FLORIDA'S RISING SEAS
Mapping Our Future

This report focuses on the Sea Level 2070 component of Florida's Rising Seas: Mapping Our Future. As with Sea Level 2040, Sea Level 2070 is a GIS-based analysis of the intersection between population growth, development patterns and sea level rise in Florida. It builds on the Florida 2070/Water 2070 reports released in 2016, while including updated data, incorporating the impacts of sea level rise on lands available for development, conservation, agriculture, and other purposes, and addressing the associated need for population relocation.

Sprawl 2070 assumes that 2010 densities and patterns of development will continue over the next five decades but factors in the impacts of sea level rise on Florida's lands and the resulting need for population relocation.

Conservation 2070 accounts for the same population growth and sea level rise by 2070, but also assumes that the state's priority natural lands will be protected, any new development will be 20% more compact, and more redevelopment will occur in urbanized areas.

For this project "state priority natural lands" include lands that are either currently protected or are high priorities for protection for Florida's biodiversity, water, or other ecosystem services. This includes Florida Managed Lands (FLMA), Florida Forever conservation land protection projects, and Priorities 1, 2, and 3 in the Florida Ecological Greenways Network (FEGN), otherwise known as the Florida Wildlife Corridor.

The Conservation Scenario avoids development on priority natural lands in the Florida Wildlife Corridor, which has been a state legislative focus since 2021. The Conservation Scenario provides an alternative to the Sprawl Scenario by showing what Florida might look in 2070 if we adopted denser development patterns while committing to ambitious conservation land protection efforts. "Protection" of additional priority conservation lands in this scenario is intended to convey a potential future that shows how growth can be accommodated while still achieving very significant land conservation goals. Future conservation lands are much more likely to be protected by easements, which means that most land will stay privately owned, will be managed by the landowner, and will stay on the tax rolls.

Densities and patterns of development are determined using Gross Development Densities (GDD). To maintain a methodology consistent with the earlier Florida 2070/Water 2070 study, GDD in this study was determined using the same approach as that of the earlier models, dividing the 2010 developed acres by the 2010 population. The GDD is increased by 20% for the Conservation Scenario to reflect less sprawling development patterns. The lower the number of people per acre, the more sprawling the development patterns are in the region. Sea Level 2070 also factors in greater redevelopment in urban areas.

The Scenarios are Based on Four Assumptions:

- **Florida's population will grow to 33,721,828 residents in 2070,** based on 2015 Florida Bureau of Economic and Business Research (BEBR) medium projections through 2040, and extended to 2070.
- **Sea Level will rise by 0.9 meters,** based on a modified version of the 2017 NOAA Intermediate-High projection.
- **Residents on lands to be lost to sea level rise will relocate,** with half allocated within or near to their current county of residence. Half are assumed to move out of state. These scenarios are based on a NOAA "Intermediate-High" sea level rise scenario and an FSU study on population relocation (Hauer 2016).
- **Likelihood of future development of land will vary depending on its location and characteristics.** For example, in this analysis proximity to cities, major roads and/or waterbodies or other features are deemed more likely to develop due to desirability, while wetlands are deemed less likely to develop due to higher development costs.

More detailed information on the methodology is available in Appendix A on page 27.

FLORIDA'S RISING SEAS
Statewide Summary

SEA LEVEL 2070

By 2070, Florida is projected to have 12.2 million more residents (a 57% increase) but lose 1.7 million acres of land due to sea level rise. Potentially more than 900,000 residents will need to relocate. The amount of developed lands in the state would more than double, and about 1.8 million acres of agricultural lands would be lost.

Florida is at a critical juncture. Will we continue to sprawl, developing 3.5 million more acres and losing prime natural and agricultural lands? Or will we develop more compactly, conserve prime natural and agricultural lands, and develop 1.3 million fewer acres than in the Sprawl scenario?

The future of Florida depends on planning, development, and conservation decisions – both large and small – that we start making now.

Population Growth

12.2 million more residents, a 57% increase

Sea Level Rise

1.7 million acres of land lost, the majority of it conservation land

906,000 residents relocated

Sprawl 2070 Scenario

Nearly 3.5 million more acres of developed land, an increase of 64%

1.8 million acres of agricultural lands lost

1.9 million acres of "other" land lost *(timber, mining, etc.)*

Conservation 2070 Scenario
(compared with Sprawl Scenario):

1.3 million fewer acres of developed land

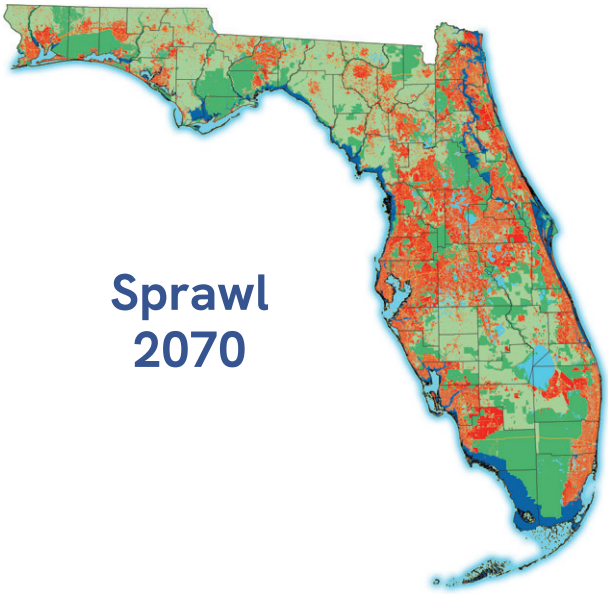
5 million more acres of protected natural land

2.3 million more acres of protected agricultural land

Under the Sprawl 2070 Scenario, Florida would lose 190 acres of land per day to development during the period from 2020 to 2070, including 97 acres of agricultural lands. Another 92 acres per day would be lost due to Sea Level Rise. These total to almost 290 acres of land lost per day over the coming five decades while Florida's population is projected to increase by more than 12 million new residents.

Statewide Maps

Baseline



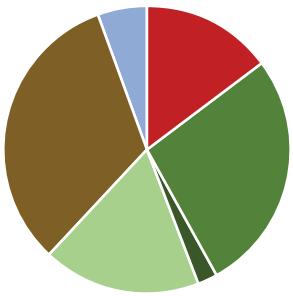
Sprawl 2070

Conservation 2070

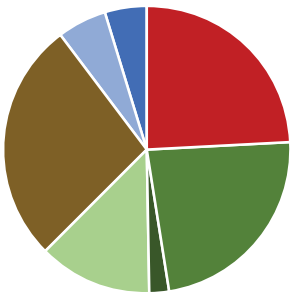
- Developed
- Protected
- Sea Level Rise
- Other

Statewide Pie Charts

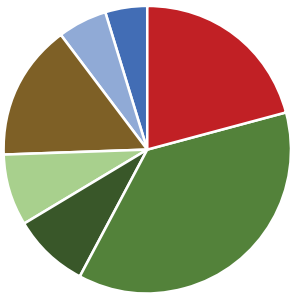
Baseline



Sprawl 2070



Conservation 2070



- Developed
- Total Protected (Excluding Agriculture)
- Protected Agriculture
- Unprotected Agriculture
- Total Other
- Open Water
- Sea Level Rise

continued

Florida 2070 Statewide Results

Population Growth

By 2070, Florida is projected to have 12.2 million more residents but lose 1.7 million acres of land due to sea level rise. More than 900,000 residents would need to relocate.

Florida is at a critical juncture. Will we continue to sprawl, developing 3.5 million more acres and losing prime natural and agricultural land? Or will we develop more compactly, conserve prime natural and agricultural lands, and develop 1.3 million fewer acres than in the Sprawl Scenario?

This represents a call to action, because we need to make significant changes to the way Florida grows and develops now to ensure a more sustainable future for our children and grandchildren.

In 2019, Florida had close to 21.5 million residents. By 2070, using medium BEBR projections, Florida is expected to have a population of 33,721,828 people, an increase of 57% in about five decades. With this growth in population comes even more development to accommodate new residents and visitors.

TABLE 1: 2070 Statewide Population Projections

Period	2019 Census	2070 Projection	Percent Increase	Additional Population to be Allocated
2019 - 2070	21,477,737	33,721,828	57%	12,244,091

Lands Lost to Sea Level Rise

Another significant change is the increasing loss of developed and developable land and the displacement of existing residents due to sea level rise. Using the 0.9m projection (or more than 35 inches of projected sea level rise), Florida stands to lose 1.7 million acres of land by 2070, likely resulting in the relocation of more than 900,000 residents. See Appendix A for more information on how population relocation was estimated.

As noted in the Sea Level 2040 report, some inland counties will be impacted by sea level rise due to hydrological connections between inland water bodies and the coast. This is particularly evident along the St. Johns River. And once again, protected natural lands will experience the brunt of sea level rise.

The bottom line is there will be far more people on increasingly less land by 2070 and beyond.

continued

Lands Lost to Sea Level Rise

TABLE 2: 2070 Statewide Lands Lost to Sea Level Rise

	Sprawl 2070 Acres Lost to SLR	% of Total Acreage	Conservation 2070 Acres Lost to SLR	% of Total Acreage
Developed Land	94,000	0.26%	94,000	0.26%
Protected Natural Lands	1,291,000	3.55%	1,403,000	3.86%
Protected Agricultural Lands	4,000	0.01%	4,000	0.01%
Unprotected Agriculture	10,000	0.03%	10,000	0.03%
All Other Land Uses	283,000	0.78%	171,000	0.47%
Total Sea Level Inundation	1,682,000	4.63%	1,682,000	4.63%

TABLE 3: Statewide Acreage Comparison of 2070 Development Scenarios

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Developed	5,428,000	14.94%	8,881,000	24.44%	7,612,000	20.95%
Protected Natural Land*	9,850,000	27.11%	8,404,000	23.13%	13,405,000	36.89%
Protected Agriculture	856,000	2.36%	852,000	2.34%	3,115,000	8.57%
Agriculture	6,418,000	17.66%	4,645,000	12.78%	2,931,000	8.07%
Other**	11,779,000	32.42%	9,867,000	27.15%	5,586,000	15.37%
2019 Open Water	2,006,000	5.52%	2,006,000	5.52%	2,006,000	5.52%
Sea Level Inundation: Protected Lands	0	0.00%	1,296,000	3.57%	1,432,000	3.94%
Sea Level Inundation: All Other Land Uses	0	0.00%	386,000	1.06%	250,000	0.69%
Total Acreage	36,337,000	**100.00%**	36,337,000	**100.00%**	36,337,000	**100.00%**
Total Land Acreage	34,330,000	94.48%	32,648,000	89.85%	32,648,000	89.85%
Total Sea Level Inundation	0	0.00%	1,682,000	4.63%	1,682,000	4.63%
Total Open Water including SLR	2,006,000	5.52%	3,772,000	10.38%	3,772,000	10.38%

**Protected Natural Land is defined for the purposes of this report as all protected natural and other semi-natural land (such as timberland) not falling into the protected agriculture category.*

