



Water 2070

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This Webinar Has Been Approved for:

- 1.5 AICP CM credits for planners ([#9109130](#))
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- .15 CEU for certified environmental health professionals





Upcoming Dr. John M. DeGrove Webinars

**February 15, 2016, 12 noon to 1:30pm
Implementing Water 2070: Water
Conservation Planning for Florida
Communities**

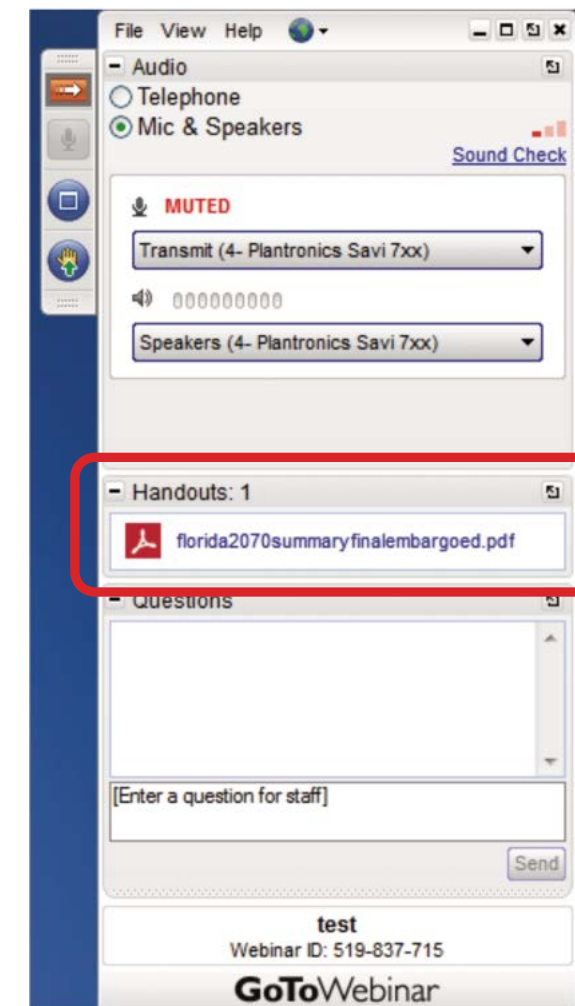
Visit www.1000friendsofflorida.org/webinar
to find out more!





The PowerPoint and materials
are available at

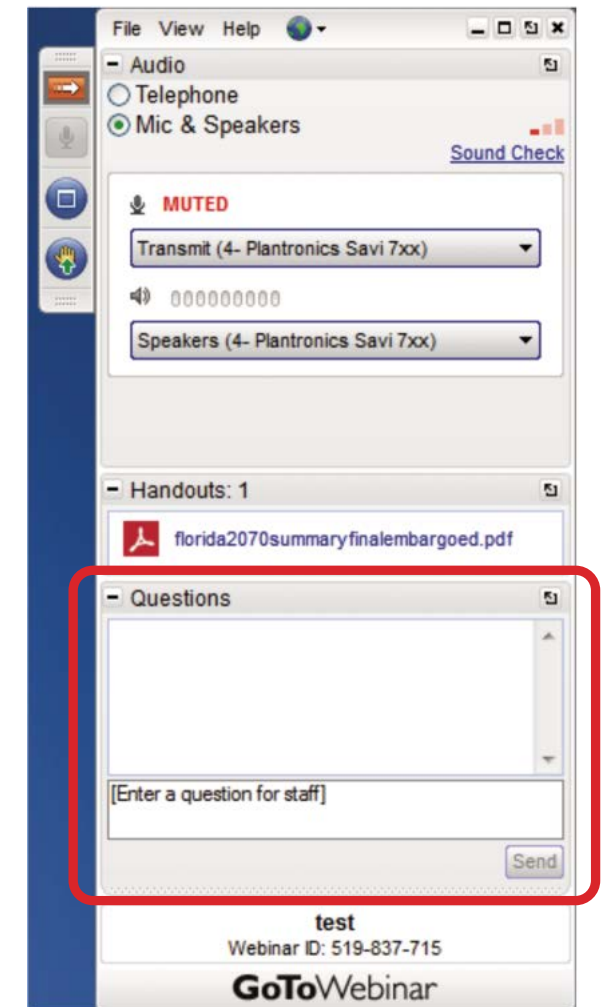
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- Please click on “+” sign and type any questions in this box
- Please refer to the slide number and/or speaker when you post your question
- We will do our best to answer all questions as time permits





Project partners and panelists:

1000 Friends of Florida

Founded in 1986, 1000 Friends of Florida is a 501(c)(3) not-for-profit organization that focuses on saving special places and building better communities in one of the fastest growing states in the nation. Visit www.1000friendsofflorida.org for more information on 1000 Friends.

Panelists

Vivian Young, *AICP, Communications Director*

Ryan Smart, *President*



Project partners and panelists:

The **Florida Department of Agriculture and Consumer Services** supports and promotes Florida agriculture, protects the environment, safeguards consumers, and ensures the safety and wholesomeness of food. Our programs and activities are so varied and extensive, they touch the life of just about every Floridian. For more information please visit www.freshfromflorida.com.

Panelists

Cori Hermle, *Environmental Consultant, Office of Agricultural Water Policy, Florida Department of Agriculture and Consumer Services*



UF | GeoPlan Center

Project partners and panelists:

Established in 1984, **Geoplan** is a multidisciplinary GIS laboratory located in the University of Florida's School of Landscape Architecture and Planning, College of Design, Construction and Planning. It was developed in response to the need for a teaching and research environment for Geographic Information Systems, or GIS. Under its auspices spatial analysis is conducted in support of a broad range of academic disciplines. Additional information is available at www.geoplan.ufl.edu.

Panelists

Margaret H. Carr, *Professor, Department of Landscape Architecture, University of Florida*

Paul D. Zwick, Ph.D., *Professor, Department of Urban and Regional Planning, University of Florida*

Mapping Florida's Future Alternative Patterns of Water Use in 2070



A joint project of . . .



UF | GeoPlan Center



One of the biggest issues facing Florida today is the availability of sufficient water to meet the needs of people, agriculture and the environment.



The Life Beneath
Mac Stone Photography

A finite water supply and declining quality combined with a growing population make the traditional competition between these users even more intense.



David Moynahan Photography

In poll after poll,
protection of drinking
water consistently
ranks as a top
environmental
concern for the
public.



Clean and abundant water also is needed to ensure that Florida's agriculture and tourism industries – the mainstays of this state's economy – remain strong and viable over the long term.



2007 Ag-Environmental Leadership Award:
Buck Island Ranch in Lake Placid



M & B Products, Tampa
Department of Agriculture and Consumer Services

Moderate projections indicate that Florida will have 15 million new residents by 2070.

The Florida 2070 study shows the impacts of the associated development on Florida's lands.

But what about the impact of 15 million new residents on Florida's waters?



Great Blue
Mac Stone Photography



THE WATER 2070 PROJECT

2010 BASELINE



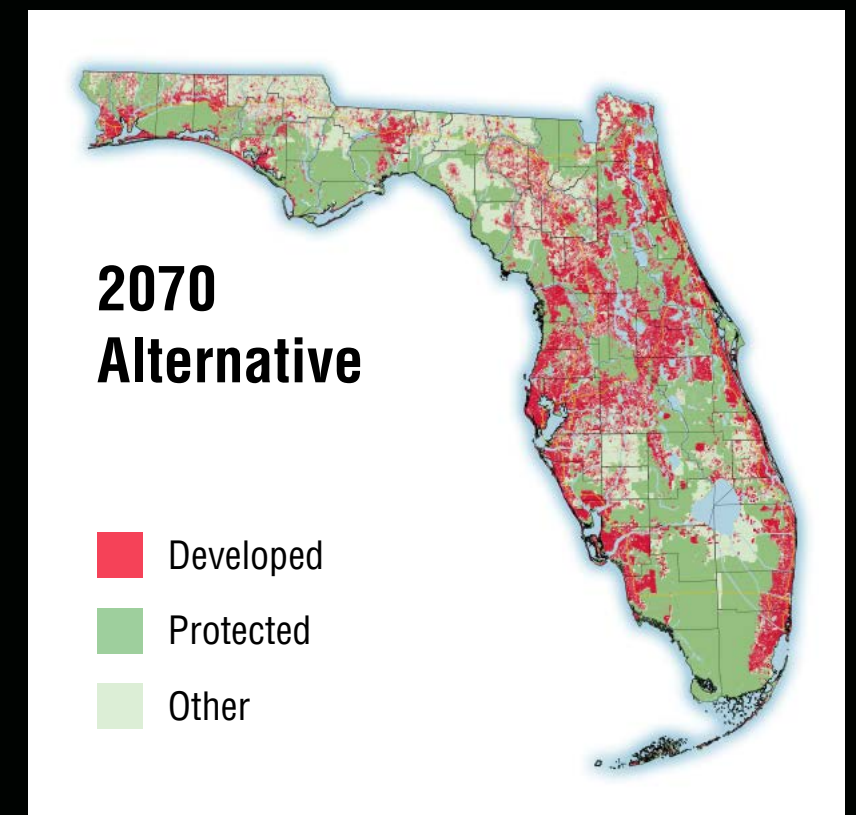
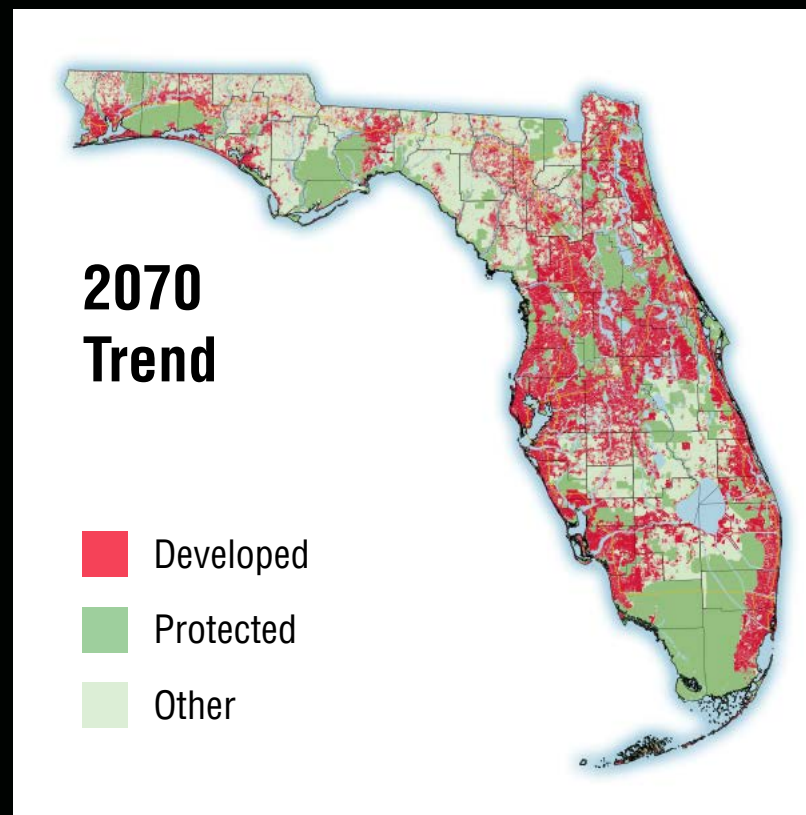
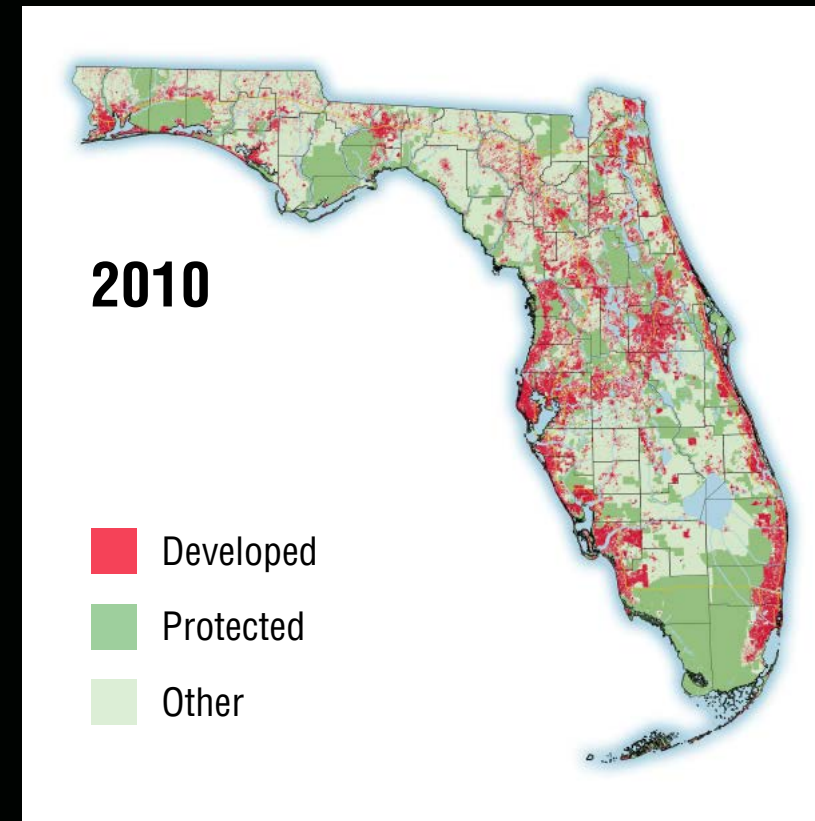
Florida 2070 provides the foundation for Water 2070.

The **top map** shows existing development and conservation lands in 2010.

The **bottom left map** shows Florida in 2070 with 15 million new residents, if current development and conservation patterns continue.

The **bottom right map** shows Florida in 2070 with 15 million new residents, but more compact development patterns and greater conservation lands.

Visit
www.1000friendsofflorida.org/florida2070 for more information on Florida 2070



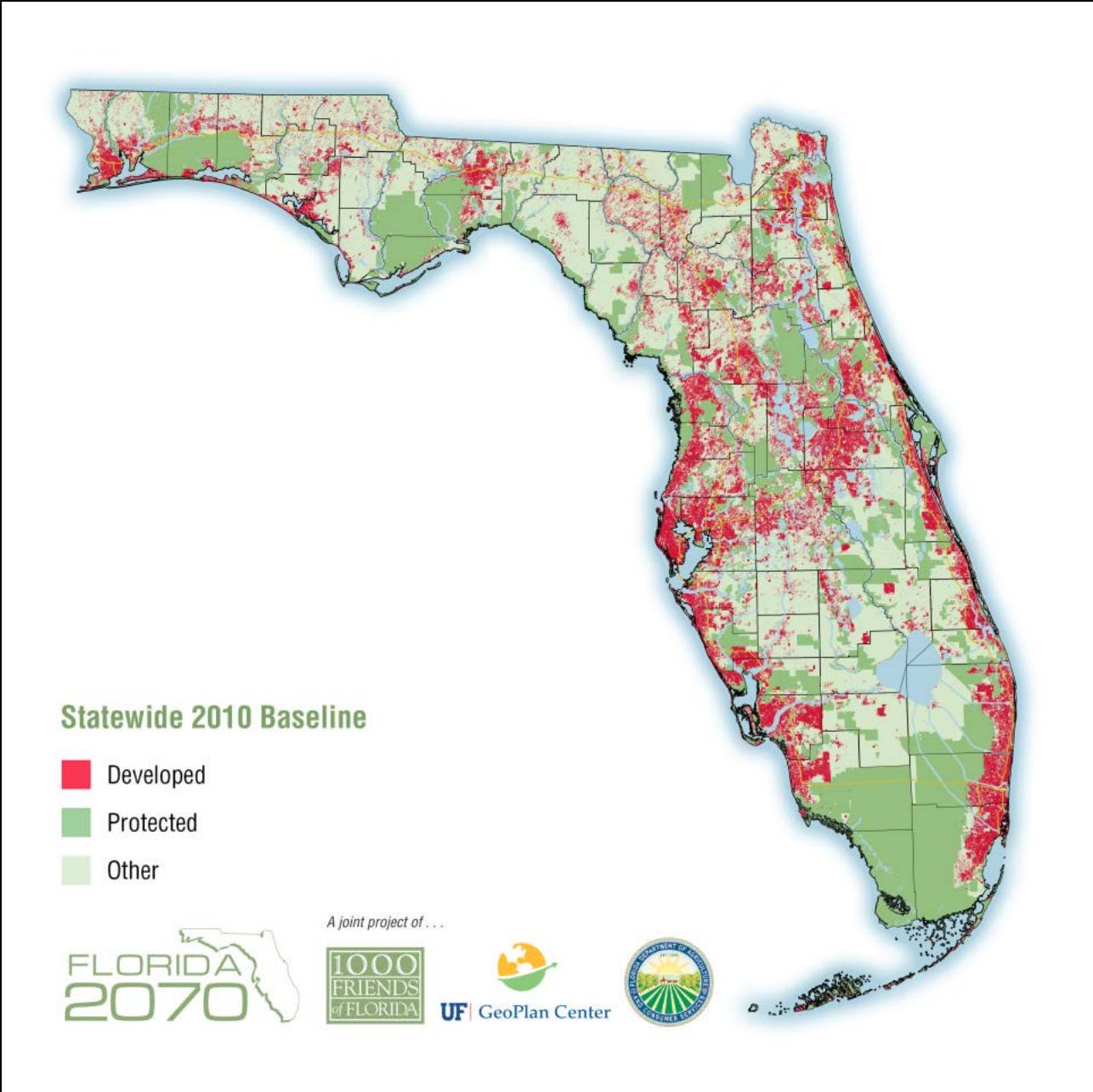
Florida 2070 in a Nutshell

- If we don't change the way we are developing more than 1/3 of Florida will be paved over
- If we protect natural lands identified on current Florida Forever and Greenways Priorities 1 and 2 lists, a little less than half of the state's land would be permanently protected
- If we protect these natural lands and promote more compact development, close to 1/4 of the state's lands will remain in agricultural production
- With either 2070 development scenario, lands used for timber and mining will be most significantly impacted

