the end of some of the names means the VBA module was modified to accommodate restoration scenarios.

Additional notes concerning the execution of the CCIAM:

- If the application stops in the middle of code execution, the FKCCS.mxd project should not be saved when closed. The code creates objects and adds these objects to the layout view. If the FKCCS.mxd project is saved, then these objects will get saved, which means the FKCCS.mxd project will not be in its pre-run set up state. If the code runs through without stoppage, then it is OK to save the FKCCS.mxd.

The VBA modules are shown in Figure 10-7 below:

Figure 10-7

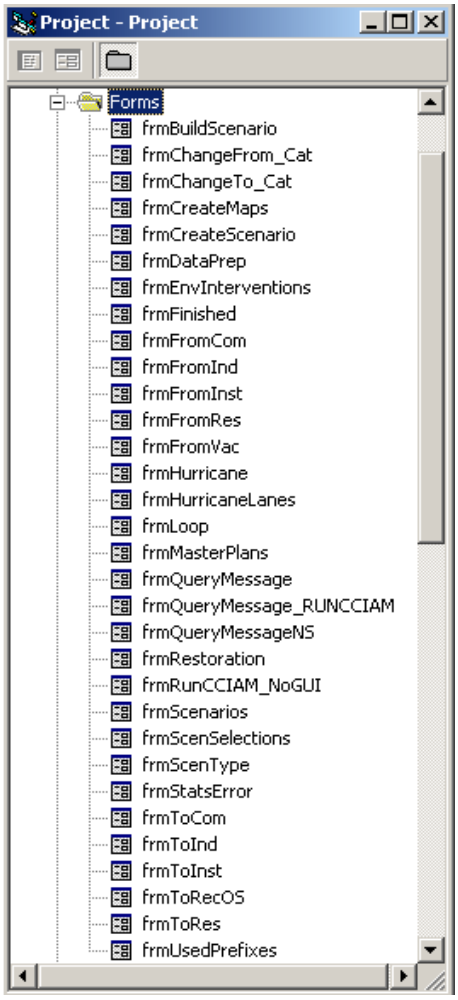


10.6 Description of VBA Forms in the FKCCS.mxd

The FKCCS.mxd contains 32 forms. These forms make up the Graphical User Interface, also referred to by the acronym, "GUI". The forms provide a front end to allow the user to build a custom land use scenario, which can then be analyzed by the CCIAM. The forms gather the users selections, which are then saved to the Scenarios.mdb database located in the FKCCS\Results directory. To actually see images of all the forms, please refer to the User's Manual (under CCIAM Step-by-Step Guidelines).

The 32 VBA forms are shown in Figure 10-8 below.

Figure 10-8



Restoration Scenarios

The restoration scenario requires its own section because it is a special case. Different procedures are called in the Analysis modules if the scenario is a restoration scenario.

The GUI will change all selected parcels to "open space restored" and all other "NS" fields to zero, except WWT_NS (wastewater treatment type), which will remain as is. The land use "open space restored" was added to the W_LU_LUT lookup table in the Water.mdb geodatabase.

All feature classes created had to have the CODE_NS (from Adid coverage) and DESCRIPTION fields changed to the primitive vegetation type (which comes from the Z_PrimVeg_LUT lookup table in the Scenario_lu.mdb geodatabase) for restored parcels.

The problem occurred because not all feature classes had the CODE_NS field (it was not needed in some feature classes for non restoration scenarios). Therefore, some additional unions had to be performed for restoration only. As well, all the SQL statements run on the CODE_NS field had to be modified to pick up the new primitive vegetation types.

The T_Adid_LUT lookup table in the Terrestrial.mdb had to be updated to reflect the six primitive vegetation types, as shown below.

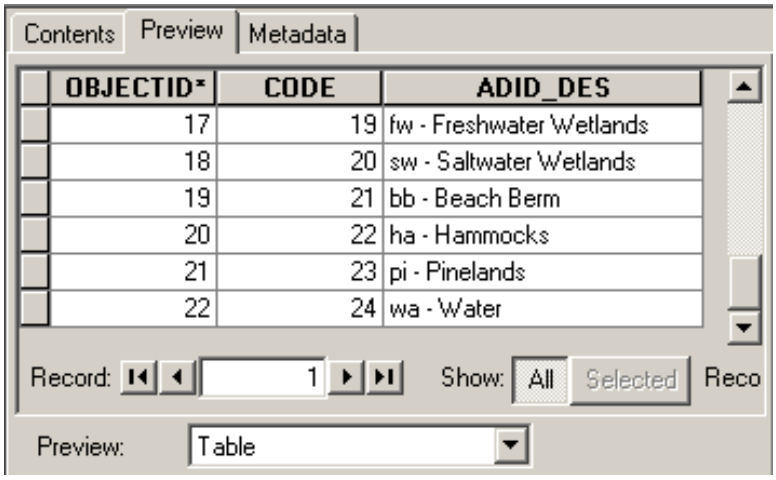
Figure 11.1

Contents | Preview | Metadata

OBJECTID	RE2	AGGCODE
14	150	sw
15	160	ha
16	170	sw
17	180	ha
18	200.0001	ha
19	200.000101	ha
20	200.000102	ha
21	200.000104	ha
22	200.000106	ha
23	200.000111	sw
24	200.000112	sw

Rather than perform a union with the primitiveveg coverage, a new lookup table was created named Z_PrimVeg_LUT located in the Scenario_lu.mdb geodatabase. This lookup table is used to determine the primitive vegetation type ("AGGCODE") for each unique RE2 number in the parcels coverage, see Figure 11-2.

Figure 11-2



(Entire table contains 69,745 records.)

The Z_PrimVeg_LUT table was created manually using the following steps:

1) Identity of parcels with primitiveveg to create parc_prim (at Arc/Info prompt),
2) Summarize parc_prim on RE2 – Max_Area, First_AGGCODE to create PrimVeg.dbf (using ArcMap),
3) Summarize parc_prim on RE2 – Sum_Area to create PrimVeg2.dbf (using ArcMap),
4) Table join of PrimVeg.dbf and PrimVeg2.dbf using RE2 as common field, add a new field named "perc", calc perc = Max_Area / Sum_Area, if perc < 0.5 then calc AGGCODE = "wa", else calc AGGCODE = First_AGGCODE (using ArcView),
5) Import the table created in step 4 into the Scenario_lu.mdb geodatabase (using ArcCatalog).

To summarize, the primitive vegetation type will be changed to water ("wa") for the entire parcel if the largest polygon is less than half the area of the parcel, or else the primitive vegetation type will be changed to whatever the largest polygon is.