***Other land includes timberlands, mining lands, and other miscellaneous land uses not classified as agriculture, developed, protected, protected agriculture, or open water.*

continued

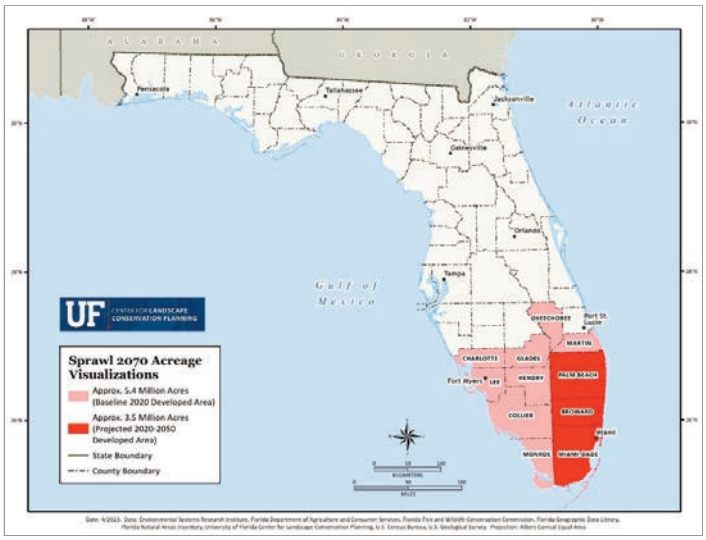
Developed Lands

As shown on the map, close to 16% of Florida's lands were considered developed in the Baseline, an area just slightly more than all the lands in Dade, Broward, and Palm Beach counties combined. Under the Sprawl Scenario, almost 3.5 million additional acres of lands would be developed, roughly the equivalent of developing Monroe, Collier, Hendry, Lee, Charlotte, Glades, Okeechobee, and Martin counties as well.

With the patterns of development in the Sprawl Scenario (designed to approximate our current patterns of development), close to a quarter of Florida's lands – 24.44% – would be developed by 2070, an almost 64% increase over 2019. And, as noted earlier, this is further compounded by more than 1.7 million acres of land projected to be lost to sea level rise.

As described, the Conservation Scenario reflects the protection of Florida's priority natural lands deemed most critical to the long-term health of Florida's environment. Under this scenario, developed lands would still increase significantly, to 21% of Florida's lands, representing an increase of 40% over the Baseline.

While significant natural lands would be protected under the Conservation Scenario, as noted earlier a modest 20% increase in population density over the next five decades is not sufficient to significantly curtail sprawling development patterns and limit all impacts to priority natural and agricultural landscapes.



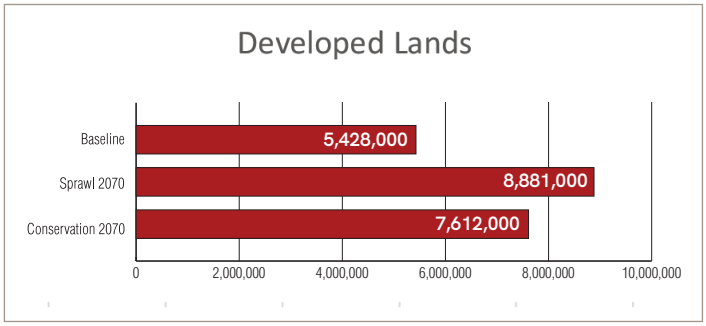


TABLE 4: Statewide Developed Lands

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Developed	5,428,000	14.94%	8,881,000	24.44%	7,612,000	20.95%

Natural Conservation Lands

Now let's focus on protected natural conservation lands, excluding protected agricultural lands. Currently, close to 10 million acres – or 27.1% – of Florida's lands are protected through federal, state, local and private programs. These include conservation easements which entail agreements with private property owners who enter legally binding commitments to limit or eliminate development on their property in return for tax benefits, payment or some other transaction. Conservation easements can be used to protect both natural and agricultural lands.

Under the Sprawl 2070 Scenario, if no new lands are added, protected state priority natural lands as a share of Florida's total lands would decrease from 27% to 23%. This is due to the loss of more than 1.4 million acres of existing protected natural conservation lands to sea level rise, many of which are coastal or low-lying, or almost 17% of current protected natural lands.

continued

The Conservation 2070 Scenario avoids development of state priority natural lands currently identified as meriting long-term protection. This includes projects identified by the State of Florida in the Florida Forever land acquisition program, and the highest three priorities in the Florida Ecological Greenways Network (FEGN), also known as the Florida Wildlife Corridor.

This scenario reflects a significant 36% increase in protected natural lands when compared with the Baseline, even when taking into account the 1.4 million acres lost to sea level rise. Under this scenario, more than 13.4 million acres would be protected, or almost 37% of Florida's lands.

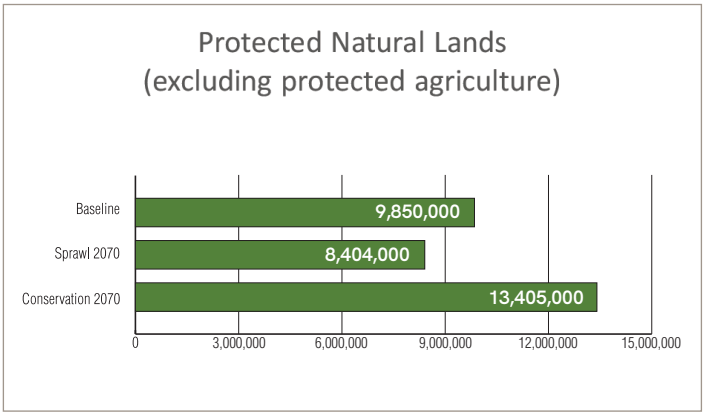


TABLE 5: Statewide Protected Natural Land

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Protected Natural Land	9,850,000	27.11%	8,404,000	23.13%	13,405,000	36.89%

Agricultural Lands

Agriculture is a mainstay in Florida's economy, with close to 7.3 million acres in croplands, livestock, aquaculture and other agricultural uses. Agricultural lands in this report are those identified in the Florida Department of Agriculture's Florida Statewide Agricultural Irrigation Demand (FSAID) study. This does not include silviculture, which is in the "other" category, nor does it include some lands identified as agricultural in local property appraiser data.

For the purposes of this study, agriculture includes a subcategory of "protected lands," some of which are protected for their natural values, such as wetlands, habitat, and the like. More detailed analysis of the impacts of development on agricultural lands in the 2040 and 2070 scenarios has been conducted separately.

Under the Sprawl Scenario, Florida would lose close to 1.8 million acres of agricultural lands by 2070, almost a quarter of the state's total. This is due primarily to development.

The Conservation Scenario, on the other hand, shows the effect of increased protection of priority natural lands on agricultural land uses. While total agricultural lands would decrease by more than 1.2 million acres under the Conservation Scenario when compared with Baseline figures, protected agricultural lands would increase by 264% from 856,000 acres to 3.1 million acres by 2070.

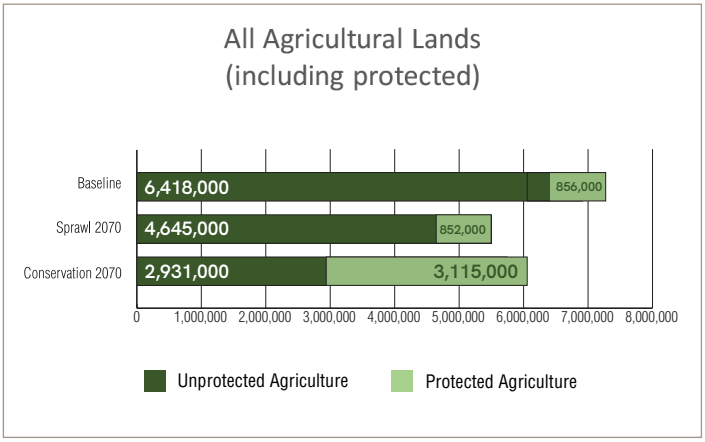


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TABLE 6: Statewide Agricultural Lands

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Protected Agricultural Lands	856,000	2.36%	852,000	2.34%	3,115,000	8.57%
Unprotected Agriculture	6,418,000	17.66%	4,645,000	12.78%	2,931,000	8.07%
Total Agriculture	7,274,000	20.02%	5,497,000	15.13%	6,046,000	16.64%

Other Lands

"Other" lands include all land uses not included in the developed, protected natural, protected and unprotected agriculture, or other categories just covered. Lands in this category include timberlands, mining lands, and other miscellaneous land uses based on the methods described in the technical report.

This category is the most impacted, due to increases in the amount of development and the shifting of lands to the protected conservation and agricultural categories. While not identified for future conservation, it is important to understand that this category does contain lands of conservation and agricultural value, especially timberlands.

The "other" category shows a steady decline, from more than 32% of Florida's lands in the Baseline, to just over 27% in the Sprawl Scenario, to 15.37% in the Conservation Scenario. Why is this the case? The Sprawl Scenario reflects the steady march of development taking over available lands and the "other" categories often include lands with the fewest environmental and economic barriers to development. The Conservation Scenario also reflects the conversion of "other" lands to protected status.

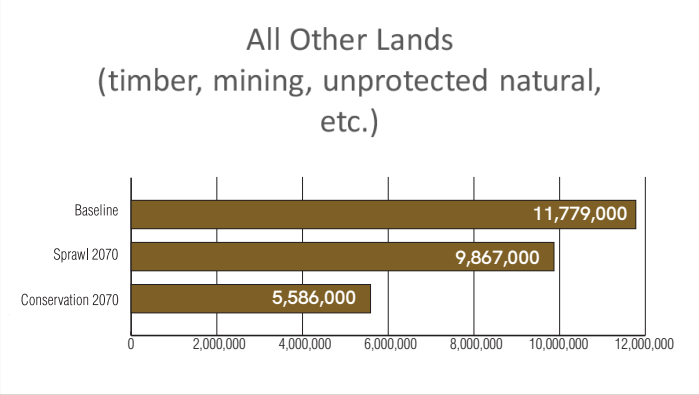

TABLE 7: Statewide Other Lands

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Other	11,779,000	32.42%	9,867,000	27.15%	5,586,000	15.37%

continued

Regional Results

For more in-depth analysis, Florida has been divided into four roughly equal regions.

Panhandle Florida is projected to lose 279,000 acres of land to sea level rise by 2070, including 233,000 acres of protected natural land. This region has by far the lowest current and projected population and is expected to experience a 38% increase in population by 2070. This region has the lowest gross development density (GDD) at 1.48 people per developed acre.

Northeast Florida could lose 305,000 acres of land to sea level rise, including 195,000 acres of protected natural land. It has a somewhat higher population than the Panhandle, but its population is expected to increase more dramatically by 64% over the next five decades. The GDD for this region is a low 1.71 people per developed acre.