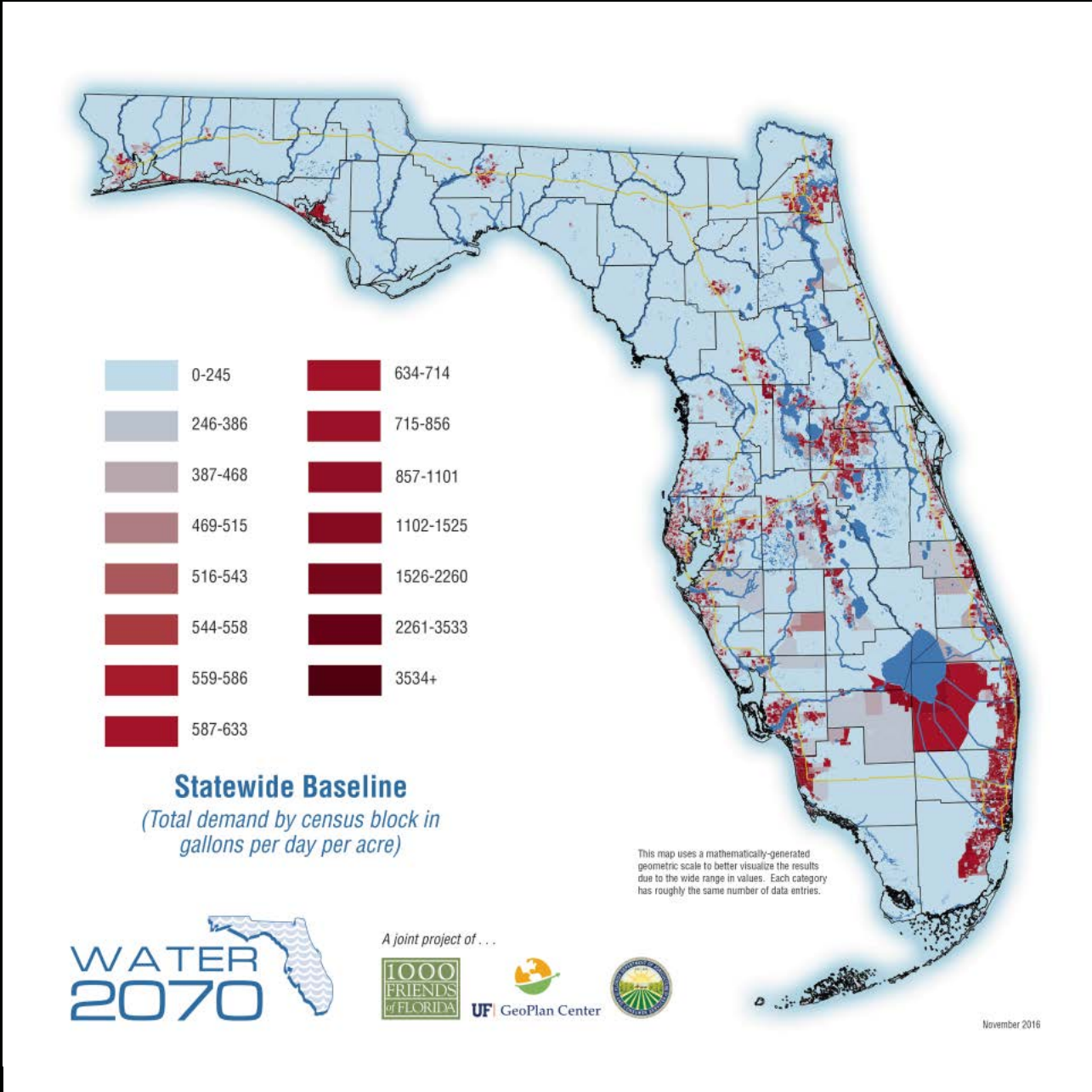
Methodology & Assumptions for Water 2070 Baseline

- The baseline demand is based on the actual 2010 distribution of population, agriculture, and protected lands
- Using data from a United States Geological Survey study, the 2010 baseline per capita gallons per day (GPD) demand for each Florida county is established and used to determine total development-related demand for each county
- Based on an Alachua County study prepared at the University of Florida, it is assumed that rural/suburban census blocks (those with less than 2000 people/square mile) use three times as much water as urban census blocks (those with ≥ 2000 people/square mile)
- Agriculture irrigation demand is based on data from a study prepared for the Department of Agriculture and Consumer Services which estimates water demand for crops, livestock and aquaculture

Florida 2070 Baseline



Water 2070 Baseline



2010 Water Use

	2010 Baseline
Development Demand (GPD)	3,139,370,035
Agriculture Demand (GPD)	2,129,941,436
<i>Total</i>	<i>5,269,311,481</i>

This study only includes water use associated with development and agriculture and does not encompass water needed for mining/industrial activities, power generation, or to support Florida's natural systems



WATER 2070 TREND WITH CURRENT DEVELOPMENT AND WATER DEMAND PATTERNS

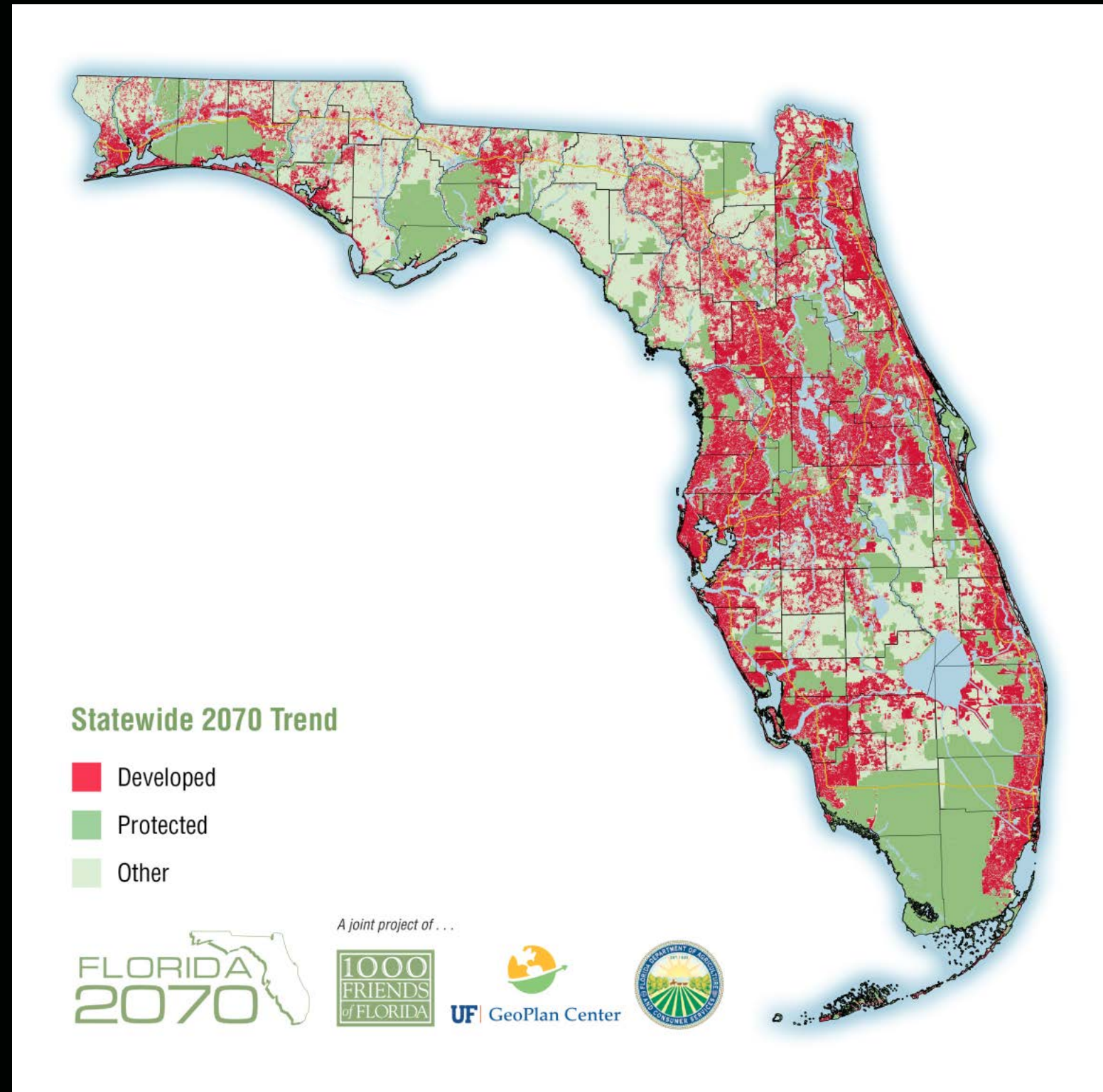


Florida 2070 Trend Results

What happens if new development follows current trends and continues to sprawl at low densities?

- More than 1/3 of the state will be developed
- Roughly 5 million acres (including 2 million acres of Florida's agricultural and natural lands) could convert from rural to urban use

What impact would this have on water use in Florida in 2070?

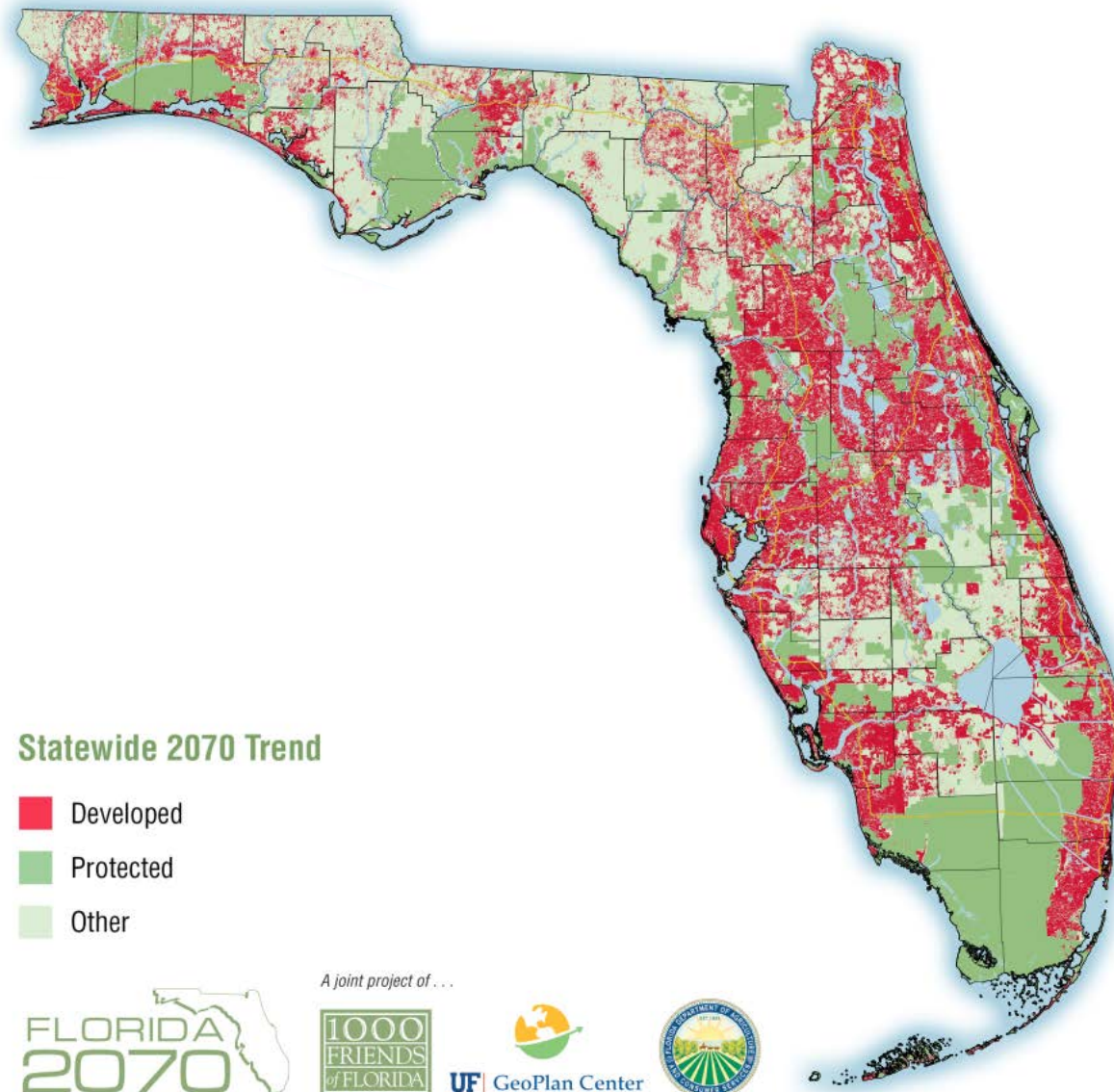


Water 2070 Trend

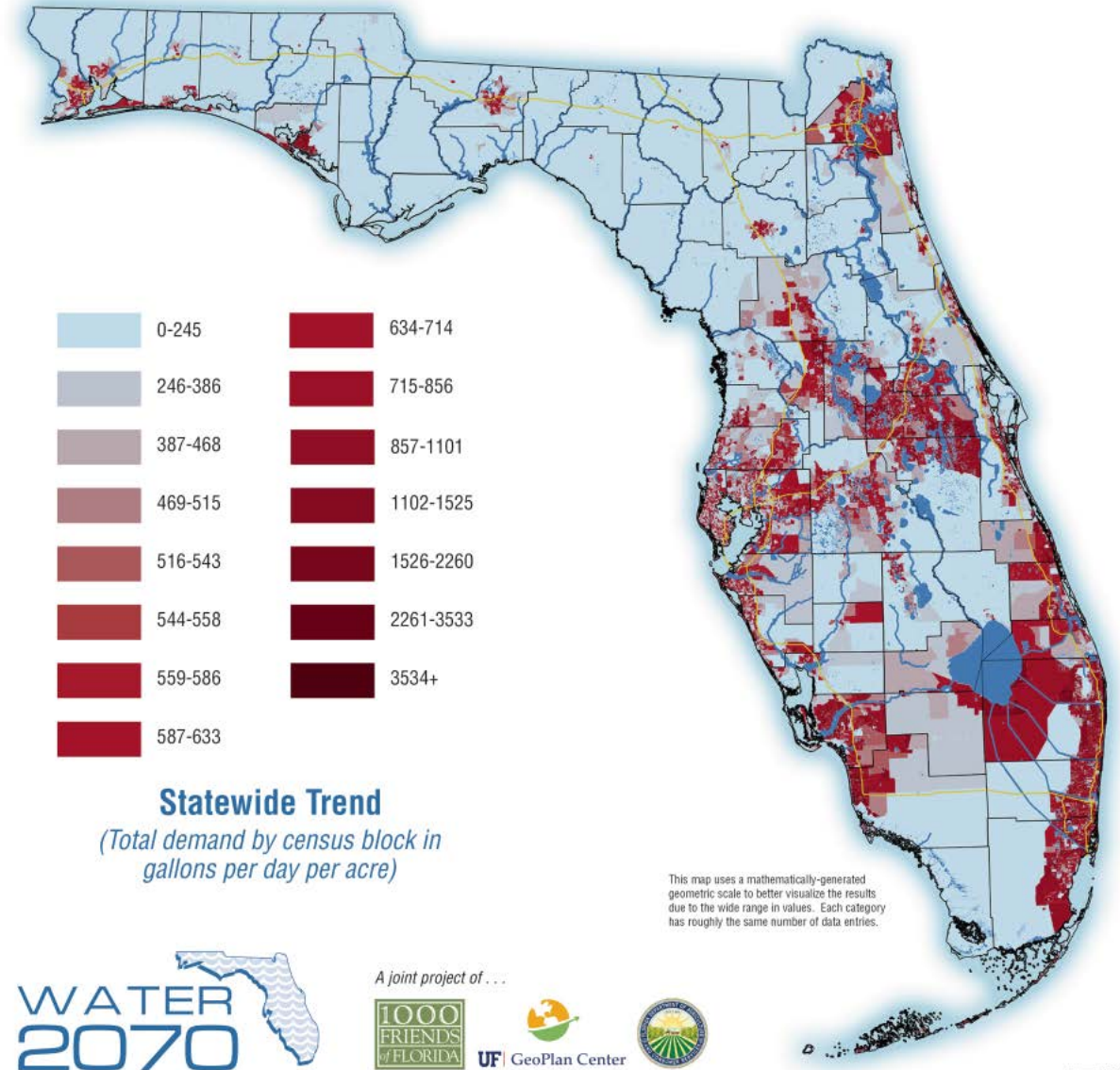
Methodology & Assumptions

- The 2070 Trend is based on the addition of 15 million new residents, assuming 2010 development patterns continue
- Using the baseline per capita gallons per day (GPD) demand for each Florida county and the assumption that suburban/rural census blocks use more water than urban census blocks, each county's water demand quantity is increased to reflect its population increase and the spatial distribution of that population
- Because some irrigated agricultural lands become developed, total agricultural demand decreases.