Note: Since the application does not actually perform a union with the primitive vegetation coverage, the entire parcel will be changed to the primitive vegetation type listed in the Z_PrimVeg_LUT lookup table (at least 50% of the parcel will consist of this primitive vegetation type).

Section 12

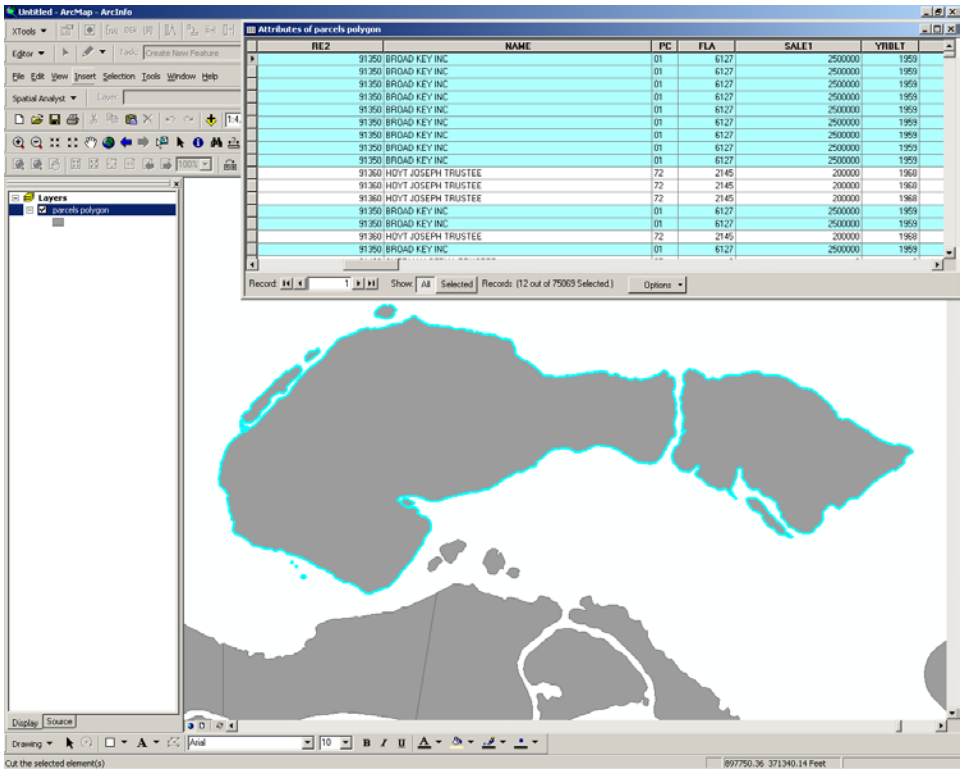
CCIAM Data Updates

The following section describes the procedures for updating information housed in the CCIAM's personal geodatabases, coverage workspaces, and grid workspaces. There is a clear distinction between updating the data as they are organized and structured in the current model versus adding data or changing look up table values to reflect a more current scientific understanding or user preference. For example, if a new land cover layer becomes available, there are procedures outlined in this document to assist the steward in pre-processing those data for use in the CCIAM. However, if new scientific understanding allows for a more refined analysis of the indirect effects of development on habitat, and additional look up tables or data are required for this analysis, then that is a model enhancement. The steward should work closely with the Florida Department of Community Affairs, South Florida Regional Planning Council, and Monroe County to reach consensus on data updates versus model enhancements.

12.1 Parcel Updates

The Monroe County Property Appraiser's (MCPA) Office parcel GIS layer is the land use dataset used in the CCIAM and the steward should have an understanding of how these data are maintained by the MCPA. The tax roll data are maintained in a Computer Assisted Mass Appraisal (CAMA) database. The parcel GIS layer is maintained in an ArcInfo 7.x Librarian system. Therefore, the MCPA must extract both the tax roll, as a DBF file, and the parcel geometry, as an ArcInfo export file, for use in the CCIAM. These files are large. The tax roll DBF is approximately 80mb and the exported parcel geometry is approximately 450 mb**.** Since these files have been extracted from two computing systems, they must be joined using the real estate identification number, RE2. Note that there can be multiple polygons for one RE2, creating a one-to-many relationship between the tax roll record and the parcel GIS layer (Figure 12-1). **Therefore, it is vital that a frequency be run on RE2 to obtain the correct acreage, floor area, etc. for each parcel. A simple summary on the attribute table will result in double counting of parcels with more than one polygon.**

Figure 12-1 Example of multiple polygons for one RE2



Both the spatial component and attribute data have been enhanced to support CCIAM analyses. All of these enhancements represent pre-processing activities that should be completed if new parcel data become available for use in the CCIAM.

First, the spatial accuracy of the parcel data was manually corrected by moving contiguous polygons into a position that visually lined up with the shoreline on the Digital Orthophoto Quarter Quadrangles. The contractor made the decision not to break up contiguous "clumps" of parcels in order to maintain the integrity of shared boundaries. Note, that due to the rotation, skew, and shift in the parcel geometry not all parcels line up correctly with the shoreline. However, this correction does provide a spatial enhancement to the parcels and increases the accuracy of the CCIAM. Since this was a manual, visual, process it is doubtful that the outcome of future corrections will be identical to the current accuracy of the GIS layer. However, the goal of this correction was to obtain a "best fit" until a systematic spatial correction process is undertaken by the county. Review the Delivery Order 10 report for further details regarding parcel corrections.

Second, there are well over 55 attribute fields associated with the Monroe County tax roll. Many of these fields are not required by the CCIAM. In addition, the contractor added several fields to the attribute table while developing the CCIAM. Table 12-1 itemizes each field, where it originated, and, if it was derived for the CCIAM how it was calculated in the table.

