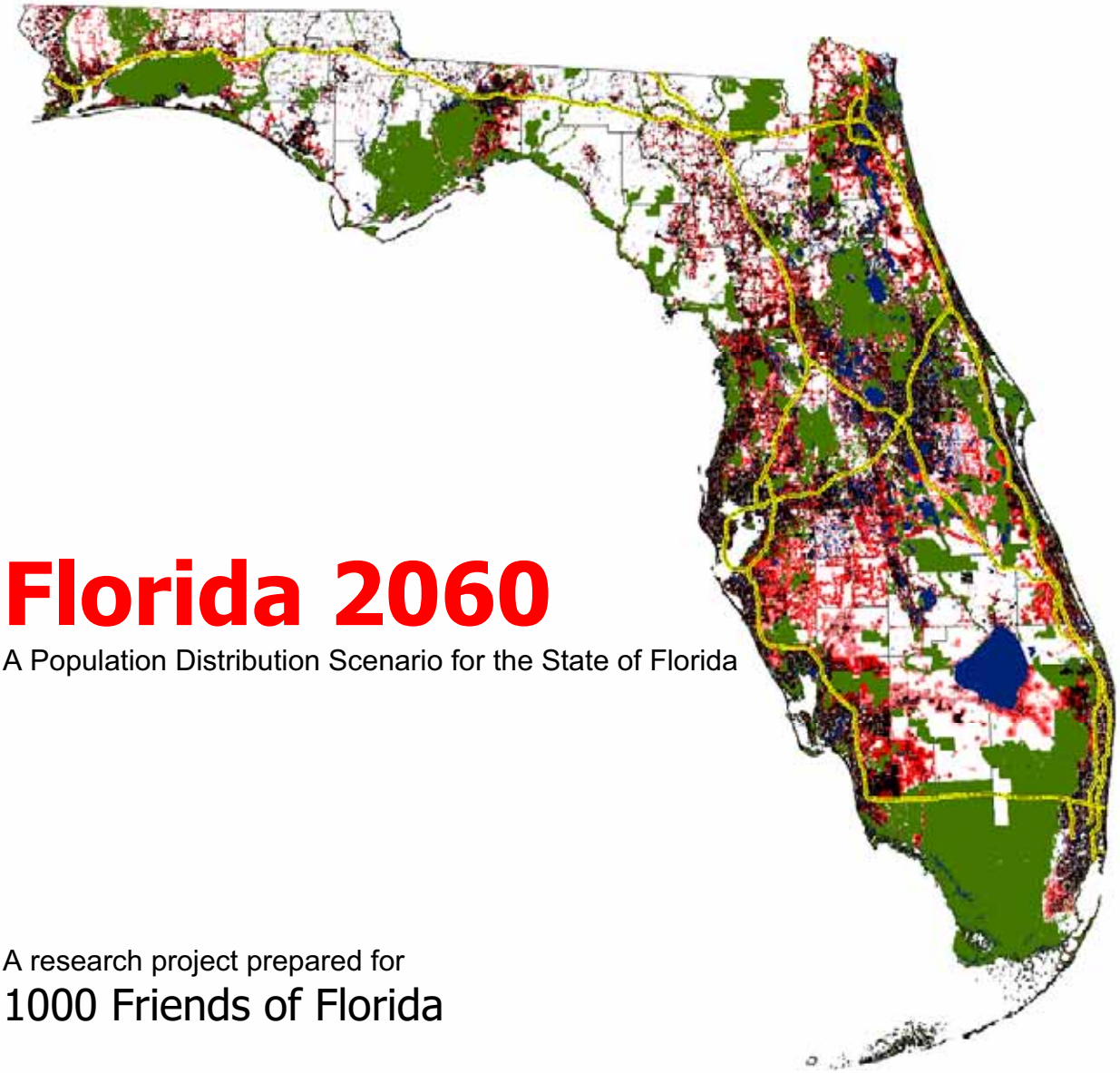

Florida 2060

A Population Distribution Scenario for the State of Florida

A research project prepared for

1000 Friends of Florida

By the

GeoPlan Center

At the University of Florida

Paul D. Zwick

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August 15, 2006

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About 1000 Friends of Florida

Employing planners, attorneys and community activists since 1986, 1000 Friends of Florida works to protect natural areas, fight urban sprawl, promote sensible development patterns, and provide affordable housing. Above all they strive to give citizens the tools to keep Florida's communities livable

www.1000friendsofflorida.org

About the GeoPlan Center

Established in 1984, Geoplan is a multidisciplinary GIS laboratory located in the College of Design, Construction and Planning. It was developed in response to the need for a teaching and research environment in Geographic Information Systems, or GIS. Under its auspices spatial analysis is conducted in support of a broad range of academic disciplines.

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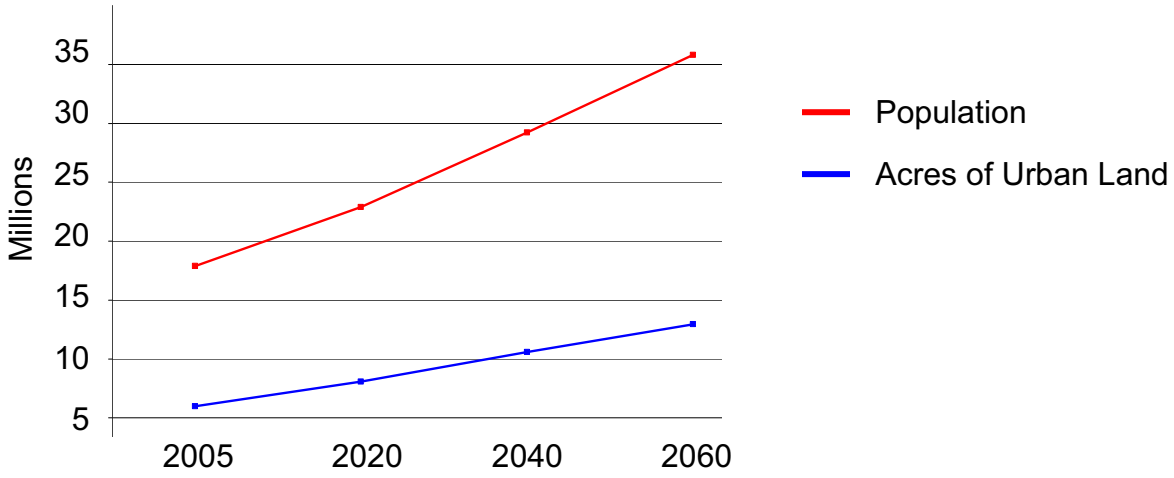
1. Executive Summary

Our beloved Florida is in the midst of rapid change. The engine of change is population growth--largely attributable to a combination of continued domestic and international immigration. The physical manifestation of our population growth is land use change, and the more rapidly population increases, the more rapidly land use changes occur. Between now and 2060 the State's population is projected to more than double and consequently, without shifts in our policies, the additional land devoted to urban use will also more than double.



To explore the physical reality of this trend 1000 Friends of Florida contracted with researchers at the University of Florida's GeoPlan Center to demonstrate what land use in the State might look like in 2060. This is a companion study to *A Time for Leadership: Growth Management and Florida 2060* prepared for 1000 Friends of Florida by researchers at Georgia Tech's Center for Quality Growth and Regional Development. GeoPlan's project was undertaken using relatively straightforward geographic information systems (GIS) suitability analysis constructed on a foundation of clearly articulated assumptions. The three key assumptions were:

1. The Bureau of Economic and Business Research (BEBR) moderate population projection from 2005 to 2030 was used as the basis for determining a trend line extending to 2060. The resulting projected statewide population change is shown below.
2. It was assumed the existing gross urban density of developed lands in each county will remain the same as in 2005. Gross urban density was calculated by taking 2005 population and dividing it by 2005 existing urban lands resulting in an expression of people per urban acre for each county. The 2005 gross urban densities ranged from a high in Dade County of 15.45 people per acre to a low in Gilchrist County of .45 people per acre. The total acres required to accommodate each county's additional population was determined based on the calculated 2005 gross urban density; and

3. The lands to which the new population was distributed were determined to be the most suitable using a set of eight criteria of which proximity to existing urban areas, road density and absence of wetlands were most heavily weighted.

The numerical results of the exercise are summarized below:

Period	Starting Population	Ending Population	Additional Population to be Accommodated	Additional Acres Required for New Population
2005 - 2060	17,872,295	35,814,574	17,942,279	6,953,264

This results in the following comparison of land use allocation in the state:

Category	2005	2060	Difference
Conservation	10,254,194	10,254,194	0
Open Water in Conservation Areas	510,886	510,886	0
Open Water Not in Conservation Areas	1,962,630	1,962,630	0
Urban Development	5,998,523	12,951,787	+ 6,953,264
Agriculture, Pristine Areas (including proposed conservation lands) and Other Undeveloped Lands	19,529,437	12,576,173	- 6,953,264
Total	38,255,670	38,255,670	0

If indeed roughly 7 million acres of additional land is converted to urban use it means 2.7 million acres of existing agricultural land will be lost along with 2.7 million acres of native habitat. It means that 630,000 acres of land currently under consideration for conservation purchase by Florida Forever and/or one of the five water management districts will be lost. And, it means more than 2 million acres within one mile of existing conservation lands will be converted to an urban use, complicating their management and isolating some conservation holdings in a sea of urbanization.

The pattern of predicted land use derived from this population distribution model is such that the central Florida region from Marion County southward through Osceola County will be almost entirely urbanized. South Florida will also become mostly urbanized with the exception of some of the agricultural lands north and south of Lake Okeechobee. Jacksonville will spillover into Nassau, Clay, St Johns and Baker Counties forever changing their rural character. Only in the Big Bend and Panhandle are significant areas of open space predicted to remain. However the latter are fragile predictions because a large, well-capitalized land-owner can create new towns that will leapfrog predictable patterns of land use change causing population increases not captured by current predictions.

Of the 67 counties in Florida, the eight predicted to undergo the greatest transformation are in rank order: Glades, Hardee, DeSoto, Hendry, Osceola, Baker, Flagler and Santa Rosa. Glades and Hardee are predicted to have at least 14 times more urban development in 2060 than they do presently. At the low end, Santa Rosa will have more than three and a half times as much urban development. Half of the remaining counties will more than double the lands dedicated to urban use.

While the results of the population distribution scenario are not guaranteed, they do represent a viable and disturbing snapshot of Florida in fifty years. 1000 Friends of Florida hopes these results will stimulate debate about the future of Florida. Is there an optimal allocation of lands in the State? To what degree do we hope to see agriculture remain? How much of our aquifer recharge areas and floodplains are needed to sustain Florida's wildlife, good quality surface and ground waters and our urban centers? Can we craft an acceptable land use decision making process that will ensure Florida's future generations lead healthy, happy and productive lives in this beautiful and bountiful state?