Central Florida, with the largest amount of land and highest population of the four regions, is also expected to grow in population by 64% by 2070. At that time, it will have almost as high a population as Northeast and South Florida combined. This region will lose fewer total acres of land to sea level rise than any other – 248,000 acres, including 187,000 acres of protected natural land. Central Florida has a GDD of 3.14 people per developed acre.

South Florida is projected to lose 850,000 acres of land to sea level rise, including 830,000 acres of protected natural lands. This is roughly half of all lands lost to sea level rise in Florida. At the same time, South Florida's population is expected to grow 50% by 2070. This region is the most densely populated with a GDD of 6.06 people per developed acre.

TABLE 8: 2070 Regional Population Projections

Region	Acres Lost to Sea Level Rise	2019 Census	2070 Projection	Percent Increase	Additional Population to be Allocated	2010 Gross Development Density (GDD)
Panhandle	331,000	1,529,159	2,110,976	38%	581,817	1.48
Northeast	389,000	2,643,040	4,335,288	64%	1,692,248	1.71
Central	308,000	9,503,600	15,601,747	64%	6,098,147	3.14
South	1,000,000	7,801,938	11,673,817	50%	3,871,879	6.06
TOTAL	**2,028,000**	**21,477,737**	**33,721,828**	**57%**	**12,244,091**	**3.11**

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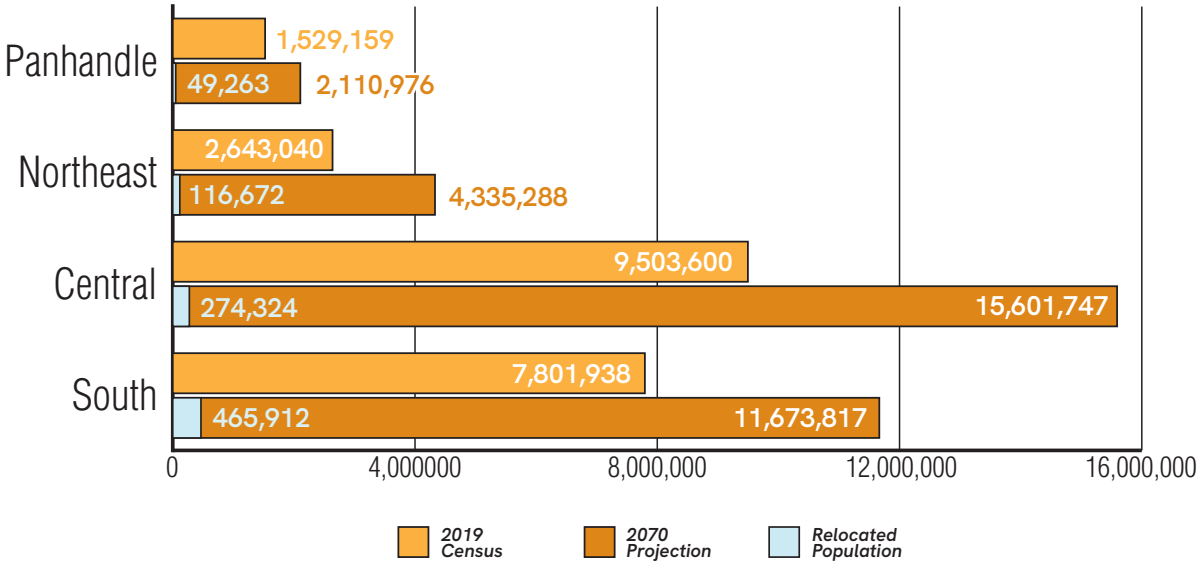
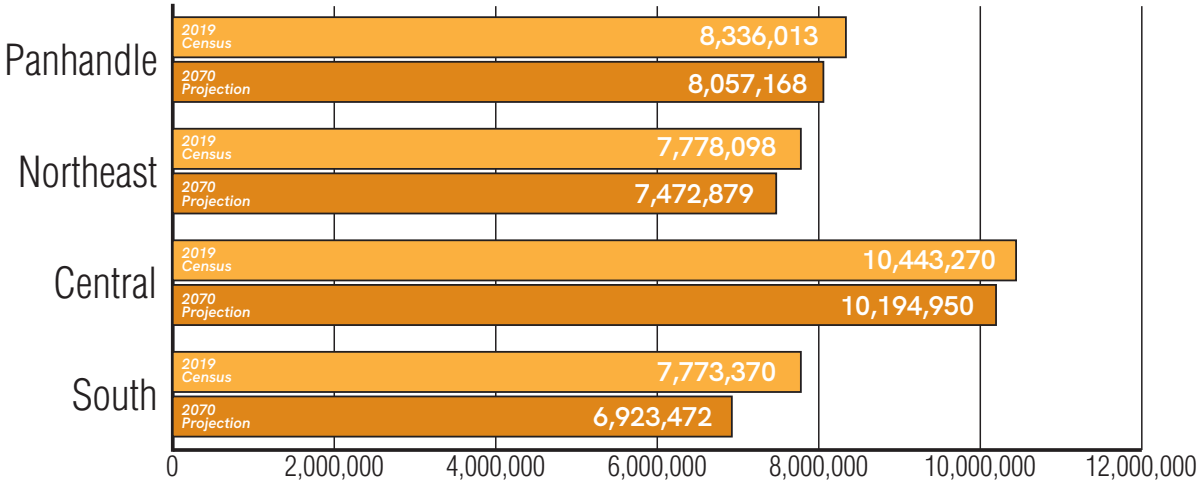
Regional Results *continued*

Total Population by Region



Total Acreage by Region



Total acreage declines in all regions due to sea level rise.

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FLORIDA'S RISING SEAS
Panhandle Summary

SEA LEVEL 2070

Named one of the nation's "biological hotspots" for its rich diversity of habitat and species, Panhandle Florida will be least impacted of the four regions by 2070 due to its relatively small current population and slower rate of growth. However, this region could be a prime relocation spot for "sea level refugees" seeking to escape more developed parts of Florida significantly impacted by sea level rise.

Careful planning for the future is essential to protect the rural character and rich biodiversity of this "biological jewel." With appropriately located and more compact future development combined with significant land conservation, more than 2.2 million acres of the Panhandle's natural and conservation lands could be protected from inappropriate development.

Population Growth

- **582,000 more residents,** a 38% increase

Sea Level Rise

- **279,000 acres of land lost**
- **50,000 residents relocated,** including 18% of Franklin County's population

Sprawl 2070 Scenario

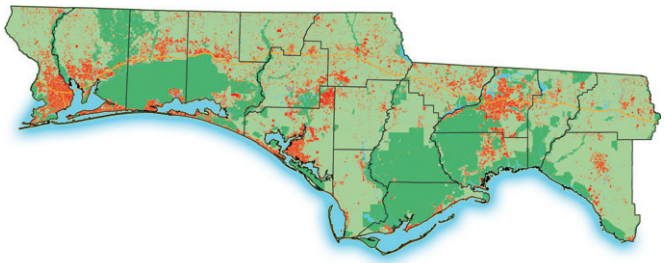
- **314,000 more acres of developed land,** an increase of 37%
- **42,000 acres of agricultural lands lost**
- **318,000 acres of "other" lands lost** *(timber, mining, etc.)*

Conservation 2070 Scenario *(compared with Sprawl Scenario):*

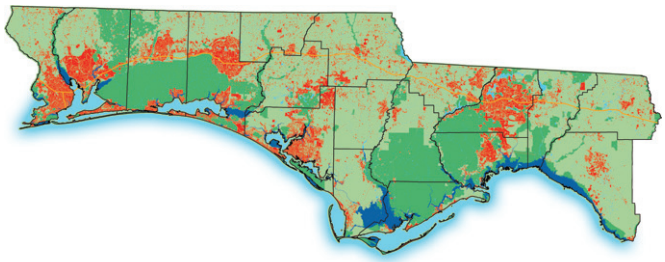
- **72,000 fewer acres of developed land**
- **2.2 million more acres of protected natural land**
- **107,000 more acres of protected agricultural land**

Panhandle Maps

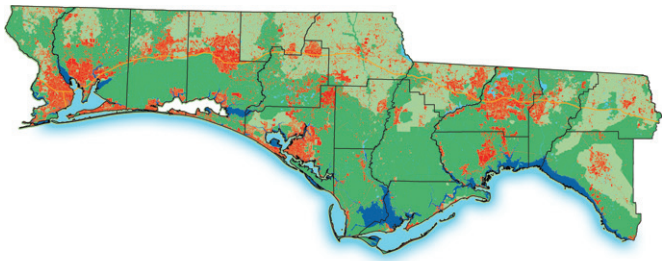
Baseline



Sprawl 2070



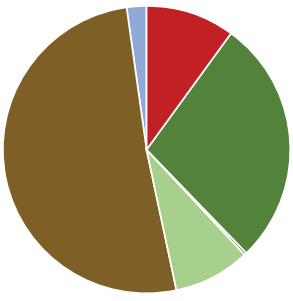
Conservation 2070



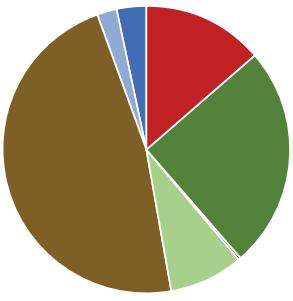
- Developed
- Protected
- Sea Level Rise
- Other

Panhandle Pie Charts

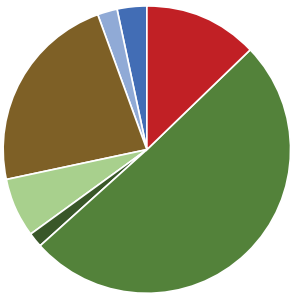
Baseline



Sprawl 2070



Conservation 2070



- Developed
- Total Protected (Excluding Agriculture)
- Protected Agriculture
- Unprotected Agriculture
- Total Other
- Open Water
- Sea Level Rise

continued

Panhandle Florida

The Panhandle, comprised of 18 counties including Bay, Calhoun, Escambia, Franklin, Gadsden, Gulf, Holmes, Jackson, Jefferson, Leon, Liberty, Madison, Okaloosa, Santa Rosa, Taylor, Wakulla, Walton, and Washington counties, encompasses 8.3 million acres of land.

The Panhandle is projected to lose roughly 279,000 acres – or more than 3% of its land mass – to sea level rise by 2070. Of these lost lands, almost 233,000 acres were in conservation in the Baseline. Sea level rise will likely result in the relocation of 50,000 residents, including 18% of Franklin County's population.

As in the past, the Panhandle is projected to remain the least developed and slowest growing region in Florida, increasing from a little more than 1.5 million residents in 2019, to approximately 2.1 million in 2070, a 38% increase. Unsurprisingly, this region has the lowest gross development density (GDD) at 1.48 people per developed acre.

Panhandle Florida has a rich diversity of habitats that are home to a diverse range of often rare species, and it is a center of biological endemism. Because of this, land conservation initiatives have been very robust here, with large tracts of land identified as priorities for future conservation.

