



Florida Department of Environmental Protection

Basin Management Action Plan (BMAP) Crystal River/Kings Bay

September 29, 2016

Terry Hansen P.G., Basin Coordinator

850-245-8561

terry.hansen@dep.state.fl.us





Topics

- Priority Focus Area (PFA)
- Nitrogen Source Inventory Loading Tool (NSILT)
(Updated)
 - Necessary reductions
 - Additional nitrogen source reduction measures
- Septic System Testing Data
- Fertilizer Ordinance Updates



PFA



PFA Requirements

- Sub-Section 373.802, Chap. 2016-1 Laws of Florida:
 - Definition: Area or areas of a basin where the Floridan Aquifer is generally most vulnerable to pollutant inputs where there is a known connectivity between ground water pathways and an Outstanding Florida Spring (OFS).



PFA Requirements

- Sub-Section 373.803, Chap. 2016-1 Laws of Florida:
 - To be delineated considering factors that may lead to degradation of an OFS, such as:
 - Groundwater travel time to spring
 - Hydrogeology
 - Nutrient load to spring
 - Additional factors
 - Soil types
 - Pollutant sources
 - Identifiable boundaries

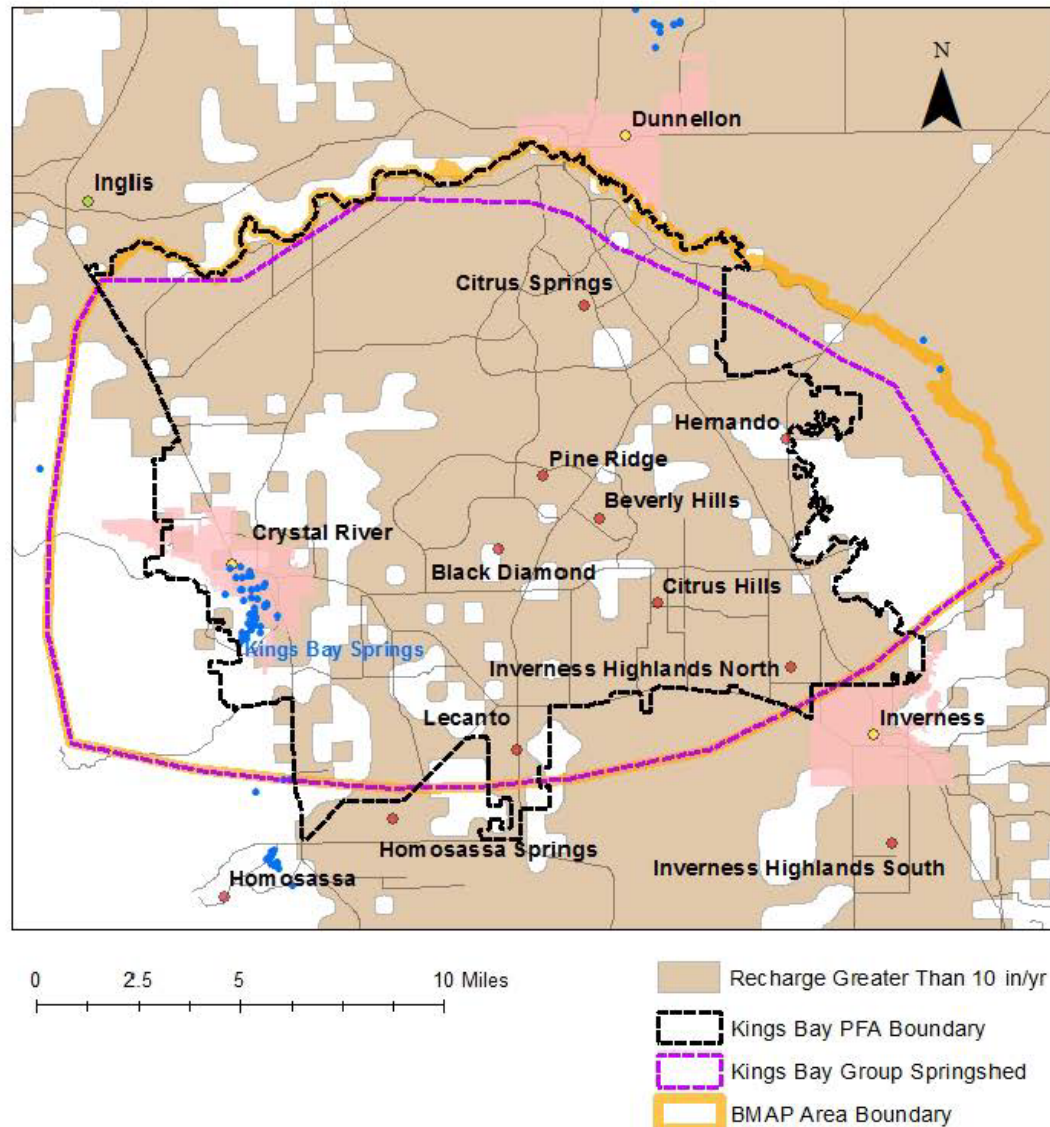


PFA Determination

- Establish groundwater **contributing area (CA)** for the spring.
- Identify regions within the CA where greatest **recharge** occurs.
- Identify regions within the CA where Floridan Aquifer is most **vulnerable**.
- Consider **nitrogen loading and travel time**.
- Consider groundwater travel time.
- Identify regions within CA to exclude or include based on **land use** and **potential occurrence of pollutant sources**.
- Create PFA boundary that corresponds with identifiable boundaries.