2. Population Projections

The population projections upon which the Florida 2060 population distribution scenario was derived used data from the Bureau of Economic and Business Research (BEBR). BEBR generates population projections for each county in three ranges: low, medium and high. Similar to the work of the US Census, these projections are based on combinations of assumptions about birth rates, death rates, immigration, and emigration. At the time this study was undertaken, BEBR's projections existed in five year increments up to 2030. BEBR's middle population projection was used in the following way. The average annual population change between 2000 and 2030 was calculated. For each five year increment following 2030, projected population was calculated by adding five times the average annual population increase to each preceding projected population. For example, the BEBR middle range 2030 population for Alachua County was 320,506. The average annual change population increase between 2000 and 2030 was calculated to be 3,418. Therefore the 2035 Alachua County population was projected to be:

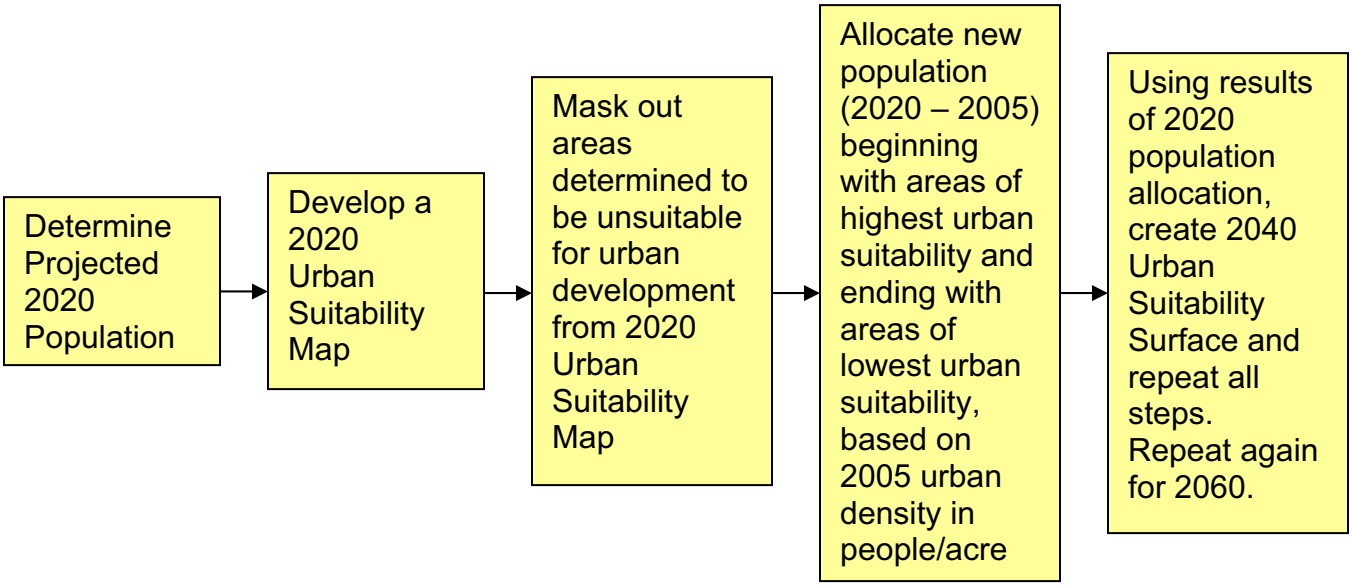
(5 [years] x 3,418 [avg. annual increase]) + 320,506 = 337,596

The table of population projections for each county developed for this project is found in Appendix 1.

3. Modeling Process and Modeling Assumptions

The Florida 2060 population distribution scenario was developed using relatively straight forward geographic information systems (GIS) suitability analysis. The modeling unit used for this project was a 1 acre cell. The majority of the modeling and analysis was completed using raster GIS. Figure 1 is a diagram of the modeling process.

Figure 1. The Florida 2060 GIS modeling process.



Generation of the Florida 2060 population distribution scenario was based on a series of key assumptions. These are enumerated below.

1. Existing urban lands were defined as all lands that support existing urban uses. These include but are not limited to residential, office/commercial, retail, industrial, roads, urban parks, utilities and utility corridors, golf courses, cemeteries and airports. Vacant platted residential properties were also included in existing urban lands for the counties and partial counties with tax parcel data. The rationale for this assumption was: As new residential areas are developed in counties with vacant residential parcels, there will continue to be a backlog of vacant residential parcels always equal in area to the sum of existing vacant residential parcels.
2. Existing conservation lands were defined as all lands with a measure of permanent protection (both fee simple and less than fee simple). These included areas under federal and state ownership managed by public agencies including the National Park Service, US Fish and Wildlife Service, USDA Forest Service and US Department of Defense. They also included lands managed by state agencies including the Department of Environmental Protection, Division of Forestry, Florida Fish and Wildlife Conservation Commission and the water management districts. A few private preserves owned and managed by non-governmental organizations were included as were lands with conservation easements held by public agencies and non-governmental organizations. The recently approved Babcock Ranch acquisition was included in the mask because of its size and its strategic location in Charlotte and Lee Counties.
3. Open water was defined as areas of the state that are covered by surface waters the majority of the time. These include lakes greater than 10 acres, rivers, streams, canals and major wetland systems.
4. An urban development mask was created so that only lands suitable for future urban development could be considered. Existing urban lands, existing conservation lands and open water were excluded. The Miccosukee Indian Reservation lands in western Broward County were also excluded from consideration for future urban development, because future land use on the reservation is the decision of the tribal leaders and it would be in appropriate to assume that future urban development will be allowed on those lands.
5. It was assumed the gross urban density of developed lands in each county will remain the same as it is today. Gross urban density was calculated by taking 2005 population and dividing it by 2005 existing urban lands (defined above) resulting in an expression of people per urban acre for each county. Appendix 2 contains a table of the calculated 2005 gross urban densities by county.
6. The projected populations for three different target dates, 2020, 2040, and 2060, were distributed. To accomplish this, the acres needed to accommodate the new projected population were calculated for each county based on its existing gross urban density. Population was allocated to the most suitable lands equal in area to the acres needed to accommodate the projected population. Once the new 2020 population was distributed, the results were fed back into the determination of urban suitability for 2040, and subsequently the 2040 population distribution was fed back into the determination of urban suitability for 2060.

7. Weights were assigned to each criterion used to determine overall urban development suitability. Appendix 3 displays the rationale for each criterion and those weights. The weights were chosen based on the degree to which each criterion was assumed to contribute to the suitability of any given cell for future urban use.
8. The mapping units used for the 2020 target date were each of Florida's 67 counties. In 2040, however, a number of counties in the central Florida region did not have sufficient land to accommodate the projected population at the assumed development density. So, to allocate the 2040 population for those counties, it was assumed the additional population would spill over into adjacent counties. This happened to such a degree in central Florida that it was necessary to cluster fourteen counties together for the 2040 population distribution. In 2060, these same fourteen counties remained clustered and two more regional clusters proved necessary, one in south Florida and one in northeast Florida. Figure 2 displays the regional clusters.

   In 2040 and 2060 for the clustered counties, population was allocated by first calculating the additional acreage needed to accommodate the new population for the target date for each county. Then the acreage needed for all counties in each cluster was totaled and the population was distributed beginning with the lands most suitable for urban development in the regional cluster until the total regional acreage needed was reached. For the counties that remained unclustered, the new population was allocated county by county as for all counties in 2020.

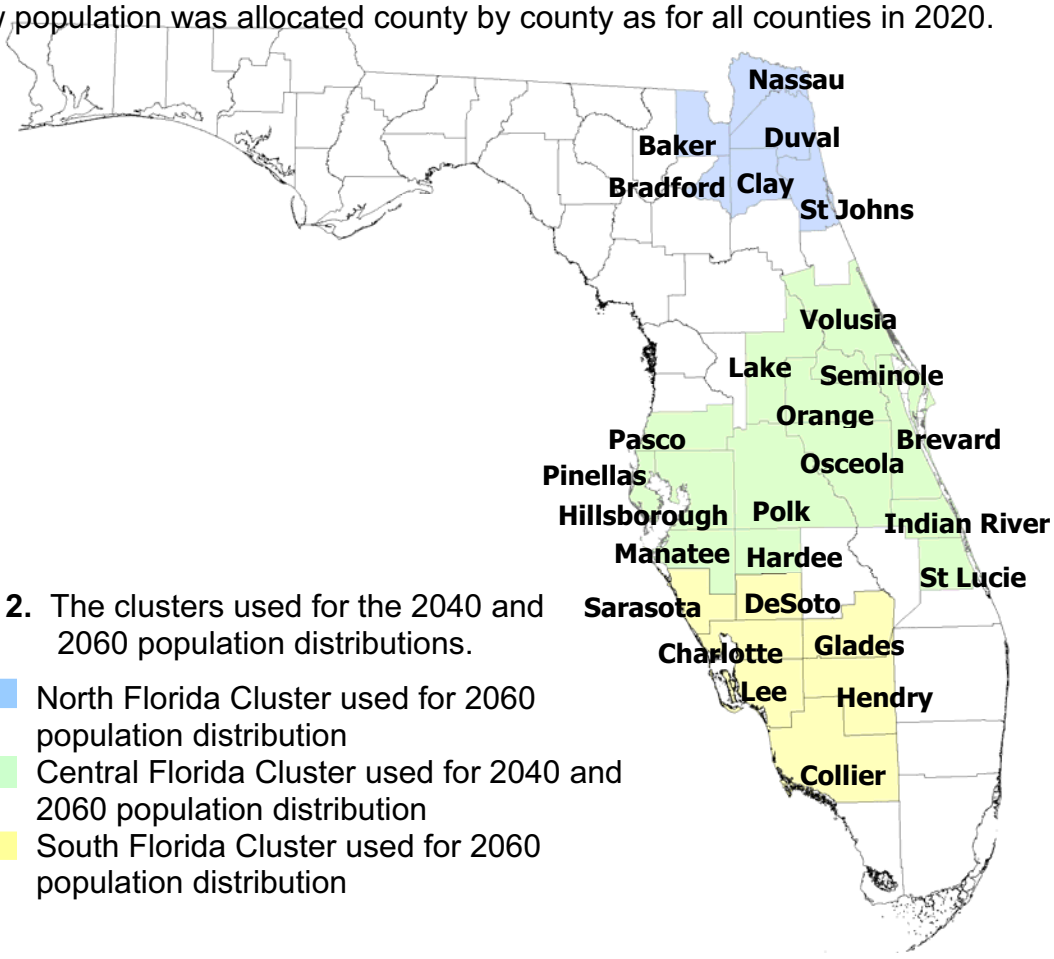


Figure 2. The clusters used for the 2040 and 2060 population distributions.