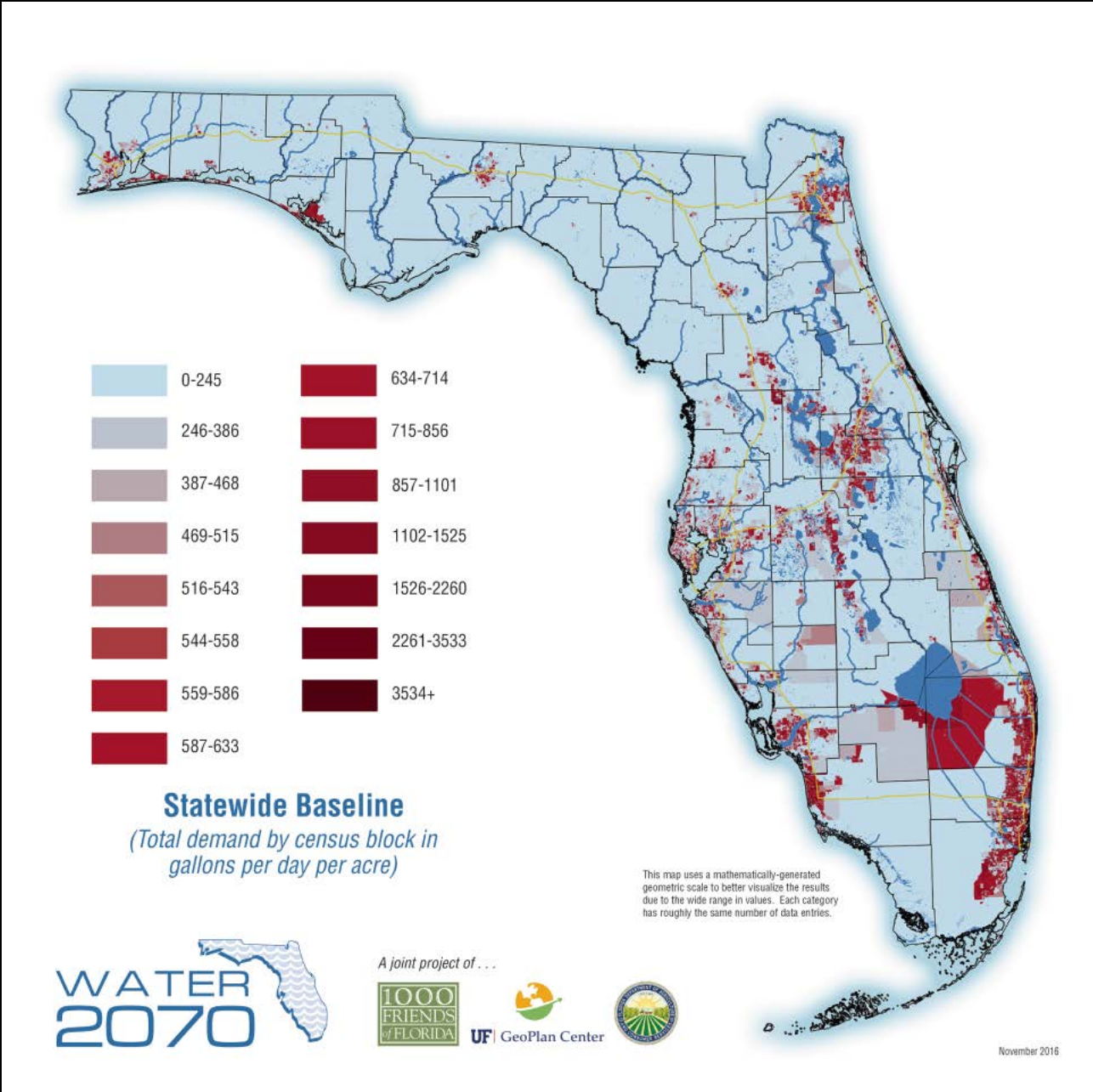
Florida 2070 Trend



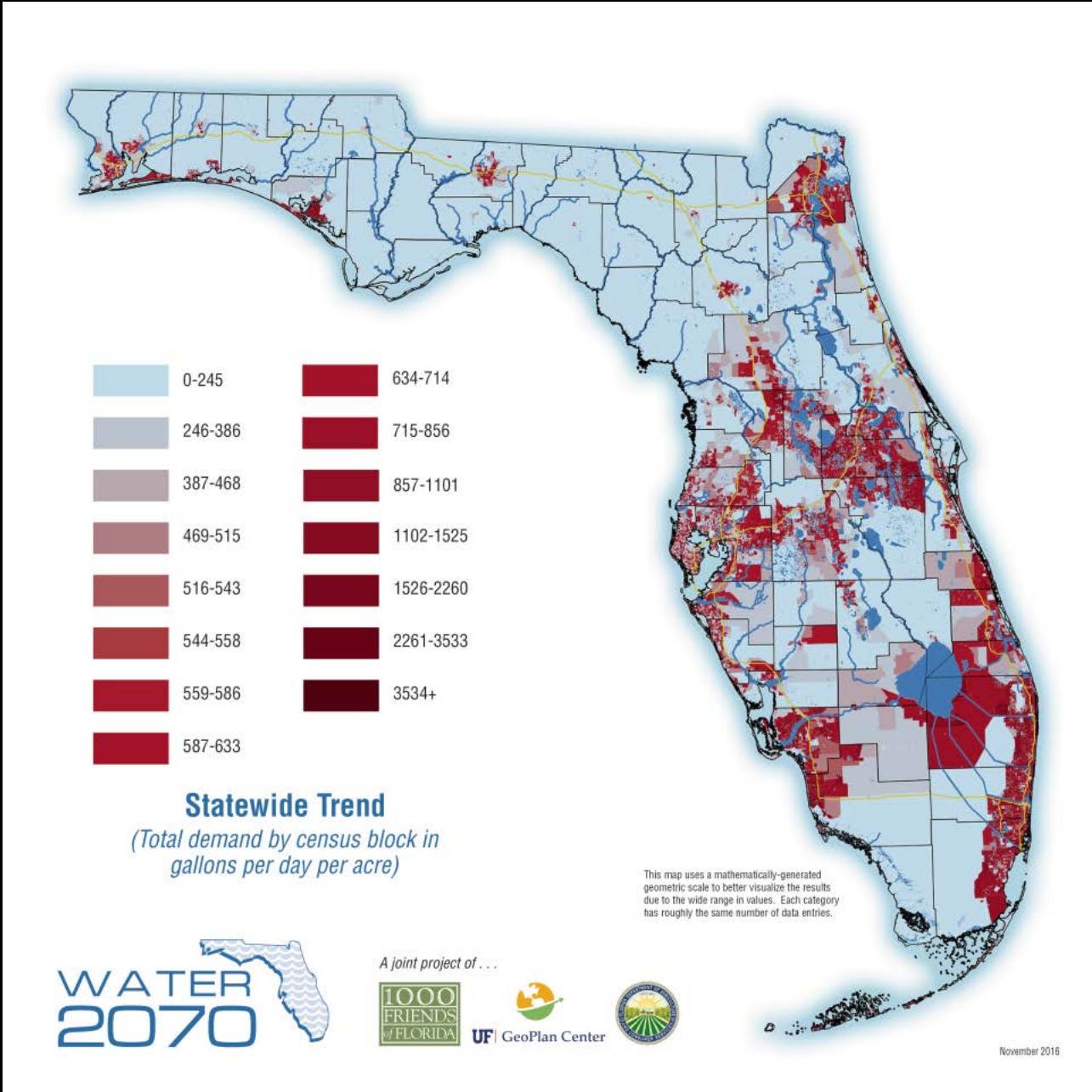
Water 2070 Trend



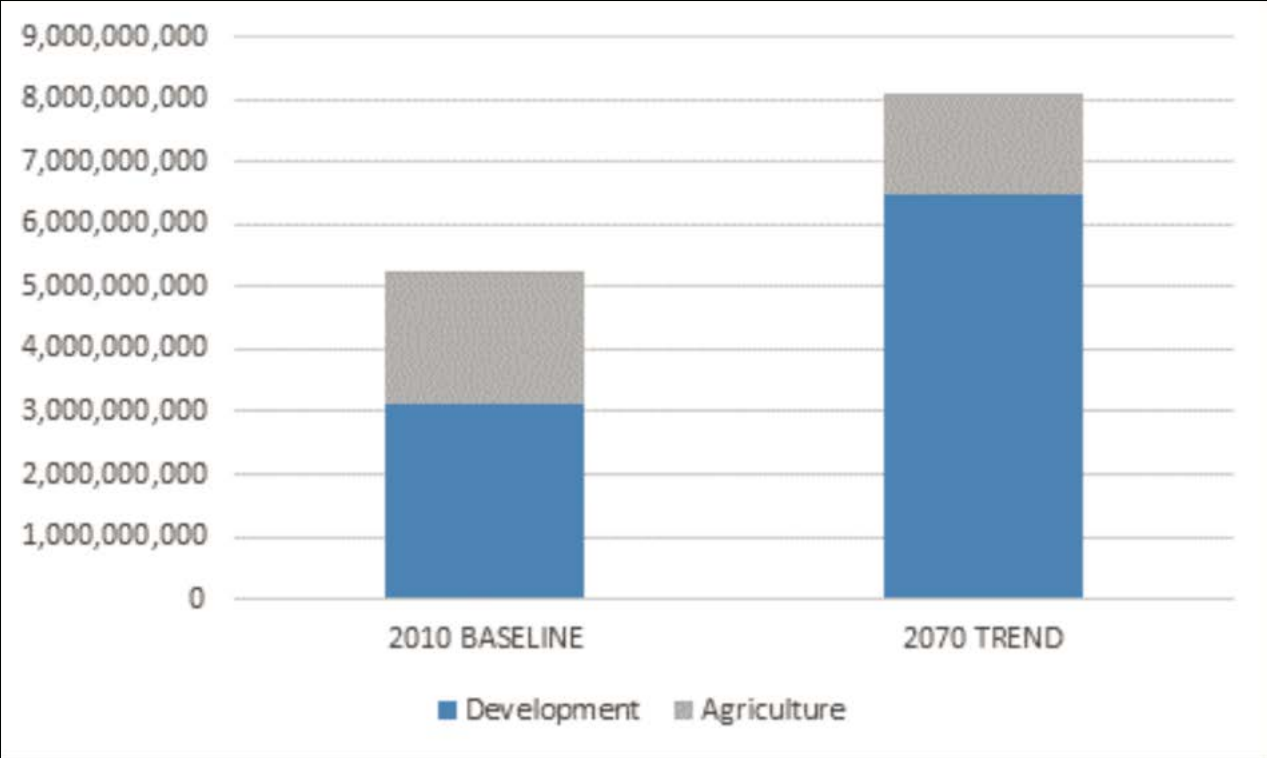
Water 2070 Baseline



Water 2070 Trend



Let's Compare



	2010 Baseline	2070 Trend	% Change Baseline Trend
Developement Demand (GPD)	3,139,370,035	6,480,557,237	106%
Agriculture Demand (GPD)	2,129,941,436	1,614,305,600	-24%
Total	5,269,311,481	8,094,962,839	54%



ALTERNATIVE 2070 USING LAND AND WATER CONSERVATION STRATEGIES

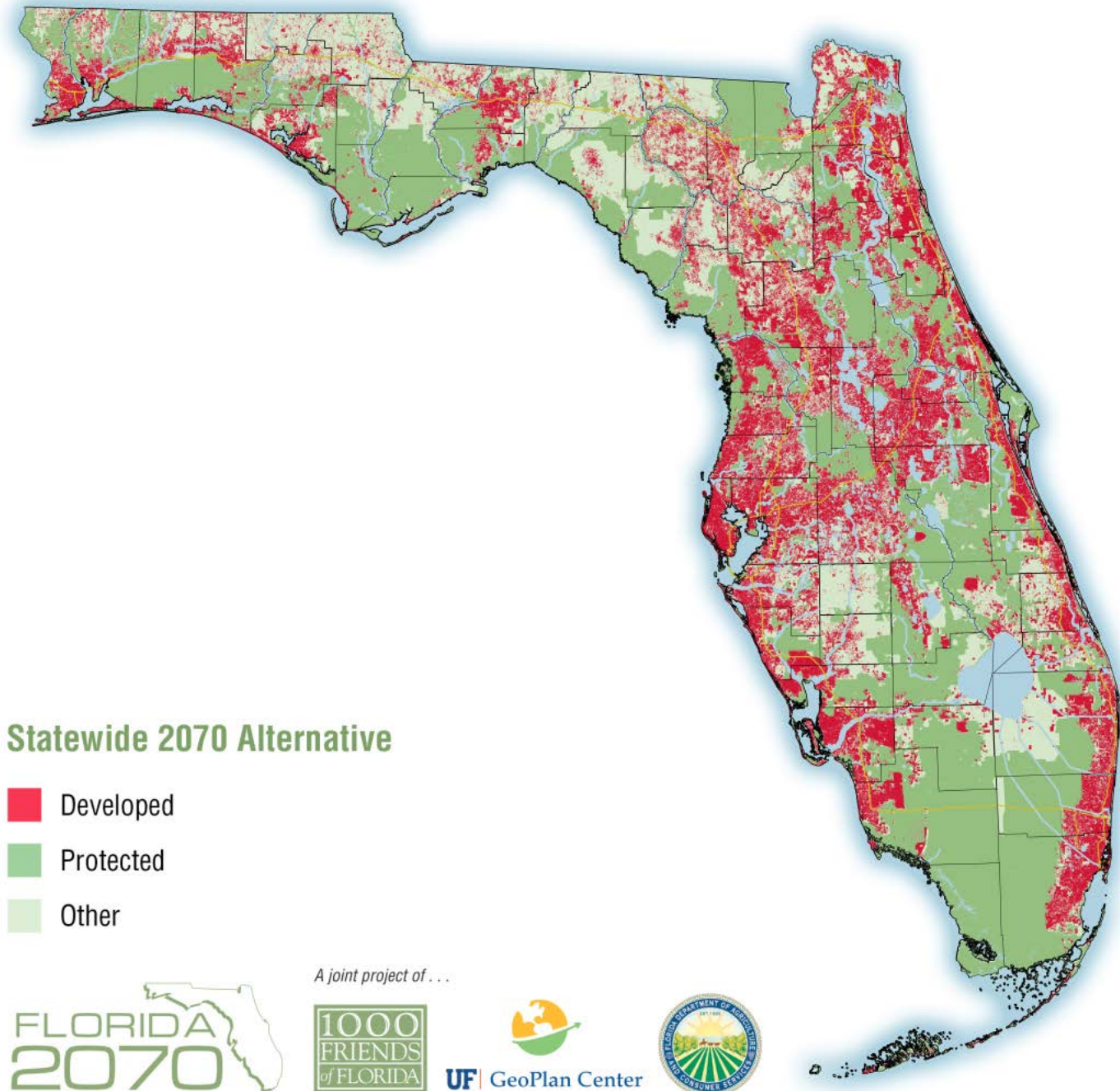


Florida 2070 Alternative Results

What happens by 2070 if new development is more compact, important conservation lands are protected, and good agricultural lands aren't developed?