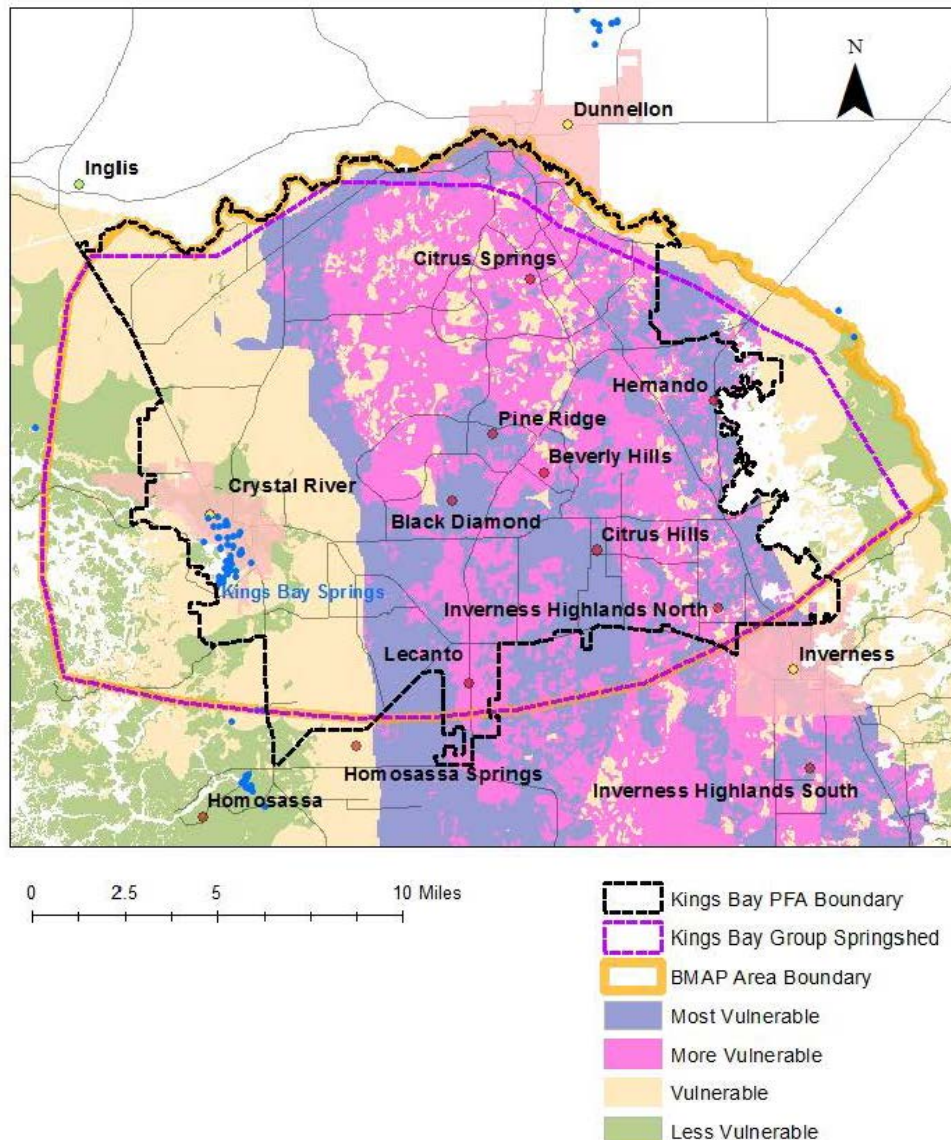


High Recharge Areas



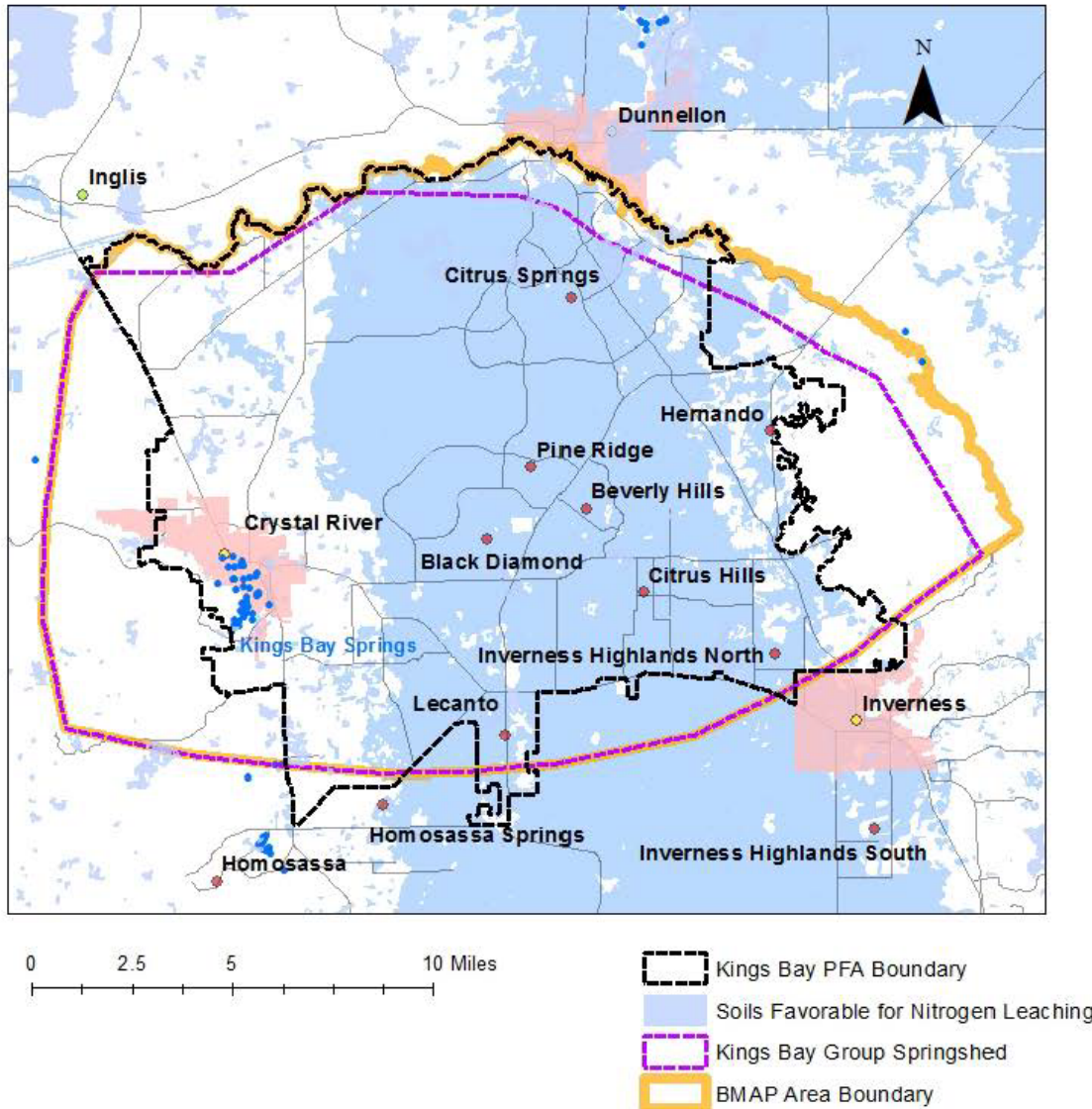


Aquifer Vulnerability



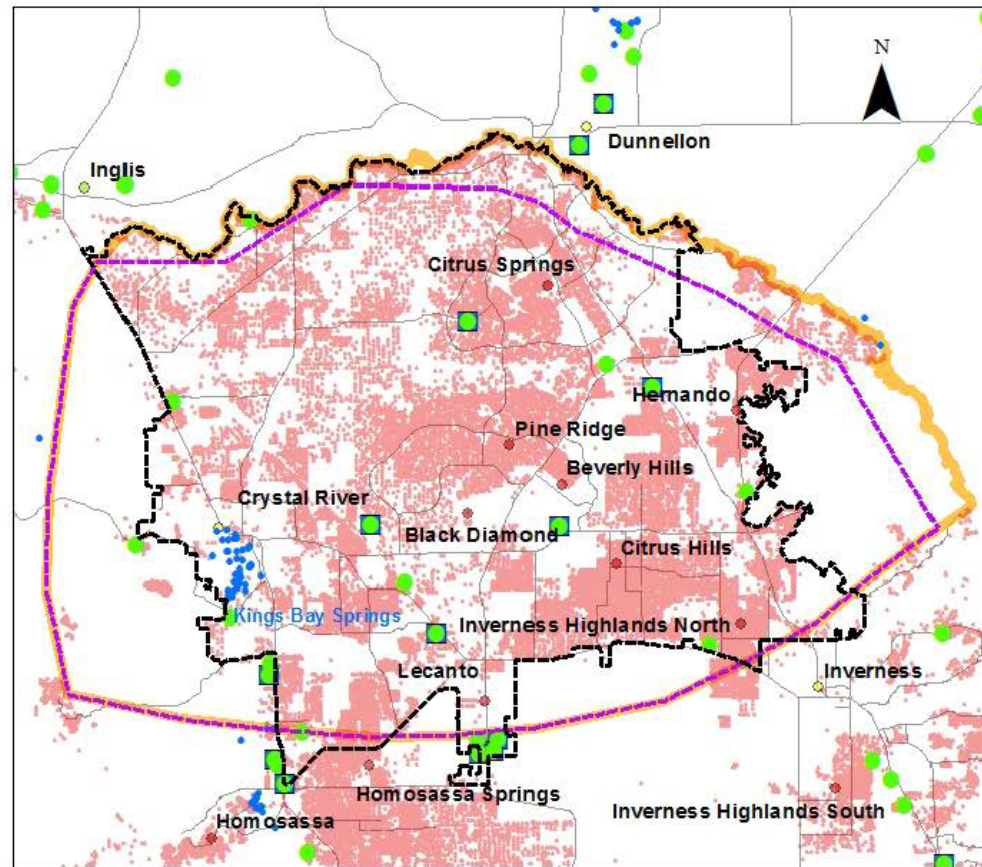


Nitrogen Loading





Potential Pollutant Sources

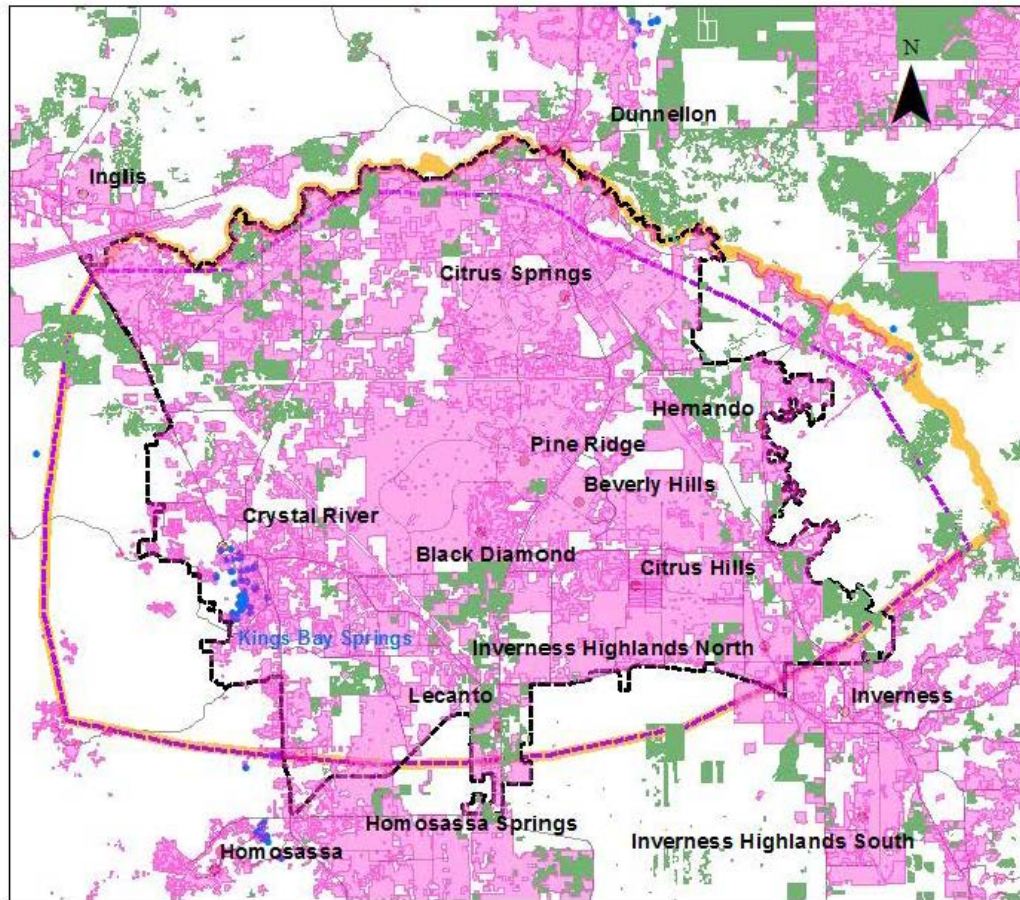


0 2.5 5 10 Miles

-  Kings Bay PFA Boundary
-  Kings Bay Group Springshed
-  Domestic Wastewater Facility
-  Facility with Design Flow > 0.1 MGD
-  Onsite Treatment and Disposal System
-  BMAP Area Boundary