North Florida Cluster used for 2060 population distribution

Central Florida Cluster used for 2040 and 2060 population distribution

South Florida Cluster used for 2060 population distribution

4. Results, Analysis and Conclusion

Results

Between 2005 and 2060 Florida's population is projected to double from approximately 18 to 36 million people. Assuming a similar pattern of development at current gross urban densities for each county, this translates into the need to convert an additional 7 million acres of undeveloped land into urban land uses. Key statewide totals from the population distribution modeling process are presented in Table 2 for the three target dates including the starting population, the ending population, the additional population to be accommodated (ending population minus starting population) and the additional acres needed to accommodate the additional population. (Remember the additional acreage was calculated on a county by county basis, based on the existing gross urban density of each county.)

Table 1. Statewide totals of starting populations, ending populations, additional population to be accommodated and additional acres of new urban land needed to accommodate the additional projected population for the target dates of 2020, 2040, and 2060.

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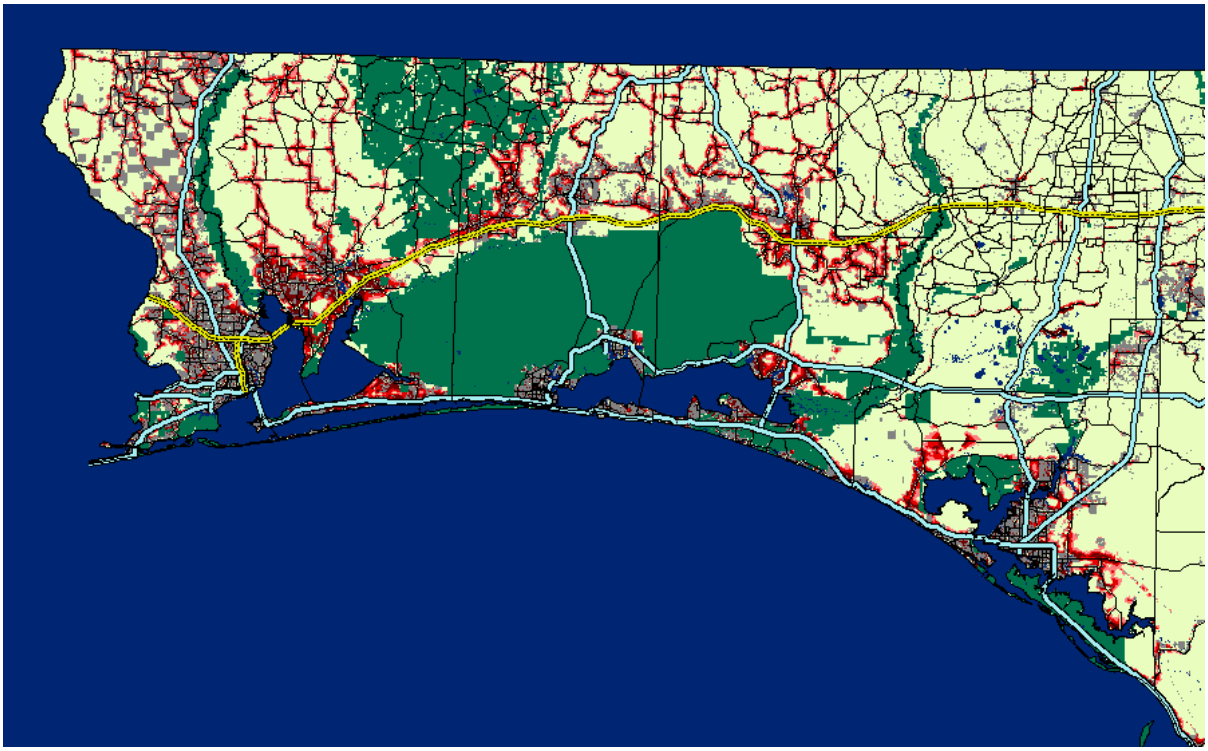
Period	Starting Population	Ending Population	Additional Population to be Accommodated	Additional Acres
2005 - 2020	17,872,295	22,894,140	5,021,845	2,078,020
2020 - 2040	22,894,140	29,203,842	6,309,702	2,520,707
2040 - 2060	29,203,842	35,814,574	6,610,732	2,354,537
Totals			17,942,279	6,953,264

The results of the population distribution modeling are presented in a series of maps for each of 7 regions of the state in Figures 3 – 9. Each map displays the acreage identified as most suitable to accommodate the population increase projected for the three target dates, 2020, 2040 and 2060.

Figure 3. Population distribution for 2020, 2040 and 2060 in northwest Florida.

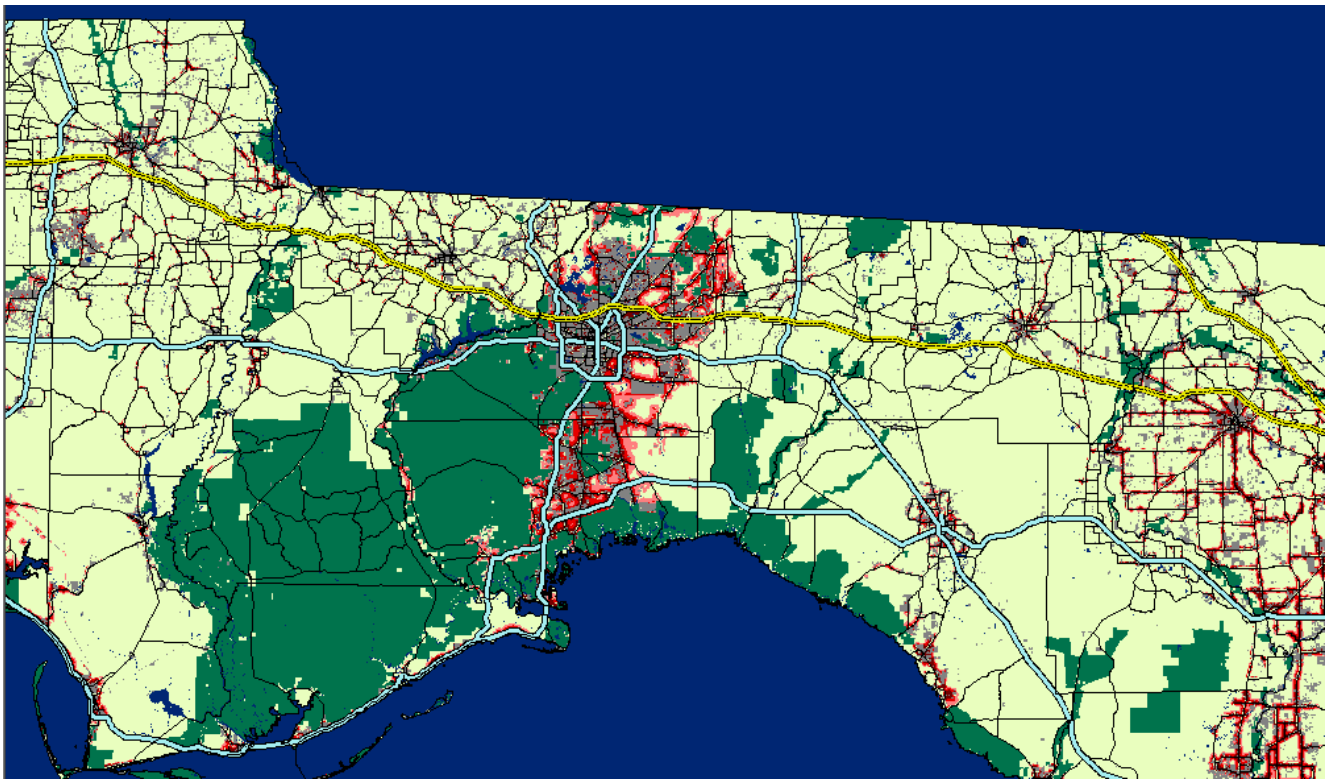


Legend

- 2020 Population Distribution
- 2040 Population Distribution
- 2060 Population Distribution
- 2005 Existing Urban Lands
- 2005 Existing Conservation Lands
- 2060 Remaining Undeveloped Lands Including Agriculture & Pristine Areas
- Open Water
- Limited Access Highways
- Major Roads

In northwest Florida (Figure 3), the majority of the new population is projected to locate in and around Pensacola, Milton, Crestview, and DeFuniak Springs along the I-10 corridor and in Bay County/Panama City. Bay County's population increase is projected to locate in the area known as West Bay and east along SR 22 towards Callaway. In 2060, considerable undeveloped land is projected to remain in the interior of northwest Florida. However, much of the land fronting along the roadways in this region is predicted for development, so the perception of the motorist (resident and visitor) will be of a mostly developed landscape. Views of undeveloped land will be blocked by a thin veneer of urban development. The undeveloped lands are attributable to the relatively low population projections for this region and its relatively undeveloped condition in 2005. This result is not guaranteed, however, as large land holders with the capital to undertake development of entire new towns can dramatically influence population growth and population distribution in a relatively short time period.

Figure 4. Population distribution for 2020, 2040 and 2060 in the Tallahassee/Big Bend area.



