

A Commercial and Industrial Land Inventory Analysis Using GIS

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ABSTRACT

Due to current and anticipated growth, Martin County, FL realized the need for an updated commercial and industrial land inventory and analysis. The spatial nature of the project and the massive databases involved made ArcGIS a prime candidate for use in the project. Indeed, GIS was used in all facets of the project from data compilation to analysis.

The County's goals were to identify and analyze lands that may be unsuitable for targeted industrial development and to determine the true supply of available land for targeted industries such as information technology and biotechnology. In addition the County hoped to better determine if the current inventory of industrial land was appropriately located. This paper will include a summary of the project methodology and results.

INTRODUCTION

In the fall of 2004 LBFH Inc. was selected by Martin County to update the County's Commercial and Industrial Land inventory. The original mapping project was completed in 2000. The scope of the project included converting the 2000 data into the County's current GIS database, and identifying parcels that have experienced some form of development since the original inventory. The inventory looked at all land in unincorporated Martin County with a Commercial or Industrial Future Land Use designation. Please note that this does not include any commercial or industrial areas within the City of Stuart's municipal boundaries. The inventory includes only those parcels in unincorporated Martin County that have an Industrial or Commercial Land Use designation.

In addition the approximate locations of any wetlands in each of the undeveloped parcels were identified. The wetland areas, with their appropriate buffers, were then overlaid over the existing parcel boundaries to show the impacts upon each parcel. In addition a calculation was performed to determine the net undeveloped area remaining after accounting for the wetland and open space requirements set forth by the County. These calculations are estimates based upon the best current available data and are meant for planning purposes only in determining the availability of land for development.

METHODOLOGY

The purpose of this project was to update the fiscal Year 2000 Commercial and Industrial Lands study that was completed by the Martin County Growth Management Department. Phase two of the project was to perform an analysis of and identification of lands designated for industrial uses that may be unsuitable for industrial development and to make recommendations regarding land that should be considered for deletion from the inventory. Due to budgetary constraints, the full analysis report was deferred to a later date.

The objective was to map existing uses on parcels with future land uses of commercial and industrial. To achieve this goal, it was necessary to acquire data from multiple sources to produce a map set and report. Martin County Growth Management, GIS Mapping Department, and the Property Appraiser's Office provided data layers. Other information was gathered during interviews with County staff and field visits. Due to the timing of the project, updated parcel information was not available for the entire study area. Therefore analysis was conducted using non-updated parcels (circa 1995) for the areas in which updated parcel mapping was not available.

The use of ESRI ArcGIS was very suitable for this project. ArcGIS can accommodate data from a variety of sources and integrates them into one database. Data from ESRI coverage, shapefile, and geodatabase formats, as well as, other tabular information was compiled. Much of the data used, such as aerial photography and parcel basemap for large portions of the county was very sizable, but ArcGIS handled the data efficiently. Finally, ArcGIS ArcInfo was able to conduct the queries and analysis, as well as the map and table production that was required for this project.

The primary data layers used included parcels, future land use, zoning, 2004 aerial photography and composite wetlands. Additional GIS data was needed for analysis operations to produce a report and files representing the best suitable parcels for future development. These layers included water and wastewater utilities, well field protection zones, and a proposed development layer that aided in identifying undeveloped commercial and industrial parcels that were already approved for development.

Also, the Property Appraiser's Office provided a Microsoft Excel file of all non-residential parcels. This file included the following fields used for the project: PCN, SRC/DOR codes (existing use as defined by The Florida Department of Revenue and the Martin County Property Appraiser), and gross floor square footage of any structures on those parcels. This Excel file was linked with the current GIS parcels by PCN, and the additional fields were added to the GIS parcel database.

Next, the future land use file was used to select only those categories of industrial and commercial. The commercial designations included COMM/OFF/RES, COMM. GENERAL, COMM. LIMITED, and COMM. WATERFRONT. The industrial designation only included INDUSTRIAL. Then, the parcels were spatially superimposed against the future land use file, and only those parcels matching the commercial/industrial areas were retained. Right of ways, easements, and retention ponds were excluded from this inventory and deleted from the parcel layer.