Table 12-1
Items in the CCIAM Parcel Attribute Table

Item in Attribute Table	Description of Item	Method to Calculate the Value
RE2	Real Estate Identification Number	Obtained directly from tax roll
NAME	Name of property owner	Obtained directly from tax roll
PC	Property Code	Obtained directly from tax roll
FLA	Floor Living Area	Obtained directly from tax roll
SALE1	Last sale	Obtained directly from tax roll
YRBLT	Year the structure was built	Obtained directly from tax roll
PBLDG1	Taxable value of the structure	Obtained directly from tax roll
PLAND1	Taxable value of the land	Obtained directly from tax roll
PTAX1	Total taxable value	Obtained directly from tax roll
PLAN_UNIT	Assign parcels to planning units	GIS process - Overlay parcels and plan_units
KEY_SEGMENT	Assign parcels to key segment	Manual activity - Visually inspect parcels to determine if they are located in the upper, middle, or lower keys. Calculate attribute accordingly.
WW_HOTSPOT	Assign parcels to wastewater hotspots	Manual Activity - Visually inspect parcels using the maps from the CH2MHill Sanitary Wastewater Master Plan to assign parcels to hotspots. Calculate attribute accordingly.
MUNICIPALITY	Assign parcels to municipality	Manual activity – visually inspect the parcels with the municipality layer to determine which jurisdiction the parcel belongs to. Calculate the attribute accordingly.
EVAC	Assign parcels to hurricane evacuation zones	Manual activity - Assign parcels to hurricane evacuation zones according to

Table 12-1
Items in the CCIAM Parcel Attribute Table
(Continued)

Item in Attribute Table	Description of Item	Method to Calculate the Value
		the Miller Consulting Hurricane Evacuation Report
ZONE	Assign zoning to each parcel	GIS process - Link the zoning field obtained from the MCPA to the parcels using RE2 as the unique identifier
ACRES	Calculate acreage for each parcel	GIS process - Run a frequency on RE2 and area. Add an item, ACRES, to the frequency table and calculate ACRES = AREA / 43560. Do a JOINITEM back to the parcel attribute table using RE2 as the unique identifier.
SQFOOTAGE	Calculate the square footage for each parcel	GIS process - Run a frequency on RE2 and area. Add an item, SQFOOTAGE, to the frequency table and calculate SQFOOTAGE = AREA. Do a JOINITEM back to the parcel attribute table using RE2 as the unique identifier.
LU	Calculate land use categories	Manual activity - See the land use categories Table 10-2. Select the PC codes and calculate the LU accordingly.
HOTEL_ROOMS	Assign hotel rooms to parcels	Manual activity.
DU_AVE	Calculate dwelling units per parcel	See dwelling unit guidelines
DENSITY	Calculate residential density	Manual activity - Divide the du_ave by ACRES
RES_SUIT	Calculate residential suitability for development on vacant parcels	See suitability guidelines
NONRES_SUIT	Calculate non-residential suitability for development on vacant parcels	See suitability guidelines
MAX_ALLOW_DU	Calculate maximum allowable dwelling units for vacant residential parcels	Manual activity – Select vacant residential parcels and multiply ACRES by the allotted dwelling units according to the ZONE value.

Table 12-1
Items in the CCIAM Parcel Attribute Table
(Continued)

Item in Attribute Table	Description of Item	Method to Calculate the Value
		See the zoning allotted density table.
MAX_FLOORAREA	Calculate maximum allowable gross floor area for vacant non-residential parcels	Manual activity – Select vacant non-residential parcels and multiply SQFOOTAGE by the allotted floor area according to the parcel's ZONE value.
MAX_HOTEL	Calculate maximum allowable hotel units for vacant commercial parcels	Manual activity – Select vacant commercial parcels and multiply the ACRES by the allotted hotel units according to the ZONE value.
REDEV_VALUE	Calculate the ratio of the building taxable value to the land taxable value	Manual activity - Divide PBLDG1 by PLAND1
WATERFRONT	Identify waterfront parcels	Manual activity - visually inspect parcels to find waterfront properties
ADJ_US1	Identify parcels adjacent to US 1	Manual activity - Visually inspect parcels to determine which ones are adjacent to US1.
VACANT_CONS	Identify parcels within 300 feet of at least 10 acres of contiguous undisturbed habitat or of a publicly owned conservation area.	see calculation guidelines
SUB_ID2	Identify parcels in subdivisions	GIS process - Overlay with subdivisions layer from MCPA. **NOTE:** must be done prior to manually shifting parcels.
SUBDIV_PERC	Identify subdivision percentage developed	Manual activity - Summarize the number of developed parcels and divide by the total number of parcels in the subdivision to get the ratio.
FAR	Calculate floor area ratios	Manual activity - Divide the GFA column by the SQFOOTAGE column.

Table 12-1
Items in the CCIAM Parcel Attribute Table
(Continued)

Item in Attribute Table	Description of Item	Method to Calculate the Value
GFA	Calculate gross floor area	Manual activity - Add an item called GFA and calc GFA equal to FLA. This was done simply to make the item more intuitive and still retain the original data field.
EDU	Assign EDUs to each parcel	See Delivery Order 8 Report
WWT	Assign wastewater treatment to each parcel	See Delivery Order 8 Report

Table 12-2
Land Use Categories

Land Use in the FKCCS	Corresponding PC Values in the Tax Roll
Vacant Land	00, 10, 40, 70
Residential (high, medium, low density)	01, 02, 03, 04, 05, 06, 07, 08, 09, 36
Retail	11, 12, 13, 14, 15, 16
Office	17, 18, 19, 23, 24
Service	21, 22, 25, 26, 28, 29, 30, 61
Marina	27
Commercial Entertainment	31, 32, 33, 34, 35, 37
Golf Course	38
Hotel/Motel	39
Light Industrial	41, 44, 45, 46
Heavy Industrial	42, 43, 47
Warehouse/Storage	48, 49
Public Facilities and Services	83, 84, 85, 91, 94
Institutional	20, 71, 72, 73, 74, 75, 76, 77, 78, 79, 90
Agriculture	69
Open Space and Recreation	80, 82, 86, 87, 88, 89, 92, 99
Military	81
Submerged Lands	95

Updating the parcels can take three forms:

- First, the spatial accuracy of the parcel geometry is improved either manually or through a systematic process. As long as the real estate (RE2) attribute does not change, a simple join of the attribute table to the new GIS layer can be performed to update the table of the new layer.
- Second, the tax roll data are updated by the MCPA and, therefore, the attribute data in the CCIAM parcels need to reflect these updates. The steward would have to perform the attribute updating actions identified in Table 10-1 and the steps noted below. Once completed, this new table has to be linked to the parcel GIS layer.
- Third, both the spatial and attribute data have been updated. The steward would have to obtain the new GIS layer and update the attributes accordingly.

It is highly recommended that the steward closely coordinate with the MCPA prior to any modifications to these data and to ensure that the steward is aware of future updates or enhancements to this information.