Legend

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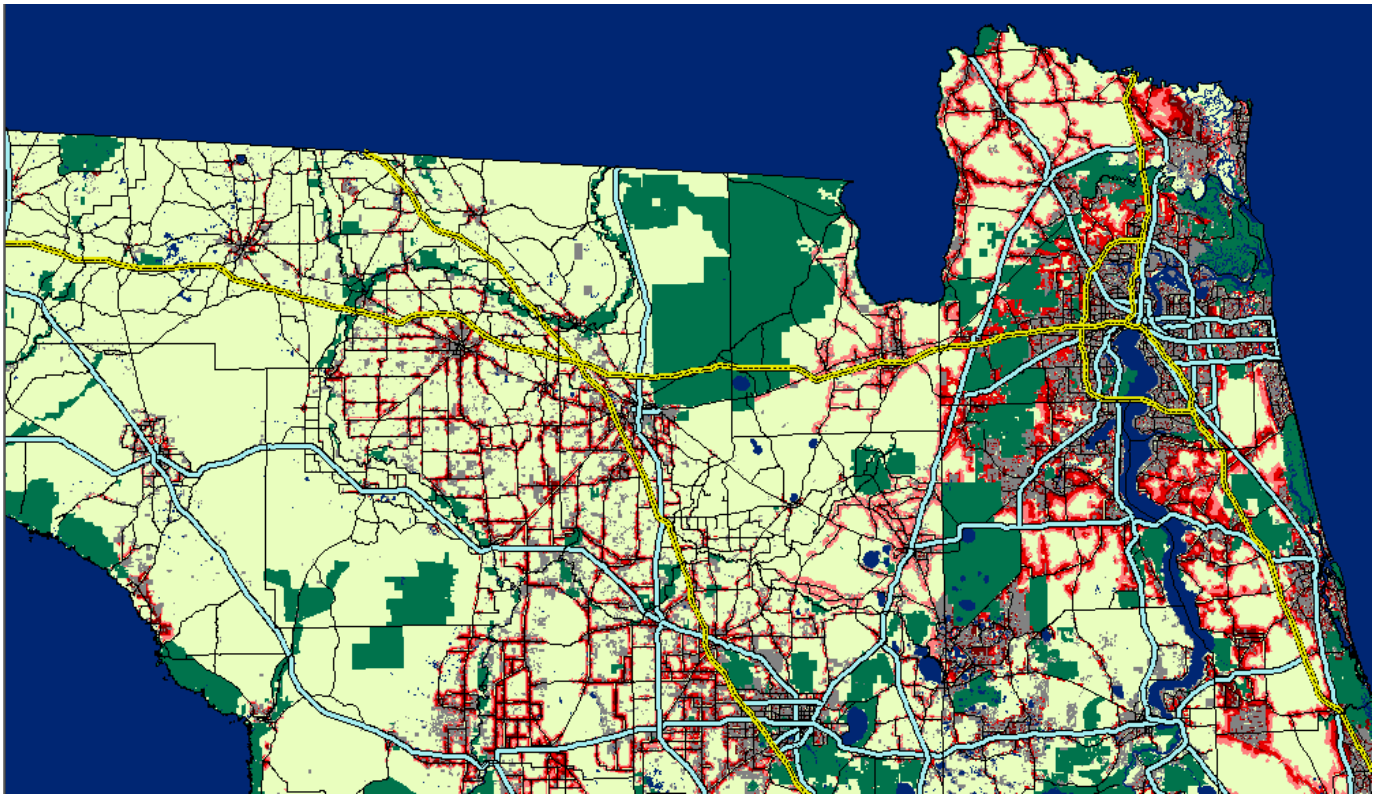
The model suggests development of the majority of available vacant land in Leon and Wakulla counties by 2060, with the exception of southeast Leon/northeast Wakulla counties (karst lands of high recharge potential) and the plantation lands of northern Leon County. Given the adjacency of Gadsden and Jefferson counties to the rapidly growing Tallahassee metropolitan area it might be surprising that these counties don't see more growth. This is because the BEBR population projections on which the model is based do not yet anticipate significant population increases in these two counties. In fact, it is quite likely this will change over the next few decades, resulting in more population distribution in these two counties than the model now predicts. Moderate growth of Marianna in Jackson County and Perry in Taylor County in close proximity to these rural centers is anticipated. Interestingly, the model distributed significant new population near Keaton Beach and Dekle Beach in Taylor County. This is an environmentally sensitive area susceptible to high storm surges where development densities have historically been low. Even more than northwest Florida, the Tallahassee/Big Bend area is predicted to retain considerable

undeveloped land in 2060. This is attributable to the relatively low population projections for this region and its relatively undeveloped condition in 2005. Just as in northwest Florida, this situation is a fragile one that could change rapidly with the development of large land holdings into new towns, and there are some areas predicted to suffer from thin strips of new development along existing roads, that greatly impact the region's visual quality.

Figure 5. Population distribution for 2020, 2040 and 2060 in northeast Florida.



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- 2005 Existing Conservation Lands
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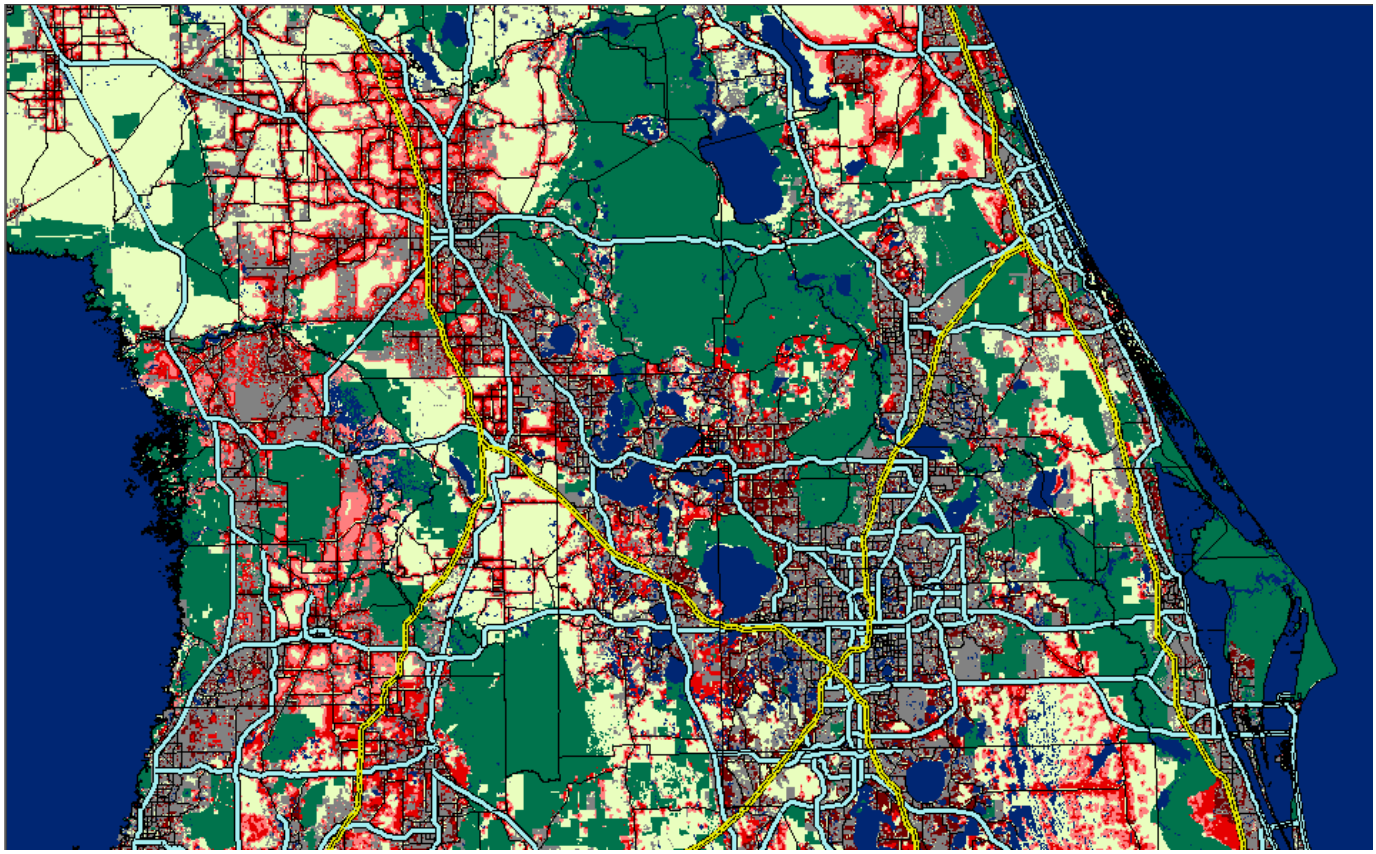
In Northeast Florida, Jacksonville/Duval County is the largest metropolitan area and its influence is projected to be far-reaching by 2060. Remember from figure 2, that vacant land in Duval County is projected to be completely built out sometime after 2040 and consequently Duval's 2060 projected population spills over into all adjacent counties. Additional centers of considerable growth are Live Oak in Suwannee County, Gainesville in Alachua County, Keystone Heights in Putnam County and virtually all of St Johns County. Relatively large areas of undeveloped land are projected to remain in Levy, Lafayette, Gilchrist and Suwannee counties in 2060. This, as in the two previous regions, is attributable to the relatively low projected

population growth and the relatively high amount of undeveloped land found in these counties in 2005. Suwannee County appears to be particularly vulnerable to roadside development in an otherwise rural landscape, a result that will significantly transform the region's visual quality.

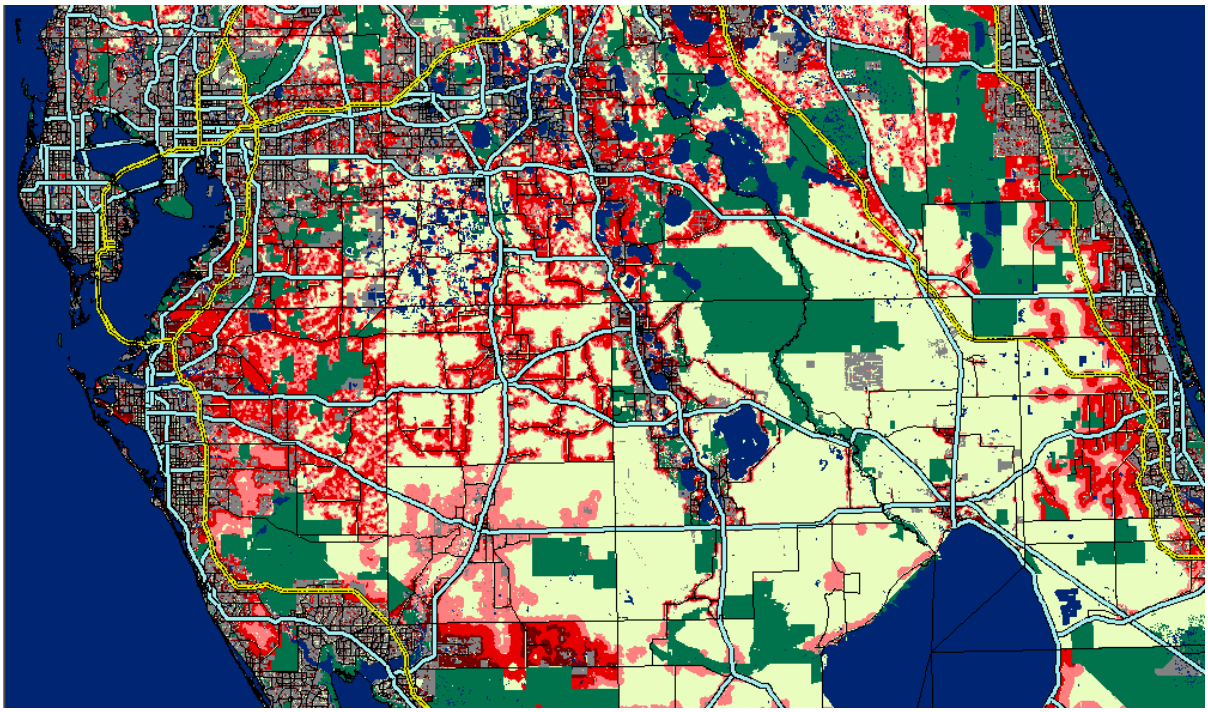
Figure 6. Population distribution for 2020, 2040 and 2060 in central Florida.