Land Use

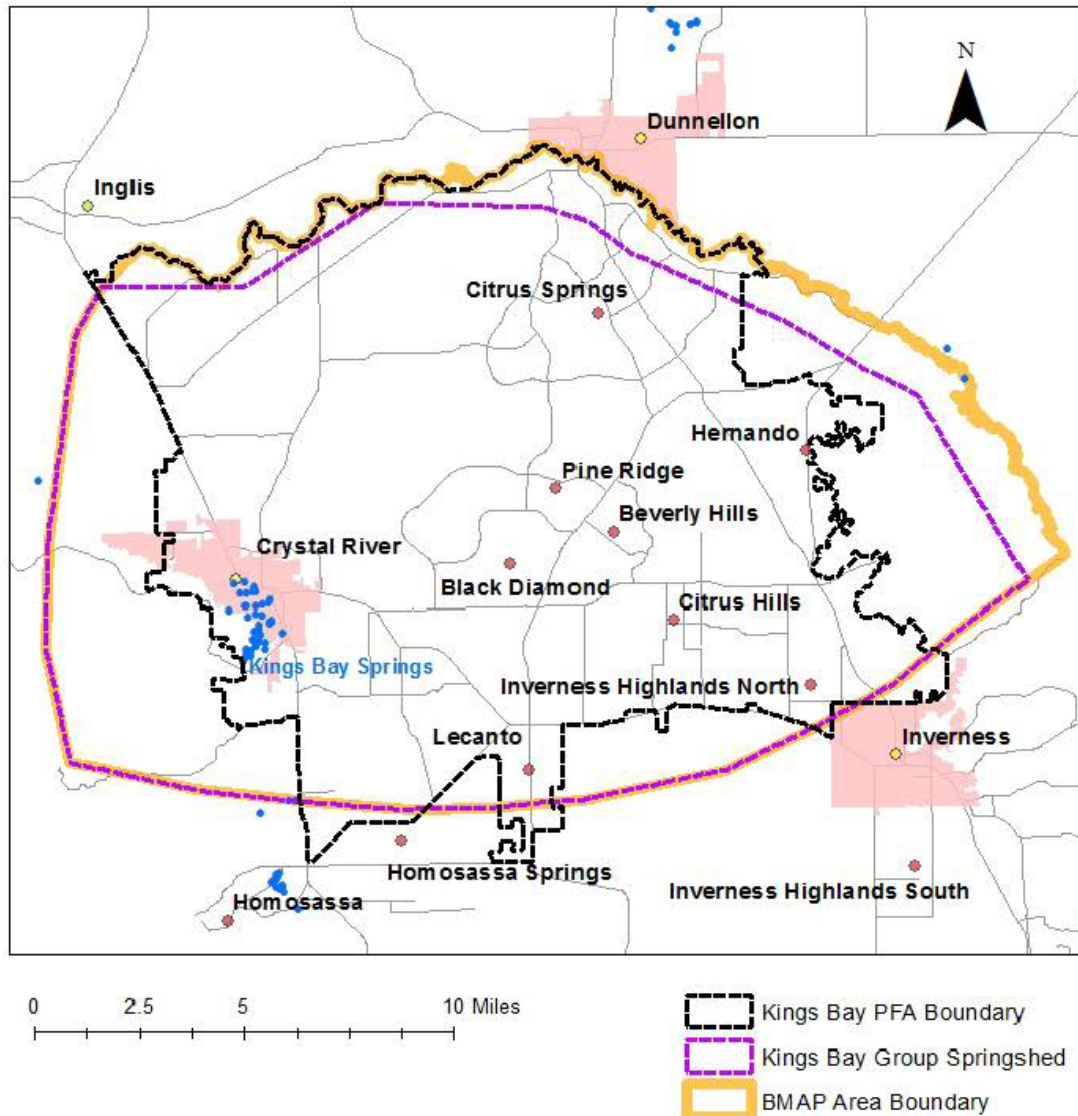


0 2.5 5 10 Miles

- Agriculture
- Urban
- Kings Bay PFA Boundary
- Kings Bay Group Springshed
- BMAP Area Boundary



Proposed PFA Boundary





PFA Determination

Questions on Draft PFA
Process?



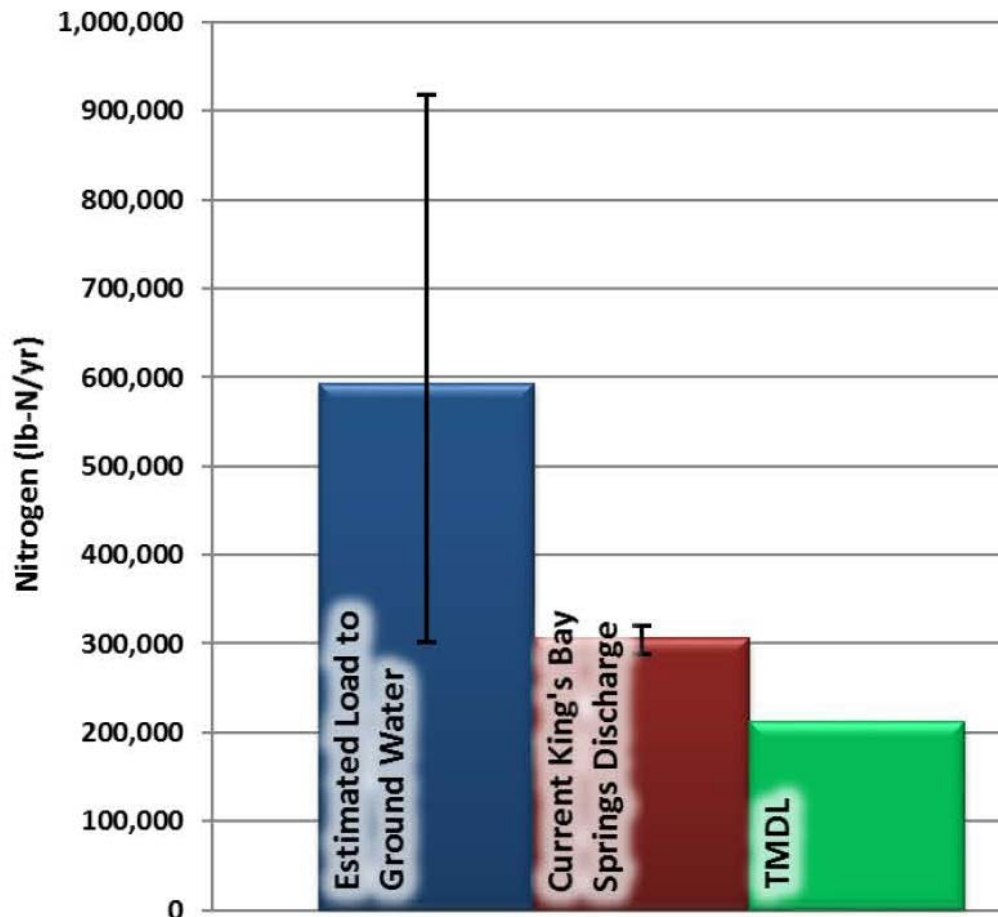
NSILT *(Updated)*



<http://fdep.maps.arcgis.com/apps/MapJournal/index.html?appid=e71ecaa35bdd4caaba7a0c411691dfa7>



NSILT



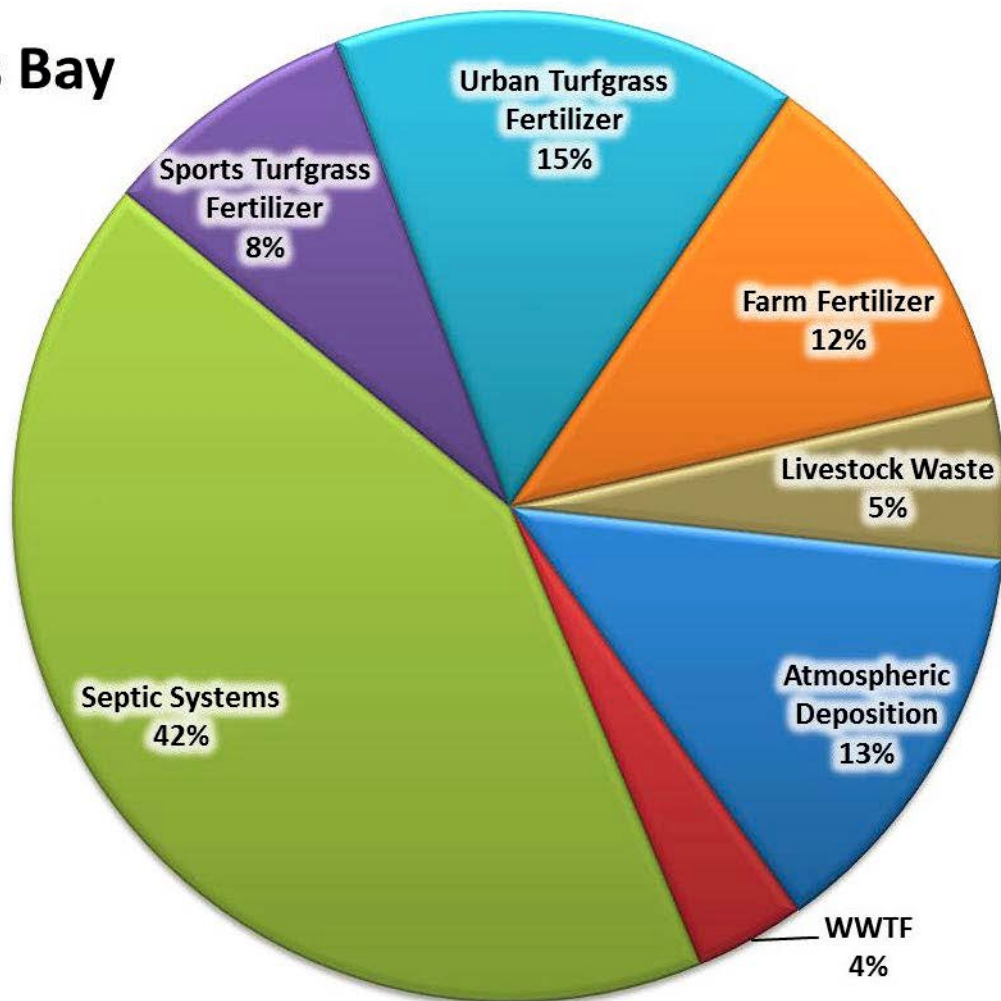
Estimated Load to Groundwater: 592,440 lb-N/yr
(Range 300,000 lb-N/yr to 900,000 lb-N/yr)

Estimated TMDL Load: 210,648 lb-N/yr



NSILT Load to Ground Water

Kings Bay



Estimated Load to Groundwater: 592,440 lb-N/yr

Estimated TMDL Load: 210,648 lb-N/yr



Nitrogen Source Reduction Strategy

Source	Total TN load %	Total <u>estimated</u> pounds/year TN from source	Total <u>estimated</u> reduction [groundwater load – TMDL] (x) %
Septic Systems	31 42	203,241 248,825	160,353
Urban Turfgrass Fertilizer	28 15	183,573 88,866	57,269
Sports Turfgrass Fertilizer	5 8	32,781 47,395	30,544
Farm Fertilizer	16 12	104,899 71,093	45,815
Livestock Waste	5	32,781 29,622	19,090
WWTF	3 4	19,669 23,698	15,272
Atmospheric Deposition	12 13	78,674 77,017	49,633
Total:	100%	655,618 592,440	377,976