Assuming that an entirely new parcel GIS layer and tax roll needs to be integrated into the CCIAM, the following steps must be performed (items in **bold** are the attributes being calculated):

1. Import the parcel GIS layer from the MCPA.
2. Link the tax roll to the imported GIS layer using **RE2** as the unique identifier.
3. Drop the un-necessary items from the attribute table.
4. Perform an overlay operation with the subdivision layer to get the **SUB_ID2** item into the parcel attribute table.
5. Summarize the number of developed parcels and divide by the total number of parcels in the subdivisions to get the ratio for **SUBDIV_PERC**.
6. If necessary, correct the spatial shift either manually or through a systematic process.

7. Overlay with the planning units layer to get the **PLAN_UNIT** item into the parcel attribute table.

8. Add an item, **KEY_SEGMENT**, and manually assign parcels to key segment (upper, middle, lower).

9. Add an item, **WW_HOTSPOT**, and manually assign parcels to wastewater hotspots using the hardcopy maps produced by CH2MHill in the Sanitary Wastewater Master Plan.

10. Load the parcels and the municipality layer into ArcInfo for viewing. Add an item, **MUNICIPALITY**, and manually assign parcels to their appropriate municipality by visual inspection.

11. Add and item, **EVAC**, and assign parcels to hurricane evacuation zones using the descriptions found in the Miller Consulting, Inc. Hurricane Evacuation Plan for Monroe County.

12. Select PC codes and calculate **LU** according to Table 12-2.

13. Link the zoning table to the parcels using RE2 as the unique identifier to get the **ZONE** field into the parcel attribute table.

14. Run a frequency on RE2 and AREA. Add an item, **ACRES**, to the frequency table and calculate ACRES = AREA / 43560. Do a JOINITEM back to the parcel attribute table using RE2 as the unique identifier.

15. Run a frequency on RE2 and area. Add an item, **SQFOOTAGE**, to the frequency table and calculate SQFOOTAGE = AREA. Do a JOINITEM back to the parcel attribute table using RE2 as the unique identifier.

16. Select the vacant residential parcels (PC = 00) and calculate **MAX_ALLOW_DU** = ACRES * DENSITY for each zoning value. See Table 12-3 for zoning allocation.

17. Select the vacant non-residential parcels (PC = 10, 40, 70) and calculate **MAX_FLOORAREA** = SQFOOTAGE *

GFA for each zoning value. See Table 12-3 for zoning allocation.

18. Select the vacant commercial parcels (PC = 10) and calculate **MAX_HOTEL** = ACRES * HOTEL_DENSITY for each zoning value. See Table 12-3 for zoning allocation.

19. For the **DU_AVE** item, do not update unless there are new CENSUS data or the MCPA refines its method of accounting for dwelling units in the tax roll. The steward should maintain close coordination with the MCPA and Monroe County planners. See the dwelling unit guidelines for information regarding this procedure.

20. Divide the DU_AVE by ACRES to obtain **DENSITY**. This should only be performed if there has been a change to the number of dwelling units or the size of the parcels.

21. See the suitability guidelines to calculate **RES_SUIT**.

22. See the suitability guidelines to calculate **NONRES_SUIT**.

23. Add an item, **REDEV_VALUE**, and calculate REDEV_VALUE = PBLDG1 / PLAND1.

24. Add an item, **WATERFRONT**, and visually inspect parcels to find those that are adjacent to the shoreline or are on a canal. Calculate WATERFRONT = 1 for those that meet the criteria.

25. Add an item, **ADJ_US1** and visually inspect parcels to determine which ones are adjacent to US1. Calculate ADJ_US1 = 1 for those parcels that meet the criteria.

26. See the vacant conservation guidelines for the **VACANT_CONS** item.

27. Add an item called **GFA** and calc GFA equal to FLA.

28. Add an item called **FAR** and divide the GFA column by the SQFOOTAGE column to obtain the FAR values.

29. For both the **EDU** and **WWT** items, refer to the Delivery Order 8 report. These items should only be updated if a systematic effort to account for equivalent dwelling units and wastewater treatment methods is undertaken to enhance the CCIAM.

Table 12-3
Zoning Classifications and Land Development Standards

ZONE	MAX_RES_DEN	MAX_HOTEL	MAX_FAR	ZONE_OSR
ACCC	0.00	0.00	0.00	1.00
UC	12.00	10.00	0.45	0.20
BU-2	12.00	10.00	0.45	0.20
BU-2F	12.00	10.00	0.45	0.20
BU-3	12.00	10.00	0.45	0.20
UR	12.00	0.00	0.30	0.20
RU-3	12.00	0.00	0.30	0.20
RU-5	12.00	0.00	0.30	0.20
RU-5P	12.00	0.00	0.30	0.20
URM	7.00	7.00	0.00	0.20
RU-1M	7.00	7.00	0.00	0.20
SC	6.00	10.00	0.40	0.00
sc	6.00	10.00	0.40	0.00
BU-1	6.00	10.00	0.40	0.00
BU1L	6.00	10.00	0.40	0.00
C-1	6.00	10.00	0.40	0.00
SR	10.00	5.00	0.50	0.50
SRL	3.00	0.00	0.00	0.00
SS	6.00	5.00	0.20	0.80
SS(ACCC)	6.00	5.00	0.20	0.80
OS	2.00	2.00	0.00	0.95
NA	-999.00	0.00	0.20	-999.00
IS	1.00	0.00	0.25	0.00
IS-D	1.00	0.00	0.25	0.00
IS-M	1.00	0.00	0.25	0.00
Isve9	1.00	0.00	0.25	0.00
RU	1.00	0.00	0.25	0.00
RU1	1.00	0.00	0.25	0.00
RU-1	1.00	0.00	0.25	0.00
RU-2	1.00	0.00	0.25	0.00
R-1	1.00	0.00	0.25	0.00
R-1A	1.00	0.00	0.25	0.00

Table 12-3
Zoning Classifications and Land Development Standards
(Continued)