TABLE 9: 2070 Panhandle Population Projections and Gross Development Density

2019 Census	2070 Projection	2010-2070 Difference	% Change	2010 Gross Development Density
1,529,159	2,110,976	581,817	38%	1.48

Sprawl 2070

In both the Baseline and the Sprawl 2070 Scenario, approximately half of the lands in the region were in the "other" category, in this case primarily timber lands. Comparing the Sprawl Scenario with Baseline land uses, developed lands only increase slightly – from a little over 10% in the Baseline to less than 14%. The Panhandle is projected to lose 213,000 acres of natural protected lands due to sea level rise. Agricultural lands, both protected and unprotected, show only a slight decline.

Conservation 2070

As is obvious in the pie charts, the Conservation 2070 Scenario shows the most dramatic change, with almost 52% of Panhandle lands under protection by 2070. Most of this is attributed to timber and rural lands in the "other" category shifting to "protected" status due to the region's high conservation value. Agriculture, meanwhile, only shows slight changes between the Baseline and Sprawl Scenario. Interestingly, developed lands increase by about 28% over the Baseline, which is only slightly less than in the Sprawl 2070 Scenario. Given the low density of development in the Panhandle, existing communities should focus on increased development density moving forward.

continued

Table 10: Panhandle Acreage Comparison of 2070 Development Scenarios

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Developed	856,000	10.06%	1,170,000	13.74%	1,098,000	12.89%
Protected Natural Land *	2,374,000	27.87%	2,141,000	25.14%	4,316,000	50.67%
Protected Agriculture	15,000	0.17%	15,000	0.17%	122,000	1.43%
Agriculture	747,000	8.77%	705,000	8.28%	588,000	6.90%
Other**	4,344,000	51.01%	4,026,000	47.27%	1,933,000	22.71%
2019 Open Water	180,000	2.12%	180,000	2.12%	180,000	2.12%
Sea Level Inundation: Protected Lands	0	0.00%	213,000	2.50%	252,000	2.96%
Sea Level Inundation: All Other Land Uses	0	0.00%	66,000	0.78%	27,000	0.31%
Total Acreage	**8,516,000**	**100.00%**	**8,516,000**	**100.00%**	**8,516,000**	**100.00%**
Total Land Acreage	8,336,000	97.88%	8,057,000	94.61%	8,057,000	94.61%
Total Sea Level Inundation	0	0.00%	279,000	3.27%	279,000	3.27%
Total Open Water including SLR	180,000	2.12%	459,000	5.39%	459,000	5.39%

**Protected Natural Land is defined for the purposes of this report as all protected natural and other semi-natural land (such as timberland) not falling into the protected agriculture category.*

***Other land includes timberlands, mining lands, and other miscellaneous land uses not classified as agriculture, developed, protected, protected agriculture, or open water based on the methods described in the technical report.*

TABLE 11: 2070 Panhandle Sea Level Rise Projected Impact by County

County	% of population impacted by SLR	Population impacted by SLR	Displaced out of state (50% of those affected by SLR)
BAY	4.17%	10,718	5,359
CALHOUN	0.00%	0	0
ESCAMBIA	1.97%	6,949	3,475
FRANKLIN	17.57%	2,227	1,114
GADSDEN	0.00%	0	0
GULF	5.37%	1,077	539
HOLMES	0.00%	0	0
JACKSON	0.00%	0	0
JEFFERSON	0.44%	78	39
LEON	0.00%	0	0
LIBERTY	0.16%	22	11
MADISON	0.00%	0	0
OKALOOSA	1.86%	5,028	2,514
SANTA ROSA	3.49%	10,817	5,408
TAYLOR	3.24%	934	467
WAKULLA	8.45%	4,600	2,300
WALTON	4.64%	6,682	3,341
WASHINGTON	0.37%	130	65
TOTAL	**2.33%**	**49,263**	**24,632**

continued

FLORIDA'S RISING SEAS
Northeast Florida Summary

Projected to be one of the fastest growing regions in the state, Northeast Florida could add 1.7 million residents over the coming five decades, a 64% increase. It also has some of the most sprawling development patterns, second only to the Florida Panhandle, with 776,000 more acres of land projected to be paved over. Compounding this, the region stands to lose 389,000 acres of land to sea level rise, including inland areas along the St. Johns because of the river's hydrological connection to the sea.

With its rapid rate of growth, sprawling patterns, and inland sea level rise impacts, Northeast Florida faces major planning challenges. Significant increases in development density in appropriate locations combined with meaningful land conservation are essential if this region is to retain its unique natural resources and character.

Population Growth

- **1.7 million more residents,** a 64% increase

Sea Level Rise

- **305,000 acres of land lost**
- **117,000 residents relocated,** including 48,000 residents in Duval County alone

Sprawl 2070 Scenario

- **776,000 more acres of developed land,** an increase of 62%
- **230,000 acres of agricultural land lost**
- **656,000 acres of "other" land lost** *(timber, mining, etc.)*

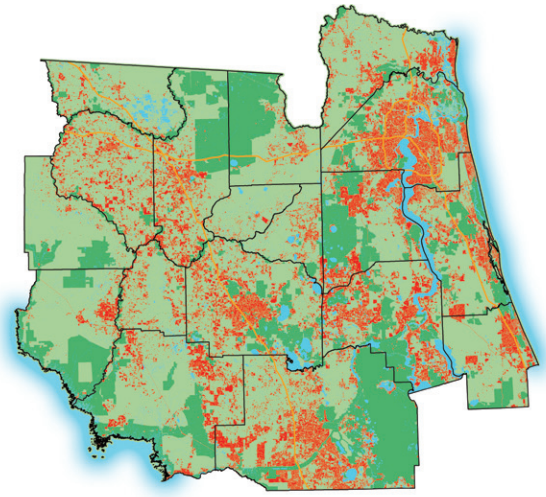
Conservation 2070 Scenario *(compared with Sprawl Scenario):*

- **201,000 fewer acres of developed land**
- **1.6 million more acres of protected natural land**
- **144,000 more acres of protected agricultural land**

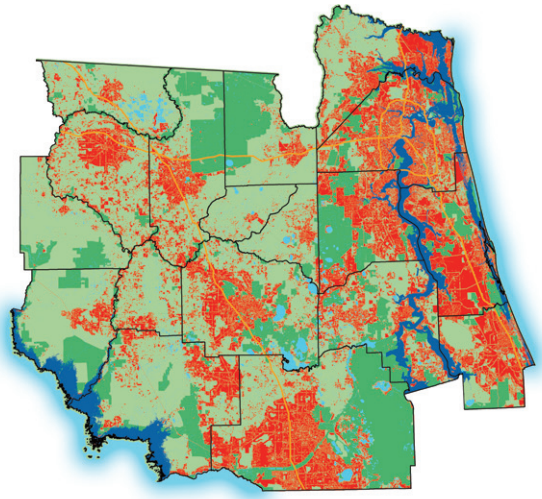
continued

Northeast Maps

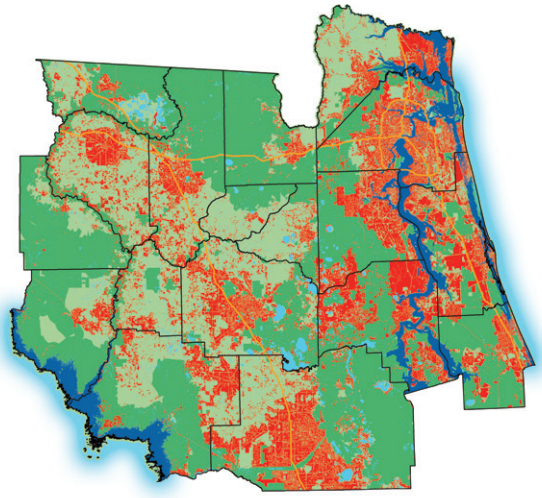
Baseline



Sprawl 2070



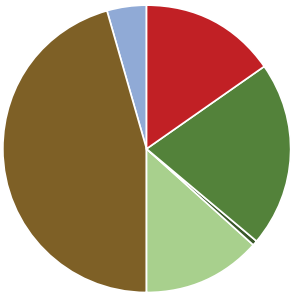
Conservation 2070



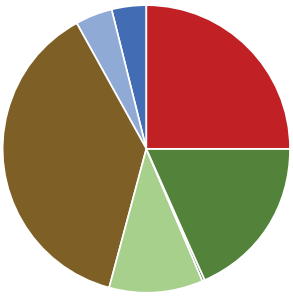
- Developed
- Protected
- Sea Level Rise
- Other

Northeast Pie Charts

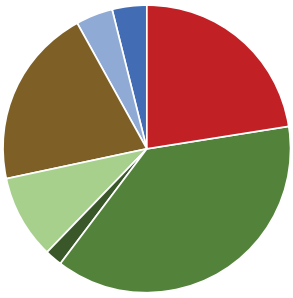
Baseline



Sprawl 2070



Conservation 2070



- Developed
- Total Protected (Excluding Agriculture)
- Protected Agriculture
- Unprotected Agriculture
- Total Other
- Open Water
- Sea Level Rise

continued

Northeast Florida

Florida's Northeast region is comprised of 18 counties including Alachua, Baker, Bradford, Clay, Columbia, Dixie, Duval, Flagler, Gilchrist, Hamilton, Lafayette, Levy, Marion, Nassau, Putnam, St. Johns, Suwannee and Union counties.

With slightly more than 7.8 million acres of land, this region is projected to grow in population by 64%, from 2.6 million residents in 2019 to 4.3 million in 2070. This region also is characterized by "sprawling" development densities at 1.71 people per developed acre.

Northeast Florida is projected to lose almost 305,000 acres to sea level rise by 2070, or approximately 3.8% of its land. It is projected that 117,000 residents in the Northeast will be forced to relocate due to the impacts of sea level rise, including 48,000 residents in Duval County alone.

TABLE 12: 2070 Northeast Florida Population Projections and Gross Development Density

2019 Census	2070 Projection	2010-2070 Difference	% Change	2010 Gross Development Density
2,643,040	4,335,288	1,692,248	64%	1.71

Sprawl 2070

Under the Sprawl Scenario, about 25% of lands in Northeast Florida are projected to be developed, up from about 15% in the Baseline. In addition, agricultural lands – including protected – will decrease from about 1.1 million acres in the Baseline to about 890,000 acres in 2070, due primarily to projected development. "Other" lands, in this region, primarily timberlands, will decrease from about 46% in the Baseline to about 37% in 2070.