Once the main parcel file was developed from those parcels matching the industrial/commercial future land use, a field called "USE" was created to simplify the SRC/DOR codes and to aid in mapping the current use of each parcel. The designations for this field are shown below.

| USE | DESIGNATION |
|------|-------------------------------------|
| I | Developed Industrial |
| C | Developed Commercial |
| O | Developed Office |
| R | Residential |
| V | Undeveloped (VC & VI) |
| PD | Partially Developed Industrial (PI) |
| IH | Hazardous Waste Site |
| INST | Institutional |

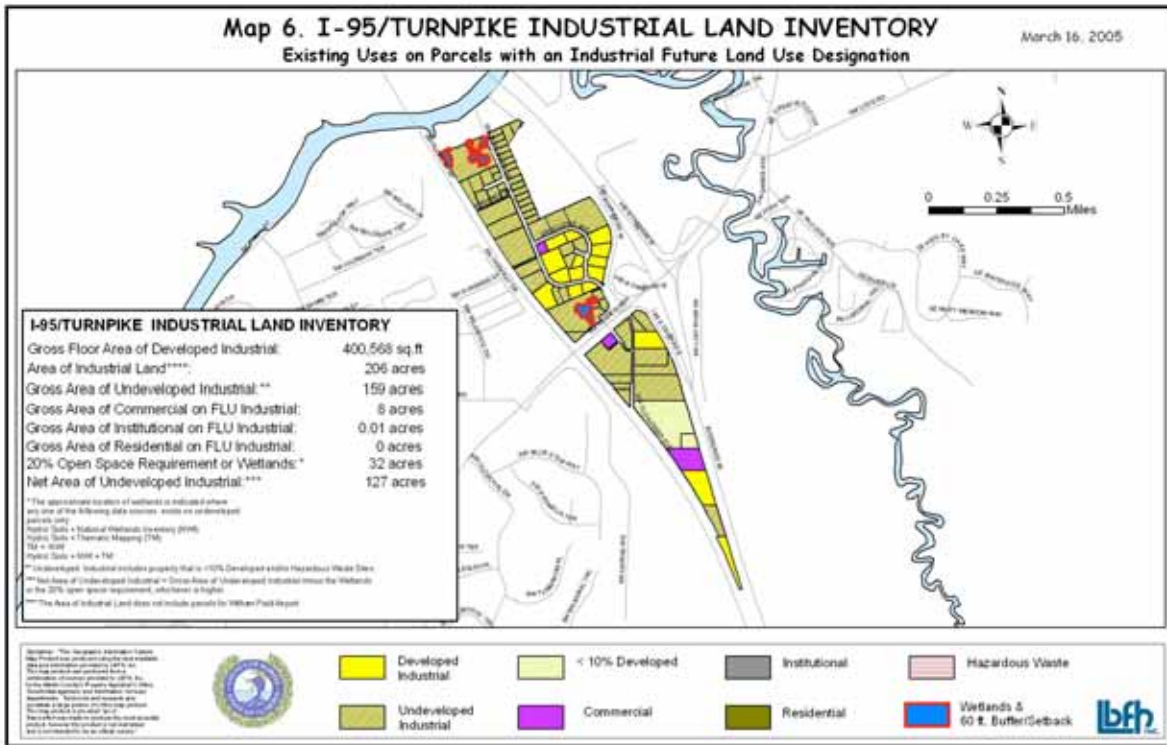
Partially developed parcels are those with less than 10% building coverage and offer potential for further development. Excluded from the partially developed category are parcels that use a large portion of their land for parking or storage. The partially developed category only pertains to the industrial parcels, for much of the open land available for commercial properties is used for parking and no additional development can occur.

Field work and 2004 aerial photography was used to perform QA/QC on the parcels to confirm current use. A high degree of match was found. However, some parcel designations were changed based on field visits to sites or at the request of the County. A listing of the parcels that were reviewed individually were included in the report. Some parcels flagged as vacant by SRC/DOR codes upon field visits were found to be in development, and some marked as commercial were found to be residential, etc.