Florida will:

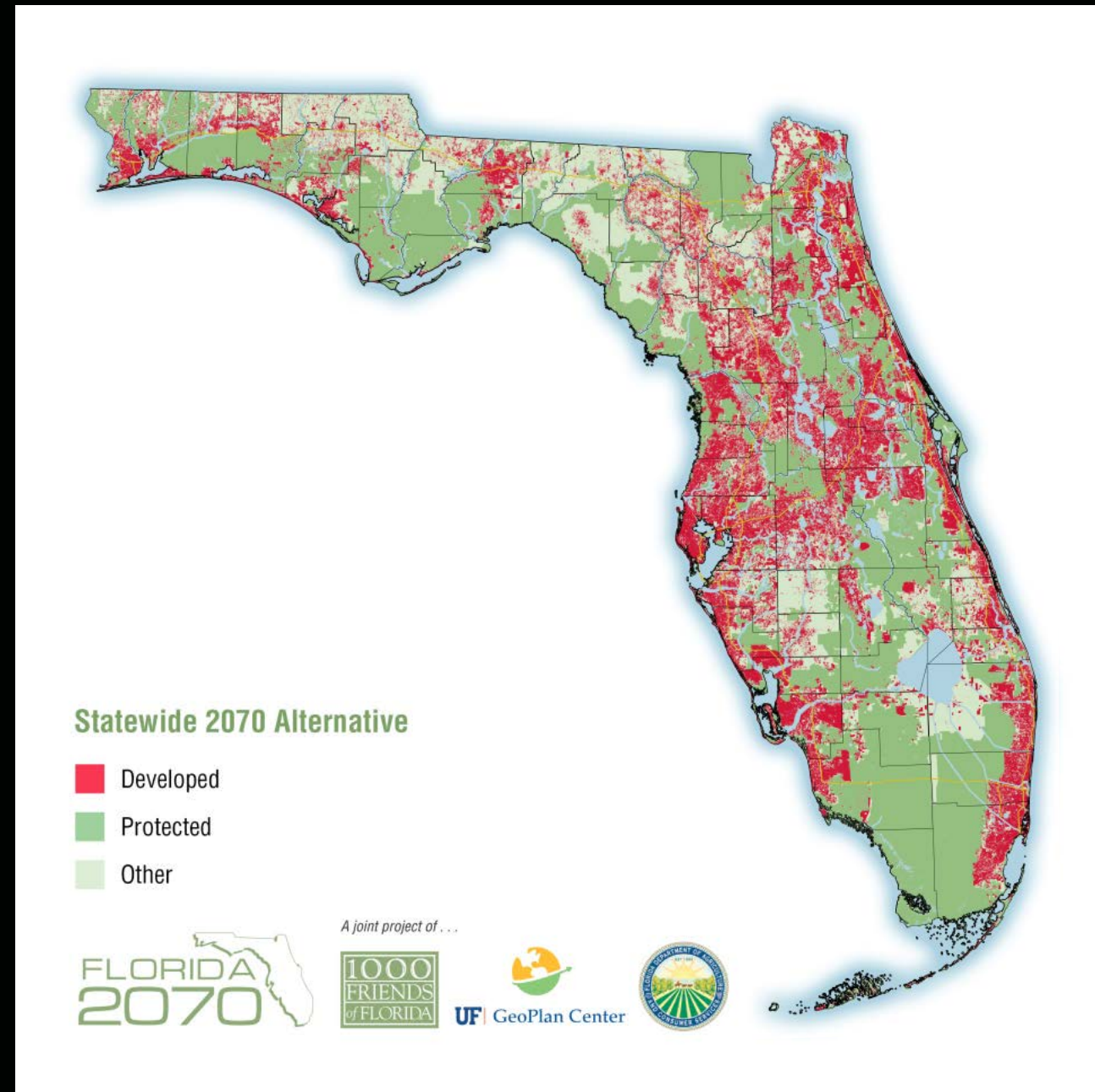
- Save 1.8 million acres of land from development
- Protect 5.8 million acres of conservation lands
- Keep 1.1 million more acres of agricultural lands in production



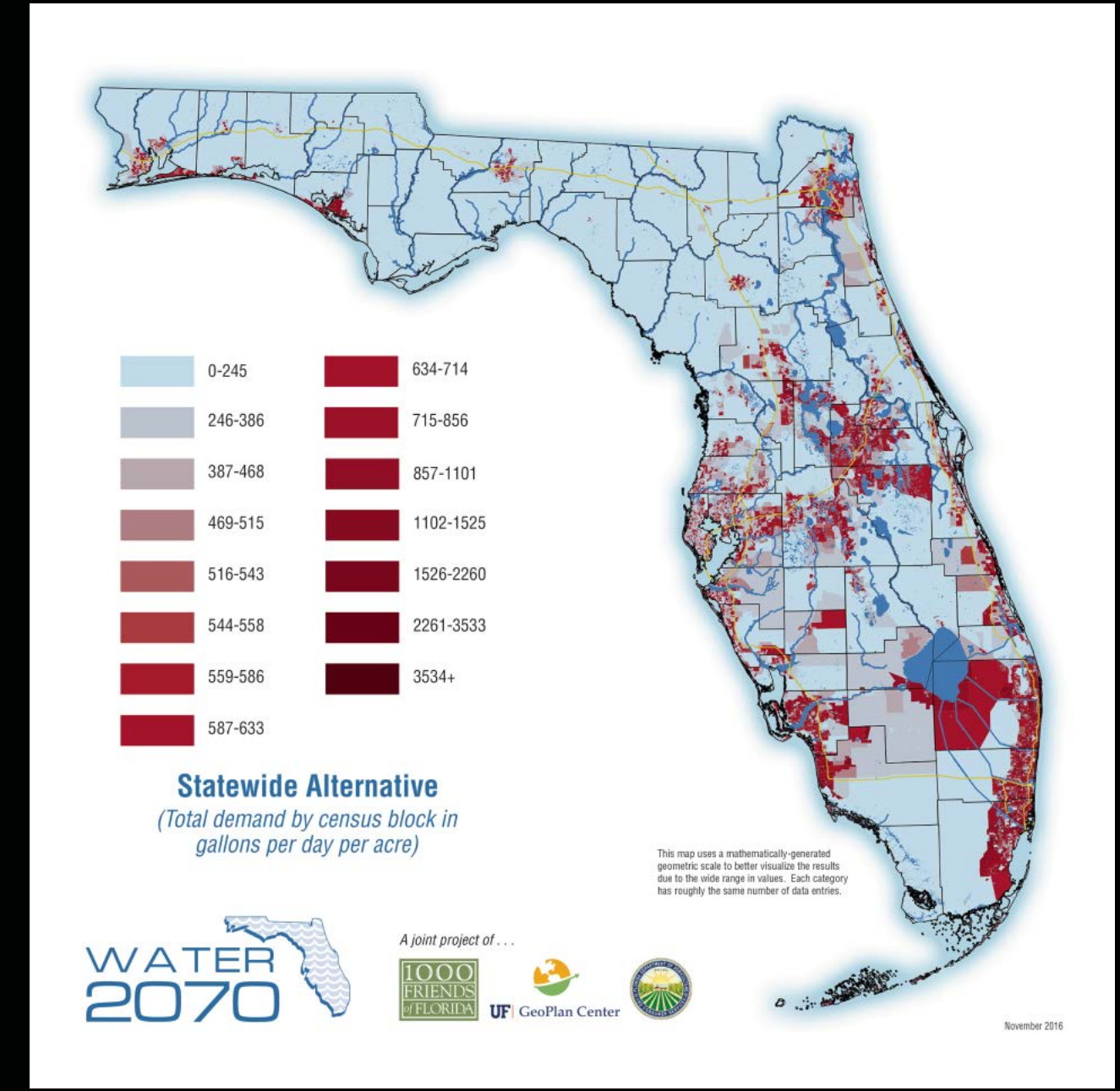
Assumptions for Water 2070 Alternative

- The projected 15 million new residents are accommodated with more compact development patterns and additional protected lands as shown in Florida 2070 Alternative:
 - Development density in each county is increased due to:
 - Accommodation of some of the population growth through redevelopment of existing urban areas
- Per capita rates of water demand for each county are conservatively reduced by 20% to capture the potential impact of water conservation measures
- No irrigated agricultural lands identified in the Department of Agriculture and Consumer Services Florida Statewide Agricultural Irrigation Demand study were allowed to develop under this scenario.

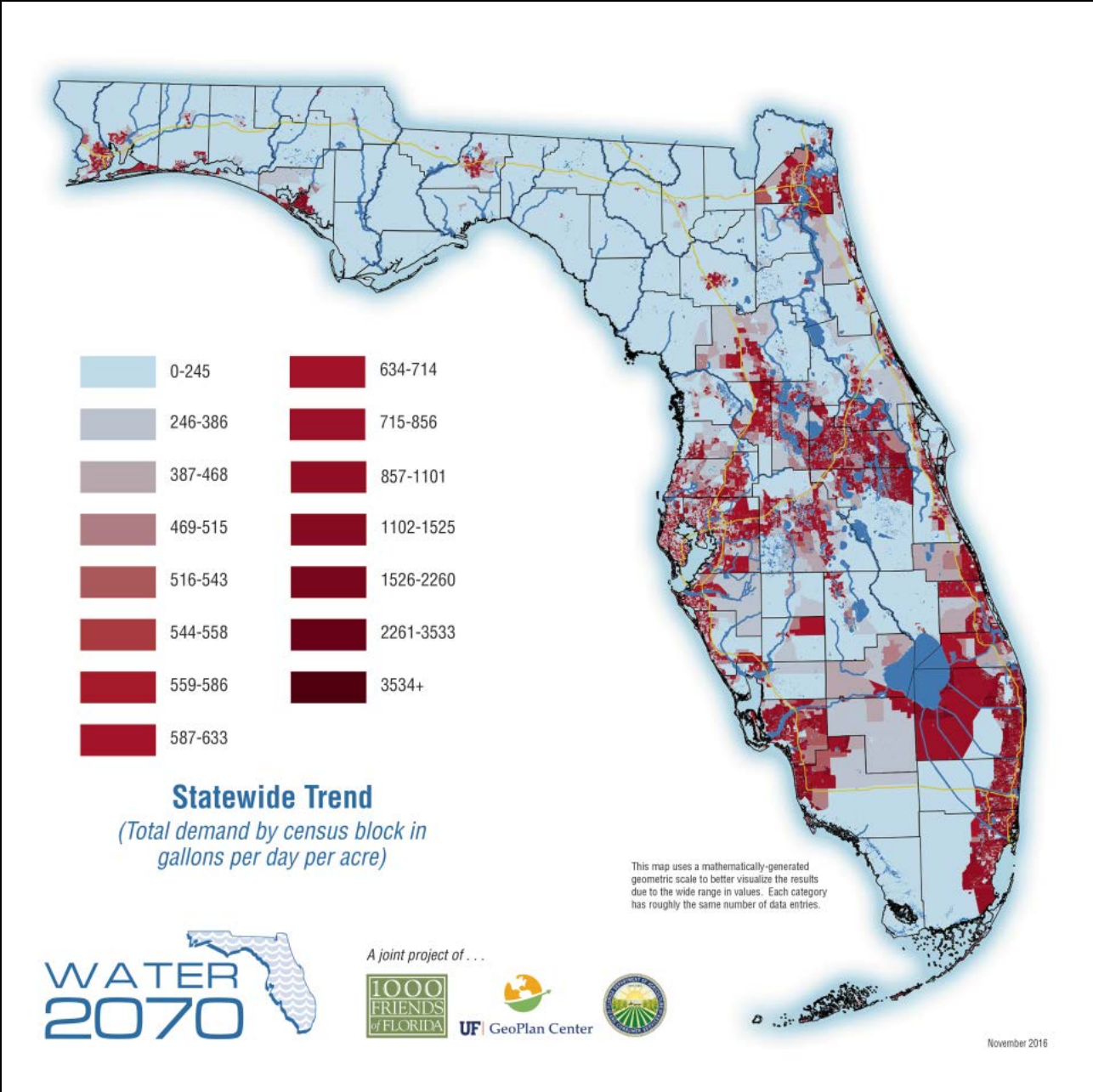
Florida 2070 Alternative



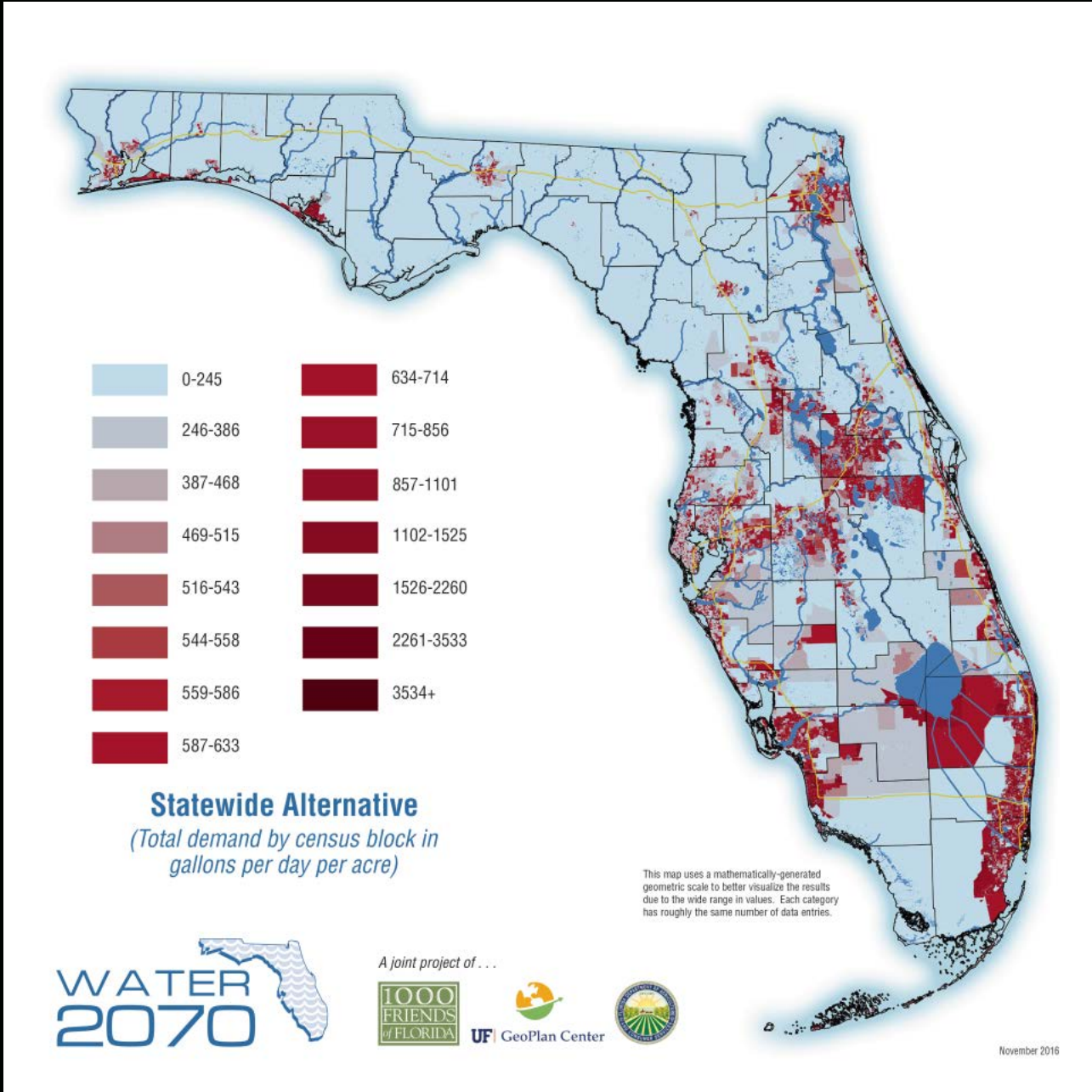
Water 2070 Alternative



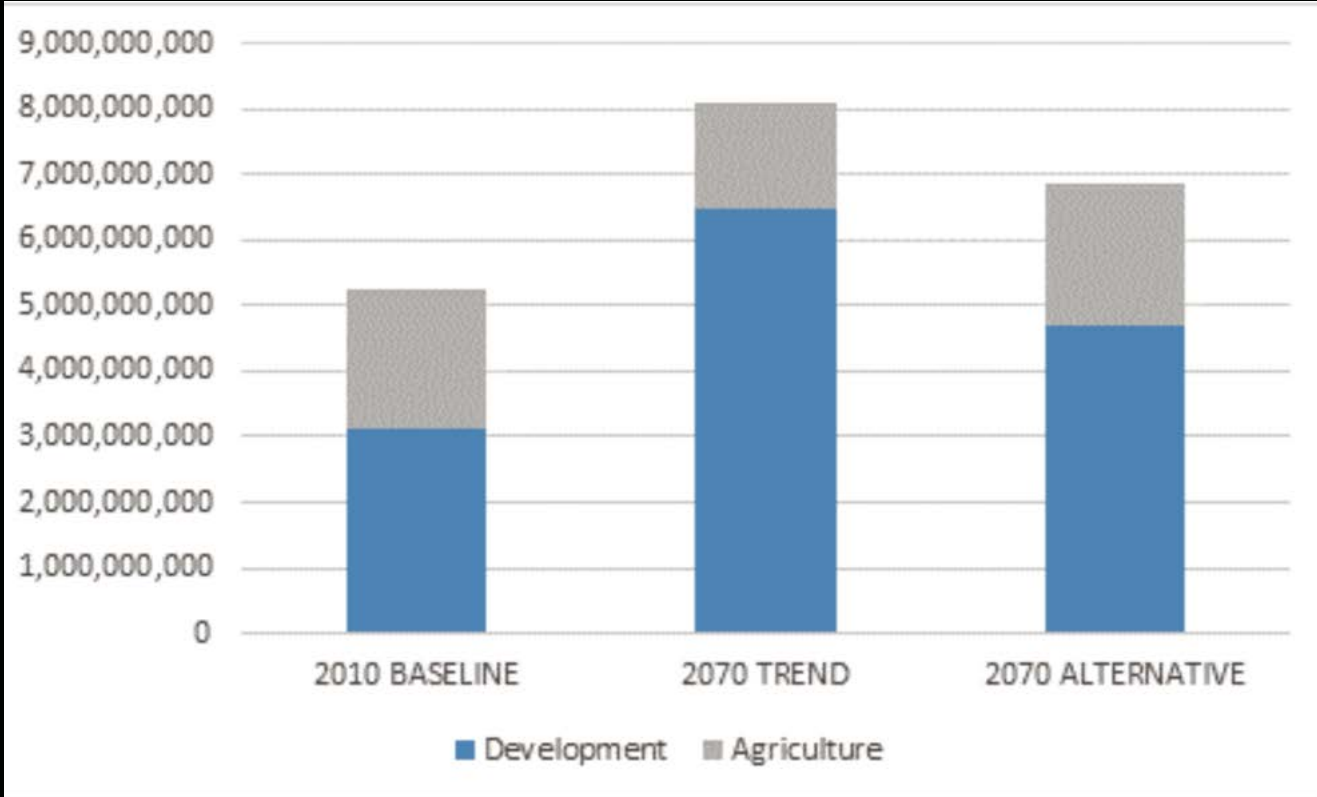
Water 2070 Trend



Water 2070 Alternative



Let's Compare



	2010 Baseline	2070 Trend	% Change Baseline Trend	2070 Alternative	% Change Baseline Alternative	% Change Trend Alternative
Development Demand (GPD)	3,139,370,035	6,480,557,237	106%	4,704,530,221	50%	-27%
Agriculture Demand (GPD)	2,129,941,436	1,614,305,600	-24%	2,150,253,570	1%	33%
<i>Total</i>	<i>5,269,311,481</i>	<i>8,094,962,839</i>	54%	<i>6,854,783,791</i>	30%	-15%

- Water 2070 Trend reveals that development-related water demand will increase by more than 100% compared to the 2010 Baseline
- With more compact development and a modest 20% increase in water conservation, Alternative 2070 would only increase development-related water demand half as much as the 2070 Trend
- However, Alternative 2070 development-related water demand is still 50% higher than the 2010 Baseline

- Compared to the 2010 Baseline, statewide agriculture irrigation demand in the 2070 Trend is 24% less due to the loss of agriculture lands to development
- Statewide agriculture irrigation demand is slightly greater in the 2070 Alternative than the 2010 Baseline because there are more agricultural lands projected for 2035 in the irrigation demand study prepared in 2015 by the Department of Agriculture and Consumer Services

- Given existing water shortages in some areas of the state, the 54% increase in total demand from 2010 to 2070 Trend, and even the 30% increase from 2010 to 2070 Alternative, may not be sustainable in some areas of Florida due to increasing demand on the Floridan aquifer
- More ambitious water conservation goals, including the use of reclaimed water, and greater development densities are necessary to forestall increasing water demands

Take Aways

The clear takeaway is that development-related water demand is the major driver of increased water consumption in Florida by 2070, and that the combination of more compact development patterns and modest water conservation measures can slow the rate of growth in demand on groundwater resources.