Conservation 2070

Even under the Conservation Scenario, about 23% of northeastern lands will be developed, only slightly less than the 25% projected under the Sprawl Scenario. This can largely be attributed to existing sprawling development patterns where just a modest 20% increase in density moving forward does not make a significant difference. Protected natural lands would nearly double, increasing from about 1.7 million acres in the Baseline to just over 3 million acres, or more than 37% of the region, in 2070. Many of the protected natural conservation acres will consist of lands shifted from the "other" category. "Other" includes almost 46% of the region's lands in the Baseline but drops to about 20% under the Conservation Scenario. Agricultural lands will still decrease under the Conservation Scenario, from 1.1 million acres in the Baseline to about 930,000 acres in 2070. However, almost 180,000 acres will be permanently protected.

continued

Table 13: Northeast Florida Acreage Comparison of 2070 Development Scenarios

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Developed	1,258,000	15.48%	2,034,000	25.03%	1,833,000	22.55%
Protected Natural Land*	1,692,000	20.82%	1,497,000	18.42%	3,066,000	37.72%
Protected Agriculture	37,000	0.45%	35,000	0.43%	179,000	2.21%
Agriculture	1,083,000	13.32%	855,000	10.52%	750,000	9.23%
Other**	3,708,000	45.64%	3,052,000	37.56%	1,645,000	20.24%
2019 Open Water	349,000	4.29%	349,000	4.29%	349,000	4.29%
Sea Level Inundation: Protected Lands	0	0.00%	172,000	2.12%	229,000	2.82%
Sea Level Inundation: All Other Land Uses	0	0.00%	133,000	1.64%	76,000	0.93%
Total Acreage	**8,127,000**	**100.00%**	**8,127,000**	**100.00%**	**8,127,000**	**100.00%**
Total Land Acreage	7,778,000	95.71%	7,473,000	91.95%	7,473,000	91.95%
Total Sea Level Inundation	0	0.00%	305,000	3.76%	305,000	3.76%
Total Open Water including SLR	349,000	4.29%	738,000	9.08%	738,000	9.08%

**Protected Natural Land is defined for the purposes of this report as all protected natural and other semi-natural land (such as timberland) not falling into the protected agriculture category.*

***Other land includes timberlands, mining lands, and other miscellaneous land uses not classified as agriculture, developed, protected, protected agriculture, or open water based on the methods described in the technical report.*

TABLE 14: 2070 Northeast Florida Sea Level Rise Projected Impact by County

County	% of population impacted by SLR	Population impacted by SLR	Displaced out of state (50% of those affected by SLR)
ALACHUA	0.00%	0	0
BAKER	0.00%	0	0
BRADFORD	0.00%	0	0
CLAY	2.92%	12,476	6,238
COLUMBIA	0.00%	0	0
DIXIE	2.48%	618	309
DUVAL	3.56%	48,121	24,061
FLAGLER	3.93%	11,636	5,818
GILCHRIST	0.34%	86	43
HAMILTON	0.00%	0	0
LAFAYETTE	0.00%	0	0
LEVY	2.28%	1,381	691
MARION	0.00%	8	4
NASSAU	6.79%	10,319	5,159
PUTNAM	4.03%	3,021	1,510
ST JOHNS	4.91%	29,007	14,503
SUWANNEE	0.00%	0	0
UNION	0.00%	0	0
TOTAL	**2.69%**	**116,672**	**58,336**

continued

FLORIDA'S RISING SEAS
Central Florida Summary

SEA LEVEL 2070

With projections of 6.1 million more residents and 1.7 million more acres of developed land by 2070, Central Florida faces the "perfect storm" of growth and sprawl. Even under the Conservation scenario, a million acres of land could still be lost to development.

With aggressive conservation efforts, 1.5 million more acres of agricultural and 870,000 more acres of natural lands could be protected. But given the shear onslaught of projected population growth, significantly more compact development is essential if the region is not to be paved over in the coming decades. This is critical to prevent significant decline in the quality of life for Central Florida's residents and major impacts on the region's natural and agricultural lands and ecosystems.

Population Growth

- **6.1 million more residents,** a 64% increase

Sea Level Rise

- **248,000 acres of land lost**
- **274,000 residents relocated,** including 49,000 in Pinellas County alone

Sprawl 2070 Scenario

- **1.7 million more acres of developed land,** an increase of 74%
- **477,000 acres of agricultural land lost**
- **763,000 acres of "other" land lost** *(timber, mining, etc.)*

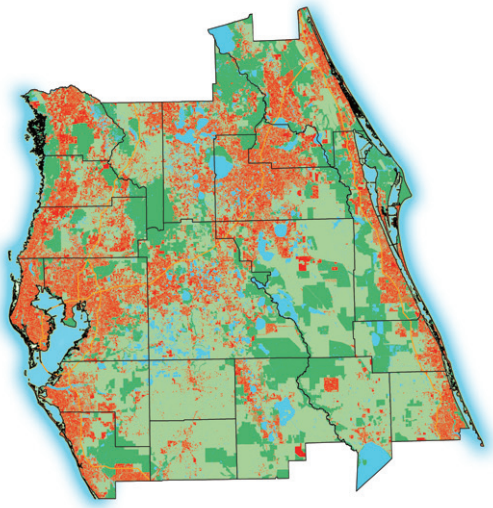
Conservation 2070 Scenario *(compared with Sprawl Scenario):*

- **624,000 fewer acres of developed land**
- **870,000 more acres of protected natural land**
- **1.5 million more acres of protected agricultural land**

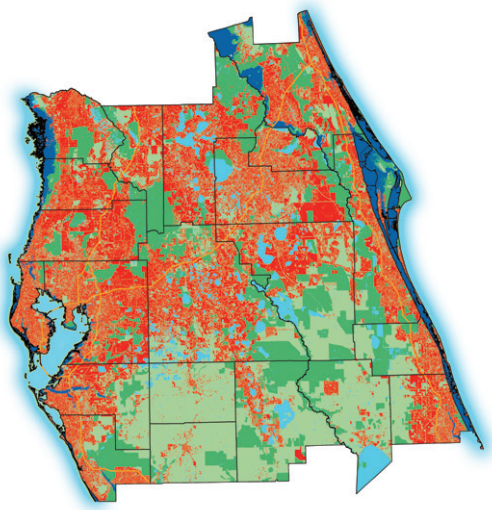
continued

Central Maps

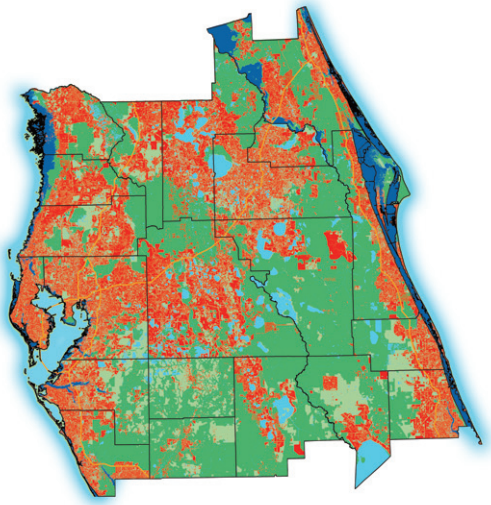
Baseline



Sprawl 2070



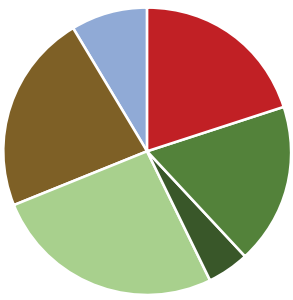
Conservation 2070



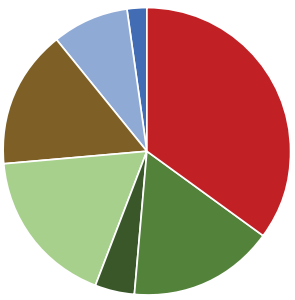
- Developed
- Protected
- Sea Level Rise
- Other

Central Pie Charts

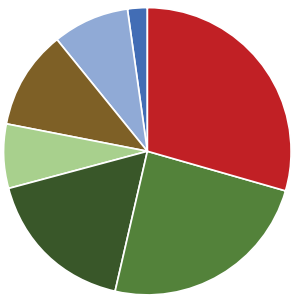
Baseline



Sprawl 2070



Conservation 2070



- Developed
- Total Protected (Excluding Agriculture)
- Protected Agriculture
- Unprotected Agriculture
- Total Other
- Open Water
- Sea Level Rise

continued

Central Florida

Central Florida is comprised of 21 counties including Brevard, Citrus, Desoto, Hardee, Hernando, Highlands, Hillsborough, Indian River, Lake, Manatee, Okeechobee, Orange, Osceola, Pasco, Pinellas, Polk, Sarasota, Seminole, St Lucie, Sumter, and Volusia.

The largest of the four regions both in terms of acreage and population, in the Baseline it encompassed 10 million acres of land with a population of 9.5 million residents. Central Florida is projected to lose about 248,000 acres – or 2% — of its lands to sea level rise by 2070, which will likely cause the relocation of 274,000 residents. Manatee County will be the hardest hit with 6.3% of its residents – or 41,000 people – needing to move due to sea level rise.

Central Florida has been described as the "perfect storm," in terms of both growth and development over the coming decades. Its population – significantly larger than any other region – is projected to increase by 64%, to 15,601,747 by 2070. With a current gross urban density of 3.14 persons per developed acre, even a 20% increase in future density barely limits further sprawl. Compounding the situation, Central Florida will likely be a popular location for "sea level refugees" seeking a home away from the coasts.

TABLE 15: 2070 Central Florida Population Projections and Gross Development Density

2019 Census	2070 Projection	2010-2070 Difference	% Change	2010 Gross Development Density
9,503,600	15,601,747	6,098,147	64%	3.14

Sprawl 2070

The pace of development is projected to remain relentless in Central Florida over the coming decades. The amount of developed land in the region will almost double – from 2.3 million acres (or 20%) in the Baseline to 4 million acres (or about 35%) in 2070. On top of this, Central Florida has by far the most agricultural lands of the four regions, with approximately 3.5 million acres – or about a third of its area – in the Baseline. Under the Sprawl Scenario, the region stands to lose about a million acres of agricultural lands by 2070. In the Baseline, about 22% of the region's lands were in the "other" category, including timber. This is projected to decrease to about 15% under the Sprawl Scenario in 2070.