Load Reduction Targets:

- 5 years – 30% of total
- 10 years – Additional 50% (80% total)
- 15 years – Remaining 20% (100% total)



Septic Systems



Septic Systems

BMAP	Hernando	Pasco	Citrus
Kings Bay/ CR			28,578
WW	30,450	3,277	
Aripeka	2,781	4,022	
Homosassa	1,263		12,100
Chaz.	6,875		297
TOTAL	44,408	108,827	41,472

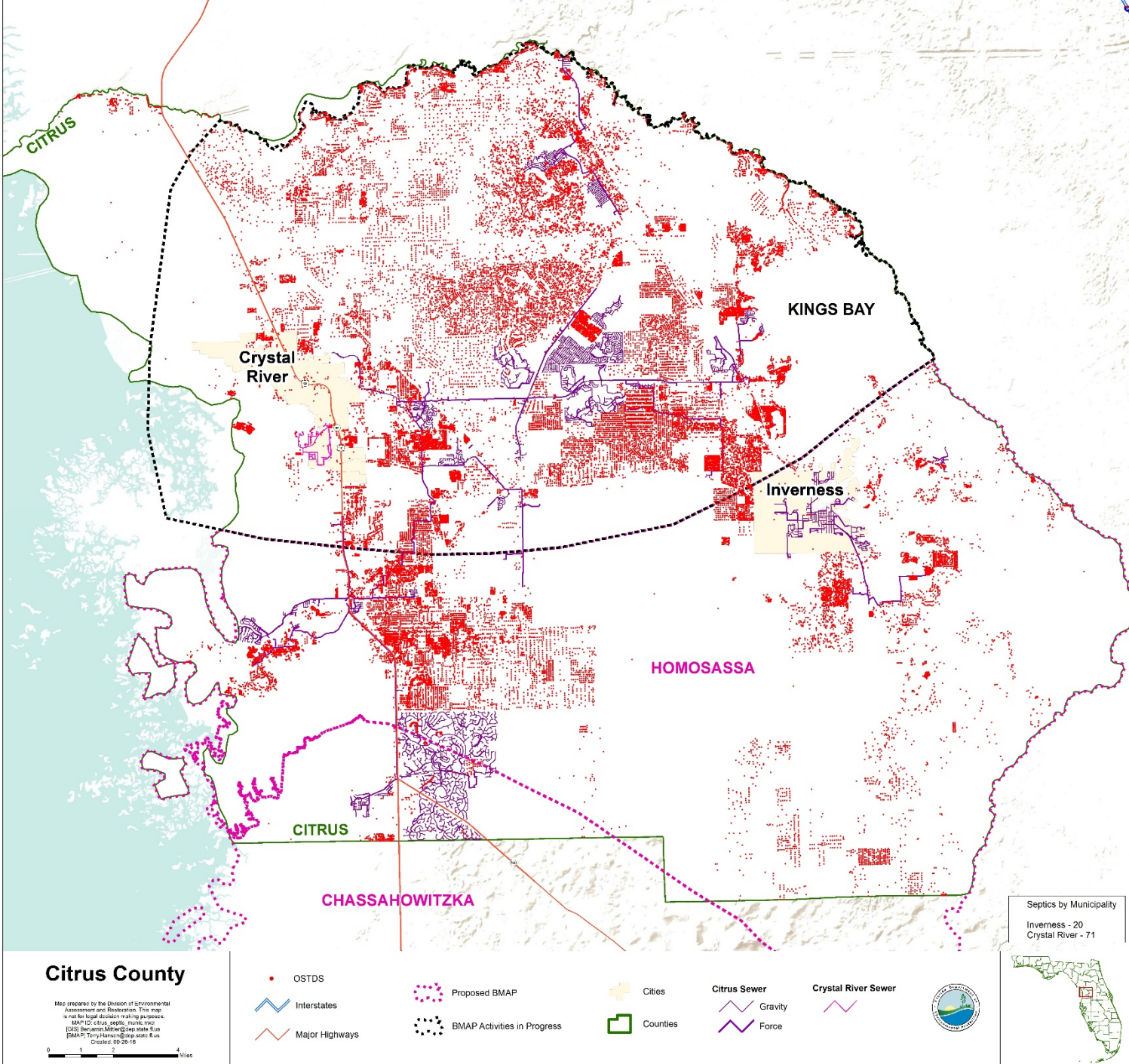
FROM: DOH Florida Water Management Inventory



Septic Systems

Citrus County
41,472 systems

KB/CR BMAP
28,578 systems

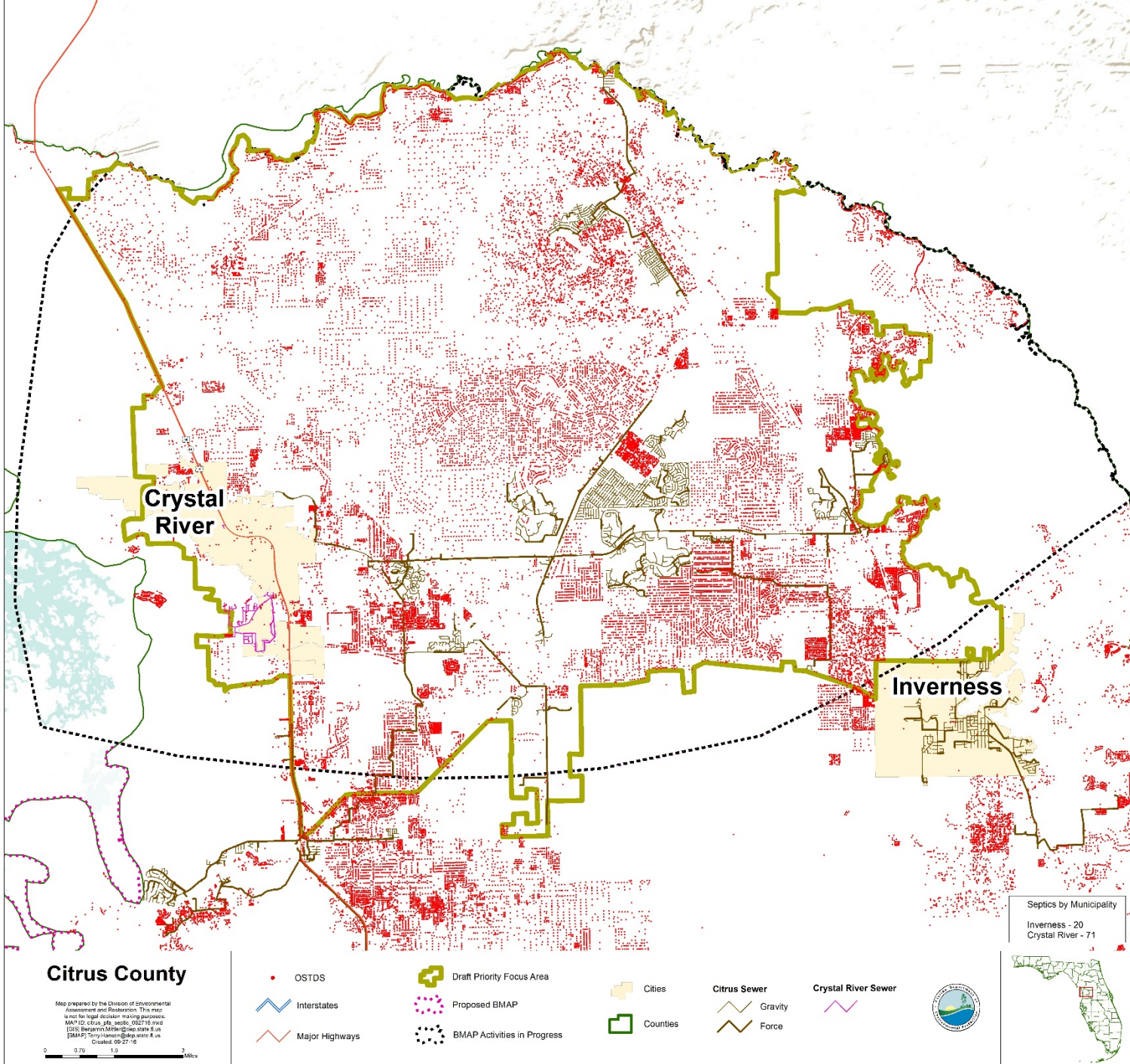




Septic Systems

Citrus County
41,472 systems

KB/CR BMAP
28,578 systems





Septic Systems

- Determine when & which enhancement options are permissible
- Identify areas of “responsibility”
- Identify areas of likely septic enhancement
 - Quantify # of systems in these areas
 - Estimate load reductions likely to be achieved
 - Determine options for septic enhancement
 - Determine realistic time frames 5/10/15 year goals
- Identify areas of likely septic conversions
 - Quantify # of systems in these areas
 - Estimate load reductions likely to be achieved
 - Determine what WWTP upgrades need to occur to address load transfer
 - Determine realistic time frames 5/10/15 year goals



Urban Turfgrass Fertilizer



Urban Turfgrass Fertilizer

Example: Surface Water Credit Available for Urban Turfgrass Fertilizer Reduction through Education Activities in other BMAPs

Activity	Credit	Activity Details
Fertilizer local code/ordinance	0.50%	
Total Credit for Education Activities	0.50%	



Urban Turfgrass Fertilizer

Examples: Calculation of an Entity's Urban Turfgrass Fertilizer Reduction Credit based on Education Activities

City of Jacksonville

Credit for Urban Fertilizer Education Activities (%)	Loading Reduction Requirement (lb-N/yr)	Total Credit (lb-N/yr)
0.50%	324,328	1,297