The central Florida region, bounded on the north by Marion County and extending southward to northern Polk and Osceola counties and most of Brevard and Pasco counties, is where population growth and the transformation of formerly undeveloped lands to urban use is predicted to be explosive. In the period between 2020 and 2040, the population of several of these counties was projected to exceed the available vacant land area, so as in northeast Florida in 2060, population was allowed to spillover into adjacent counties and it was distributed to the most suitable lands in the entire regional cluster (refer to Figure 2). In 2060 small areas of Polk, Lake and Sumter counties are anticipated to remain undeveloped, mostly due to their distance from

major transportation corridors or the presence of wetland conditions. The I-75 and I-4 corridors are projected to be fully developed.

Figure 7. Population distribution for 2020, 2040 and 2060 in south central Florida.



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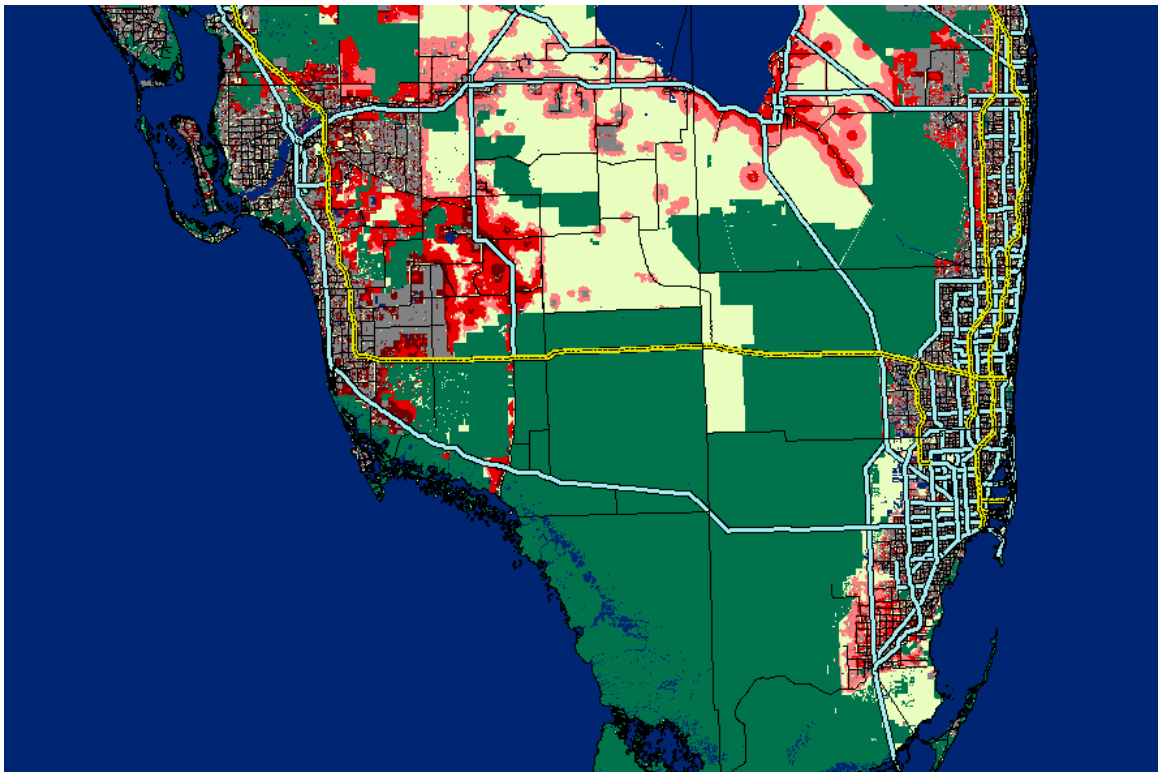
The influence of significant population increases in Orange, Brevard, Hillsborough, Manatee, Charlotte, Brevard and Indian River counties is evident in south central Florida with considerable development spillover into counties adjacent to these, particularly those counties inland of the coastal counties. Large amounts of new development are predicted for Hardee, DeSoto and Osceola counties. In fact these three counties are among those projected to experience the greatest transformation over the next fifty year period as they shift from largely rural to largely urban counties. In 2060 the model predicts there will still be vacant lands in the center of the state, but the historic desire to live in close proximity to the Florida coast suggests the coastal counties will all become almost entirely built out.

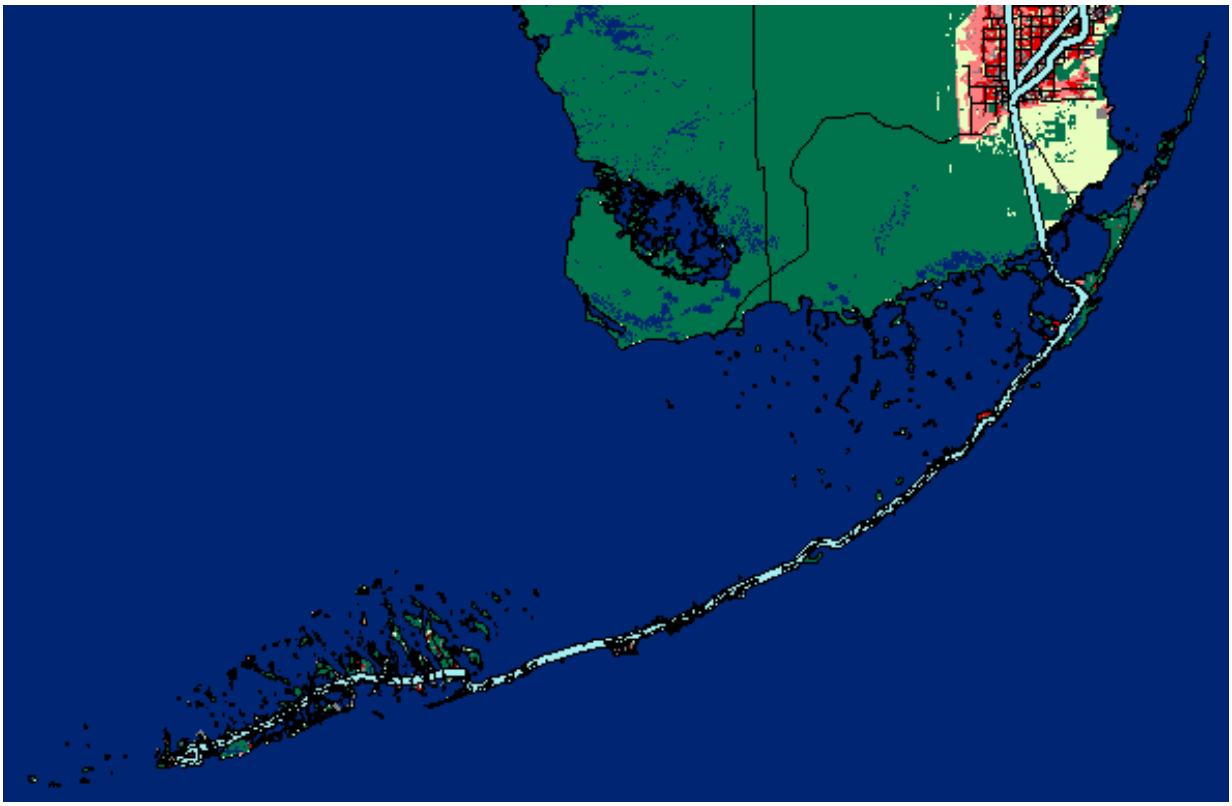
Figure 8. Population distribution for 2020, 2040 and 2060 in south Florida (minus the Keys).



In the period between 2040 and 2060, the population of Lee and Collier counties was projected to exceed the available vacant land area, so population was allowed to spillover into adjacent counties and it was distributed to the most suitable lands in the entire regional cluster (refer to Figure 2). However in this case, spillover from Collier County into Monroe, Dade and Broward was not assumed. This was because the interface of eastern Collier County, northern Monroe County, northwestern Dade County and western Broward County occurs mostly within large conservation holdings like Big Cypress National Preserve and Everglades National Park. The result is considerable new growth in Glades and Hendry counties. Palm Beach county's population is also projected to grow significantly and if the model is accurate, that population will locate south of Lake Okeechobee in the Everglades Agricultural Area. The result of the projected development pattern is an almost continuous urban strip extending from eastern Ft Myers to West Palm Beach. The undeveloped land in western Broward County is an Indian Reservation and consequently was excluded from consideration for new urban development. You may note that a portion of Broward County east of the most westerly north-south major

road remains undeveloped. This occurred because once Broward was included in the regional cluster, lands more suitable for urban development were found in the spillover counties and so population was distributed to those areas first. Perhaps surprising to some, Dade County did not reach build-out by 2060. This is attributable to two factors, 1) considerable undeveloped land remains in southern Dade County (most is currently used for highly productive agriculture) and 2) the current gross urban density (and so the density used for distribution of future population) is the highest in the state at 15.45 people per acre. Regardless, there is still significant conversion of lands in southern Dade County projected between now and 2060.

Figure 9. Population distribution for 2020, 2040 and 2060 in the Florida Keys



Legend

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It is difficult to see the distribution of the population increase projected for 2020, 2040, and 2060 for the Keys on a map of this scale, but suffice it to say that almost all of the available vacant land is consumed by the projected population increase including land identified as developable by the model that is not necessarily accessible by automobile. The projected population change for

Monroe County is relatively modest at only 212 people per year (refer to Appendix 1). Even so, virtually no vacant land is predicted to remain in the Keys by 2060.

Analysis

Three analyses of the results of this population distribution scenario were completed. The first is a comparison of the 2005 statewide land use allocation with the 2060 allocation. The second is a description of the counties that will be most and least transformed if the model predictions are accurate. And the third is a set of analyses of the character of the roughly 7 million acres of land that will be converted to urban use. The latter includes a determination of the acres of native habitat and agricultural lands predicted for transformation along with an evaluation of the potential impact to proposed and existing conservation lands.