Conservation 2070

With 20% more compact development moving forward, the Conservation Scenario results in approximately 30% of the region's lands being developed, somewhat less than the 35% projected under the Sprawl Scenario. Interestingly, protected natural lands are only projected to increase from about 18% in the Baseline to 24% in 2070. Meanwhile, protected agricultural lands would increase from 528,000 acres in the Baseline to close to 2 million acres in 2070. Total agricultural lands in the region (both protected and not) would decrease from about 3.5 million acres in the Baseline to about 2.8 million acres under the Conservation 2070 Scenario, but much of the region's prime agricultural lands would be protected. Other lands would more than halve, from almost 2.6 million acres in the Baseline to 1.2 million by 2070. .

continued

Table 16: Central Florida Acreage Comparison of 2070 Development Scenarios

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Developed	2,297,000	20.12%	4,004,000	35.08%	3,380,000	29.61%
Protected Natural Land*	2,058,000	18.03%	1,871,000	16.39%	2,741,000	24.01%
Protected Agriculture	528,000	4.63%	526,000	4.61%	1,985,000	17.39%
Agriculture	3,004,000	26.32%	2,001,000	17.53%	825,000	7.22%
Other**	2,556,000	22.40%	1,793,000	15.71%	1,264,000	11.08%
2019 Open Water	971,000	8.51%	971,000	8.51%	971,000	8.51%
Sea Level Inundation: Protected Lands	0	0.00%	168,000	1.47%	195,000	1.71%
Sea Level Inundation: Other Land Uses	0	0.00%	80,000	0.71%	53,000	0.47%
Total Acreage	**11,414,000**	**100.00%**	**11,414,000**	**100.00%**	**11,414,000**	**100.00%**
Total Land Acreage	10,443,000	91.49%	10,195,000	89.32%	10,195,000	89.32%
Total Sea Level Inundation	0	0.00%	248,000	2.18%	248,000	2.18%
Total Open Water including SLR	971,000	8.51%	1,219,000	10.68%	1,219,000	10.68%

**Protected Natural Land is defined for the purposes of this report as all protected natural and other semi-natural land (such as timberland) not falling into the protected agriculture category.*

***Other land includes timberlands, mining lands, and other miscellaneous land uses not classified as agriculture, developed, protected, protected agriculture, or open water based on the methods described in the technical report.*

TABLE 17: 2070 Central Florida Sea Level Rise Projected Impact by County

County	% of population impacted by SLR	Population impacted by SLR	Displaced out of state (50% of those affected by SLR)
BREVARD	3.50%	28,082	14,041
CITRUS	3.13%	6,856	3,428
DESOTO	0.03%	9	4
HARDEE	0.00%	0	0
HERNANDO	1.96%	6,829	3,414
HIGHLANDS	0.00%	0	0
HILLSBOROUGH	1.28%	32,931	16,465
INDIAN RIVER	4.76%	12,087	6,044
LAKE	0.01%	36	18
MANATEE	6.31%	41,202	20,601
OKEECHOBEE	0.00%	0	0
ORANGE	0.00%	0	0
OSCEOLA	0.00%	0	0
PASCO	2.86%	29,075	14,538
PINELLAS	4.77%	49,522	24,761
POLK	0.00%	0	0
ST LUCIE	1.71%	11,030	5,515
SARASOTA	4.16%	24,801	12,400
SEMINOLE	0.07%	484	242
SUMTER	0.00%	0	0
VOLUSIA	4.51%	31,380	15,690
TOTAL	**1.76%**	**274,324**	**137,162**

continued

FLORIDA'S RISING SEAS
South Florida Summary

SEA LEVEL 2070

South Florida is already in the crosshairs of sea level rise, and much more is to come. By 2070 the region could experience a 50% increase in population and lose 850,000 acres of land to sea level rise, including 743,000 acres of currently protected conservation lands. An estimated 466,000 residents – including 55% of Monroe County's population – could face relocation by 2070.

South Florida stands to lose 656,000 acres of land to development under the Sprawl scenario, but with a 20% increase in density and increased redevelopment, that could come down to 284,000 acres as shown in the Conservation scenario. But the location of redevelopment and new development should be carefully evaluated to ensure that more residents are not put in harms way as the seas continue to rise.

Population Growth

- **3.9 million more residents,** a 50% increase

Sea Level Rise

- **850,000 acres of land lost,** roughly half the lands lost to sea level rise in Florida
- **466,000 residents relocated,** including 55% of Monroe County's population

Sprawl 2070 Scenario

- **656,000 more acres of developed land,** an increase of 65%
- **500,000 acres of agricultural land lost**
- **175,000 acres of "other" land lost** *(timber, mining, etc.)*

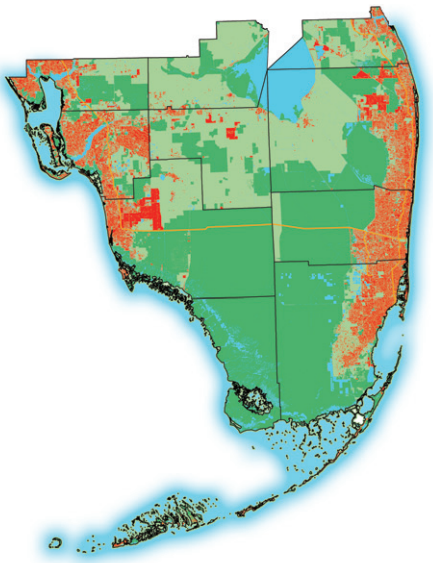
Conservation 2070 Scenario *(compared with Sprawl Scenario):*

- **372,000 fewer acres of developed lands**
- **387,000 more acres of protected natural land**
- **553,000 more acres of protected agricultural land**

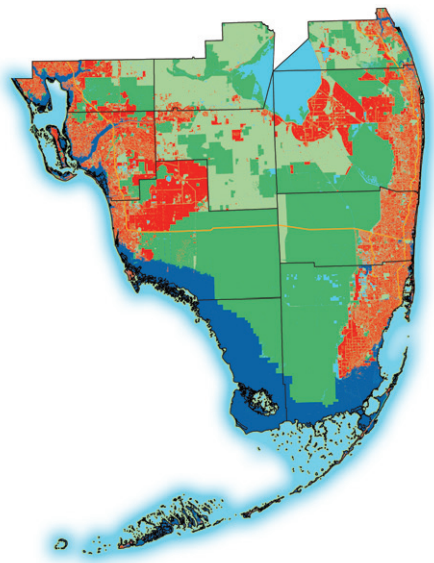
continued

South Maps

Baseline

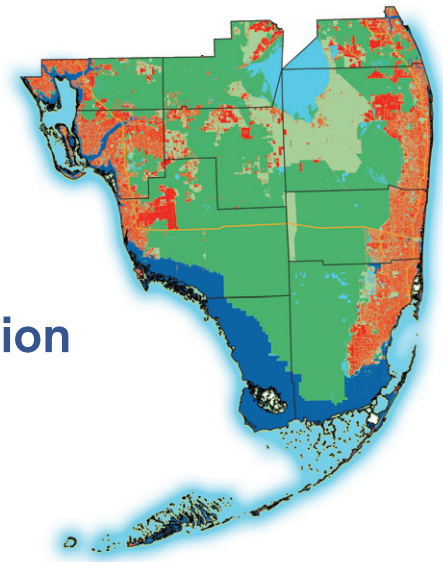


Sprawl 2070



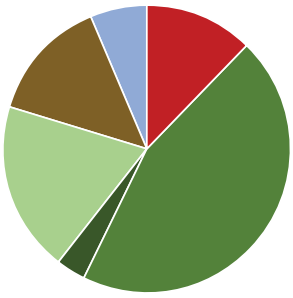
- Developed
- Protected
- Sea Level Rise
- Other

Conservation 2070

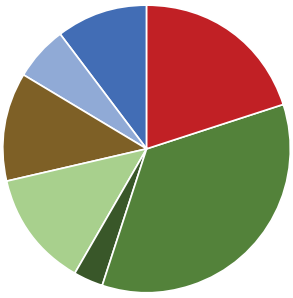


South Pie Charts

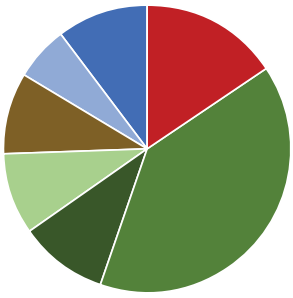
Baseline



Sprawl 2070



Conservation 2070



- Developed
- Total Protected (Excluding Agriculture)
- Protected Agriculture
- Unprotected Agriculture
- Total Other
- Open Water
- Sea Level Rise

continued

South Florida

Comprised of 10 counties including Broward, Charlotte, Collier, Glades, Hendry, Lee, Martin, Miami-Dade, Monroe, and Palm Beach, South Florida encompasses 7.8 million acres of land. This region is expected to experience a 50% increase in population, from 7.8 million residents in the Baseline to almost 11.7 million residents by 2070.

In the Baseline, almost half of the lands in South Florida were already under protection, mostly for their natural value. This is due in large part to federal and state conservation lands protecting the Everglades and other large swaths of environmentally unique lands in the region. Not surprisingly, because of its low elevation and vast expanses of wetlands, this region is expected to experience the greatest loss of land due to sea level rise, totaling a little over 850,000 acres lost, including 743,000 acres of currently protected land.

Sea level rise is projected to cause the relocation of 466,000 residents in the region, including 178,000 in Miami-Dade and 61,000 in Broward County on the east coast. On the west coast, 98,000 residents in Lee and 37,000 residents in Collier will likely need to relocate. Of course, Monroe County, home to the Florida Keys island chain, will be the most impacted, with 55% of its population likely needing to move.

TABLE 18: 2070 South Florida Population Projections and Gross Development Density

2019 Census	2070 Projection	2010 -2070 Difference	% Change	2010 Gross Development Density
7,801,938	11,673,817	3,871,879	50%	6.06

Sprawl 2070

Under the Sprawl Scenario, developed lands will increase from a little over 1 million acres in the Baseline to almost 1.7 million acres in 2070. Combining this growth with the loss of land due to sea level rise, roughly 20% of South Florida's lands would be developed. During the same period, unprotected agricultural lands would decline, from roughly 1.6 million acres (or 19%) in the Baseline to about 1.1 million acres (or 13%) by 2070. Other lands, including timber, would decline from 14% to 12% during the period, from 1.2 million acres to about 744,000 acres.

Conservation 2070

With its major metropolitan areas, South Florida understandably has the highest gross development density of the four regions, with 6.06 people per developed acre. This means that if new development in the region is 20% more compact moving forward, less land will be needed to accommodate new residents than in other parts of the state. Under this scenario, developed lands will increase from a little over 1 million acres in the Baseline to about 1.3 million acres in 2070, an increase from about 12% to a little under 16%. Protected natural lands will decline by about 440,000 acres even under the Conservation Scenario due primarily to sea level rise. Unprotected agricultural lands will decline in total acreage by more than half but protected agriculture will increase from about 276,000 acres in the Baseline to almost 830,000 acres in 2070.

continued

TABLE 19: South Florida Acreage Comparison of 2070 Development Scenarios

	Baseline	% of Total Acreage	Sprawl 2070	% of Total Acreage	Conservation 2070	% of Total Acreage
Developed	1,017,000	12.28%	1,673,000	20.20%	1,301,000	15.71%
Protected Natural Land*	3,726,000	45.00%	2,895,000	34.97%	3,282,000	39.64%
Protected Agriculture	276,000	3.33%	276,000	3.33%	829,000	10.01%
Agriculture	1,584,000	19.13%	1,084,000	13.09%	768,000	9.28%
Other**	1,171,000	14.15%	996,000	12.02%	744,000	8.97%
2019 Open Water	506,000	6.12%	506,000	6.12%	506,000	6.12%
Sea Level Inundation: Protected Lands	0	0.00%	743,000	8.97%	756,000	9.13%
Sea Level Inundation: Other Land Uses	0	0.00%	107,000	1.29%	94,000	1.14%
Total Acreage	**8,280,000**	**100.00%**	**8,280,000**	**100.00%**	**8,280,000**	**100.00%**
Total Land Acreage	7,773,000	93.88%	6,923,000	83.62%	6,923,000	83.62%
Total Sea Level Inundation	0	0.00%	850,000	10.26%	850,000	10.26%
Total Open Water including SLR	506,000	6.12%	1,356,000	16.38%	1,356,000	16.38%