Formula:

$$\begin{aligned} \% \text{ credit (x) total loading reduction requirement} &= \text{total credit} \\ [0.50\% \text{ (x) } 324,328 &= 1,297] \end{aligned}$$

Lee County

Credit for Urban Fertilizer Education Activities (%)	Loading Reduction Requirement (lb-N/yr)	Total Credit (lb-N/yr)
0.50%	371,728	1,859

Formula:

$$\begin{aligned} \% \text{ credit (x) total loading reduction requirement} &= \text{total credit} \\ [0.50\% \text{ (x) } 371,728 &= 1,859] \end{aligned}$$



Urban Turfgrass Fertilizer

Total Urban Turfgrass Fertilizer Reduction Requirement for CR/KB

Years	Percentage of Total	Amount (lb/yr)
5	30%	17,181
10	50%	28,634
15	20%	11,454
Total:	100%	57,269

CR/KB

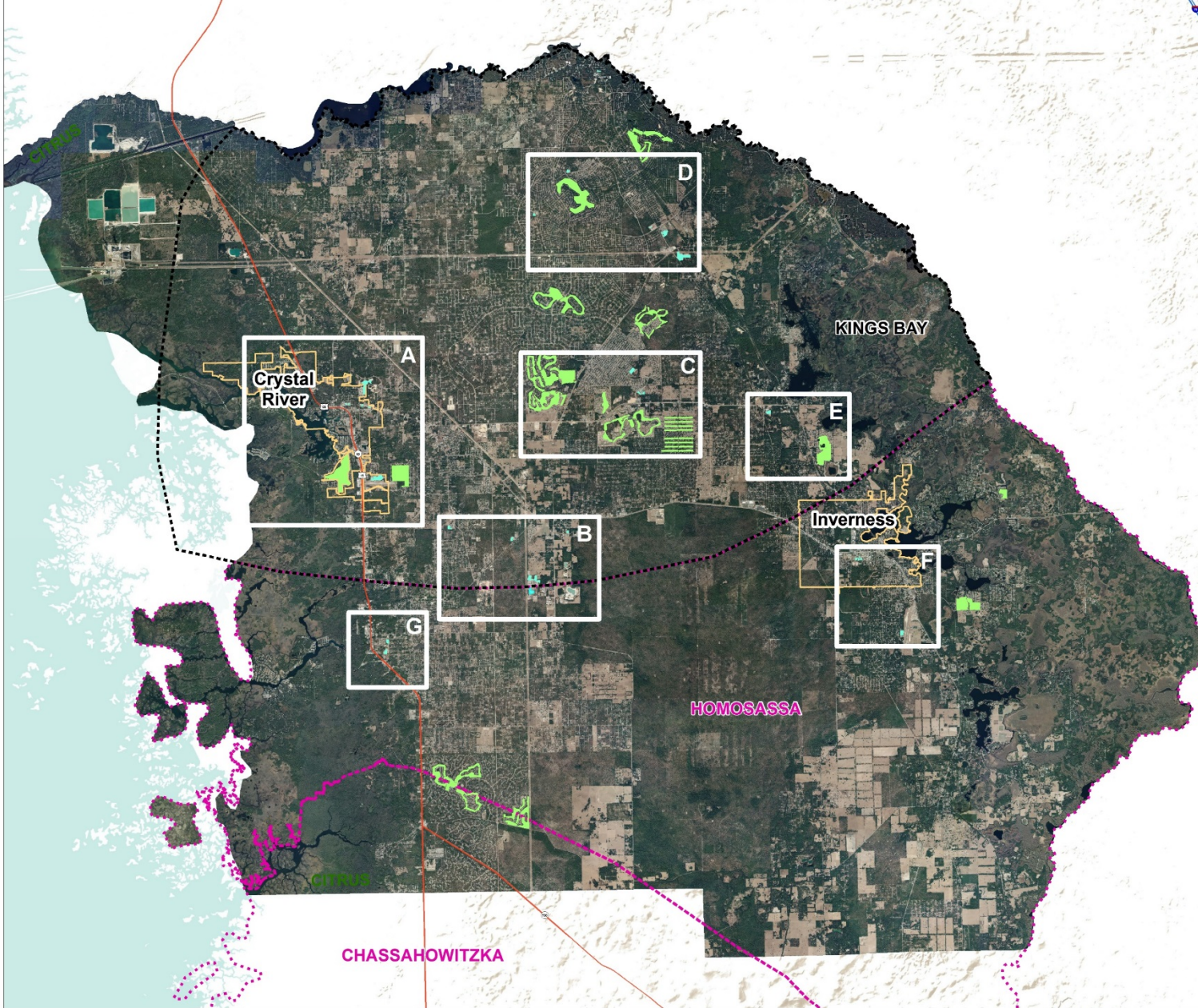
Credit for Urban Fertilizer Education Activities (%)	Loading Reduction Requirement (lb-N/yr)	Total Credit (lb-N/yr)
0.50%	57,269	286

Formula:

$$\begin{aligned} \% \text{ credit (x) total loading reduction requirement} &= \text{total credit} \\ [0.50\% \text{ (x) } 57,269] &= 286 \end{aligned}$$



Sports Turfgrass Fertilizer



Citrus County

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.
Map ID: Citrus_Turf.mxd
(C)2013 Benjamin Mitterberg/step state fl us
(BMAP) Terry Harnett/step state fl us
Created: 09-14-16

0 1 2 4 Miles

 Interstates

 Major Highways

 Proposed BMAP

 BMAP Activities in Progress

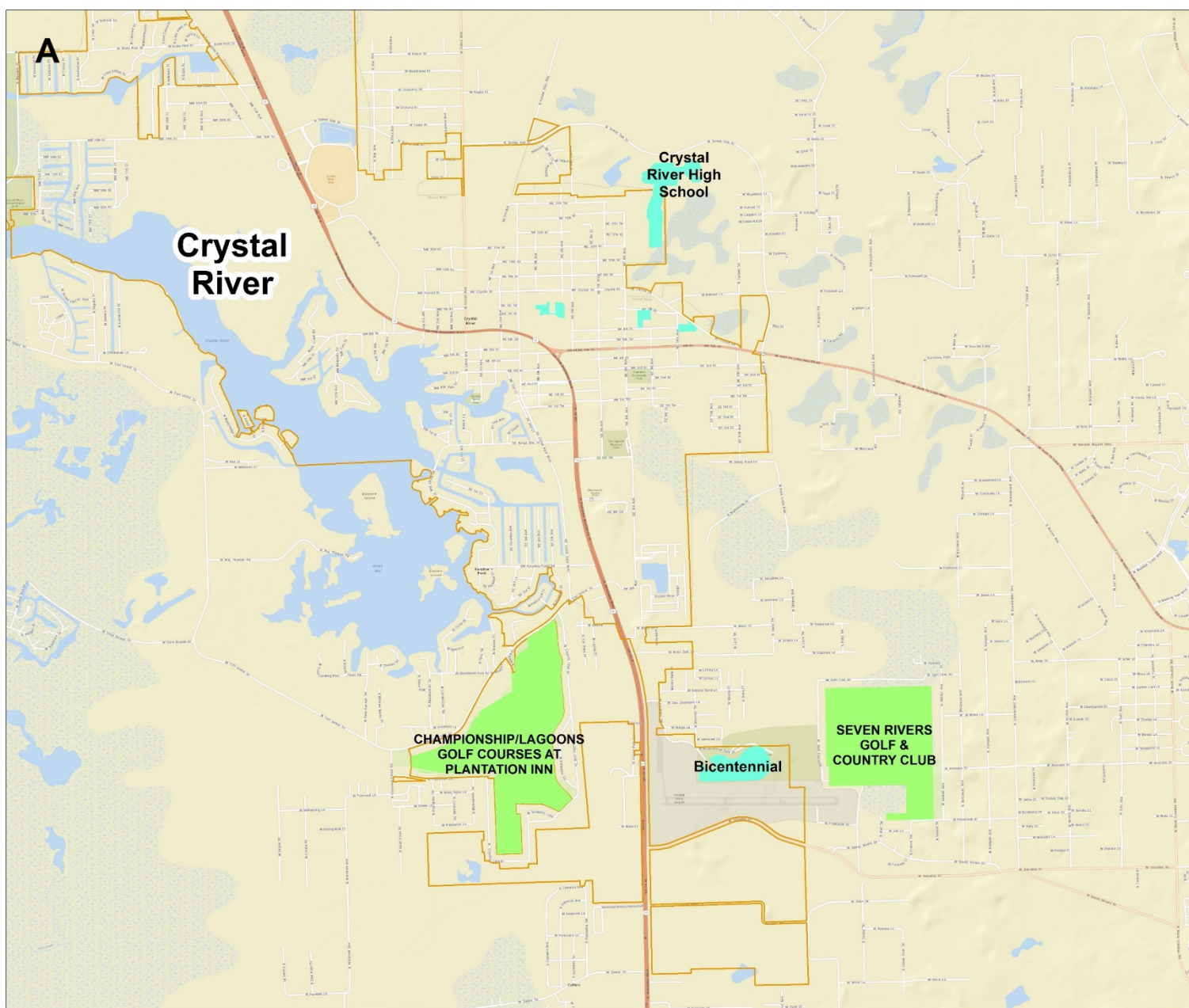
 Cities

 Counties

 Sports turf

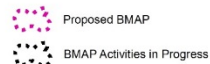
 Golf Courses





Citrus County

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Map Of Citrus, Tallahassee
(GIS) Benjamin Miller@dep.state.fl.us
(BMAP) Tony Hansen@dep.state.fl.us
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A

CR Middle School

CR Primary School

Open field?