Take Aways

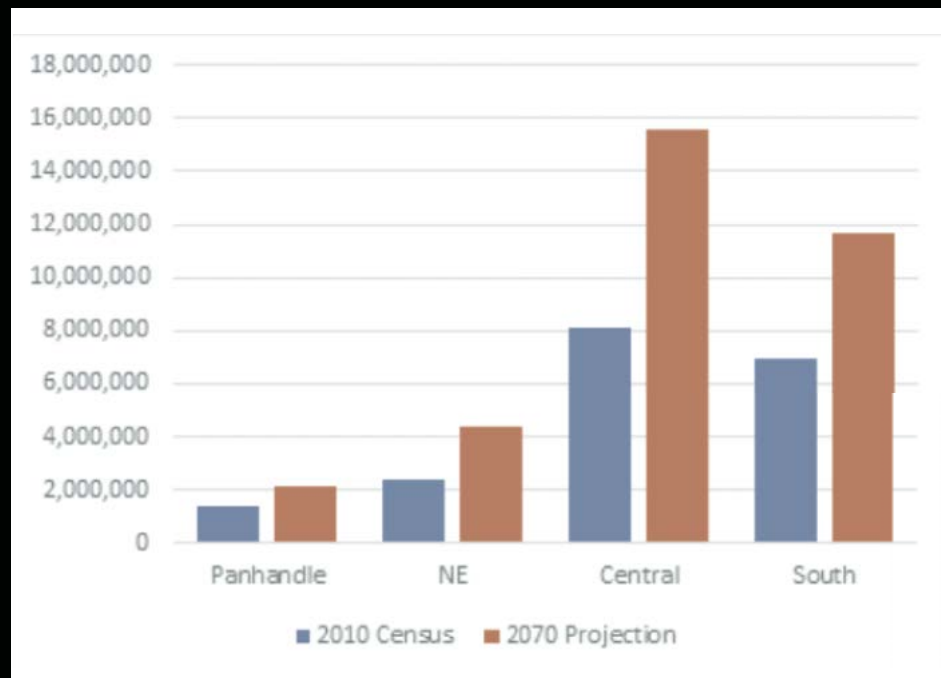
However, given existing water supply shortfalls in some areas of the state, going beyond Water Alternative 2070 by promoting even more compact development and increasing water conservation efforts is essential if Florida is to accommodate 15 million more residents and maintain agricultural productivity and protect natural systems in 2070



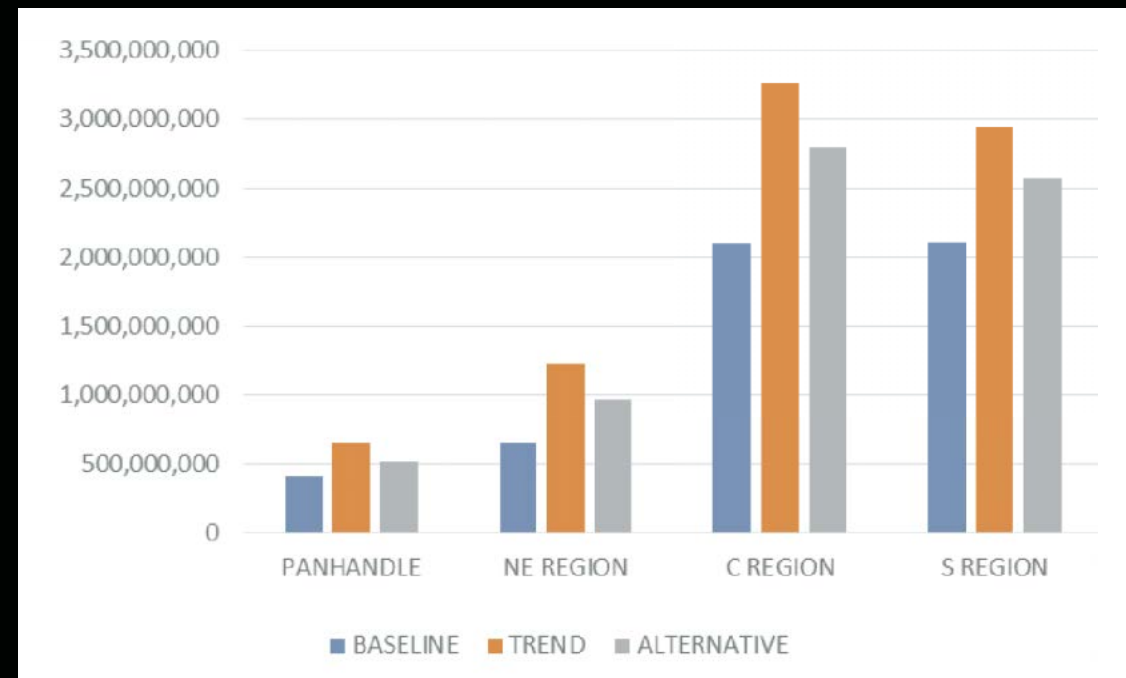
WHAT'S HAPPENING IN MY PART OF THE STATE?



Regional Summary

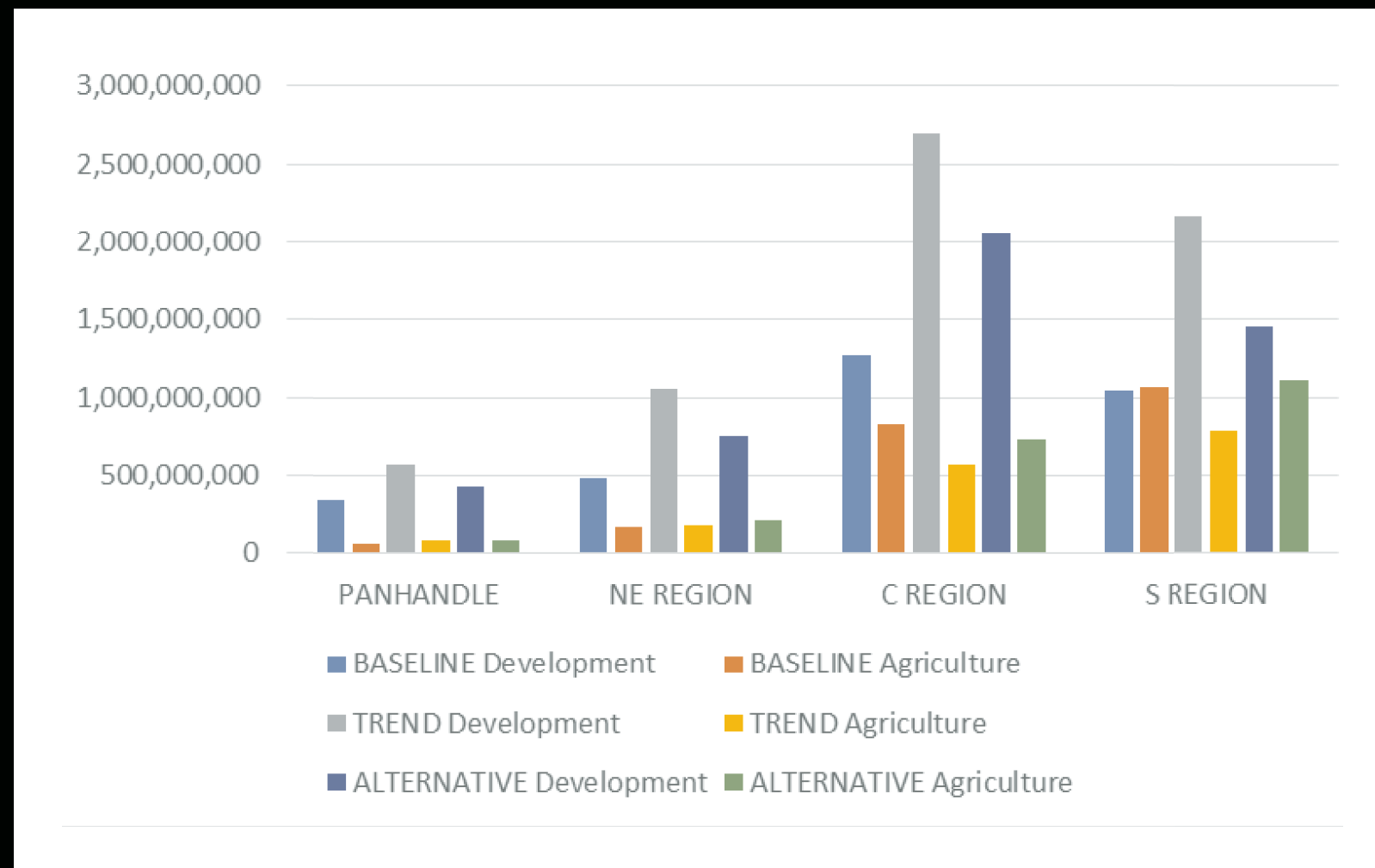


Total population per region for comparison purposes



Total demand per region in gallons per day (GPD)

Development-related and agriculture water demand in total gallons per day for the 3 scenarios in 4 regions



Panhandle Region



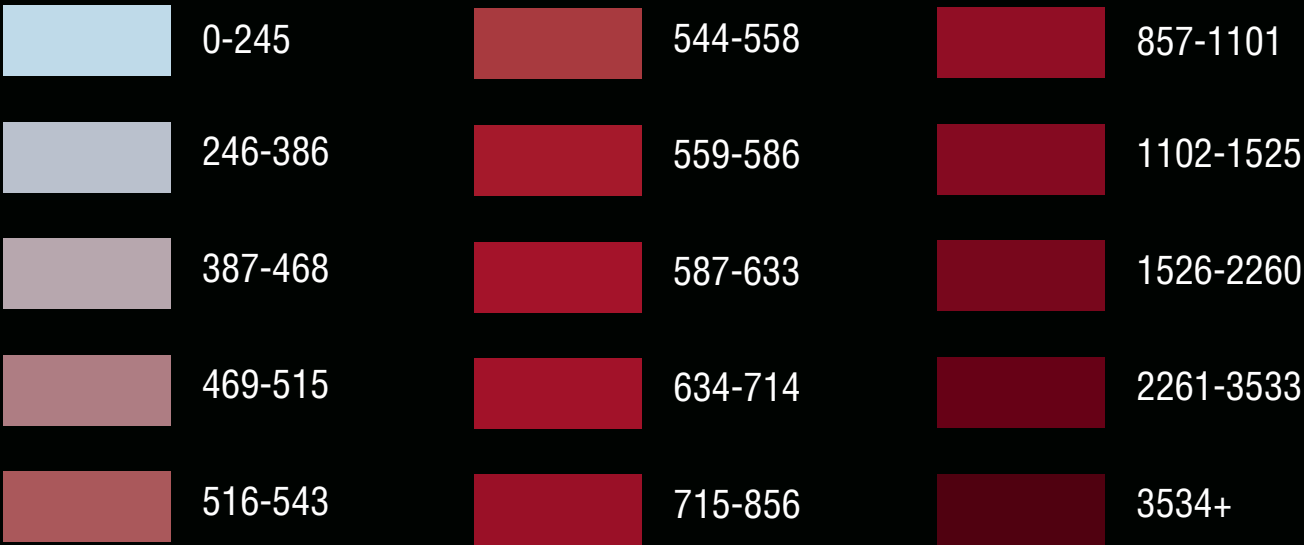
Baseline



Trend



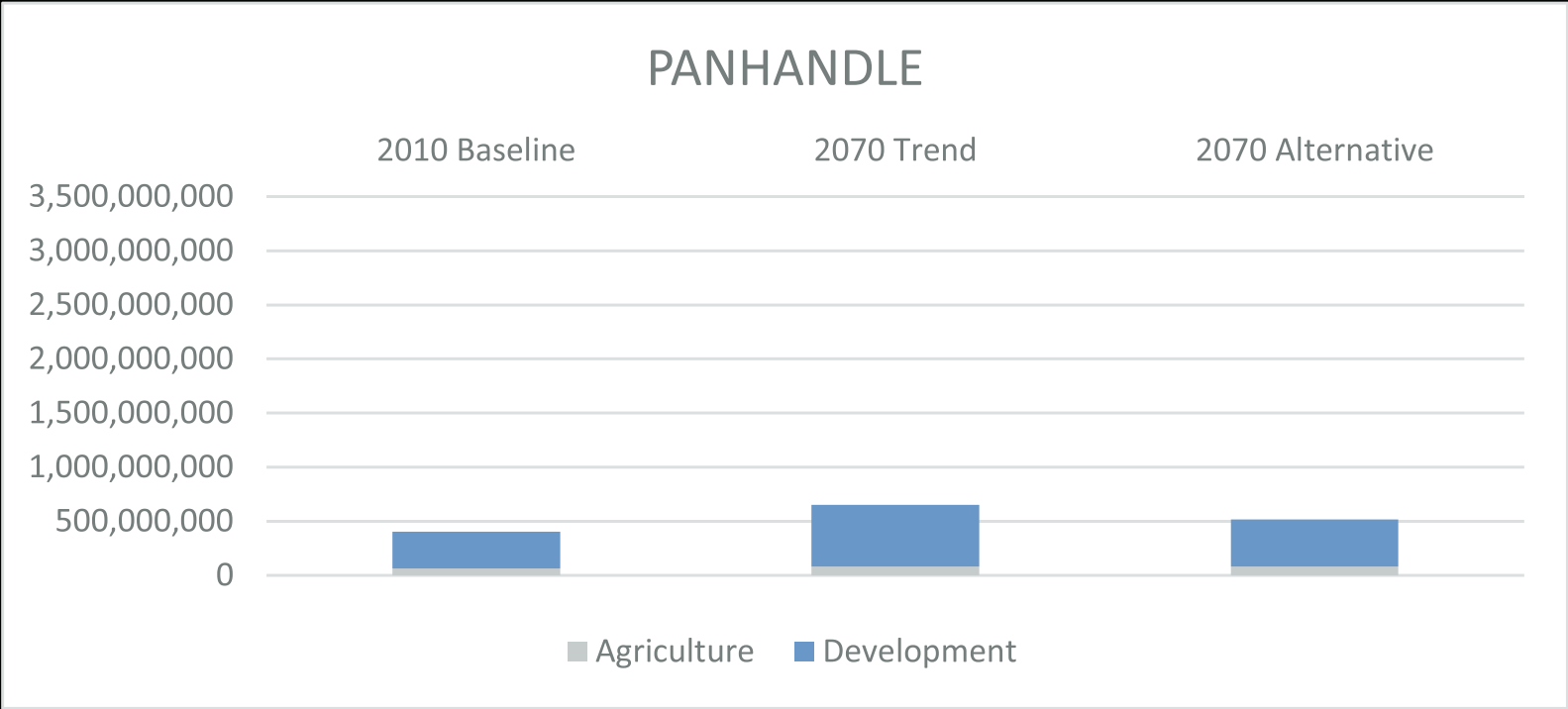
Alternative



This map uses a mathematically-generated geometric scale to better visualize the results due to the wide range in values. Each category has roughly the same number of data entries.