The wetlands composite file provided by Martin County was used to overlay against undeveloped and partially developed parcels, and a 60 ft. buffer/setback, as instructed by Martin County Growth Management Department, was created for mapping and analysis. The following classifications from the wetlands composite were used in the overlay:

- a. Hydric soils & Thematic Mapping
- b. Hydric soils & National Wetlands Inventory
- c. Thematic Mapping & National Wetlands Inventory
- d. Hydric soils, Thematic Mapping, & National Wetlands Inventory

MAP 1: EXAMPLE DETAIL AREA ANALYSIS RESULTS



THE INDUSTRIAL LAND INVENTORY

Based upon the current analysis there are 3,647 acres of undeveloped land in unincorporated Martin County with an Industrial Future Land Use designation. Industrial development requires 20 % open space. Wetlands, along with their required buffers, cannot be developed. The net area of undeveloped Industrial land in unincorporated Martin County is 2,457 acres. This net area takes into account wetlands and their buffers or the 20% open space requirement whichever is greater. The following tables show these calculations based upon different areas within the county.

TABLE 1: UNDEVELOPED AND PARTIALLY DEVELOPED INDUSTRIAL LAND

| Location | Gross Area of Undeveloped Industrial (Acres) | Wetlands & 60' Buffer/Setback (Acres) | 20% Open Space Requirement (Acres) | Net Area* Undeveloped Industrial | % of Total Net Undeveloped Industrial |
|----------------------------|---|--|---|---|--|
| Indiantown | 2,166 | 812 | 433 | 1,353 | 55% |
| North County | 93 | 5 | 19 | 74 | 3% |
| Palm City | 853 | 184 | 171 | 669 | 27% |
| Golden Gate/Salerno | 98 | 4 | 20 | 78 | 3% |
| I-95 Turnpike | 159 | 10 | 32 | 127 | 5% |
| South County | 278 | 122 | 56 | 156 | 6% |
| Total | 3,647 | 1,137 | 731 | 2,457 | 100% |

* Includes undeveloped and partially developed parcels

TABLE 2: EXISTING DEVELOPED INDUSTRIAL LAND

| Location | Area of Developed Industrial (Acres) | Gross Developed Floor Area (Sq.Feet) |
|----------------------------|---|---|
| Indiantown | 388 | 845,207 |
| North County | 59 | 632,392 |
| Palm City | 192 | 1,609,967 |
| Golden Gate Salerno | 231 | 2,425,803 |
| I-95\Turnpike | 47 | 400,568 |
| South County | 31 | 172,362 |
| Total | 948 | 6,086,299 |

TABLE 3: SUMMARY OF DEVELOPED AND NET UNDEVELOPED INDUSTRIAL LAND

| Location | Total Area of Industrial (Acres) | Area of Developed Industrial (Acres) | Net Area* Undeveloped Industrial (Acres) |
|----------------------------|---|---|---|
| Indiantown | 2,554 | 388 | 1,353 |
| North County | 152 | 59 | 74 |
| Palm City | 1,045 | 192 | 669 |
| Golden Gate Salerno | 329 | 231 | 78 |
| I-95 Turnpike | 206 | 47 | 127 |
| South County | 309 | 31 | 156 |
| Total | 4,595 | 948 | 2,457 |

* Includes undeveloped and partially developed parcels

THE COMMERCIAL LAND INVENTORY

Based upon the current analysis there are 1,208 acres of undeveloped land in unincorporated Martin County with a Commercial Future Land Use designation. Wetlands, along with their required buffers, cannot be developed. The open space requirement for commercial development varies from 20% for General Commercial to 30% for Limited and Waterfront Commercial to 40% for COR. For analytical purposes we used an average of 30% open space for our calculations. The net area of undeveloped Commercial land in unincorporated Martin County is 839 acres. This net area takes into account wetlands and their buffers or the 30% open space requirement whichever is greater. The following tables show these calculations based upon different areas within the county.