Citrus County

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0 0.025 0.05 0.1 Miles



Interstates



Major Highways



Proposed BMAP



BMAP Activities in Progress



Cities



Counties

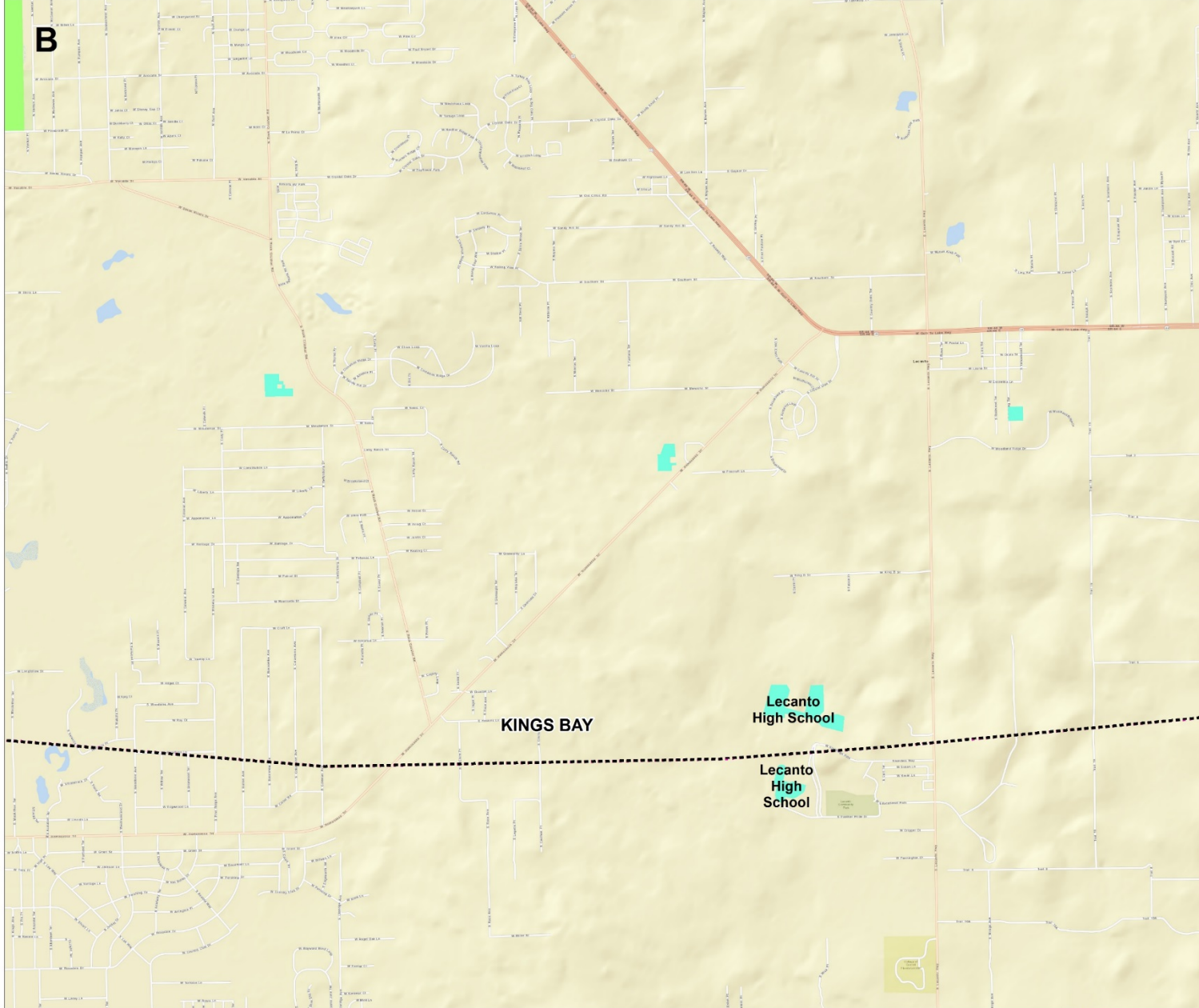


Sports turf



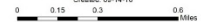
Golf Courses





Citrus County

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- Interstates
- Major Highways

- Proposed BMAP
- BMAP Activities in Progress

- Cities
- Counties

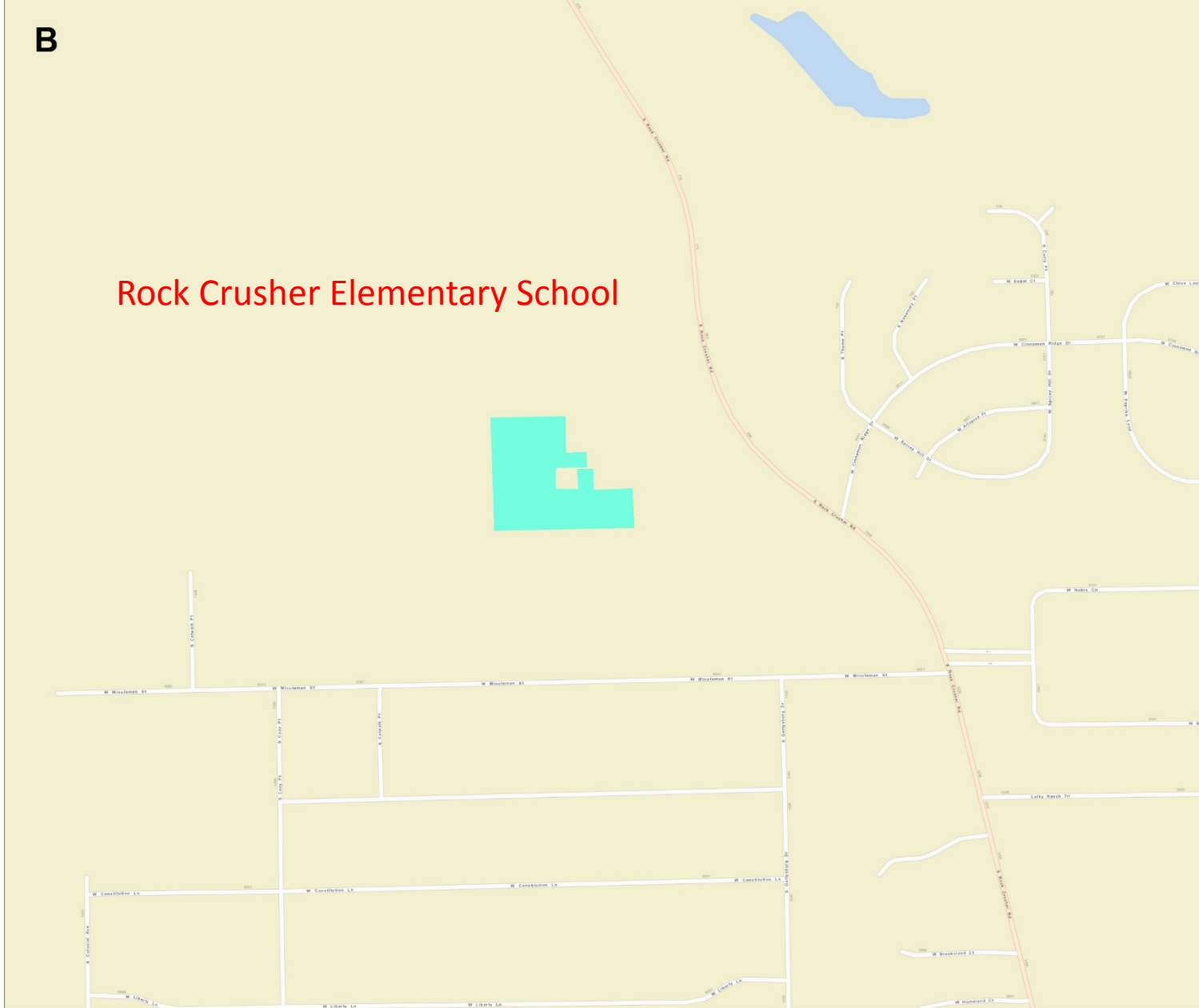
- Sports turf
- Golf Courses





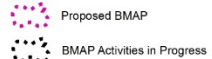
B

Rock Crusher Elementary School



Citrus County

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Map ID: Citrus_Turf.mxd
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B

St. John Paul II Catholic School

Citrus County

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Map ID: Citrus_Turf.mxd
[D:\IS] Benjamin Miller@dep.state.fl.us
[BMAP] Terry Hansen@dep.state.fl.us
Created: 05-14-16