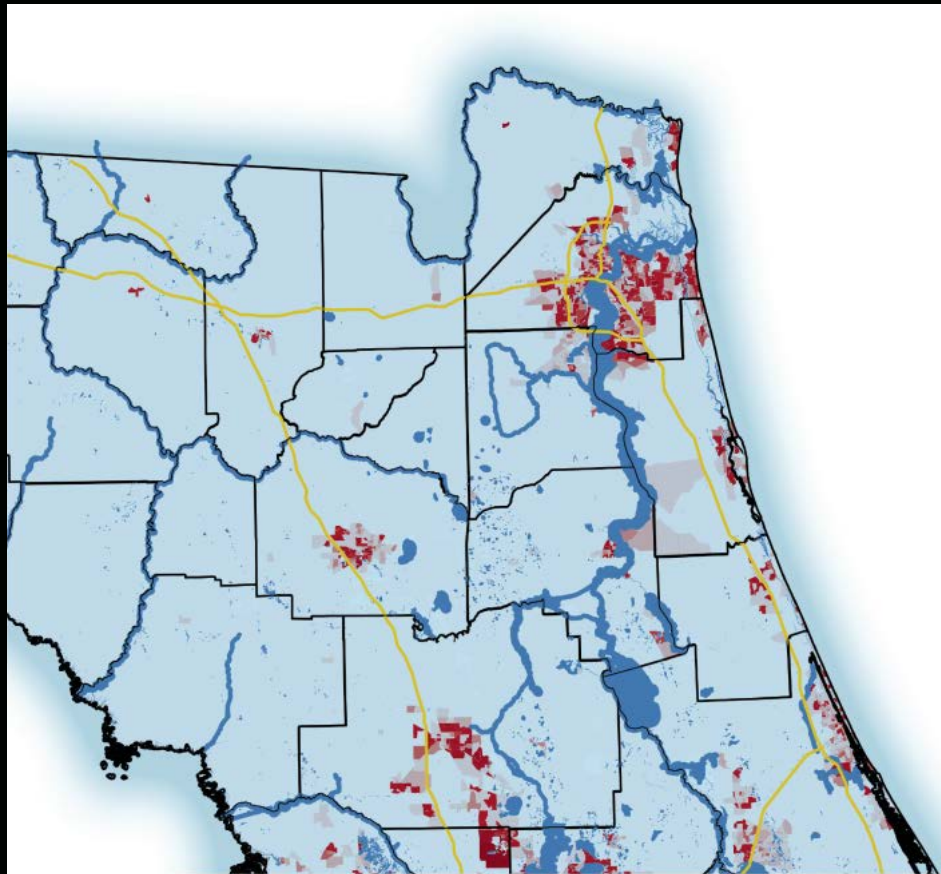
Panhandle Region

- A 61% increase in overall water demand between 2010 baseline and 2070 trend.
- A 28% increase in overall water demand between 2010 baseline and 2070 alternative, a 21% savings over trend.
- Agriculture water demand to increase by 31% between 2010 baseline and the 2070 trend because the acreage of agricultural land in the Panhandle is projected to increase.
- Agriculture water demand projected to increase by 33% between 2010 baseline and the 2070 alternative, with the fact that irrigated agricultural lands were not developed in the 2070 alternative accounting for this difference.
- Development-related water demand clearly the leading factor in increased water demand in the trend scenario, with both development-related water demand and agriculture water demand causing the increase between 2010 trend and the 2070 alternative scenario.

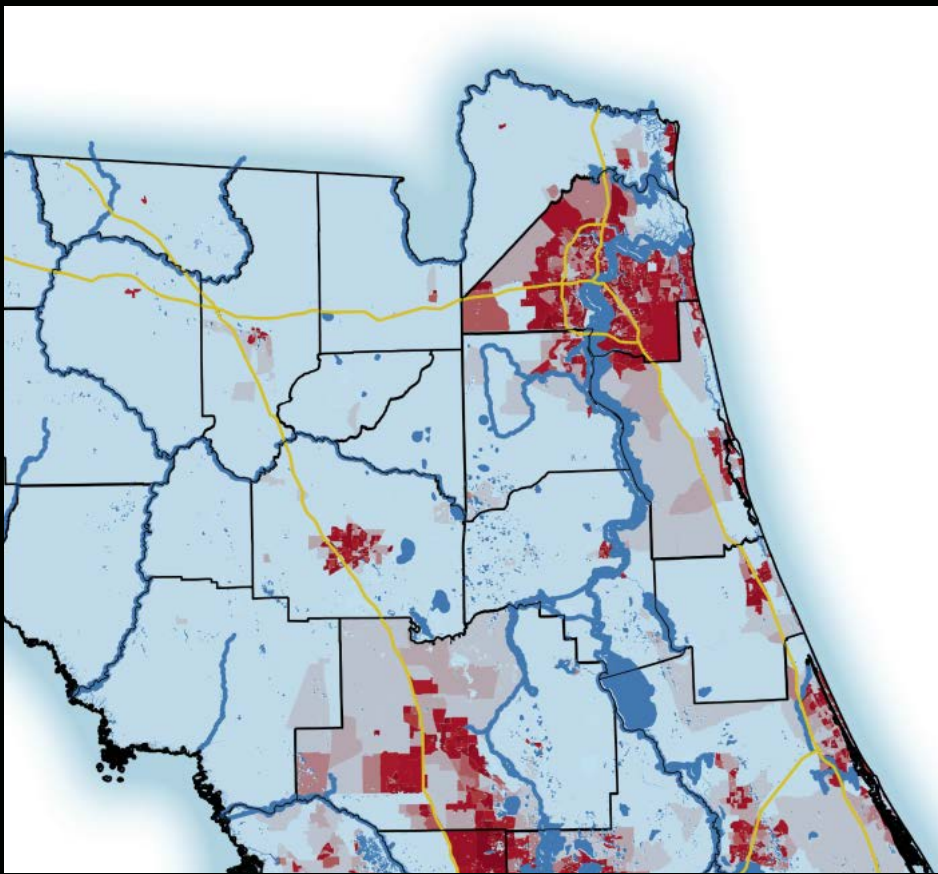


	2010 Baseline	2070 Trend	Difference Trend minus Baseline	2070 Alternative	Difference Alternative minus Baseline	Difference Alternative minus Trend
Agriculture	62,656,690	82,383,033	19,726,343	83,145,736	20,489,046	762,703
Development	341,425,469	568,858,108	227,432,639	433,238,192	91,812,723	-135,619,916
Total	404,082,159	651,241,141	247,158,982	516,383,928	112,301,769	-134,857,213

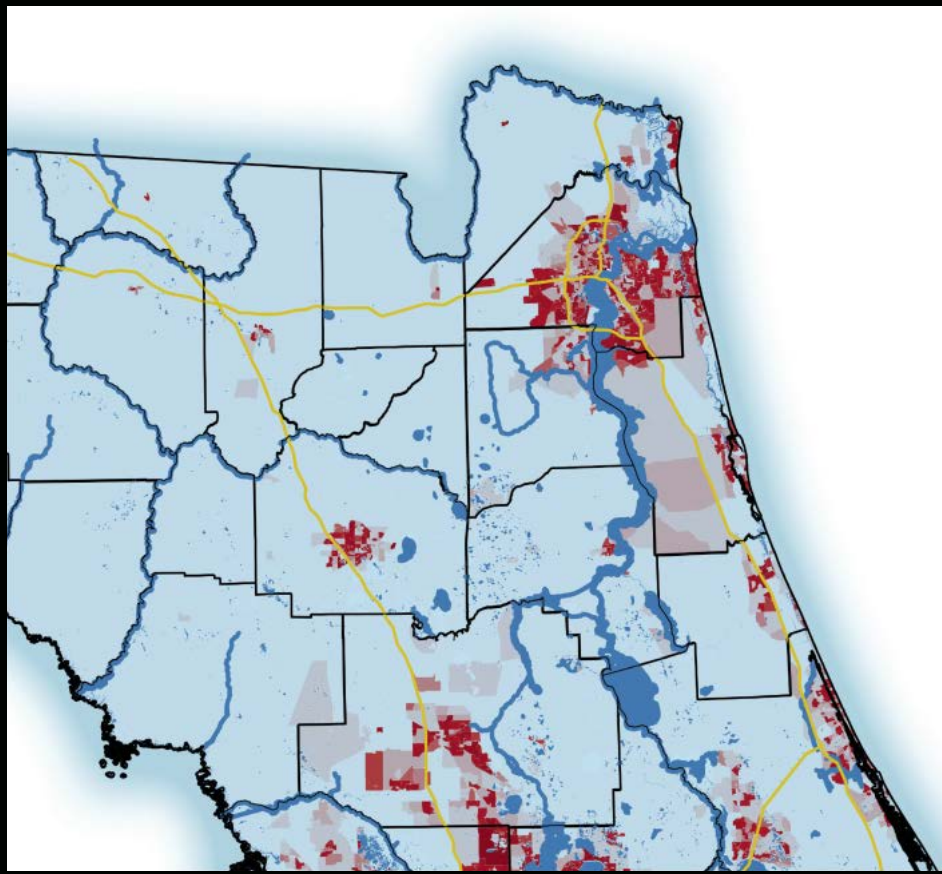
Northeast Florida Region



Baseline



Trend



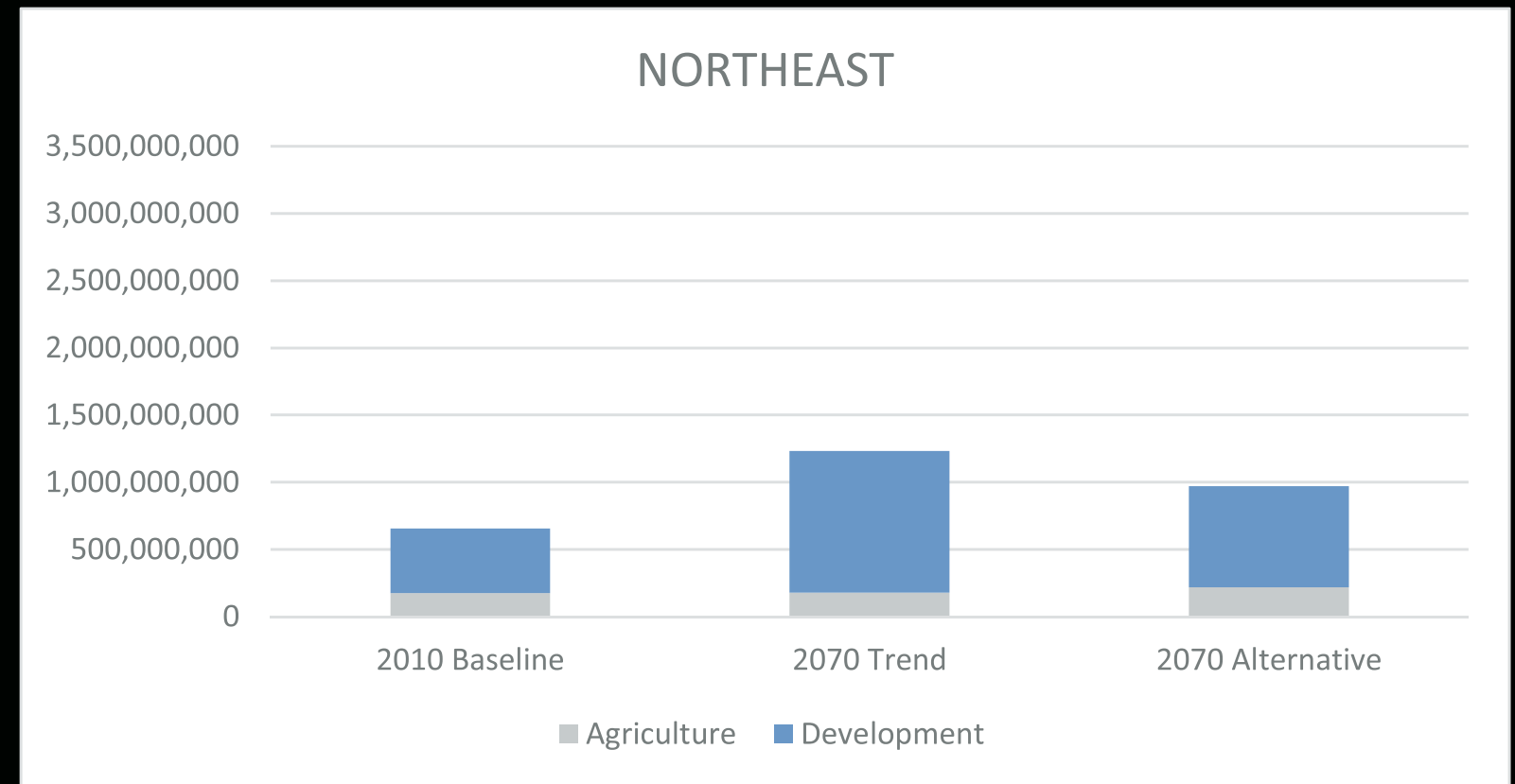
Alternative



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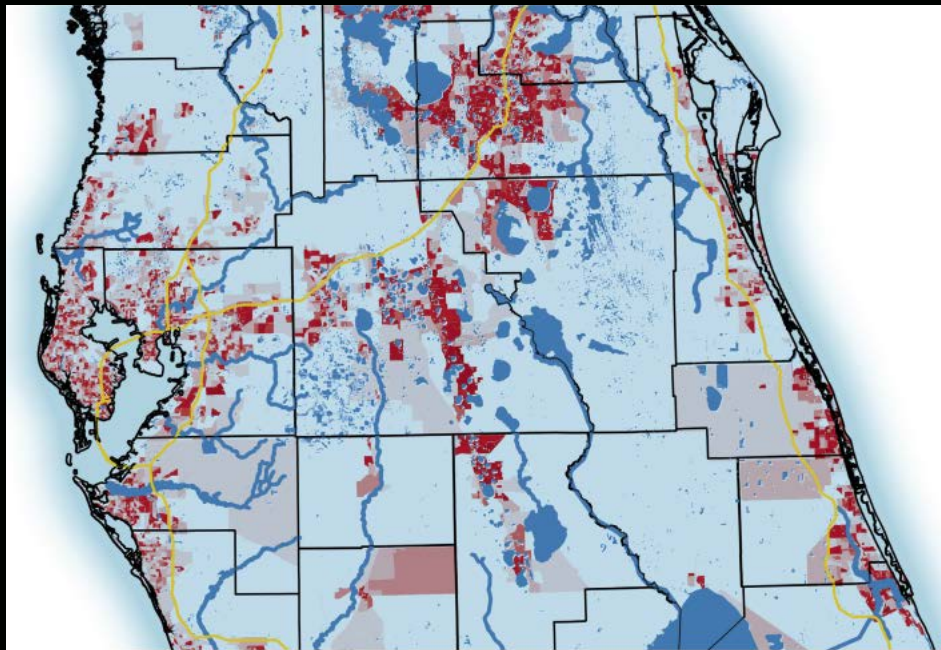
Northeast Florida Region

- An 88% increase in overall water demand between 2010 baseline and 2070 trend.
- A 48% increase in overall water demand between 2010 baseline and 2070 alternative, a 21% savings over trend.
- Agriculture water demand to increase by only 1% in the 2070 trend due to the loss of irrigated agricultural lands.
- Because irrigated agriculture lands were not developed in the 2070 alternative, agricultural water demand is projected to increase by 25% between the 2010 trend and the 2070 alternative.
- Development-related water demand increases by 120% from the 2010 baseline to 2070 trend, and by 57% when comparing 2010 baseline with 2070 alternative.