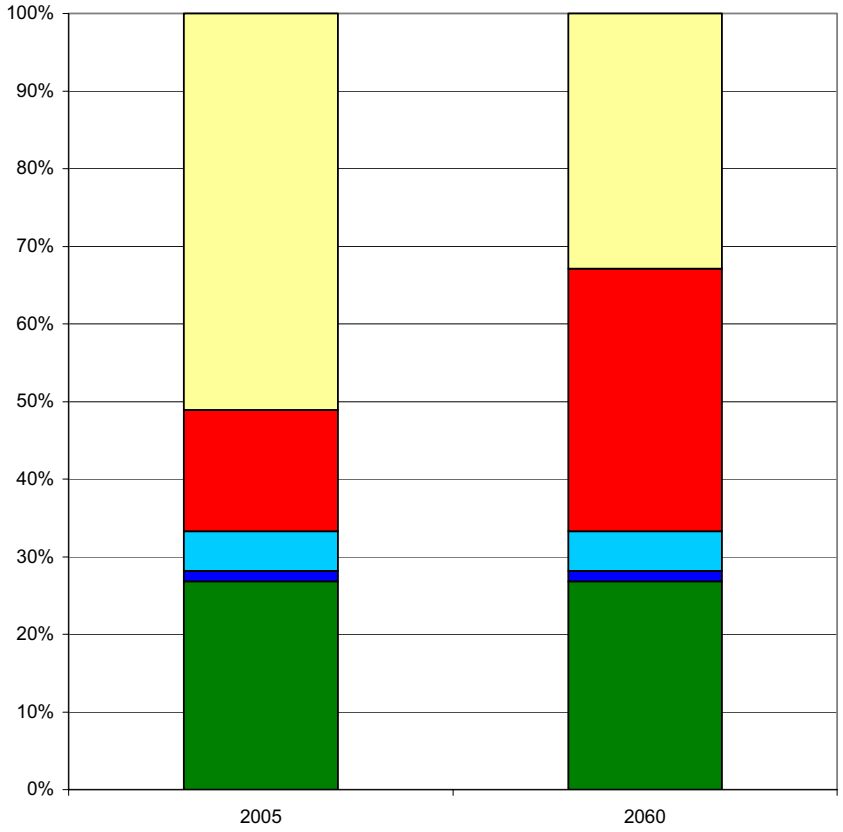
Comparison of 2005 and 2060 Land Use Allocations

A comparison of the 2005 allocation of lands of the state with that predicted for 2060 by this population distribution model reveals some simple facts (refer to table 3 and figure 10). First, the land area allocated for urban development will more than double by 2060, from approximately 16 percent to 34 percent of the state. Second, agriculture and other undeveloped lands will be reduced from approximately 51 percent to 33 percent of the state. Third, since the model assumes a freeze on the acquisition of additional conservation lands their quantity would remain constant at approximately 28 percent of the state (land and water within designated conservation areas). Lastly, roughly 5 percent of the state is now in unprotected open water and is presumed to remain as such.

Table 2. Comparison of 2004 Land Use Allocation with 2060 Land Use Allocation resulting from 2060 Population Distribution

	2005	2060	Difference
Conservation	10,254,194	10,254,194	0
Open Water in Conservation Areas	510,886	510,886	0
Open Water Not in Conservation Areas	1,962,630	1,962,630	0
Urban Development	5,998,523	12,951,787	+ 6,953,264
Agriculture and Other Undeveloped Lands	19,529,437	12,576,173	- 6,953,264
Total	38,255,670	38,255,670	0

Figure 10. Comparison of the 2005 land use allocation with 2060 land use allocation resulting from the UF's 2060 population distribution, where yellow is agriculture and other undeveloped lands, red is urban development, light blue is open water not within conservation areas, dark blue is open water within conservation areas and green is existing conservation lands.



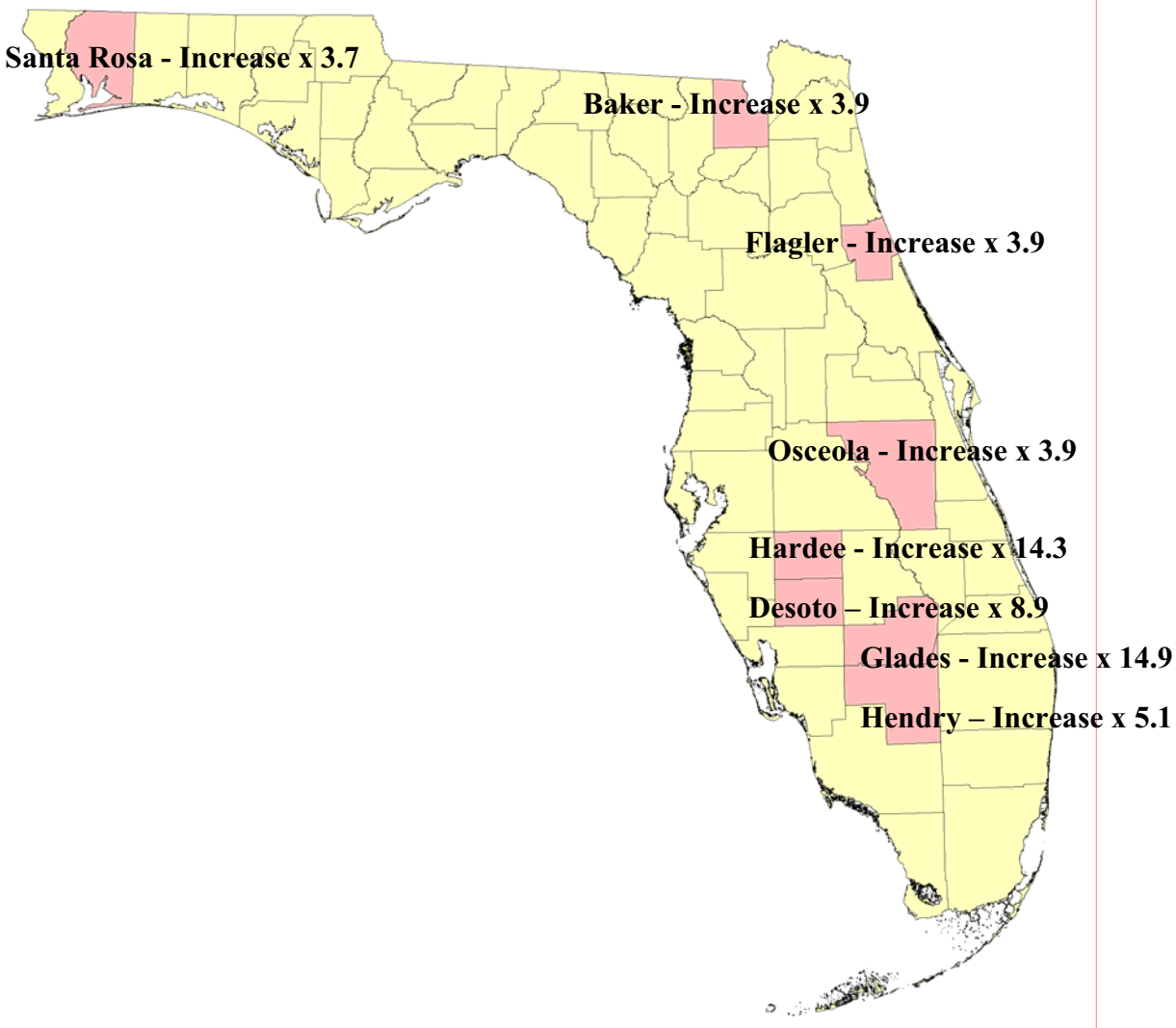
County Land Use Transformation

Of the 67 counties in Florida, the eight predicted to undergo the greatest transformation are in rank order: Glades, Hardee, DeSoto, Hendry, Osceola, Baker, Flagler and Santa Rosa (see figure 11). Glades and Hardee are predicted to have at least 14 times more urban development in 2060 than they do presently. At the low end, Santa Rosa will have more than three and a half times as much urban development. Half of the remaining counties will more than double the lands dedicated to urban use.

The predicted transformation of Santa Rosa and Flagler counties is a result of their relatively high projected population increase coupled with their relatively low existing gross urban densities (1.97 and 1.72 respectively – see Appendix 2). The change in Baker County is attributable to spillover from Jacksonville. Osceola and Hardee counties will change because of spillover from the collection of central Florida counties predicted to exceed available space including Orange, Seminole, Pinellas and Hillsborough. Glades and Hendry counties will transform because of spillover from Charlotte, Lee, and Collier counties.

The county predicted to see the least change is Pinellas. This is because more than 70% of Pinellas County is already in urban use, the highest of any county in the State.

Figure 11. The eight counties predicted to experience the greatest relative increase in urban area



Character and Composition of the Lands Predicted for Conversion to Urban Use

Using the Florida Fish and Wildlife Conservation Commission's 2003 GIS Habitat dataset, we analyzed the composition of the approximately 7 million acres of land predicted for conversion to new urban use. Approximately 40 percent (2.7 million acres) is currently in native habitat or pine plantation. (The FFWCC habitat dataset does not distinguish between native pinelands and planted pine plantations). Approximately another 40 percent (2.7 million acres) is currently in agricultural use. The balance, approximately 20 percent (1.5 million acres) are in other current uses, including exotic plant cover (e.g. Melaleuca), mining or other forms of extraction; or in low density forms of urban use that did not qualify as existing urban development by the definitions and data used to determine existing urban lands in the model (see assumption 1). Remember that from table 3 we already learned only about 12 million