0 0.025 0.05 0.09 Miles



Interstates



Major Highways



Proposed BMAP



BMAP Activities in Progress



Cities



Counties



Sports turf



Golf Courses





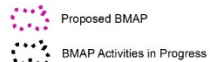
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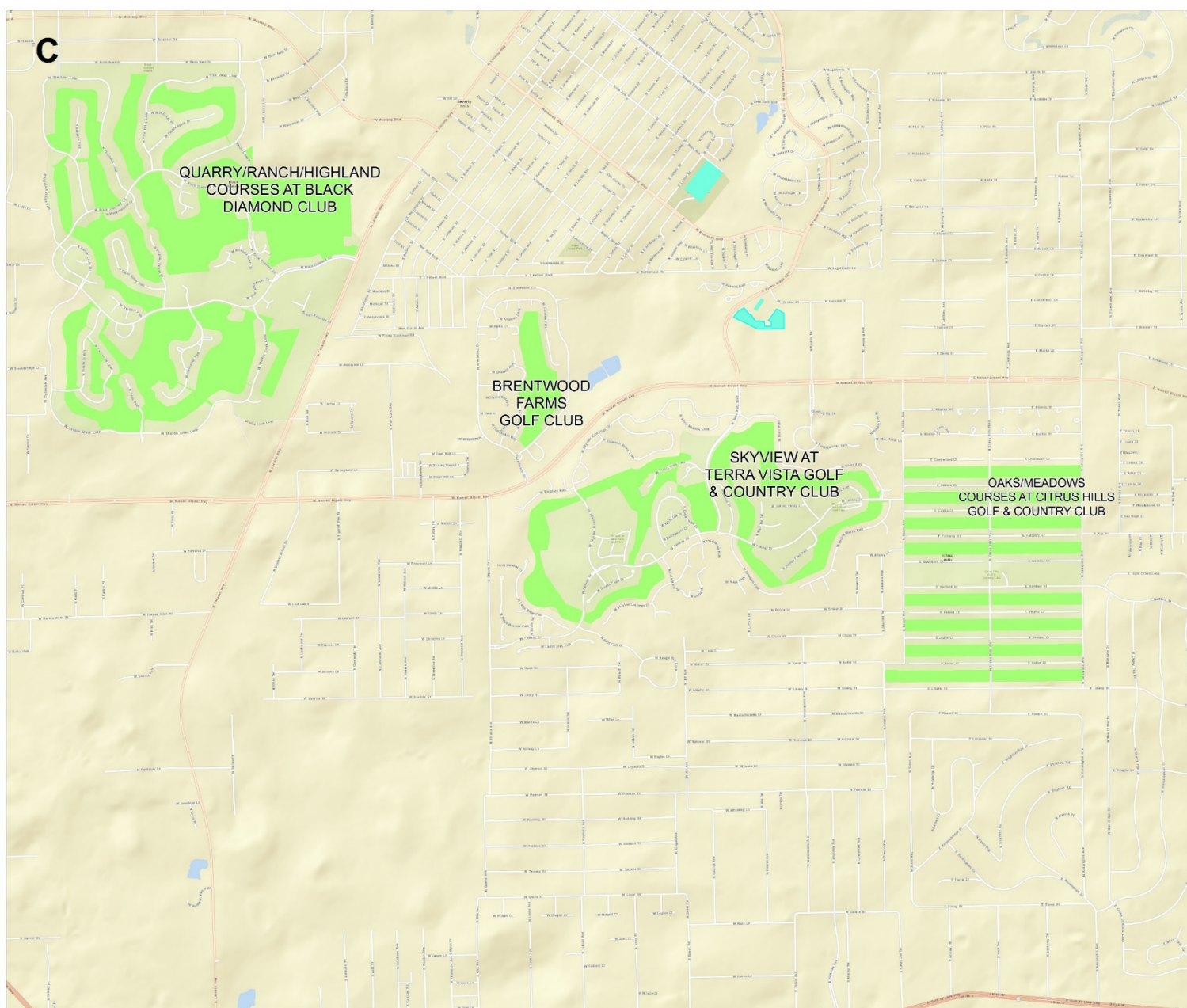
Cypress Creek Academy



Citrus County

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[BMAP] Terry Hansen\GIS\MapState4.us
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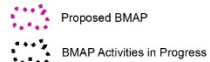




Citrus County

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[GIS] Benjamin Miller/bep@state.fl.us
[BMAP] Terry Hansen/tah@state.fl.us
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0 0.15 0.3 0.6 Miles





D

Beverly Hills Community Park

Forest Ridge Elementary School

Citrus County

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Interstates
 Major Highways

Proposed BMAP
 BMAP Activities in Progress

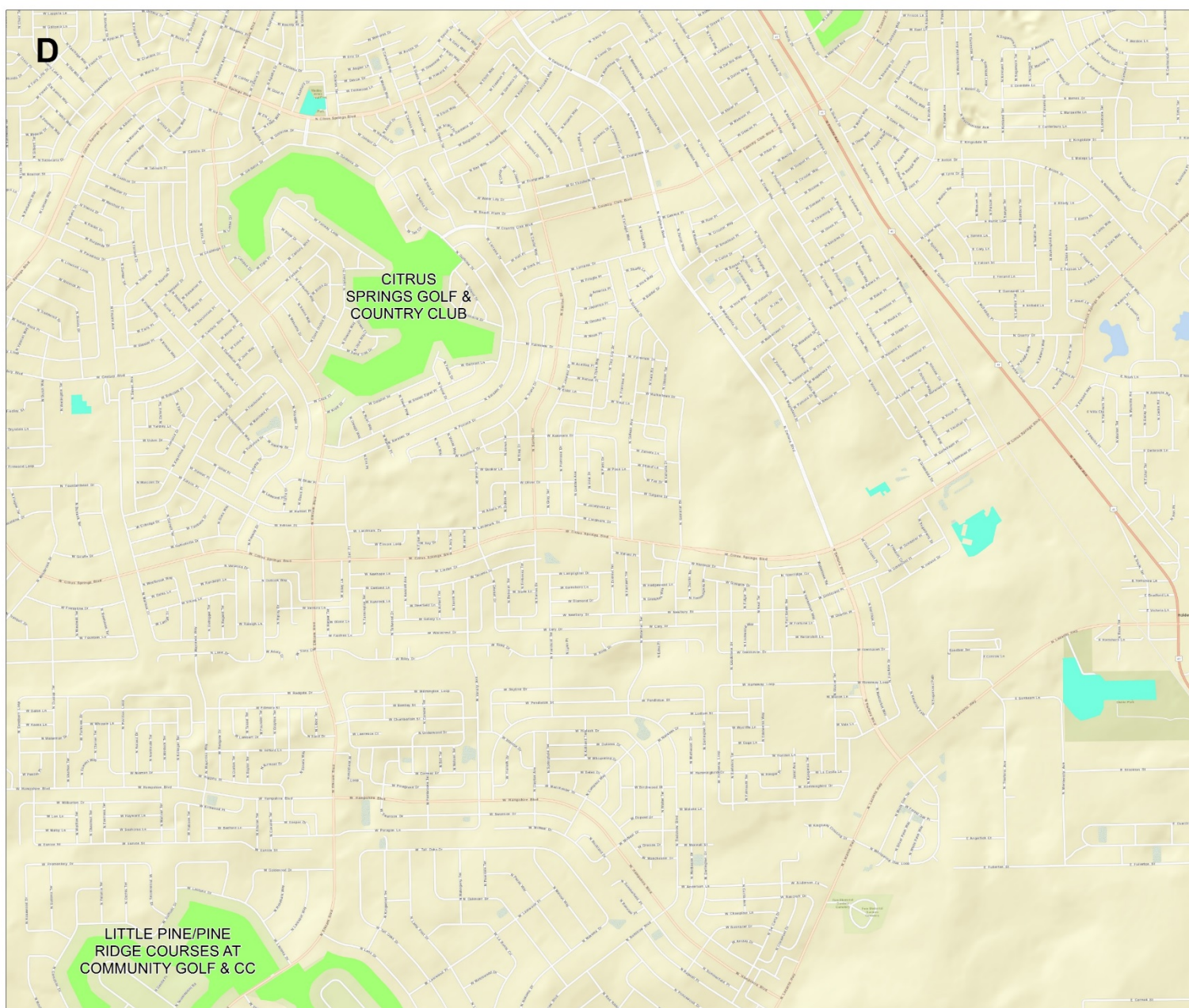
Cities
 Counties

Sports turf
 Golf Courses





D

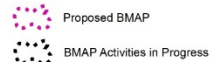


CITRUS
SPRINGS GOLF &
COUNTRY CLUB

LITTLE PINE/PINE
RIDGE COURSES AT
COMMUNITY GOLF & CC

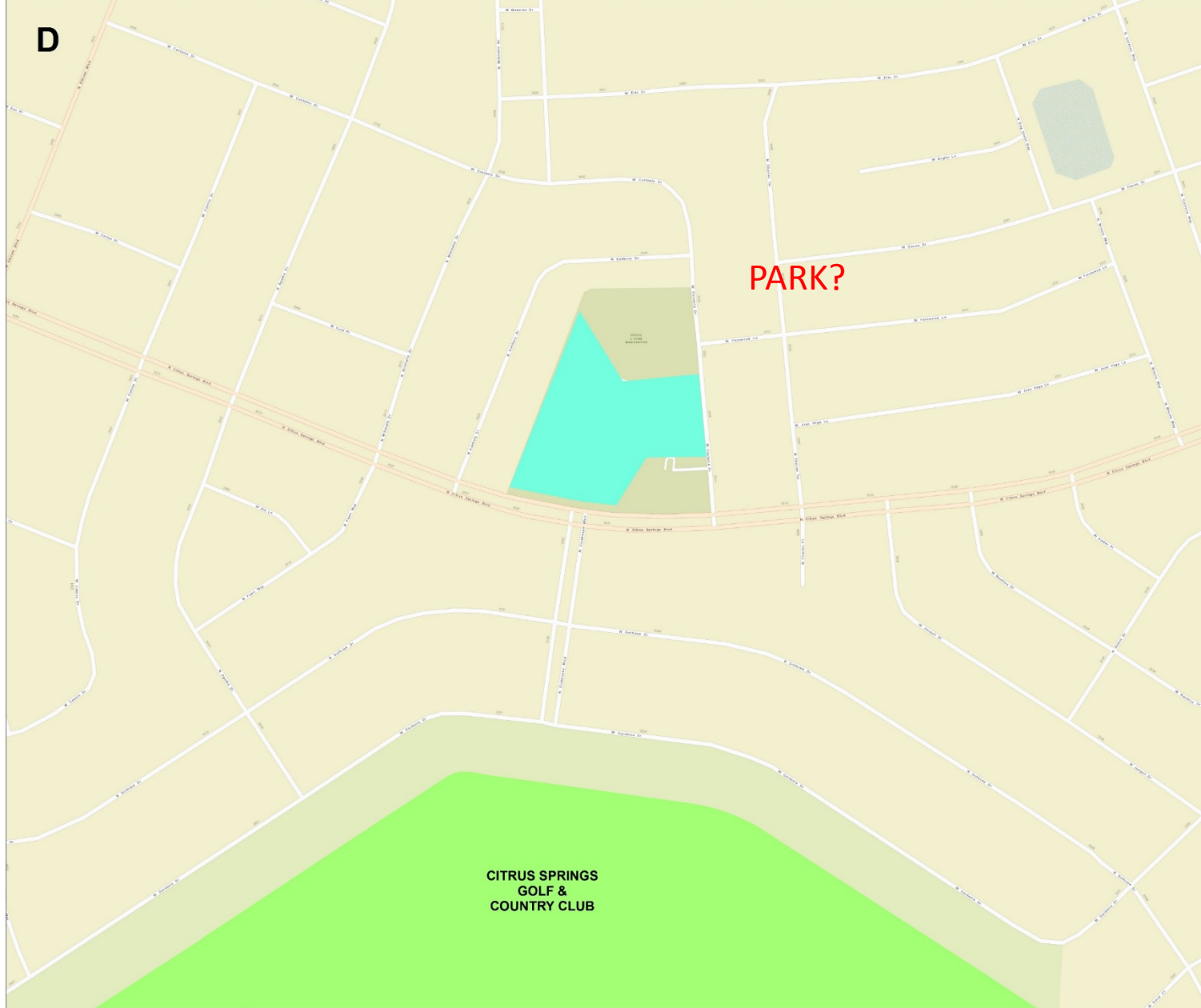
Citrus County

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(BMAP) Terry Hansen/Gap state #10
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D