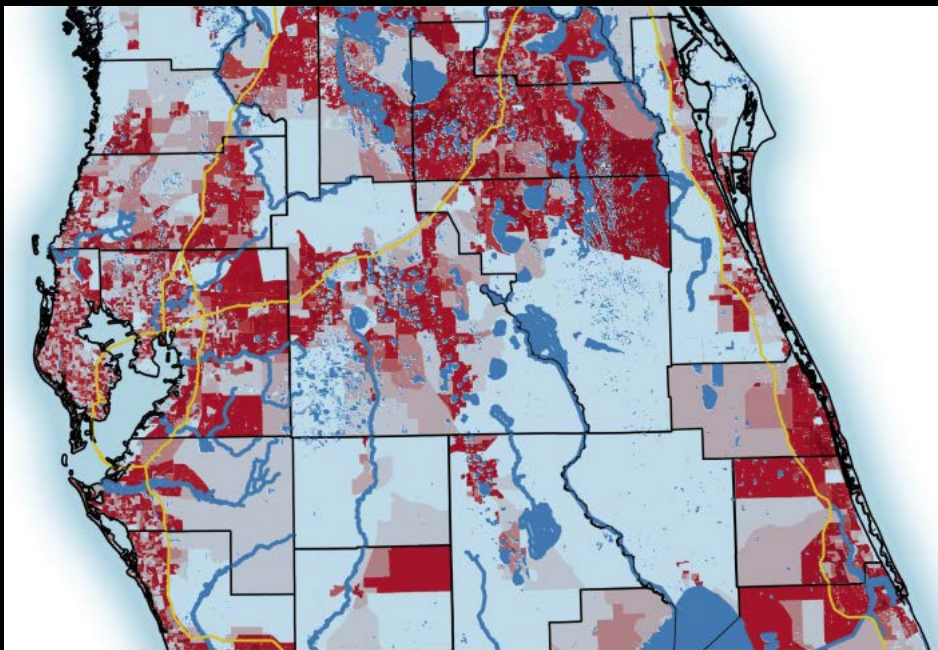


	2010 Baseline	2070 Trend	Difference Trend minus Baseline	2070 Alternative	Difference Alternative minus Baseline	Difference Alternative minus Trend
Agriculture	175,664,784	177,659,419	1,994,635	219,224,707	43,559,923	41,565,288
Development	479,689,711	1,054,252,410	574,562,699	753,637,390	273,947,679	-300,615,020
Total	655,354,495	1,231,911,829	576,557,334	972,862,097	317,507,602	-259,049,732

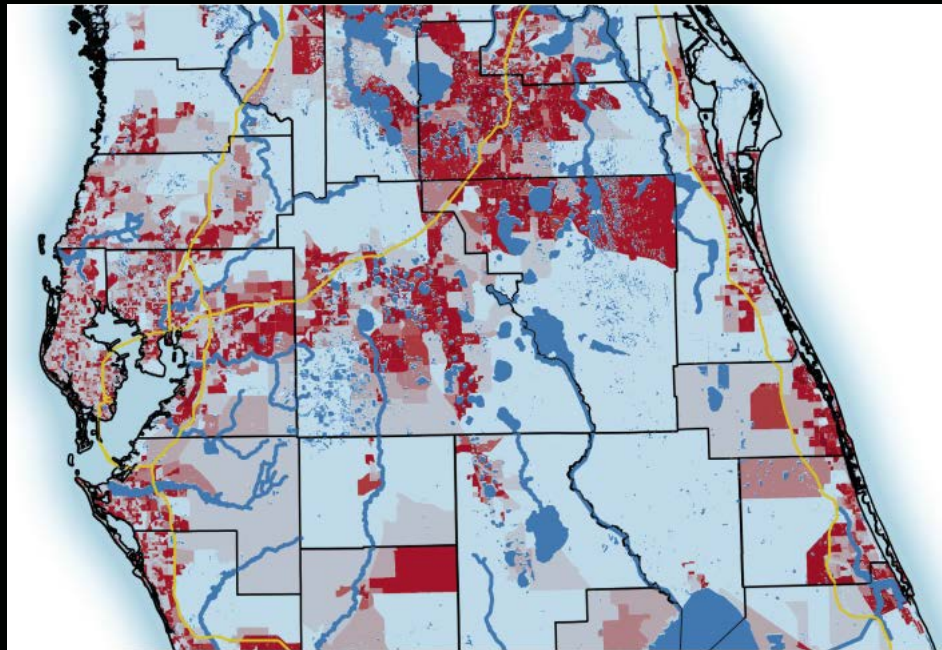
Central Florida Region



Baseline



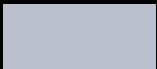
Trend



Alternative



0-245



246-386



387-468



469-515



516-543



544-558



559-586



587-633



634-714



715-856



857-1101



1102-1525



1526-2260



2261-3533

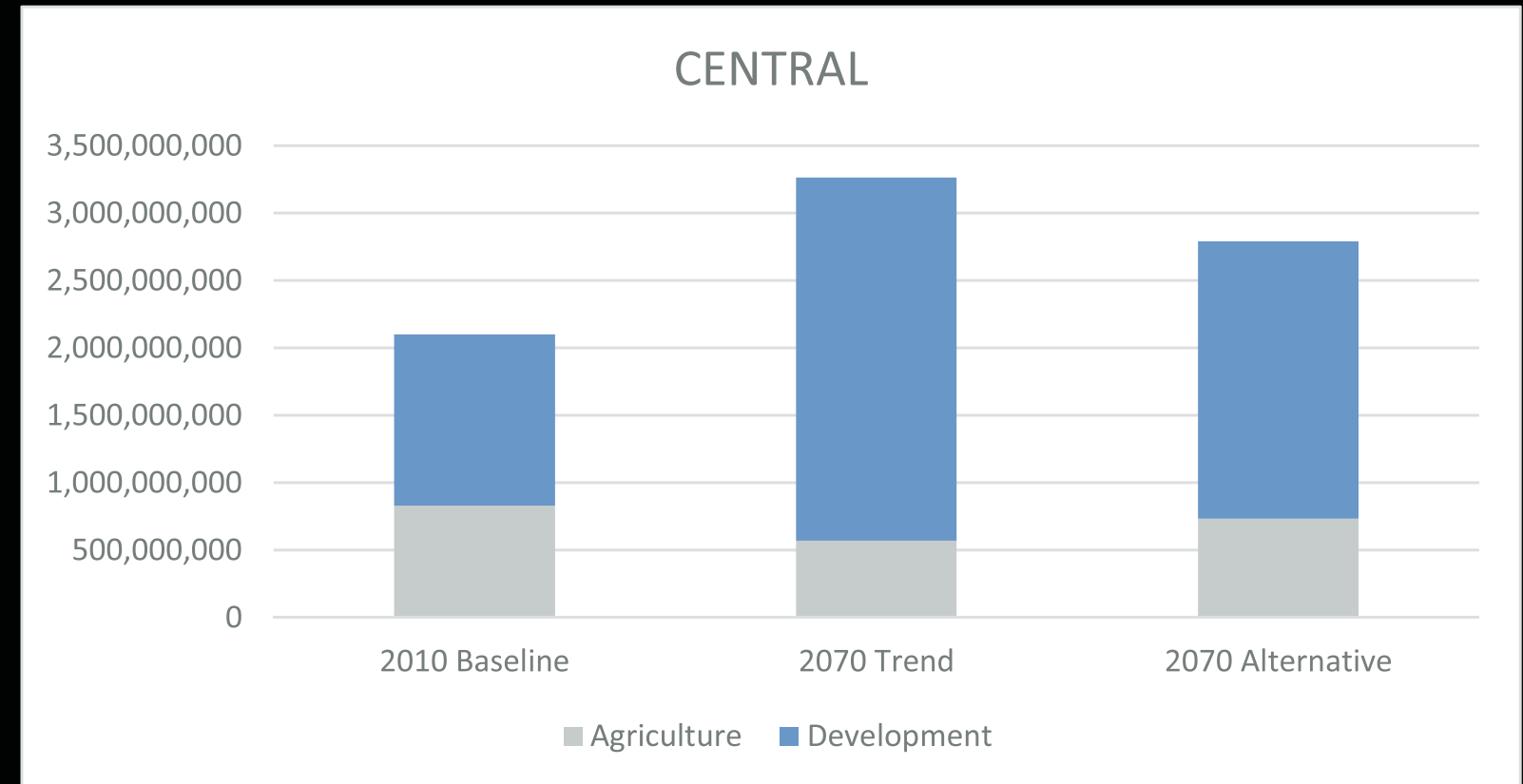


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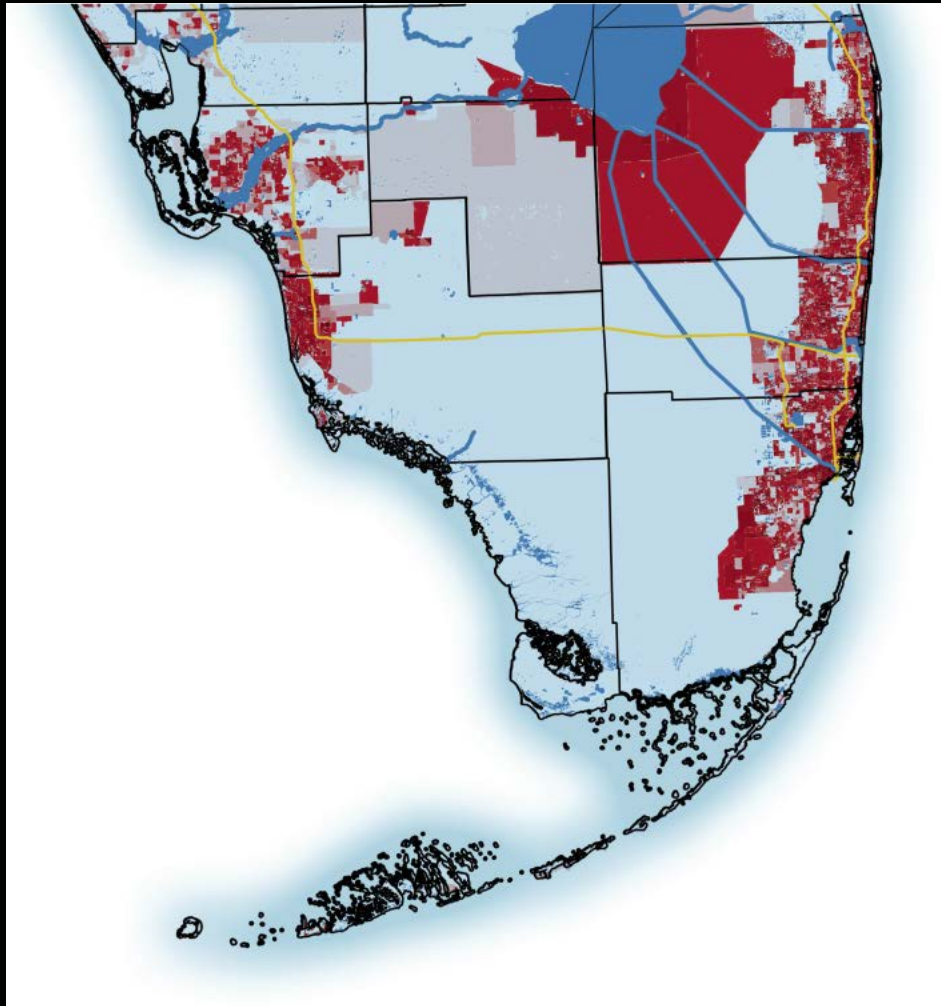
Central Florida Region

- A 55% increase in overall water demand between 2010 baseline and 2070 trend.
- A 33% increase in overall water demand between 2010 baseline and 2070 alternative, a 14% savings over 2070 trend.
- Agriculture water demand to decline by 31% comparing the 2010 baseline to the 2070 trend, and by 12% comparing the 2010 baseline to the 2070 alternative.
- Both 2070 scenarios reflect a significant projected loss of agricultural lands in Central Florida.
- Development-related water demand increases by 112% from the 2010 baseline to 2070 trend, and by 62% when comparing the 2010 baseline with 2070 alternative.

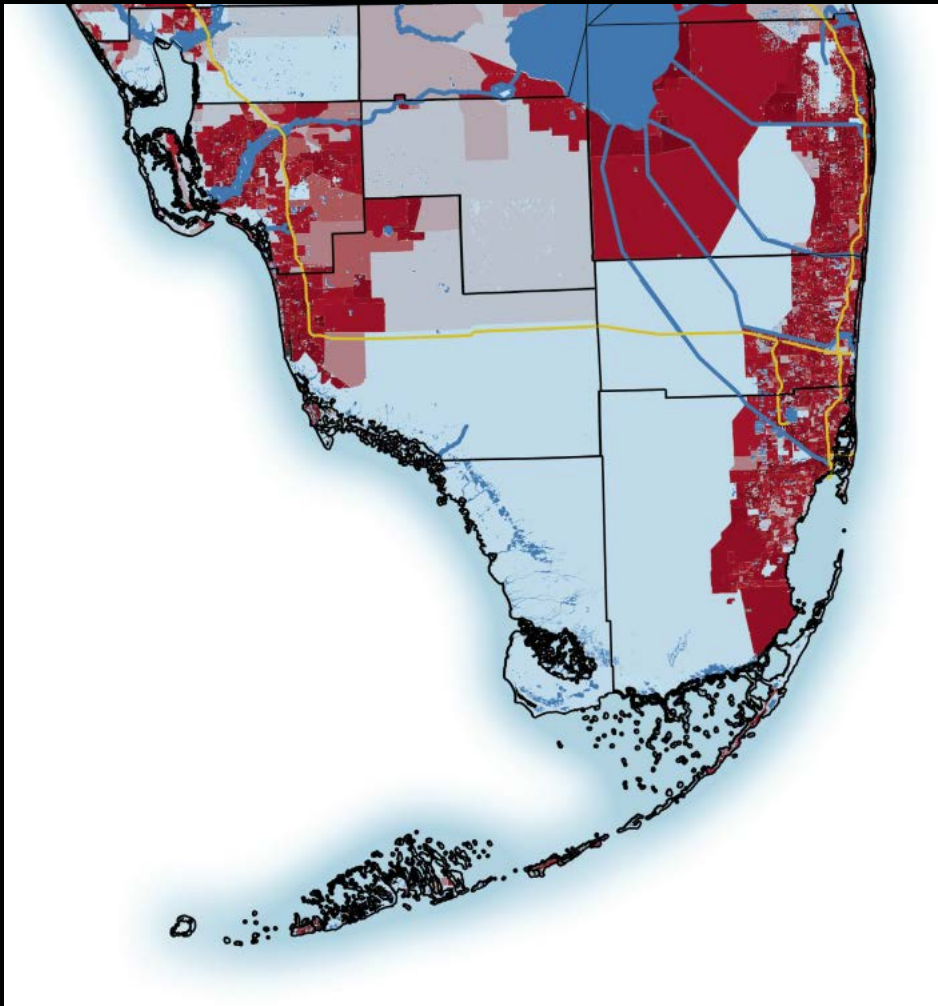


	2010 Baseline	2070 Trend	Difference Trend minus Baseline	2070 Alternative	Difference Alternative minus Baseline	Difference Alternative minus Trend
Agriculture	829,465,491	570,861,745	-258,603,746	732,548,298	-96,917,193	161,686,553
Development	1,272,162,173	2,691,896,944	1,419,734,771	2,059,321,097	787,158,924	-632,575,847
Total	2,101,627,664	3,262,758,689	1,161,131,025	2,791,869,395	690,241,731	-470,889,294