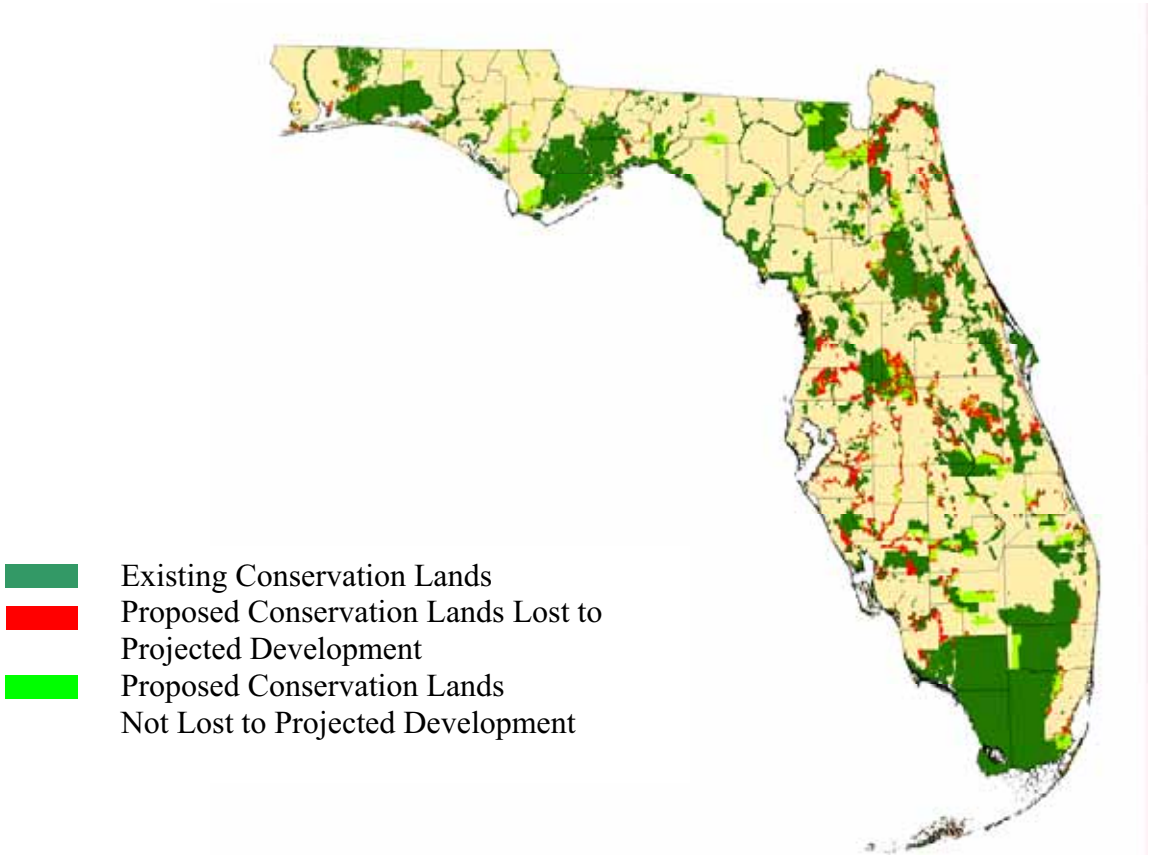
acres, or approximately 33% of the state will remain in agriculture or some other undeveloped condition.

Table 3. Composition of Lands Allocated to New Development

Description	Acres	Percent
Native Habitat	2,742,206	39.4
Agriculture	2,707,705	38.9
Other	1,503,353	21.7
	6,953,264	100

The Florida Natural Area Inventory's Florida Forever Proposed Acquisitions in combination with proposed acquisitions from the five water management districts reveal that approximately 630,000 acres of the total 2.8 million acres being considered for acquisition (over 20%) will likely be developed by 2060 if the lands are not acquired. A map of the proposed lands highly likely to be developed is found in figure 12. Since Florida has a strong record of conservation acquisitions, the model assumption that no new conservation acquisitions will occur is the most unrealistic of the modeling assumptions. Regardless, the analysis of the relationship of the lands slated for acquisition and lands predicted for urban conversion reiterates the importance of moving swiftly to secure sensitive environmental lands because the pressure of urbanization is unlikely to abate.

Figure 12. Proposed Conservation Lands Projected for Urban Development by 2060



The final analysis conducted was to determine the composition of lands within a one mile buffer of existing conservation lands. Of the roughly 8 million acres in that one mile buffer, almost 1.5 million are already in urban use and it appears an additional 1.9 million acres could be converted. That means as much as 41% of the lands within the one mile buffer could be urbanized by 2060. The implications of this are great for the long term management of our conservation lands. Where rural lands once were their neighbors, urban land uses have and will continue to move in. In the worst cases this will leave conservation lands completed isolated, surrounded by a sea of urbanization. In the best cases it means management strategies dependent on natural ecological processes like flooding and fire will be compromised to accommodate the new neighbors.

Conclusion

This project was undertaken to demonstrate the spatial reality of continued land use change in Florida if we follow past policies that have produced our current development patterns. Because land use change is incremental, it is difficult to comprehend its cumulative effect without taking the long view. As demonstrated by this exercise, the face of Florida will potentially be radically transformed by 2060. If this outcome is not acceptable then it is the hope of 1000 Friends of Florida that the results will stimulate debate about our future and the patterns of development that we will allow.

Among the questions appropriate to ask, as land is limited, are: Is there an optimal allocation of lands in the State? How much agriculture do we want to see remain and how can we ensure it happens? How much of our aquifer recharge areas and floodplains are needed to sustain Florida's wildlife, good quality surface and ground waters and our urban centers and what programs can we employ to protect them? How much land shall we devote to our resource-based recreation needs and how should they be distributed and managed? How much land do we want to preserve for our native flora and fauna for both their survival and for the restorative qualities they provide the human population? And perhaps most importantly, Can we craft an acceptable land use decision making process that will ensure Florida's future generations lead healthy, happy and productive lives?

We pose these questions as a challenge to the citizens and leaders of this State. We hope the results of this population distribution scenario, *Florida 2060* and the companion analysis of policy, *A Time for Leadership: Growth Management and Florida 2060,* will assist with answers. It is clear that now is the time when we must combine our considerable intellect and sense of fairness and equity to shape our collective future.

Appendix 1 Table of Projected Population 2000 - 2060

	Census	Projections												
County	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Annual Change
ALACHUA	217,955	240,605	259,704	277,233	292,440	306,903	320,506	337,598	354,690	371,782	388,873	405,965	423,057	3,418
BAKER	22,259	24,343	26,368	28,184	29,979	31,719	33,340	35,187	37,034	38,881	40,727	42,574	44,421	369
BAY	148,217	160,643	171,755	181,913	191,989	201,674	210,682	221,093	231,504	241,915	252,325	262,736	273,147	2,082
BRADFORD	26,088	28,068	29,494	30,776	32,059	33,294	34,443	35,836	37,228	38,621	40,013	41,406	42,798	279
BREVARD	476,230	530,678	577,253	620,571	663,497	704,528	742,669	787,076	831,482	875,889	920,295	964,702	1,009,108	8,881
BROWARD	1,623,018	1,755,930	1,919,267	2,068,088	2,215,555	2,357,047	2,488,332	2,632,551	2,776,770	2,920,989	3,065,208	3,209,427	3,353,646	28,844
CALHOUN	13,017	13,706	14,364	14,983	15,588	16,169	16,709	17,324	17,940	18,555	19,170	19,786	20,401	123
CHARLOTTE	141,627	160,454	177,783	193,689	209,435	224,577	238,670	254,844	271,018	287,192	303,365	319,539	335,713	3,235
CITRUS	118,085	131,728	144,772	156,688	168,505	179,860	190,416	202,471	214,526	226,582	238,637	250,692	262,747	2,411
CLAY	140,814	168,319	192,706	215,075	237,492	259,199	279,478	302,589	325,699	348,810	371,921	395,031	418,142	4,622
COLLIER	251,377	318,560	380,946	438,707	496,961	553,762	607,214	666,520	725,826	785,133	844,439	903,745	963,051	11,861
COLUMBIA	56,513	61,835	68,774	73,922	79,029	83,937	88,497	93,828	99,158	104,489	109,820	115,150	120,481	1,066
DADE	2,253,362	2,412,682	2,576,427	2,726,101	2,874,576	3,017,288	3,150,030	3,299,475	3,448,919	3,598,364	3,747,809	3,897,253	4,046,698	29,889
DESOTO	32,209	34,720	39,251	42,299	45,329	48,246	50,963	54,089	57,214	60,340	63,466	66,591	69,717	625
DIXIE	13,827	15,475	16,982	18,365	19,740	21,067	22,304	23,717	25,130	26,543	27,955	29,368	30,781	283
DUVAL	778,879	853,353	917,943	977,919	1,037,431	1,094,313	1,147,189	1,208,574	1,269,959	1,331,344	1,392,729	1,454,114	1,515,499	12,277
ESCAMBIA	294,410	310,277	325,402	339,233	352,954	366,143	378,409	392,409	406,409	420,409	434,408	448,408	462,408	2,800
FLAGLER	49,832	73,451	92,482	110,192	128,100	145,617	162,163	180,885	199,607	218,329	237,050	255,772	274,494	3,744
FRANKLIN	9,829	10,779	12,824	13,352	13,882	14,395	14,877	15,718	16,560	17,401	18,242	19,084	19,925	168
GADSDEN	45,087	47,280	48,794	50,177	51,550	52,869	54,096	55,598	57,099	58,601	60,102	61,604	63,105	300
GILCHRIST	14,437	16,414	18,636	20,700	22,772	24,788	26,687	28,729	30,770	32,812	34,854	36,895	38,937	408
GLADES	10,576	10,932	11,657	12,329	12,991	13,609	14,172	14,771	15,371	15,970	16,569	17,169	17,768	120
GULF	14,560	16,348	17,125	17,842	18,561	19,261	19,921	20,815	21,708	22,602	23,495	24,389	25,282	179
HAMILTON	13,327	14,410	14,931	15,414	15,889	16,346	16,771	17,345	17,919	18,493	19,067	19,641	20,215	115
HARDEE	26,938	28,164	29,775	31,242	32,688	34,075	35,430	36,845	38,261	39,676	41,091	42,507	43,922	283
HENDRY	36,210	39,189	43,295	47,064	50,822	54,450	57,839	61,444	65,049	68,654	72,258	75,863	79,468	721
HERNANDO	130,802	148,425	164,674	179,479	194,214	208,403	221,625	236,762	251,899	267,037	282,174	297,311	312,448	3,027
HIGHLANDS	87,366	93,625	101,486	108,714	115,772	122,500	128,702	135,591	142,481	149,370	156,259	163,149	170,038	1,378
HILLSBOROUGH	998,948	1,131,582	1,248,515	1,355,095	1,460,262	1,560,924	1,653,815	1,762,960	1,872,104	1,981,249	2,090,393	2,199,538	2,308,682	21,829
HOLMES	18,564	19,127	19,867	20,563	21,251	21,908	22,518	23,177	23,836	24,495	25,154	25,813	26,472	132
INDIAN RIVER	112,947	129,859	145,218	159,142	173,007	186,339	198,697	212,989	227,280	241,572	255,864	270,155	284,447	2,858
JACKSON	46,755	49,220	51,062	52,746	54,416	56,022	57,515	59,308	61,102	62,895	64,688	66,482	68,275	359
JEFFERSON	12,902	14,100	14,603	15,064	15,521	15,960	16,369	16,947	17,525	18,103	18,680	19,258	19,836	116