ZONE	MAX_RES_DEN	MAX_HOTEL	MAX_FAR	ZONE_OSR
R-2	1.00	0.00	0.25	0.00
IC(ACCC)	1.00	0.00	0.25	0.00
IS(ACCC)	1.00	0.00	0.25	0.00
DR	18.00	10.00	0.30	0.20
RV	0.00	15.00	0.00	0.00
CFA	12.00	0.00	0.40	0.20
CFV	12.00	0.00	0.40	0.20
CFSD	12.00	0.00	0.40	0.20
MU	12.00	10.00	0.40	0.20
I	12.00	0.00	0.40	0.00
MI	12.00	10.00	0.60	0.00
MF	12.00	0.00	0.50	0.20
M	12.00	0.00	0.50	0.20
AD	0.00	0.00	0.10	0.00
PR	5.00	5.00	0.20	0.90
LDR-C	1.00	0.00	0.00	0.50
MDR-C	8.00	0.00	0.00	0.50
SF-1	1.00	0.00	0.00	0.50
SF-2	1.00	0.00	0.00	0.50
SF	1.00	0.00	0.00	0.50
MDR	16.00	0.00	0.00	0.50
HDR	22.00	0.00	0.00	0.60
LC	16.00	0.00	0.80	0.60
GC	16.00	0.00	0.80	0.60
CT	16.00	0.00	0.80	0.60
RO	16.00	0.00	0.80	0.60
PRD	8.00	0.00	0.80	0.60
HMDR	16.00	0.00	1.00	0.60
HHDR	22.00	0.00	1.00	0.60
HRCC-1	22.00	0.00	1.00	0.70
HRCC-2	8.00	0.00	1.00	0.60
HRCC-3	22.00	0.00	1.00	0.60
HNC-1	16.00	0.00	1.00	0.60
HNC-2	16.00	0.00	1.00	0.60
HNC-3	16.00	0.00	1.00	0.60
HCT	22.00	0.00	1.00	0.70
HRO	16.00	0.00	1.00	0.60
HPS	0.00	0.00	1.00	0.50

Table 12-3
Zoning Classifications and Land Development Standards
(Continued)

ZONE	MAX_RES_DEN	MAX_HOTEL	MAX_FAR	ZONE_OSR
HPRD	22.00	0.00	1.00	0.50
PS	0.00	0.00	0.80	0.50
A	0.00	0.00	0.80	0.00
C-OW	0.10	0.00	0.01	0.95
C-TW	0.10	0.00	0.01	0.95
C-UH	0.10	0.00	0.01	0.95
C-FW	0.10	0.00	0.01	0.95
CM	0.10	0.00	0.01	0.95

12.2 Residential Developability & Suitability Guidelines

Each developable vacant residential parcel has been assigned a value of one through four, with one representing parcels that are most suitable for development and four representing parcels least suitable for development. Details regarding the rationale and methods of this developability/suitability analysis can be found in the Delivery Order 11 report. There are four instances where this analysis may have to be performed to update the developability/suitability information:

- The spatial accuracy of the parcels is greatly improved and, therefore, enhances the habitat constraints portion of the analysis. Note that the contractor has already manually moved the parcels GIS data. See Section 10.1 for more information.
- The land cover attribute data (ADID) are updated to include descriptor information regarding the quality of the vegetation. Monroe County includes habitat quality in their assessment of development suitability. This was not performed in the CCIAM due to the lack of available data.
- The land cover data are delineated with an emphasis on determining the true extent of developed areas. Currently areas of vegetation that may lie throughout the "developed" ADID polygons are simply coded as developed in the ADID attribute table. See Delivery Order 10 for more details.

- GIS data regarding potable water and electricity hook ups becomes available and is appropriate to use in that portion of the suitability analysis which determines vacant parcels' access to infrastructure.

The following list itemizes the steps taken to determine the residential suitability rankings for vacant residential parcels:

1. Select vacant parcels from the \data\parcels coverage to create VACPARCELS.

2. Perform an IDENTITY operation on VACPARCELS and ADID to produce VACADID.

3. Join the Z_ZONE_LUT to VACADID using the ZONE item.

4. Join Z_HabitatOSR_LUT to VACADID using the CODE_NS item.

5. Add an item, DEV_RATIO. Compare the open space values from the zoning and the habitat. Calculate DEV_RATIO equal to the most stringent of the two open space ratios.

6. Add an item, POLY_ACRE, and calc POLY_ACRE equal to AREA / 43560.

7. Add an item, DEV_POLY, and calculate DEV_POLY equal to POLY_ACRE * DEV_RATIO.

8. For each RE2, summarize DEV_POLY (in Arc Workstation, this is a FREQUENCY, in ArcMap it is a SUMMARIZE) to produce a new summarized table.

9. In the summarized table, change the DEV_POLY name to PARC_TOTDEV. Do this to avoid confusion when joining these data back to the coverage.

10. Add an item, LESS_01, to the summarized table.

11. Select for PARC_TOTDEV greater than or equal to 0.1. Calculate LESS_01 equal to 'N'.

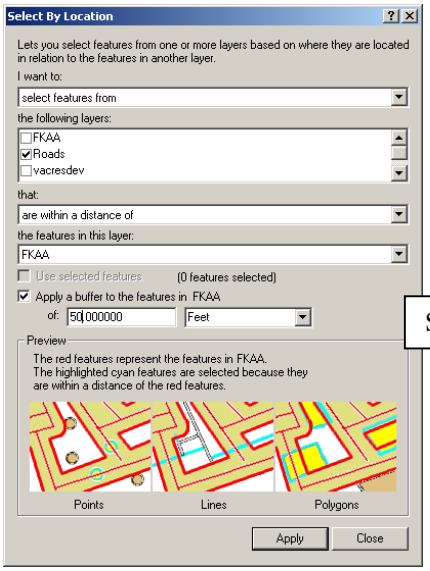
12. Select for PARC_TOTDEV less than 0.1. Calculate LESS_01 equal to 'Y'.

13. Join the summarized table to VACPARCELS using RE2 as the join item.

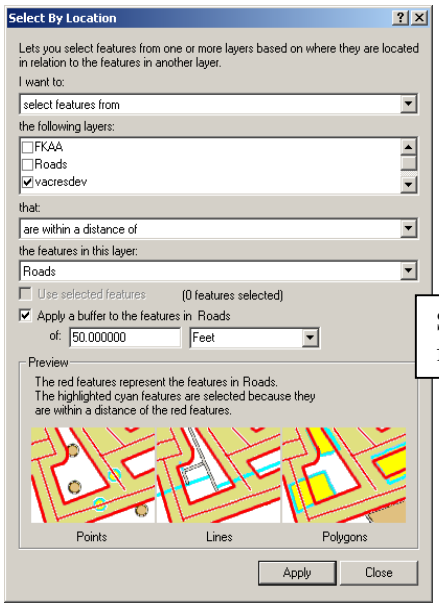
14. Select from VACPARCELS all polygons that have a LESS_01 value of 'N' to create VACRESDEV. These are the developable vacant residential parcels. The remaining tasks calculate the suitability ranking of these developable parcels.