TABLE 4: UNDEVELOPED COMMERCIAL LAND

| Location | Gross Area Undeveloped Commercial (Acres) | Wetland on Undeveloped Commercial (Acres) | 30 % Open Space Requirement (Acres) | Net Area* Undeveloped Commercial (Acres) | % of Total Net Undeveloped Commercial |
|----------------------------|--|--|--|---|--|
| Indiantown | 232 | 45 | 70 | 162 | 19% |
| North County | 244 | 60 | 73 | 171 | 20% |
| Palm City | 79 | 13 | 24 | 55 | 7% |
| West Stuart | 67 | 25 | 20 | 42 | 5% |
| Golden Gate Salerno | 206 | 38 | 62 | 144 | 17% |
| I-95 Turnpike | 249 | 68 | 75 | 174 | 21% |
| Hobe Sound | 122 | 3 | 37 | 85 | 10% |
| South County | 9 | 0 | 3 | 6 | 1% |
| Total | 1,208 | 252 | 364 | 839 | 100% |

*Includes undeveloped and partially developed parcels

TABLE 5: EXISTING DEVELOPED COMMERCIAL LAND

| Location | Area of Developed Commercial (Acres) | Gross Developed Floor Area (Sq.Feet) |
|----------------------------|---|---|
| Indiantown | 94 | 348,080 |
| North County | 588 | 4,717,909 |
| Palm City | 149 | 719,008 |
| West Stuart | 58 | 464,971 |
| Golden Gate Salerno | 330 | 2,052,116 |
| I-95 Turnpike | 133 | 172,208 |
| Hobe Sound | 183 | 941,780 |
| South County | 30 | 178,884 |
| Total | 1,565 | 9,594,956 |

TABLE 6: SUMMARY OF DEVELOPED AND NET UNDEVELOPED COMMERCIAL LAND

| Location | Total Area of Commercial (Acres) | Area of Developed Commercial (Acres) | Net Area* Undeveloped Commercial (Acres) |
|----------------------------|---|---|---|
| Indiantown | 326 | 94 | 162 |
| North County | 832 | 588 | 171 |
| Palm City | 228 | 149 | 55 |
| West Stuart | 125 | 58 | 42 |
| Golden Gate Salerno | 536 | 330 | 144 |
| I-95 Turnpike | 382 | 133 | 174 |
| Hobe Sound | 305 | 183 | 85 |
| South County | 39 | 30 | 6 |
| Total | 2,773 | 1,565 | 839 |

*Includes undeveloped and partially developed parcels

TABLE 7: SUMMARY OF DEVELOPED AND UNDEVELOPED INDUSTRIAL AND COMMERCIAL LAND

| Future Land Use Designation (FLU) | Developed | | Net Undeveloped | | Total Area per Future Land Use Designation (Acres) |
|-----------------------------------|-----------|----------|-----------------|----------|--|
| | Acreage | % of FLU | Acreage | % of FLU | |
| Industrial | 948 | 20% | 2,457 | 51%* | 4,836 |
| Commercial | 1,565 | 53% | 839 | 28%* | 2,954 |

*The remaining percentages are wetlands, buffers and open space, or developed as other uses.

CONCLUSION

One of the primary reasons for the analysis was to determine which parcels were most suitable and unsuitable for development. A series of criteria was developed. Through automated GIS functions parcels were selected and assigned to categories. Our search criteria was as follows:

1. Parcel was vacant
2. Parcel had utilities available nearby
3. Parcel had "access"
4. Parcel was larger than 3 acres
5. Parcel was smaller than 10 acres.

Queries performed on the dataset resulted in the identification of 18 parcels of which 2 were already in the Development Review process. The location of these parcels is identified on the map below. The parcel details are shown on Table 8. No parcels meeting the search criteria exist in the Indiantown area, for the parcels are either too large or too small.

One might expect that Martin County would see a reduction in both available Commercial and Industrial lands since the 2000 Study. In fact the 2004 Study shows an increase of both the Total Available Commercial and Industrial land and a decrease of developed Industrial. These changes can be attributed to an enhanced methodology used in this study relative to the 2000 study that included retention ponds, right of ways, and other parcels that were counted as developed, and changes in Future Land Use as approved by the Board of County Commissioners.