	Census	Projections												
County	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Annual Change
LAFAYETTE	7,022	7,615	8,027	8,406	8,780	9,130	9,462	9,869	10,275	10,682	11,089	11,495	11,902	81
LAKE	210,528	260,440	303,626	343,372	383,297	422,064	458,388	499,698	541,008	582,318	623,628	664,938	706,248	8,262
LEE	440,888	537,180	618,026	692,089	766,316	838,209	905,394	982,812	1,060,229	1,137,647	1,215,065	1,292,482	1,369,900	15,484
LEON	239,452	267,852	288,424	308,309	326,051	343,104	358,965	378,884	398,803	418,722	438,640	458,559	478,478	3,984
LEVY	34,450	38,306	42,476	46,308	50,127	53,815	57,262	61,064	64,866	68,668	72,470	76,272	80,074	760
LIBERTY	7,021	7,412	7,777	8,101	8,416	8,712	8,980	9,307	9,633	9,960	10,286	10,613	10,939	65
MADISON	18,733	19,682	20,450	21,157	21,856	22,527	23,151	23,887	24,624	25,360	26,096	26,833	27,569	147
MANATEE	264,002	302,002	335,937	366,698	397,301	426,694	453,905	485,556	517,206	548,857	580,507	612,158	643,808	6,330
MARION	258,916	301,125	340,260	375,999	411,721	446,208	478,313	514,879	551,445	588,012	624,578	661,144	697,710	7,313
MARTIN	126,731	140,292	154,019	166,549	178,977	190,917	202,014	214,561	227,108	239,656	252,203	264,750	277,297	2,509
MONROE	79,589	81,433	82,414	83,326	84,233	85,111	85,938	86,996	88,054	89,113	90,171	91,229	92,287	212
NASSAU	57,663	66,796	75,730	83,917	92,115	100,048	107,452	115,750	124,048	132,347	140,645	148,943	157,241	1,660
OKALOOSA	170,498	189,200	206,225	221,508	236,606	250,989	264,260	279,887	295,514	311,141	326,768	342,395	358,022	3,125
OKEECHOBEE	35,910	38,491	40,670	42,716	44,770	46,774	48,601	50,716	52,831	54,947	57,062	59,177	61,292	423
ORANGE	896,344	1,042,035	1,183,386	1,312,573	1,441,778	1,566,611	1,682,942	1,814,042	1,945,141	2,076,241	2,207,341	2,338,440	2,469,540	26,220
OSCEOLA	172,493	236,011	287,902	335,899	384,294	431,483	475,906	526,475	577,044	627,613	678,181	728,750	779,319	10,114
PALM BEACH	1,131,184	1,270,641	1,412,447	1,542,925	1,672,996	1,798,676	1,916,213	2,047,051	2,177,889	2,308,728	2,439,566	2,570,404	2,701,242	26,168
PASCO	344,765	398,964	445,559	488,192	530,435	571,032	608,662	652,645	696,628	740,611	784,593	828,576	872,559	8,797
PINELLAS	921,482	949,760	980,346	1,008,945	1,037,177	1,064,181	1,089,280	1,117,246	1,145,213	1,173,179	1,201,145	1,229,112	1,257,078	5,593
POLK	483,924	538,220	587,621	631,895	675,627	717,488	756,765	802,239	847,712	893,186	938,659	984,133	1,029,606	9,095
PUTNAM	70,423	73,829	76,844	79,652	82,440	85,138	87,667	90,541	93,415	96,289	99,163	102,037	104,911	575
SANTA ROSA	117,743	137,531	157,645	175,202	192,809	209,932	226,057	244,109	262,162	280,214	298,266	316,319	334,371	3,610
SARASOTA	325,957	364,954	398,370	428,933	459,072	488,047	515,053	546,569	578,085	609,601	641,117	672,633	704,149	6,303
SEMINOLE	365,196	412,180	456,279	496,224	536,159	574,644	610,525	651,413	692,301	733,190	774,078	814,966	855,854	8,178
ST. JOHNS	123,135	155,031	183,718	210,246	236,967	262,991	287,456	314,843	342,230	369,617	397,003	424,390	451,777	5,477
ST. LUCIE	192,695	232,497	264,510	293,983	323,284	351,562	377,894	408,761	439,627	470,494	501,360	532,227	563,093	6,173
SUMTER	53,345	69,304	82,403	94,581	106,890	118,925	130,286	143,110	155,933	168,757	181,580	194,404	207,227	2,565
SUWANNEE	34,844	38,503	43,944	47,556	51,149	54,610	57,837	61,669	65,501	69,334	73,166	76,998	80,830	766
TAYLOR	19,256	21,145	22,458	23,298	24,140	24,956	25,723	26,801	27,879	28,957	30,034	31,112	32,190	216
UNION	13,442	14,871	15,918	16,686	17,444	18,167	18,836	19,735	20,634	21,533	22,432	23,331	24,230	180
VOLUSIA	443,343	493,144	537,787	578,307	618,620	657,376	693,428	735,109	776,790	818,471	860,151	901,832	943,513	8,336
WAKULLA	22,863	26,411	31,670	35,174	38,699	42,140	45,391	49,146	52,900	56,655	60,410	64,164	67,919	751
WALTON	40,601	52,392	62,301	71,479	80,732	89,752	98,242	107,849	117,456	127,063	136,669	146,276	155,883	1,921
WASHINGTON	20,973	22,765	25,759	27,194	28,605	29,947	31,180	32,881	34,582	36,284	37,985	39,686	41,387	340
FLORIDA	15,982,378	17,872,295	19,655,063	21,280,260	22,894,140	24,449,152	25,898,476	27,551,159	29,203,842	30,856,525	32,509,208	34,161,891	35,814,574	330,537

Appendix 2 Table of 2005 Average Gross Urban Densities by County

County	2005 Density in People/Acre	County	2005 Density in People/Acre	County	2005 Density in People/Acre
ALACHUA	1.73	HAMILTON	0.72	OKALOOSA	2.54
BAKER	1.73	HARDEE	2.03	OKEECHOBEE	1.07
BAY	1.98	HENDRY	1.17	ORANGE	4.31
BRADFORD	1.32	HERNANDO	1.82	OSCEOLA	2.35
BREVARD	2.79	HIGHLANDS	1.03	PALM BEACH	6.09
BROWARD	11.03	HILLSBOROUGH	3.56	PASCO	2.69
CALHOUN	1.12	HOLMES	0.97	PINELLAS	7.38
CHARLOTTE	0.82	INDIAN RIVER	2.27	POLK	2.26
CITRUS	1.22	JACKSON	0.82	PUTNAM	0.65
CLAY	2.07	JEFFERSON	1.31	SANTA ROSA	1.97
COLLIER	2.15	LAFAYETTE	0.92	SARASOTA	3.24
COLUMBIA	1.08	LAKE	1.81	SEMINOLE	4.06
DADE	15.45	LEE	2.48	ST. JOHNS	2.14
DESOTO	1.79	LEON	2.42	ST. LUCIE	3.17
DIXIE	0.61	LEVY	0.56	SUMTER	2.16
DUVAL	3.75	LIBERTY	1.21	SUWANNEE	0.61
ESCAMBIA	1.99	MADISON	1.25	TAYLOR	0.74
FLAGLER	1.72	MANATEE	2.66	UNION	2.78
FRANKLIN	1.21	MARION	1.52	VOLUSIA	2.09
GADSDEN	1.17	MARTIN	3.96	WAKULLA	0.74
GILCHRIST	0.45	MONROE	0.87	WALTON	0.89
GLADES	1.24	NASSAU	0.91	WASHINGTON	1.61
GULF	0.98				

Appendix 3. Urban suitability criteria, rationale for use, and assigned weights.

Urban Suitability Criterion	Rationale for Use	Weight
Proximity to existing urban areas	New urban development tends to occur in close proximity to existing urban development.	29%
Presence/absence of wetlands	The presence of wetlands tends to increase the cost of urban development.	18%
Road density	New urban development tends to occur in areas of relatively higher road density.	14%
Proximity to coastline	The coast has historically been an attractor for urban development.	11%
Developments of Regional Impact (other than urban infrastructure projects like airports) and the West Bay Detailed Specific Area Plan (less the approved airport site)	Areas within approved DRIs and DSAPs are highly likely to develop. The only DSAP that was used, however, was West Bay in Bay County, because the other existing DSAPs fell in the path and pattern of new urban development and their boundaries did not affect the pattern or timing of new urban development.	10%
Proximity to major roads	Roads facilitate new urban development.	7%
Proximity to centroids of major urban areas (population greater than 30,000)	Major urban areas tend to accommodate more additional population than do smaller urban areas	7%
Proximity to open water	Access to the view of water has historically been an attractor for development.	4%

Appendix 4. Data Sources

The UF used the most current available GIS data to develop this population distribution scenario. Following is a list of all the data used and their sources.

GIS Data Layer	Description	Source
Existing Urban Lands	All lands that support existing urban uses	For counties with complete parcel data, it was used. Urban parcel acreage was summed and 20% land area was added for roads. For counties without property parcel data, WMD land use + GFC Habitat was used to sum urban acreage. Again, 20% land area was added for roads. For counties with partial property data a combination of the two strategies above was used. Counties with partial tax parcel data: Franklin, Polk, Lake, Martin & Monroe Counties without tax parcel data: Santa Rosa, Washington, Sumter, Citrus, Highlands
Existing Conservation Lands	Lands with a measure of permanent protection, excluding those held by local governments and small non-governmental organizations	FNAIMA (Florida Natural Areas Inventory managed areas), and WMD lands from water management districts
Open Water	All areas of the state covered by surface water for the majority of each year	USGS Hydro 1:24,000
Wetlands	All areas of the state included in the USGS Hydro coverage not considered to be open water	USGS Hydro 1:24,000
Major Roads	These data include the new roads in the adopted five year work plan.	Major Roads from FDOT and 5 year work plans
Road Density	Calculated in miles per square mile	TIGER Roads

Proposed Conservation Lands	Areas on adopted acquisition lists for the Florida Forever program and water management land acquisition programs	FFBOT06 (from FNAI) WMD lands from water management districts
County Boundaries		
Habitat	Includes native and non-native habitat types.	GFCHAB03 - From Florida Fish and Wildlife Conservation Commission 2003
DRIs and Selected Sector Plans	Approved Developments of Regional Impact less those for public infrastructure, like airports; and the West Bay Detailed Specific Area Plan (Bay County)	DRI data layer created at UF's GeoPlan Center, West Bay Detailed Specific Area created at UF's GeoPlan Center from map provided by Miller Sellen and Babcock Ranch created at UF's GeoPlan Center with data provided by Glatting Jackson
Florida Cities greater than 30,000 people	Centroids of Florida cities selected for population greater than 30,000	USGS Cities and Towns of Florida
Coastline	An edge between Florida's land and marine waters and inland waters and marine waters	USGS Hydro 1:24,000