15. Add four items to the VACRESDEV attribute table: POT_H2O, HABITAT, FEMA, SUBDIV.

16. Select for parcels that have access to potable water. Do this by finding all roads that have an FKAA customer location within 100 feet of the road. Then select all parcels that are within 50 feet of the selected roads. The assumption being that if a road has a FKAA customer on it, then the vacant parcels would be able to get a potable water hook-up. The 50 foot buffer is used try to minimize the effect of the spatial error in both the FKAA point data and the parcel data. After both selections have been made calculate POT_H2O equal to '1'.

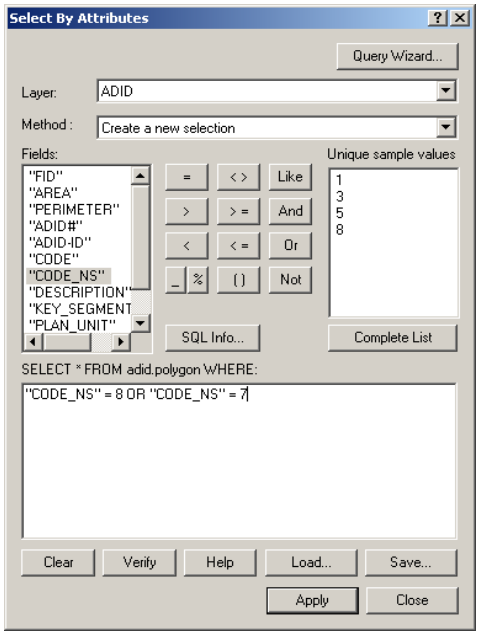


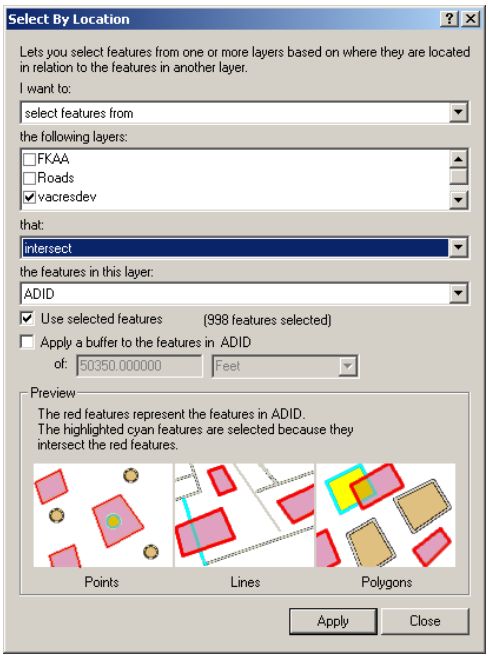
Select roads first



Select parcels within 50 feet of the selected roads.

17. Select for parcels with no habitat constraints by selecting for parcels that intersect the ADID description of developed' or description of 'exotics'. Calculate HABITAT = '1'.





18. Visually inspect the VACRESDEV with the FEMA coverage. Very few intersect the 'X' zone. Most intersect the 'AE' zone. Manually calculate the FEMA item according to the flood zone for the parcel.

19. Select for parcels in VACRESDEV that have a SUB_ID2 value greater than zero. Calc SUBDIV equal to '1'.

20. Add an item called RES_SUIT. Calculate RES_SUIT with a '1', '2', '3', or '4' based on Table 12-4.

Table 12-4

	SUBDIV		POT_H2O		HABITAT		FEMA		
Ranking	**1**	**0**	**1**	**0**	**1**	**0**	**X**	**AE**	**V**
1	x		x		x		x		
1	x		x		x			x	
2	x		x		x				x
2	x			x	x		x		
2	x			x	x			x	
2		x	x		x		x		
2		x	x		x			x	
3	x		x			x	x		

12.3 Non-Residential Suitability Guidelines

Each developable vacant non-residential parcel has been assigned a value of one though four, with one representing parcels that are most suitable for development and four representing parcels least suitable for development. Details regarding the rationale and methods of this developability/suitability analysis can be found in the Delivery Order 11 report. The steps to calculate the non-residential suitability for vacant non-residential parcels is identical to the residential suitability methods with the exception of three items:

1. Location within a subdivision is not a criterion for non-residential development. Do not make these selections and calculations.

2. Access to potable water and electrical infrastructure is not a criterion for non-residential development. Do not make these selections and calculations.

3. Adjacency to US 1 is a criterion for non-residential development. Add an item, US1, and visually inspect the data to calculate US1 equal to '1' for those parcels adjacent to US1.

Once the HABITAT, US1, and FEMA items have been calculated, add an item, NONRES_SUIT and calculate it with a '1', '2', '3', or '4' based on Table 12-5.

Table 12-5

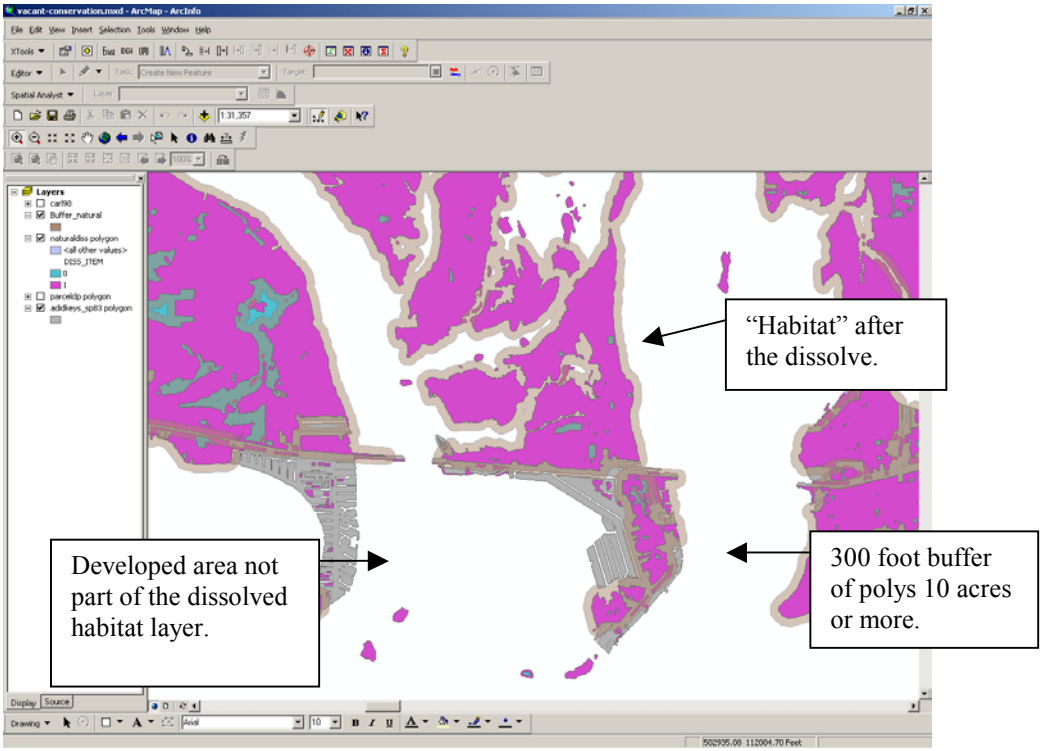
Ranking	US1		HABITAT		FEMA		
	1	0	1	0	X	AE	V
1	x		x		x		
2	x		x			x	x
2		x	x		x	x	
2		x	x			x	x
3	x			x	x	x	
3		x		x	x		
4	x			x		x	x
4		x		x		x	x