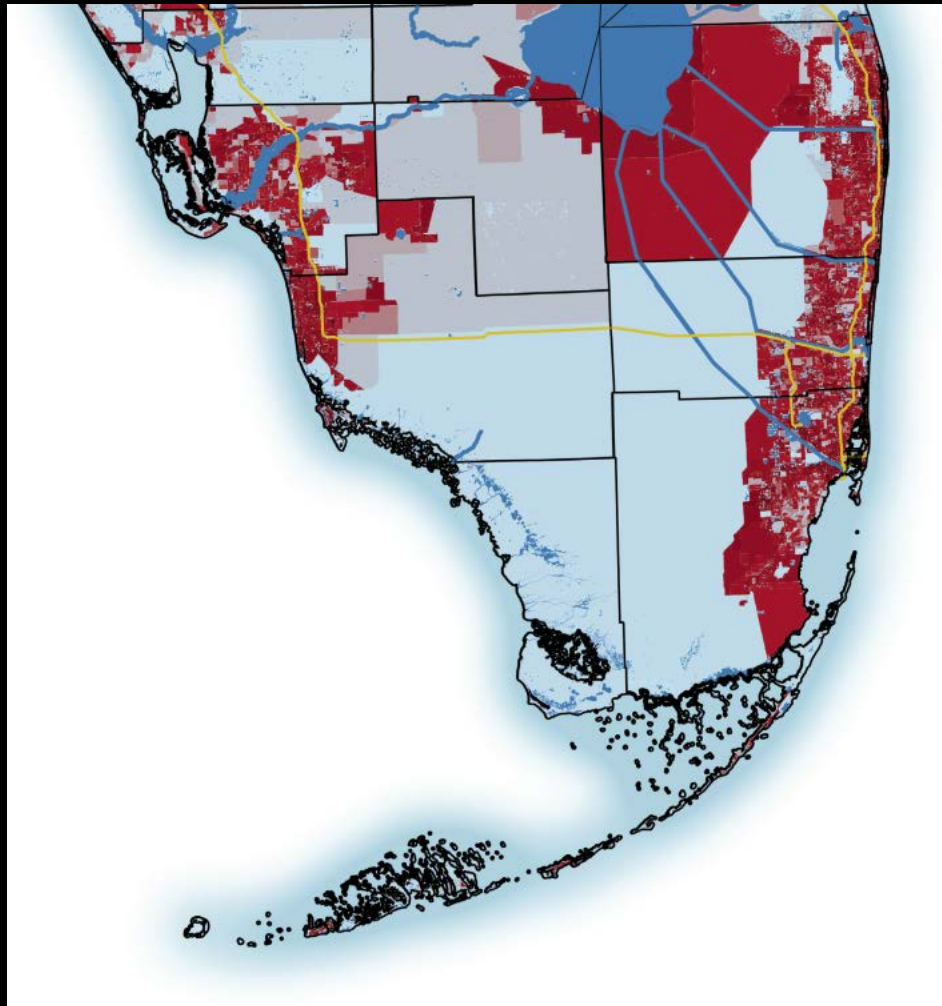
South Florida Region



Baseline



Trend



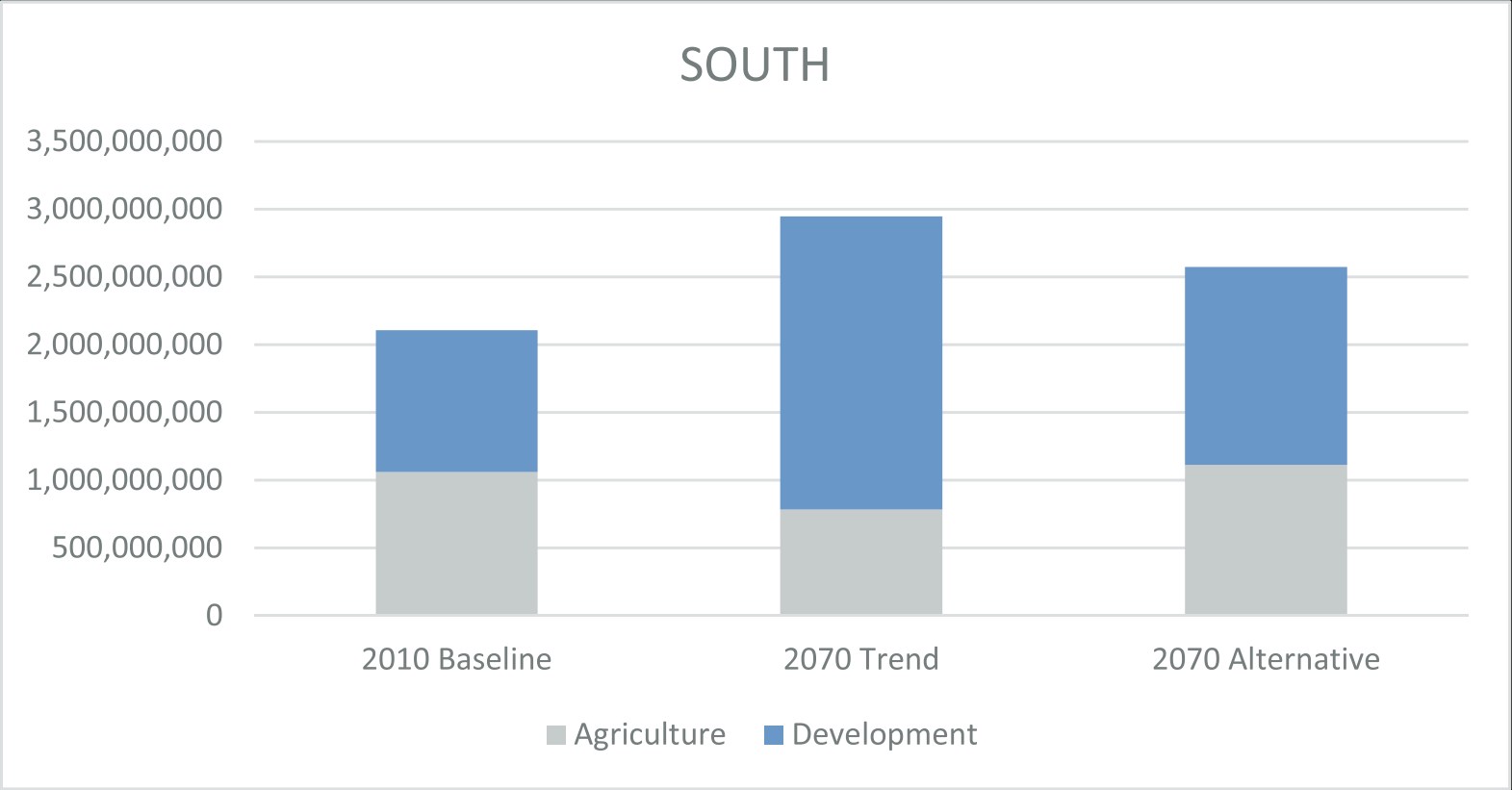
Alternative



This map uses a mathematically-generated geometric scale to better visualize the results due to the wide range in values. Each category has roughly the same number of data entries.

South Florida Region

- A 40% increase in overall water demand between 2010 baseline and 2070 trend.
- A 22% increase in overall water demand between 2010 baseline and 2070 alternative, a 13% savings over 2070 trend.
- Agriculture water demand to decline by 26% comparing baseline to the 2070 trend, due to the loss of agricultural lands.
- Agriculture water demand to increase by 5% comparing the 2010 baseline to the 2070 alternative because irrigated agricultural lands do not development and their rates of demand are projected to increase.
- Development-related water demand increases by 107% from the 2010 baseline to 2070 trend, and by 39% when comparing the 2010 baseline with 2070 alternative.



	2010 Baseline	2070 Trend	Difference Trend minus Baseline	2070 Alternative	Difference Alternative minus Baseline	Difference Alternative minus Trend
Agriculture	1,062,154,471	783,401,403	-278,753,068	1,115,334,829	53,180,358	331,933,426
Development	1,046,092,682	2,165,549,775	1,119,457,093	1,458,333,542	412,240,860	-707,216,233
Total	2,108,247,153	2,948,951,178	840,704,025	2,573,668,371	465,421,218	-375,282,807



HOW DO WE BETTER CONSERVE FLORIDA'S LIMITED WATER RESOURCES?



Increase Supply, Reduce Demand

- Increase supply through alternative sources
 - Reclaim water
 - Desalinization – prohibitively expensive
- Decrease demand
 - Water conservation
 - More compact development patterns

Water conservation and reclaiming water both provide significant and cost-effective results

Increase Water Supply

- Water reclamation geared to irrigation
 - City of Pompano Beach – OASIS water reuse plant and incentivizing single family residential connections to the plant
 - University of Florida – All water for irrigation from reclaimed water

Many more examples around Florida

Reduce Water Demand

- University of Florida IFAS Florida-Friendly Landscaping™ Program – At least **50%** of water used by households is used outdoors for landscape irrigation.
- University of Florida Program for Resource Efficient Communities, Establishing Water Consumption Baselines for Alachua County – Single family homes with an automated irrigation system consumed an average of 358 gallons of water per day (GPD), while those without consumed an average of 190 GPD, a **47%** reduction.
- Another study by the same group, Reduced Impact Development Practices at ‘Restoration’ – Installing soil moisture sensors which override timer-based controls on irrigation systems can reduce the amount of water used for landscape irrigation by more than **50%**.

The single most effective strategy to reduce water demand in Florida is to significantly reduce the amount of water used for landscape irrigation.

Benefits:

- Conserve water
- Savings to homeowners through reduced water bills
- Community costs associated with supplying water and addressing sewage and stormwater can be significantly reduced, resulting in tax savings.

Existing Statewide Water Conservation Programs

- **Florida Water Star** (www.floridawaterstar.com)
 - State water conservation certification program for new and existing homes and commercial developments
 - Addresses both outdoor and indoor water conservation strategies
- **Florida-Friendly Landscaping™** (www.ffl.ifas.ufl.edu/)
 - Provides residents, developers and landscaping professionals with water conservation and other strategies to better protect Florida's environment.

Protect Natural Lands

Florida 2070 calls for additional protection of lands on the Florida Forever Acquisition list and lands identified as Priorities 1 & 2 in the Florida Ecological Greenways Network

**Existing Conservation
and Working Lands**



**With Florida Forever and Florida Greenways
priorities 1 and 2 lands**



- Help recharge Florida's aquifer – the source of much of the state's water supply
- Cleanse our drinking water
- Provide boundless recreational opportunities for residents and visitors alike
- Shelter and sustain Florida's wildlife

While not within the scope of this study, the value of natural lands in the protection of Florida's water supply should not be underestimated



RECOMMENDATIONS

VISIT

WWW.1000FRIENDSOFFLORIDA.ORG/FLORIDA2070/
FOR MORE DETAILED INFORMATION



Expand Public Water Conservation Efforts



*City of Pompano Beach
OASIS Reuse Water Facility*

- Increase funding and outreach for the Florida Water Star and Florida-Friendly Landscaping™ programs to promote greater water conservation in new and existing development
- Require Florida Friendly Landscaping™, manual irrigation, soil moisture sensors, or comparable water conservation technology for all new development
- Require permitted major water users to monitor the amount of groundwater used by major users

- Partner with developers and local governments to establish conservation goals, water budgets and water use monitoring strategies prior to the approval of new development
- Update the Florida Building Code to require indoor and outdoor water efficiency standards for new construction and major remodeling
- Adopt registration and training standards for irrigation professionals
- Establish conservation rate structures that incentivizes lower levels of water consumption
- Construct and incentivize the use of reclaimed water facilities

Reduce Personal Water Use

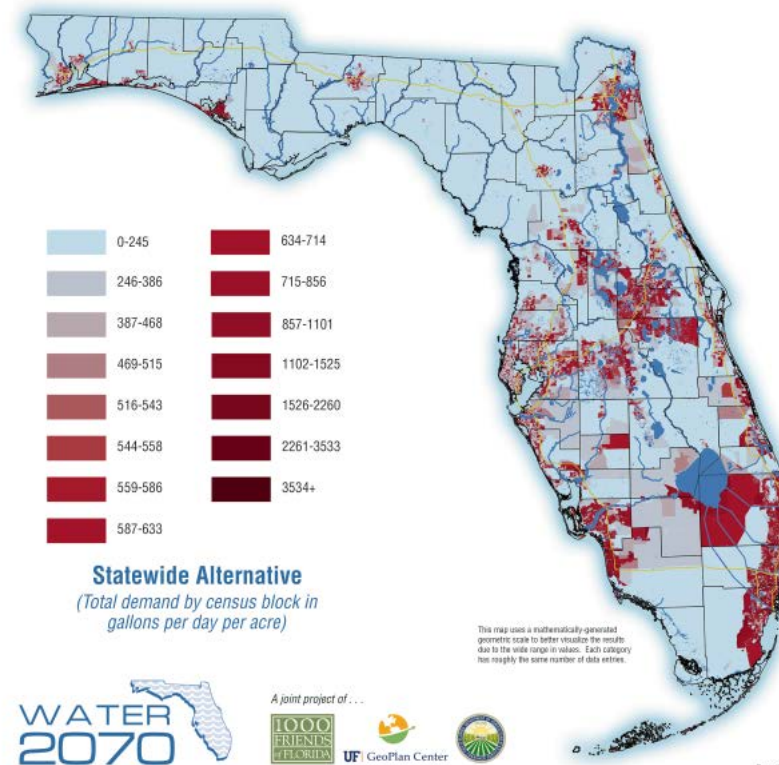
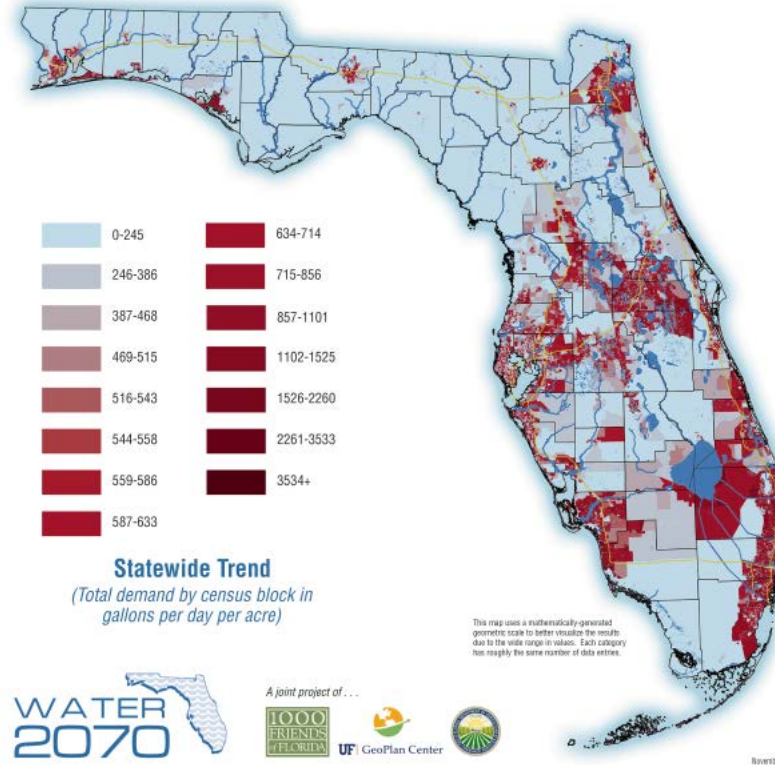
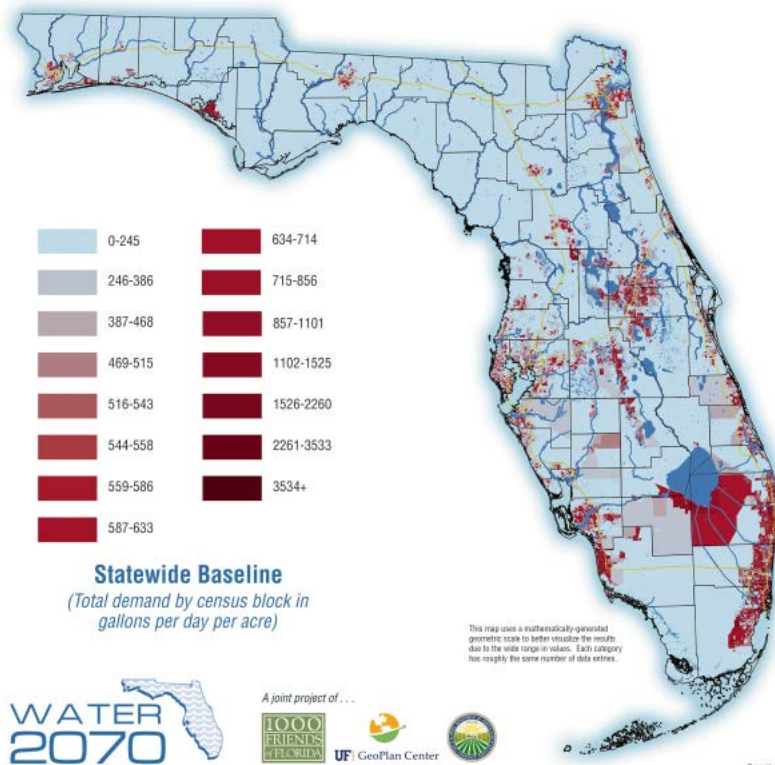


*An efficient micro-spray system
Florida Water Star*

- Use Florida-Friendly Landscaping™ and other measures to reduce or eliminate landscaping water use, and seek formal Florida-Friendly Landscaping™ recognition
- Lessen the need for irrigation by using the right plants in the right locations, grouping them according to water needs, and using rain barrels or cisterns to capture rainwater for irrigation
- Reduce stormwater runoff through mulching plant beds, using porous surfaces for patios, walkways and driveways, and creating swales or low areas to hold and filter water on your property

- If an automated irrigation system is used, ensure that it is designed and operated to meet strict water conservation criteria including drip systems, soil moisture sensors, automatic rain shutoff sensors and/or other technology to significantly reduce water use
- Make sure the irrigation system is calibrated correctly and check it regularly for breaks and head alignment
- Do not water if it has rained in the last 24 hours or if rain is forecast in the next 24 hours
- Select Florida Water Star certified properties when purchasing a new home, and follow Water Star guidelines when remodeling an existing home
- Use Water-Sense labeled high-efficiency appliances to significantly reduce indoor water consumption

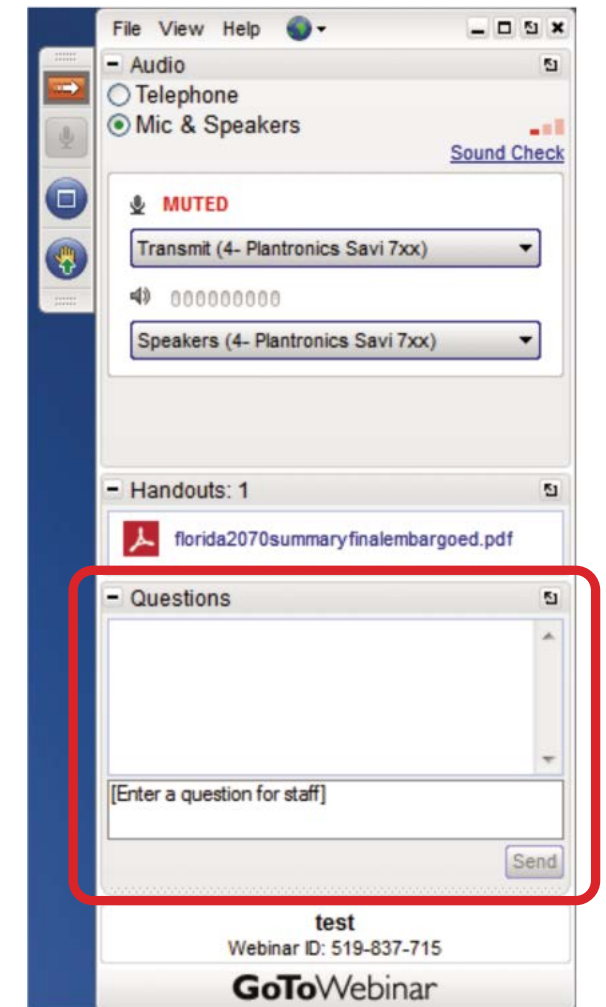
How Do You Envision Florida's Future Water Demand?





If you have questions:

- Your webinar control panel includes a “Questions” box
- Please click on “+” sign and type any questions in this box
- Please refer to the slide number and/or speaker when you post your question
- We will do our best to answer all questions as time permits





This Webinar Has Been Approved for:

- 1.5 AICP CM credits for planners ([#9109130](#))
- 2 CLE credits for the Florida Bar ([#1606410N](#))
- .15 CEU for certified environmental health professionals





Upcoming Dr. John M. DeGrove Webinars

**February 15, 2016, 12 noon to 1:30pm
Implementing Water 2070: Water
Conservation Planning for Florida
Communities**

Visit www.1000friendsofflorida.org/webinar
to find out more!





The PowerPoint and materials
are available at

www.1000friendsofflorida.org/florida2070