MAP 2: MAP OF BEST SUITABLE PARCELS BASED ON SELECTED CRITERIA

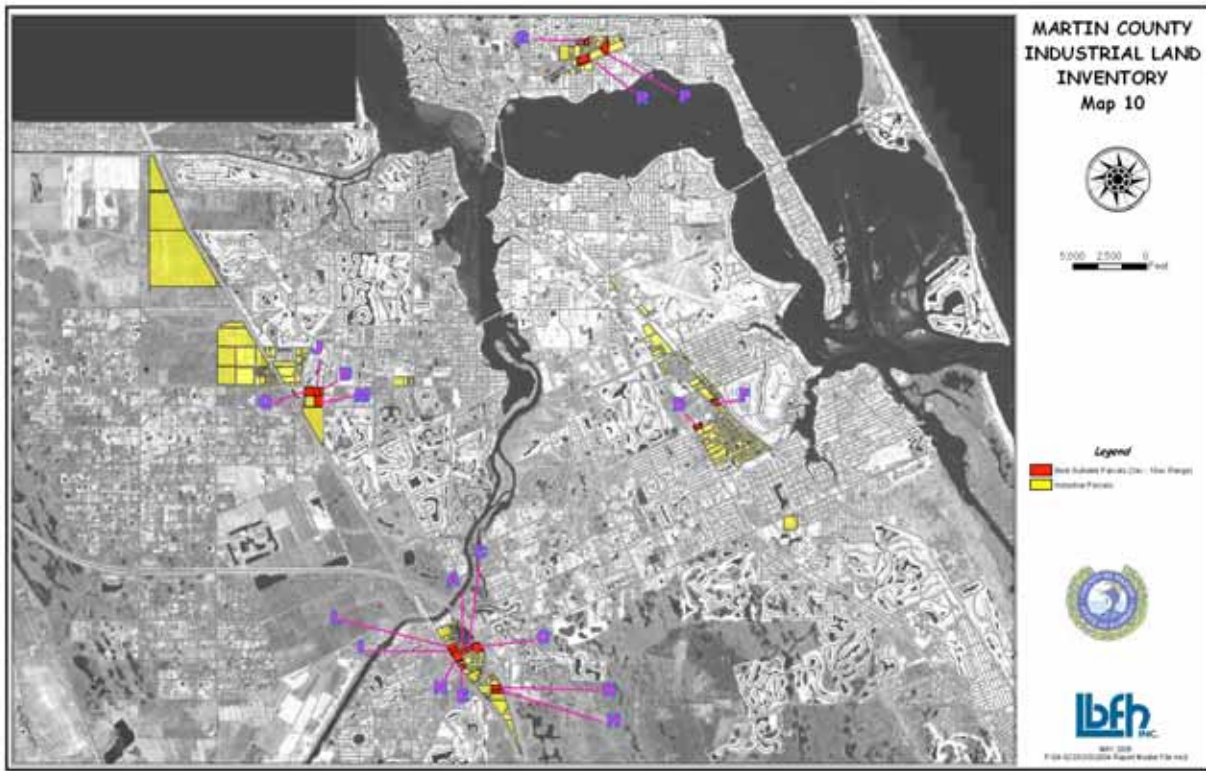
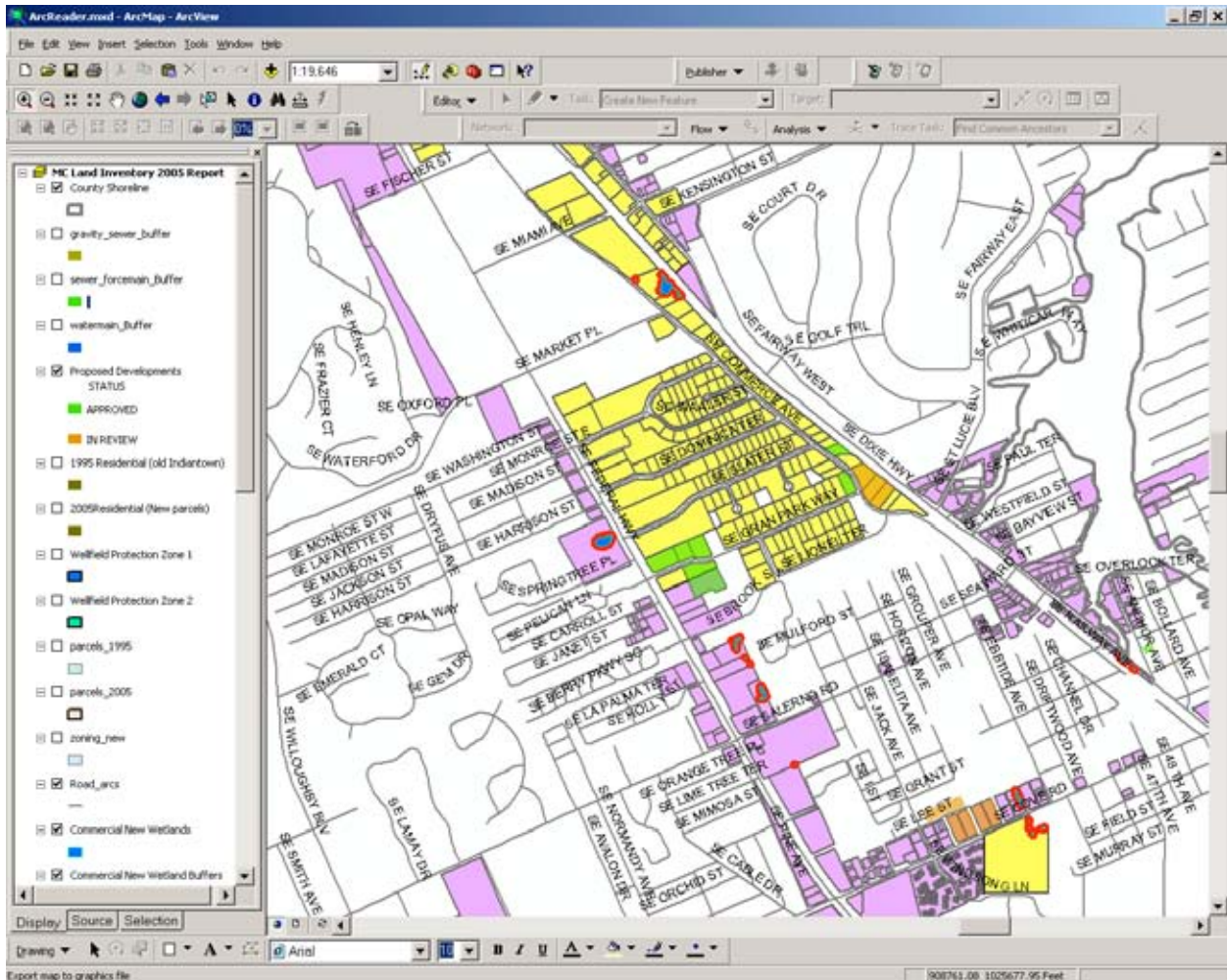