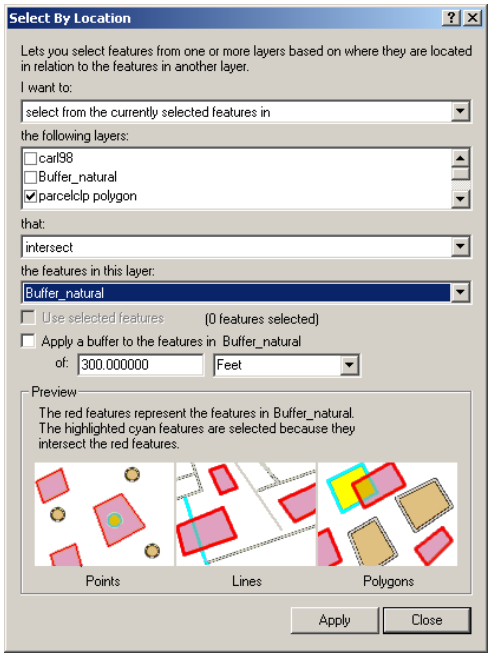
12.4 Vacant-Conservation Land Guidelines

The GUI has an option in the 'Change From "Vacant" ' form for a user to select vacant parcels that are within 300 feet of 10 acres of contiguous habitat or CARL lands. The steps to identify these parcels are noted below.

1. Select all ADID vegetation types except for developed and exotic.
2. Dissolve the selected polygons.
3. Select for polys greater than or equal to 10 acres from the resulting dissolved layer.
4. Buffer the selected polys in the dissolved layer by 300 feet (Figure 12-2)
5. Select for all PC = 00, 10, 40, and 70 from the PARCELS coverage.
6. Select by location, in ArcMap, to get vacant parcels within the 300 foot buffer layer (Figure 12-3).

Figure 12-2

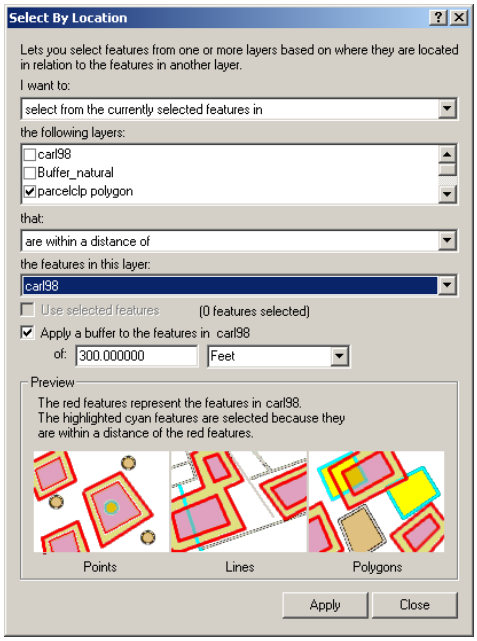




7. Add an item, VACANT_CONS, and calculate VACANT_CONS = 1 for those records.

8. Do another select by location in ArcMap with the CARL coverage layer and use the buffer on the fly option (Figure 12-4).

Figure 12-4



9. Calculate VACANT_CONS = 1 for those records.

12.5 Dwelling Unit Calibration Guidelines

The CENSUS 2000 provided additional information regarding the number of dwelling units in the Florida Keys. The contractor used this opportunity to calibrate the dwelling units in the parcel GIS layer with the dwelling units being reported in the CENSUS. See the Delivery Order 11 report for a discussion on the methods and rationale that guided this effort. The DU_AVE attribute should not be updated unless the Monroe County Property Appraiser's office provides a more accurate, or reliable, count of dwelling units from their CAMA tax roll database.

12.6 Input Layer Updates

There are sixteen ArcInfo coverages and 22 grids required by the CCIAM. Table 12-6 itemizes each coverage and describes the required pre-processing activity for the layer.

Table 12-6
Input Layers and Required Pre-Processing

Layer Name	Description of Layer	Required Pre-Processing
ADID	land cover	Add an item for planning units
ADID_BASINS	overlay of land cover and basins	IDENTITY operation with ADID and BASINS
ADIDFIN_DO7	historic vegetation	No Action
BASINS	wastesheds/watersheds	No Action
BASINS_UNITS	overlay of basins and planning units	IDENTITY operation with BASINS and PLANUNITS
FEMA	FEMA flood zones	No Action
KEYDEER	key deer habitat	Add an item, HABITAT, and calculate all habitat polys to 1
MRABBIT	lower keys marsh rabbit habitat	Add an item, HABITAT, and calculate all habitat polys to 1. Add item, RISK, and calculate to 0.
PARCELS	land use	See section 6.1.
PLANUNITS	27 areas throughout the Florida Keys used to summarize results	Add an item, KEY_SEGMENT, and calculate each planning unit poly based on upper, middle, lower keys.
RICERAT	silver rice rat habitat	Add an item, HABITAT, and calculate all habitat polys to 1. Add item, RISK, and calculate to 0.
ROADS	road line work	No Action
SHORELINE	official shoreline of the FKCCS	No Action
US1	U.S. 1 line work	No Action
WCP	white crowned pigeon habitat	Add an item, HABITAT, and calculate all habitat polys to 1
PLANUNITLAND	grid of the land within the planning units	Convert planning units to grid. Convert shoreline to grid where the shoreline polys have a value of 0 and all other values are nodata. Add the planning unit grid to the shoreline grid to produce a new grid with the planning unit numbers only on land.
RICH	species richness grid	See section 6.3.
ROADDIST	euclidean distance grid from roads	Perform a Euclidean distance to 500 feet using the ROADGRID as the source.
ROADGRID	roads as a grid	Convert the roads to a grid.