**Protected Natural Land is defined for the purposes of this report as all protected natural and other semi-natural land (such as timberland) not falling into the protected agriculture category.*

***Other land includes timberlands, mining lands, and other miscellaneous land uses not classified as agriculture, developed, protected, protected agriculture, or open water based on the methods described in the technical report.*

TABLE 20: 2070 South Florida Sea Level Rise Projected Impact by County

County	% of population impacted by SLR	Population impacted by SLR	Displaced out of state (50% of those affected by SLR)
BROWARD	2.45%	60,817	30,408
CHARLOTTE	8.90%	21,141	10,571
COLLIER	5.56%	36,646	18,323
GLADES	0.00%	0	0
HENDRY	0.00%	0	0
LEE	6.32%	98,020	49,010
MARTIN	4.61%	9,969	4,984
MIAMI-DADE	4.22%	177,783	88,891
MONROE	54.95%	42,724	21,362
PALM BEACH	0.86%	18,812	9,406
TOTAL	**3.99%**	**465,912**	**232,956**

continued

Appendix A

Sea Level 2040 Methodology

Sea Level 2070 includes a Baseline and two future scenarios, with each future scenario reflecting the impacts of population growth and sea level inundation in Florida by the year 2070. Each future scenario reflects that 50% of the population displaced by sea level rise in each county will relocate in the county or nearby counties, with the remaining 50% projected to leave the state.

Sprawl 2070 reflects each county continuing similar patterns of development as in 2010 amid sea level rise and population growth, with development allowed to occur on state priority natural lands. Conservation 2070 accommodates the same population growth and sea level rise, does not allow development to occur on identified state priority natural lands, and includes some redevelopment of existing developed areas and a 20% increase in gross development density in each county. Table 21 outlines major differences between the two future scenarios.

TABLE 21: General Comparison of Sprawl and Conservation Modeling Assumptions

	Sprawl 2070	Conservation 2070
Redevelopment Areas	No new population is accommodated within existing urban areas	In all counties, some of the 2070 population growth is accommodated through an increase in the densities of existing urban areas
Development Densities	New population to be accommodated is allocated at each county's 2010 gross urban density	The remaining new population to be allocated after the redevelopment population is removed is allocated at a development density 20% greater than that used for Sprawl 2070.
Protected lands	2021 Florida Managed Areas are included as protected	In addition to 2021 Florida Managed Areas, 2021 Florida Forever project lands, and Florida Ecological Greenways Network Priorities 1-3 (the Florida Wildlife Corridor) are protected.
Agricultural lands	No agricultural lands are excluded from population allocation	All irrigated agricultural lands (using the 2045 projection) on good soils (USDA/NRCS Capability Rating Excellent – Marginal) from FSAID, 2020 version, are excluded from population allocation
Sea Level Rise	50% of population impacted by sea level rise is reallocated within the county affected. The other 50% is assumed to move out of the state. Areas between 0.9-1.4m in elevation are assumed to be less likely to develop.	50% of population impacted by sea level rise is reallocated within the county affected. The other 50% is assumed to move out of the state. Areas between 0.9-1.4m in elevation are not allowed to develop.

continued

Methodology:

The University of Florida Center for Landscape Conservation Planning undertook these steps to develop the baseline and two future scenarios:

1. **Calculate the projected new population county by county** — To provide greater consistency with the 2016 Florida 2070 and Sea Level 2070 scenarios, the 2015 Florida Bureau of Economic and Business Research (BEBR) medium projections for 2040 were used, with a linear projection to extrapolate the 2040 population to 2070. These projections are based on 2019 U.S. census data, with regional projections shown in Table 22.

TABLE 22: Population Projected Change by Region and State

	2019 Census	2070 Projection	2019-2070 Difference	% Change
Panhandle	1,529,159	2,110,976	581,817	38%
Northeast	2,643,040	4,335,288	1,692,248	64%
Central	9,503,600	15,601,747	6,098,147	64%
South	7,801,938	11,673,817	3,871,879	50%
Statewide	**21,477,737**	**33,721,828**	**12,244,091**	**57%**

2. **Map existing developed lands** — County property appraiser data for the land use categories identified in Table 23 was used to identify developed lands for the Baseline. These were also shown as developed for both the Sprawl and Conservation 2070 Scenarios.

TABLE 23: Developed Categories

SINGLE FAMILY
MOBILE HOMES
MULTI-FAMILY
CONDOMINIA
COOPERATIVES
RETIREMENT HOMES
BOARDING HOMES (INSTITUTIONAL)
MULTI-FAMILY LESS THAN 10 UNITS
STORES ONE-STORY
MIXED USE, I.E., STORE AND OFFICE
DEPARTMENT STORES
SUPERMARKET
REGIONAL SHOPPING MALLS
COMMUNITY SHOPPING CENTERS
ONE-STORY NON-PROFESSIONAL OFFICES
MULTI-STORY NON-PROFESSIONAL OFFICES
PROFESSIONAL SERVICE BUILDINGS
AIRPORTS, MARINAS, BUS TERMINALS, AND PIERS
RESTAURANTS, CAFETERIAS
DRIVE-IN RESTAURANTS
FINANCIAL INSTITUTIONS
INSURANCE COMPANY OFFICES
REPAIR SERVICE SHOPS
SERVICE STATIONS
AUTOMOTIVE REPAIR, SERVICE, AND SALES
PARKING LOTS, MOBILE HOME SALES
WHOLESALE, MANUFACTURING, AND PRODUCE OUTLETS
FLORIST, GREENHOUSES
DRIVE-IN THEATERS, OPEN STADIUMS
ENCLOSED THEATERS, AUDITORIUMS
NIGHT CLUBS, BARS, AND COCKTAIL LOUNGES

BOWLING ALLEYS, SKATING RINGS, ENCLOSED ARENAS
TOURIST ATTRACTIONS
RACE HORSE, AUTO, AND DOG TRACKS
GOLF COURSES
HOTELS, MOTELS
LIGHT MANUFACTURING
HEAVY MANUFACTURING
LUMBER YARDS, SAWMILLS, PLANNING MILLS
FRUIT, VEGETABLES, AND MEAT PACKING
CANNERIES, DISTILLERIES, AND WINERIES
OTHER FOOD PROCESSING
WAREHOUSES, AND DISTRIBUTION CENTERS
INDUSTRIAL STORAGE (FUEL, EQUIP, AND MATERIAL)
CHURCHES
PRIVATE SCHOOLS
PRIVATE HOSPITALS
HOMES FOR AGED
MORTUARIES, CEMETERIES
CLUBS, LODGES, AND UNION HALLS
SANITARIUMS, CONVALESCENT, AND BEST HOM
CULTURAL ORGANIZATIONS
PUBLIC SCHOOLS
COLLEGES
PUBLIC HOSPITALS
OTHER MUNICIPAL
UTILITIES
VACANT RESIDENTIAL
VACANT COMMERCIAL
VACANT INDUSTRIAL
VACANT INSTITUTIONAL

continued

3. **Map existing protected lands and state priority natural lands** — The Baseline included lands already protected in Florida based on May 21, 2021, Florida Managed Areas (FLMA) data from Florida Natural Areas Inventory. Additional state priority natural lands included projects identified as priorities in the Florida Forever land acquisition program and Florida Ecological Greenways Network (FEGN) highest priorities 1-3 (also known as the Florida Wildlife Corridor). The 2070 Sprawl Scenario assumed that priority natural lands could be developed over the coming decades, while the Conservation Scenario assumed they were not developed. Tables 24 and 25 include additional information on protected natural and protected agriculture lands in the Baseline and future scenarios.

TABLE 24: Protected Natural Lands

	Baseline	Sprawl 2070	Conservation 2070
Protected Natural Lands	Lands in the 2021 Florida Managed Lands data layer (from Florida Natural Areas Inventory (FNAI))	Lands in the 2021 Florida Managed Lands data layer (from Florida Natural Areas Inventory (FNAI))	Lands in the 2021 Florida Managed Lands data layer (from Florida Natural Areas Inventory via FGDL), or Florida Forever 2021 project lands, or Florida Ecological Greenways Network priorities 1,2, and 3 (the Florida Wildlife Corridor)

TABLE 25: Protected Agriculture

	2019	Sprawl 2070	Conservation 2070
Protected Agriculture	Lands in the 2021 Florida Managed Lands data layer (from Florida Natural Areas Inventory via FGDL) and in the Crop, Livestock and Aquaculture Lands of 2018 (FSAID).	Lands in the 2021 Florida Managed Lands data layer (from Florida Natural Areas Inventory via FGDL) and in the Crop, Livestock and Aquaculture Lands of 2045 (FSAID).	Lands in the 2021 Florida Managed Lands data layer (from Florida Natural Areas Inventory via FGDL), or Florida Forever 2021 project lands, or Florida Ecological Greenways Network priorities 1,2, and 3 and in the Crop, Livestock and Aquaculture Lands of 2045 (FSAID)
Agriculture (crop, livestock, and aquaculture)	2018 lands so identified through FSAID not in the Florida Managed Lands data layer.	2045 lands so identified through FSAID not in the Florida Managed Lands data layer.	2045 lands so identified through FSAID not overtaken by development and not included in the protected category defined above.

4. **Identify lands and population projected to be impacted by sea level rise** — Sea level rise was based on a 0.9m projection by 2070 (a modified version of the 2017 NOAA intermediate high projections). The number of people impacted in 2070 by a 0.9m SLR was identified using the percentage of population impacted in coastal counties by a 0.9m SLR in 2100 (Hauer 2016) and then applying those percentages to BEBR's 2015 medium 2070 population projections for coastal counties.

   For this analysis, 50% of the population on inundated lands was assumed to relocate out of state as shown in Table 26, with the remaining 50% relocating within or near their existing county of residence, based on the premise that existing residents would want to move to locations close to their existing employment, social networks, and home.

continued

Counties with sufficient capacity accommodated the full 50% of the relocated population, but in counties with insufficient capacity, "overflow" population was assigned to an adjacent county or counties.

An additional 0.5m buffer (corresponding with a 1.4m sea level rise and a 2017 NOAA "High" sea level rise scenario) was included where new population was allowed but given a low likelihood in the Sprawl Scenario and not allowed in the Conservation Scenario.