TABLE 8: COMPARISON OF 2000 AND 2004 INVENTORIES

| | Developed 2000 | Developed 2004 | Total + / - | Total Area Available 2000 | Total Area Available 2004 | Total + / - |
|-------------------|-------------------|-------------------|----------------|------------------------------------|------------------------------------|----------------|
| Industrial | 1,070 | 948 | -122 | 4,786 | 4,836 | +50 |
| Commercial | 1,423 | 1,565 | +142 | 2,487 | 2,954 | +467 |

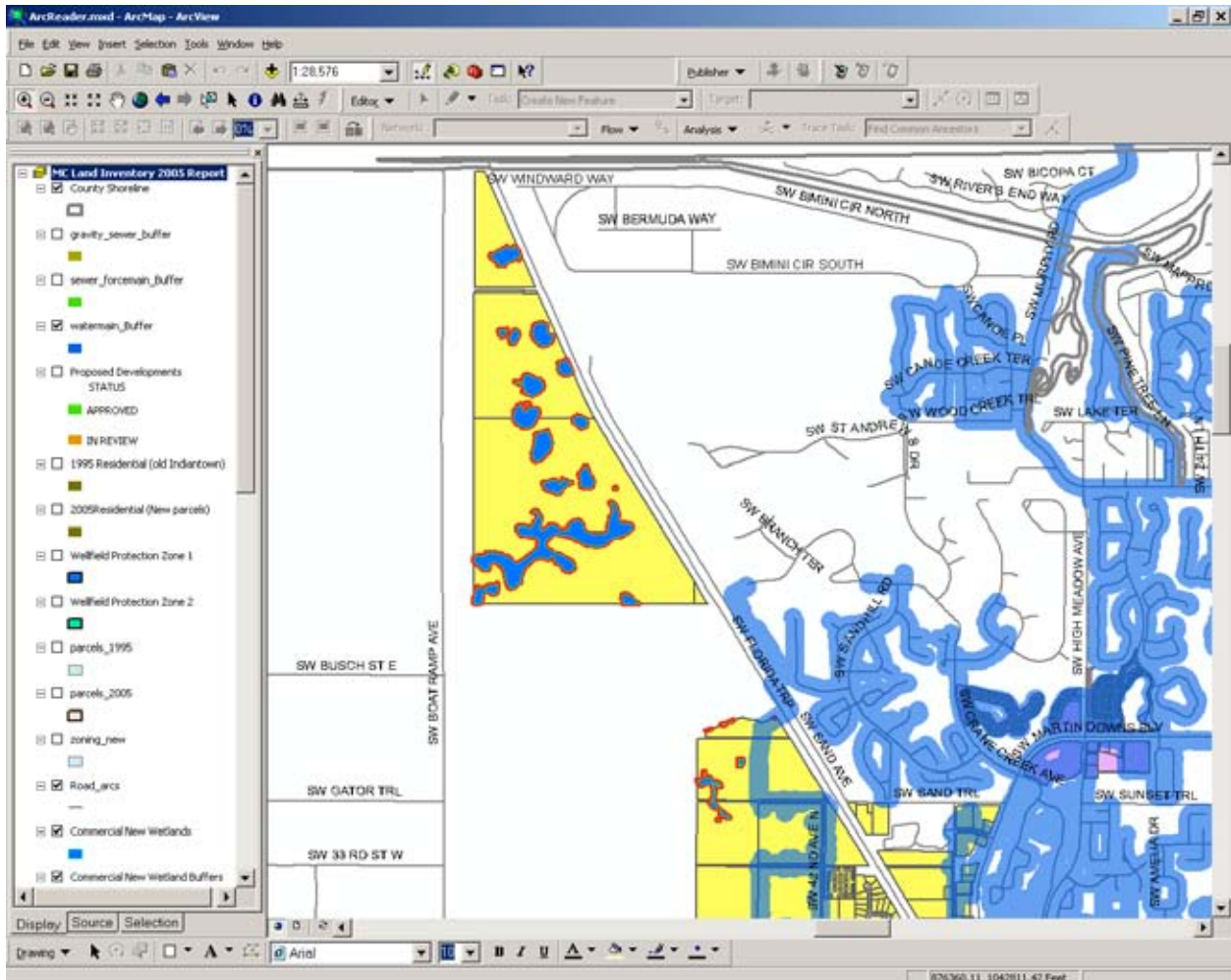
The maps and tables produced as a result of this project were very informative and will be used in the decision making process and planning for future uses of the land. While ArcGIS will be used by analysts to view the results, for others, an ArcReader pmf file (below) was created with ArcPublisher to access the GIS data. This simple solution allowed for the GIS to be in the hands of the decision makers who are not strong GIS users and/or do not have a copy of ArcGIS software.

MAP 3: SCREENSHOT OF ARCREADER PMF FILE USED FOR BROWSING STUDY RESULTS



Users of the ArcReader file have the ability to look at all the criteria separately by turning layers on and off. For example, the map below shows a utility buffer (200 feet), which was used to determine if parcels were close to existing water utilities.

MAP 4: ARCREADER WITH SELECTABLE CRITERIA



The project was successful, and ArcGIS software played a key role. The results are a good tool for future planning efforts. Due to the inevitable changes and growth that will occur over time, this methodology will be saved for future use. A periodic update of the inventory may be conducted in the future to develop a new inventory as well as spot trends in the land use and available land.

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REFERENCES

2000 Industrial and Commercial Land Inventory, Martin County, FL.

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