12.7 Potential habitat/richness models

Potential habitat for seventeen terrestrial species were modeled and then aggregated into a species richness grid. All seventeen models, as ArcInfo grids, and the resulting species richness grid were created based on the Florida Fish and Wildlife Conservation Commission's Habitat Needs of Rare and Imperiled Species study. The steward should read the metadata associated with each model, the Florida Keys Carrying Capacity Final Report, and the Habitat Needs of Rare and Imperiled Species documentation prior to updating these models. If the potential habitat models are updated, then they are simply summed to produce the overall species richness grid.

Section 13

Routine Planning Tool (RPT)

13.1 RPT Architecture

The steward should be familiar with the installation and operation of ArcIMS 3.1. The RPT was designed using ArcIMS manager and all of the subdirectories for this application were created in accordance with the standards outlined in the ArcIMS 3.1 documentation. The RPT is a light-weight application that serves shapefiles using an image map service through a HTML viewer. Specific configuration parameters for the RPT are itemized in Table 13-1.

Table 13-1

Map Configuration File	C:\ArcIMS\AXL\rpt.axl
	C:\ArcIMS\AXL\currentconditions.axl
	C:\ArcIMS\AXL\smartgrowth.axl
	C:\ArcIMS\AXL\scenario5.axl
Map Services (Note: Image map services only)	basemap (uses rpt.axl)
	Current conditions (uses current conditions.axl)
	smartgrowth (uses smart growth.axl)
	scenario5 (uses scenario5.axl)
ArcIMS website	C:\ArcIMS\website\rpt
Shapefiles	E:\rpt\basedata
	E:\rpt\currcondition
	E:\rpt\smartgrowth
	E:\rpt\scenario5
Homepage and associated HTML files	C:\Inetpub\wwwroot\fkccs

13.2 Installation Procedures

1. Install ArcIMS 3.1 according to the software documentation. This installation assumes that the steward is using a Java Servlet connector and Microsoft IIS webserver.

2. Copy the contents of the RPT DVD to the appropriate locations on the server:

   a. Copy the AXL files to C:\ArcIMS\AXL

   b. Copy the rpt directory to C:\ArcIMS\website

c. Copy the shapefile directories (rpt\basedata, rpt\currcondition, rpt\smartgrowth, rpt\scenario5) to a local drive on the server. Note that you will have to re-path the AXL files if the data are not placed on the E:\ drive.

3. Copy the contents of the fkccs directory to C:\Inetpub\wwwroot.

4. Re-path the AXL files within the <WORKSPACE> tags (Figure 13-1).

Figure 13-1

```
<WORKSPACES>
<SHAPEWORKSPACE name="shp_ws-6" directory="E:\rpt\basedata" />
<SHAPEWORKSPACE name="shp_ws-8" directory="E:\rpt\currcondition" />
</WORKSPACES>
```

5. Edit the C:\ArcIMS\website\rpt\ARCIMSparams.js file to change the name and IP address of the server (Figure 13-2)

Figure 13-2

```
//**************************************************************************
//*               parameters File for HTML Template             *
//**************************************************************************
// get machine name
var hostName = document.location.host;

// make URL for getting mapservice catalog

var catURL=
"http://10.101.4.12/servlet/com.esri.esrimap.Esrimap?ServiceName=catalog";
var serverURL=
"http://10.101.4.12/servlet/com.esri.esrimap.Esrimap?ServiceName=";


//var catURL = "http://" + hostName +
"/servlet/com.esri.esrimap.Esrimap?ServiceName=catalog";
//"http://10.101.4.12/servlet/com.esri.esrimap.Esrimap?ServiceName=catalog";

// make prefix for URL
//var serverURL  = "http://" + hostName +
"/servlet/com.esri.esrimap.Esrimap?ServiceName=";
//"http://10.101.4.12/servlet/com.esri.esrimap.Esrimap?ServiceName=";

//*****************************************************************
//*               parameters set by Designer
*
//*****************************************************************
var imsURL =
'http://10.101.4.12/servlet/com.esri.esrimap.Esrimap?ServiceName=BaseMap';

//var imsURL = "";

//'http://10.101.4.12/servlet/com.esri.esrimap.Esrimap?ServiceName=BaseMap';

//var imsOVURL =  "";

var imsOVURL=
'http://10.101.4.12/servlet/com.esri.esrimap.Esrimap?ServiceName=BaseMap';
```

6. Edit the aimsPrint.js file to change the name of the server (Figure 13-3)

Figure 13-3

```
Win1.document.writeln('       <IMG
SRC="http:\/\/ursims\/Website\/rpt\/images\/FKCCSsmall.gif" width = "75"
HSPACE="10" VSPACE=0 BORDER=0 BORDERCOLOR = "white" ALT="" ALIGN =
"middle" ></TD>');
```

Table 13-2

Map Service Name	AXL File	Service Type
Basemap	C:\ArcIMS\AXL\rpt.axl	Image
currentconditions	C:\ArcIMS\AXL\currentconditions.axl	Image
smartgrowth	C:\ArcIME\AXL\smartgrowth.axl	Image
scenario5	C:\ArcIMS\AXL\scenario5.axl	Image

7. Start ArcIMS Administrator.

8. Add four new map services

9. Save the website configuration and close ArcIMS Administrator.

10. Type the URL of the server into the address line of a web browser to view the application.

13.3 RPT Updates

The RPT can be updated with new data or functionality. It can also be updated with the latest version of ArcIMS. If new data become available, the steward can either edit the map configuration files with ArcIMS Author or build entirely new map configuration files and associated map services. If new data from the CCIAM are to be added to the RPT, these data will have to be converted to shapefiles prior to being added to the RPT.

The steward can add to the functionality of the RPT by either modifying the JavaScript in the HTML viewer or by creating a new website using the ArcIMS Java viewer. If the steward chooses to upgrade the RPT to a new version of ArcIMS, then it is highly recommended that the steward research all of the implications of a version change to an application built in ArcIMS 3.1.

List of Supporting Documentation (Refer to USACE FKCCS Website)

- FKCCS Final Report
- CCIAM Users Guide
- Delivery Order 10 Report
- Florida Keys Hurricane Evacuation Study, Miller Consulting
- ArcGIS Users Guides (including Spatial Analyst)
- Exploring ArcObjects Volumes I & II
- ArcObjects Object Model Diagrams
- Microsoft Access 2000 Developers Guide
- HTML and Java Script Reference Guides