TABLE 26: County Population Impacted by SLR

County	% of population impacted by SLR	Population impacted by SLR	Displaced out of state (50% of those affected by SLR)
ALACHUA	0.00%	0	0
BAKER	0.00%	0	0
BAY	4.17%	10,718	5,359
BRADFORD	0.00%	0	0
BREVARD	3.50%	28,082	14,041
BROWARD	2.45%	60,817	30,408
CALHOUN	0.00%	0	0
CHARLOTTE	8.90%	21,141	10,571
CITRUS	3.13%	6,856	3,428
CLAY	2.92%	12,476	6,238
COLLIER	5.56%	36,646	18,323
COLUMBIA	0.00%	0	0
DESOTO	0.03%	9	4
DIXIE	2.48%	618	309
DUVAL	3.56%	48,121	24,061
ESCAMBIA	1.97%	6,949	3,475
FLAGLER	3.93%	11,636	5,818
FRANKLIN	17.57%	2,227	1,114
GADSDEN	0.00%	0	0
GILCHRIST	0.34%	86	43
GLADES	0.00%	0	0
GULF	5.37%	1,077	539
HAMILTON	0.00%	0	0
HARDEE	0.00%	0	0
HENDRY	0.00%	0	0
HERNANDO	1.96%	6,829	3,414
HIGHLANDS	0.00%	0	0
HILLSBOROUGH	1.28%	32,931	16,465
HOLMES	0.00%	0	0
INDIAN RIVER	4.76%	12,087	6,044
JACKSON	0.00%	0	0
JEFFERSON	0.44%	78	39
LAFAYETTE	0.00%	0	0
LAKE	0.01%	36	18
LEE	6.32%	98,020	49,010
LEON	0.00%	0	0
LEVY	2.28%	1,381	691

continued

TABLE 26: County Population Impacted by SLR *(Continued)*

County	% of population impacted by SLR	Population impacted by SLR	Displaced out of state (50% of those affected by SLR)
LIBERTY	0.16%	22	11
MADISON	0.00%	0	0
MANATEE	6.31%	41,202	20,601
MARION	0.00%	8	4
MARTIN	4.61%	9,969	4,984
MIAMI-DADE	4.22%	177,783	88,891
MONROE	54.95%	42,724	21,362
NASSAU	6.79%	10,319	5,159
OKALOOSA	1.86%	5,028	2,514
OKEECHOBEE	0.00%	0	0
ORANGE	0.00%	0	0
OSCEOLA	0.00%	0	0
PALM BEACH	0.86%	18,812	9,406
PASCO	2.86%	29,075	14,538
PINELLAS	4.77%	49,522	24,761
POLK	0.00%	0	0
PUTNAM	4.03%	3,021	1,510
ST JOHNS	4.91%	29,007	14,503
ST LUCIE	1.71%	11,030	5,515
SANTA ROSA	3.49%	10,817	5,408
SARASOTA	4.16%	24,801	12,400
SEMINOLE	0.07%	484	242
SUMTER	0.00%	0	0
SUWANNEE	0.00%	0	0
TAYLOR	3.24%	934	467
UNION	0.00%	0	0
VOLUSIA	4.51%	31,380	15,690
WAKULLA	8.45%	4,600	2,300
WALTON	4.64%	6,682	3,341
WASHINGTON	0.37%	130	65
TOTAL		**906,170**	**453,085**

5. **Determine the potential location of future** — Shown in Table 27, the likelihood of development criteria are used to determine where projected new development is to be allocated. These assume that available lands closer to cities, close to major roads, and in proximity to waterbodies would be more likely to develop. Due to higher development costs, wetlands were deemed less likely to develop. Likewise, lands with prime agricultural soils in the Florida Statewide Agricultural Irrigation Demand (FSAID) study for 2045 were determined less likely to develop in the Sprawl 2070 scenario because of the considerable investment in irrigation to make these lands more productive. These lands were excluded from development in the Conservation 2070 Scenario.

continued

TABLE 27: Likelihood of Development (Development Suitability) Criteria

Development Suitability Criterion	Rational for Use	Weight
Proximity to Large Urban Areas (over 50,000 people)	Major urban areas tend to accommodate more additional population than do smaller urban areas.	5%
Proximity to All Urban Areas (over 2,500 people)	New urban development tends to occur in close proximity to existing urban development.	27%
Proximity to coastline	The coast has historically been an attractor for urban development. However future sea level rise is expected to make these areas less attractive in 2070.	9%
Preliminary Development Approvals	Areas within approved Developments of Regional Impact (DRIs) and Detailed Specific Area Plans (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.	8%
Road density	New urban development tends to occur in areas of relatively higher road density.	12%
Presence/absence of wetlands	Urban development on lands without wetlands is often less costly than lands with wetlands.	16%
Proximity to open water	Access to the view of water has historically been an attractor for development.	2%
Proximity to major roads	Roads facilitate new urban development.	5%
Absence of USDA/NRCS Soils within FSAID 2045 Projected Irrigated Agricultural Lands	There is an economic incentive to convert poorer agricultural soils to urban development before good agricultural soils.	16%

6. **Determine the density of existing and future development** — Gross Development Density (GDD) was used to determine the density of existing and projected development. GDD reflects the average number of people per every developed acre and is calculated on a county-by-county basis. For the future scenarios, the GDD was used to determine the acreage required to accommodate new development in each county.

   To achieve results consistent with the earlier Florida 2070/Water 2070 study, both the 2016 version and this current 2070 analysis used the same 2010 GDD, as shown in Table 28, so the impact of sea level rise would be clearer. For the 2070 Sprawl Scenario, the 2070 population projection for each county was divided by the 2010 GDD for that county to determine the amount of land needed to accommodate potential future development. This means that current patterns of development are presumed to persist.

   In order to show an alternative future scenario with less sprawling development patterns, for the Conservation 2070 Scenario the GDD was increased by 20% and some redevelopment was included. For the 2070 Conservation Scenario, the same 2070 population projection for each county was divided by a 20% more compact GDD for that county, thus reducing sprawl. County-level population projections were based on the 2015 population projections used in the 2016 Florida 2070 scenarios for maximum parity with those scenarios. The Conservation Scenario also includes some redevelopment in existing developed areas. The amount of redevelopment was based on a ratio of developed 2010 land to available land for development. Counties with less land available for redevelopment were assumed to have a higher percentage of the future population accommodated through redevelopment. Redevelopment percentages range from 10% in counties with abundant available land to 60% in counties with less land for new growth.

continued

TABLE 28: Gross Development Density (GDD) by County

County	2010 GDD
ALACHUA	1.91
BAKER	1.62
BAY	1.65
BRADFORD	1.26
BREVARD	3.15
BROWARD	10.85
CALHOUN	0.95
CHARLOTTE	1.64
CITRUS	1.04
CLAY	2.19
COLLIER	2.44
COLUMBIA	0.89
DESOTO	1.48
DIXIE	0.60
DUVAL	4.84
ESCAMBIA	2.84
FLAGLER	1.89
FRANKLIN	0.88
GADSDEN	1.07
GILCHRIST	0.53
GLADES	1.31
GULF	0.67
HAMILTON	0.26
HARDEE	1.79
HENDRY	1.17
HERNANDO	1.87
HIGHLANDS	1.35
HILLSBOROUGH	4.73
HOLMES	0.85
INDIAN RIVER	2.49
JACKSON	0.74
JEFFERSON	0.46
LAFAYETTE	1.04
LAKE	1.57

County	2010 GDD
LEE	2.66
LEON	2.13
LEVY	0.43
LIBERTY	1.46
MADISON	0.79
MANATEE	3.09
MARION	1.68
MARTIN	2.79
MIAMI-DADE	13.58
MONROE	3.81
NASSAU	0.80
OKALOOSA	2.58
OKEECHOBEE	1.10
ORANGE	4.59
OSCEOLA	2.61
PALM BEACH	6.23
PASCO	3.18
PINELLAS	7.21
POLK	2.45
PUTNAM	0.58
ST JOHNS	1.73
ST LUCIE	2.82
SANTA ROSA	1.87
SARASOTA	4.75
SEMINOLE	6.47
SUMTER	2.32
SUWANNEE	0.48
TAYLOR	0.74
UNION	2.75
VOLUSIA	2.16
WAKULLA	0.84
WALTON	0.71
WASHINGTON	0.53

7. **Identify lands within special planning areas that were available for new development** — It was assumed that certain lands that had already been approved for development were more likely to develop first. To address these lands, a special planning area mask was created for lands designated as Developments of Regional Impact (DRIs) and Detailed Specific Area Plans (DSAPs). Lands within those planning areas that could not be developed were excluded, including open water, major road rights of way, existing protected lands, mitigation banks, and Miccosukee Indian Reservation lands in western Broward County.

   The lands with the highest in Likelihood of Development scores derived from Table 27 were the first to have

continued

population allocated to them, using the 2010 GDD from the appropriate county, as shown in Table 28. This allocation process was repeated until all DRI/DSAP lands in each county were used or all new population accommodated. The population allocated to DRI/DSAP lands was then subtracted from remaining new population data to determine infill/greenfield population.

8. **Identify lands outside of special planning areas that were available for new development** — This involved creating an infill/greenfield mask for land use categories identified in the county property appraiser data from Table 29, and then excluding lands that could not be developed for other reasons (open water, major road rights of way, existing protected lands), mitigation banks, and Miccosukee Indian Reservation lands in western Broward County. Population was allocated first to the areas identified as having the highest likelihood of development following the methodology in Table 27 and using the appropriate county GDD from Table 28. This allocation process was repeated until all the population was accommodated or all infill/greenfield lands in each county were used.

TABLE 29: Infill-Greenfield Categories

CAMPS
IMPROVED AGRICULTURE
CROPLAND SOIL CLASS 1
CROPLAND SOIL CLASS 2
CROPLAND SOIL CLASS 3
TIMBERLAND
TIMBERLAND
TIMBERLAND
TIMBERLAND
TIMBERLAND
TIMBERLAND
GRAZING LAND SOIL CLASS 1
GRAZING LAND SOIL CLASS 2
GRAZING LAND SOIL CLASS 3

GRAZING LAND SOIL CLASS 4
GRAZING LAND SOIL CLASS 5
GRAZING LAND SOIL CLASS 6
ORCHARD, GROVES, CITRUS
POULTRY, BEES, TROPICAL FISH, RABBITS, ETC
DAIRIES, FEED LOTS
ORNAMENTALS, MISC. AGRICULTURE
MINING, PETROLEUM, AND GAS LANDS
ACREAGE NOT ZONED AGRICULTURE
VACANT RESIDENTIAL
VACANT COMMERCIAL
VACANT INDUSTRIAL
VACANT INSTITUTIONAL

9. **Allocate spillover population** — If there was insufficient land available to accommodate the projected population increase for a particular county, spillover population was allocated to adjacent counties. This was based upon the percentage of the sum of the total 2019 population of the adjacent counties, following the Likelihood of Development criteria in Table 27 and the GDD in Table 28 for the county accommodating the spillover. For example, if there was spillover population from Orange County, then Lake, Seminole, Brevard, Osceola and Polk counties received their proportionate share of the spillover. Population to be accommodated through redevelopment was calculated using the ratio of 2010 developed lands to available lands for development. Counties with less land available for future development were assumed to have higher levels of redevelopment than counties with abundant available land.

continued