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[BMAP] Terry Hansen@dep.state.fl.us
Created: 08-14-16

0 0.02 0.04 0.08 Miles



Interstates



Major Highways



Proposed BMAP



BMAP Activities in Progress



Cities



Counties



Sports turf



Golf Courses





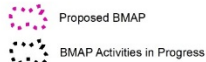
D

Citrus Springs Elementary School

Citrus County

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(BMAP) Terry Hansen@dep.state.fl.us
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D

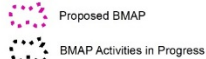
Central Ridge Elementary School

Citrus Springs Middle School

Citrus County

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Map ID: Citrus_Turf.mxd
(010) Benjamin Miller@dep.state.fl.us
(BMAP) Terry Hansen@dep.state.fl.us
Created: 05-14-16

0 0.025 0.05 0.09 Miles





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[GIS] Benjamin.Mittler@dep.state.fl.us
[BMAP] Terry.Hansen@dep.state.fl.us
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Proposed BMAP

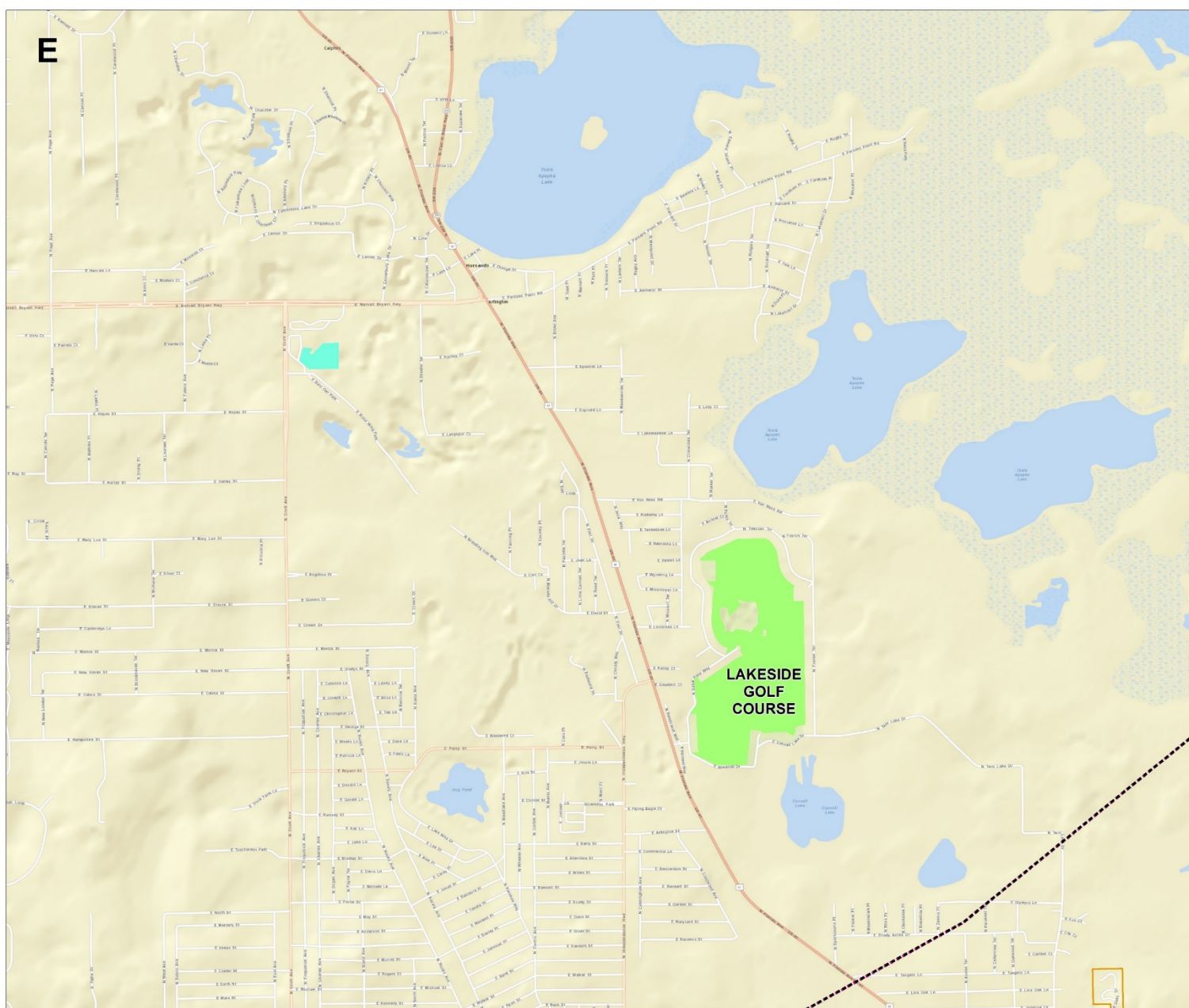
BMAP Activities in Progress



 Cities

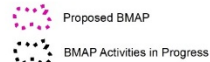
 Counties





Citrus County

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Map Of Citrus, July 2015
(C)2015 Benjamin Miller/MapState Plus
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0 0.125 0.25 0.5 Miles



E



Hernando Elementary School

Citrus County

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[BMAP] Terry Hansen@dep.state.fl.us
Created: 05-14-16



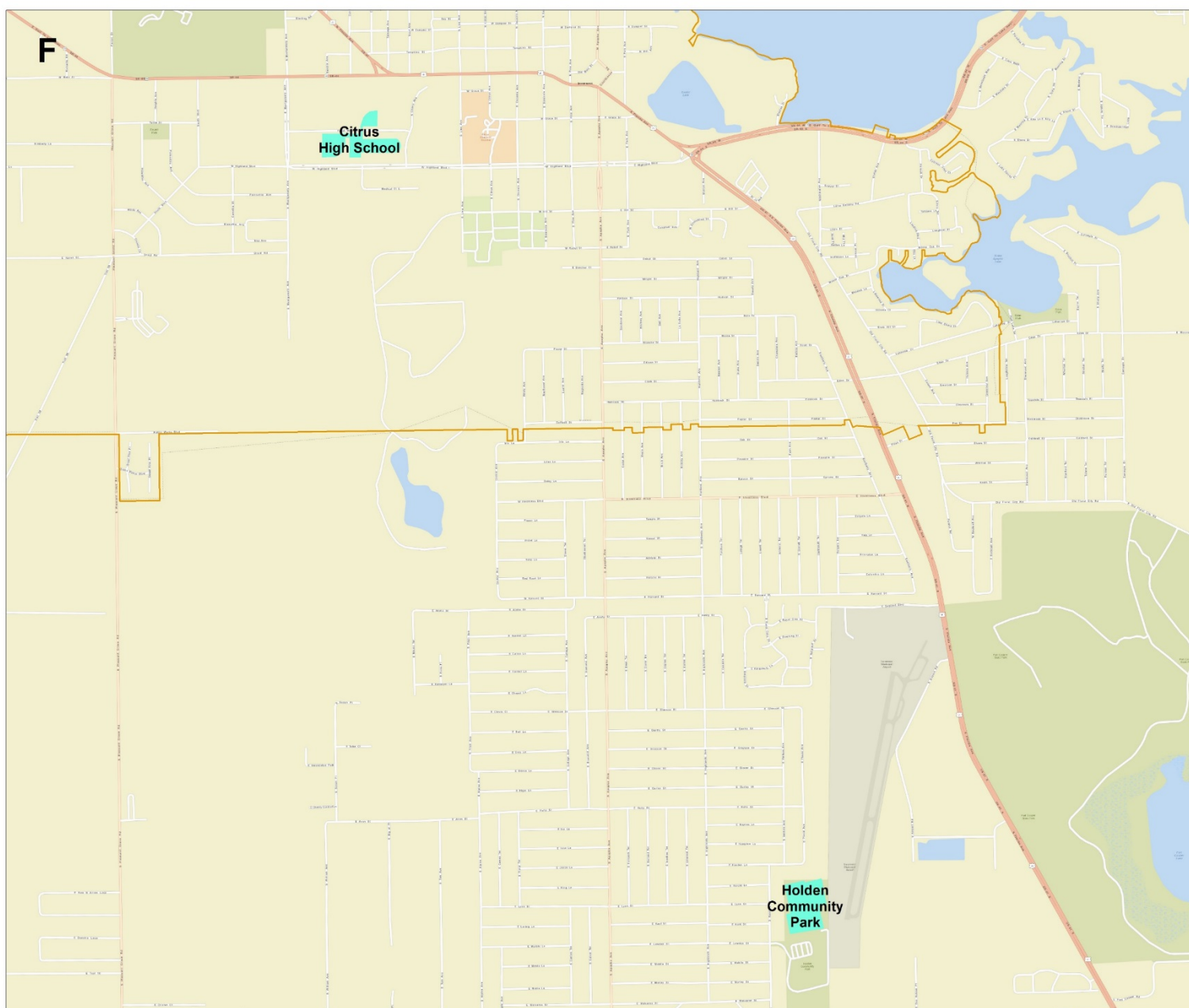
- Interstates
- Major Highways

- Proposed BMAP
- BMAP Activities in Progress

- Cities
- Counties

- Sports turf
- Golf Courses

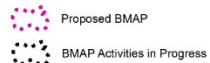




Citrus County

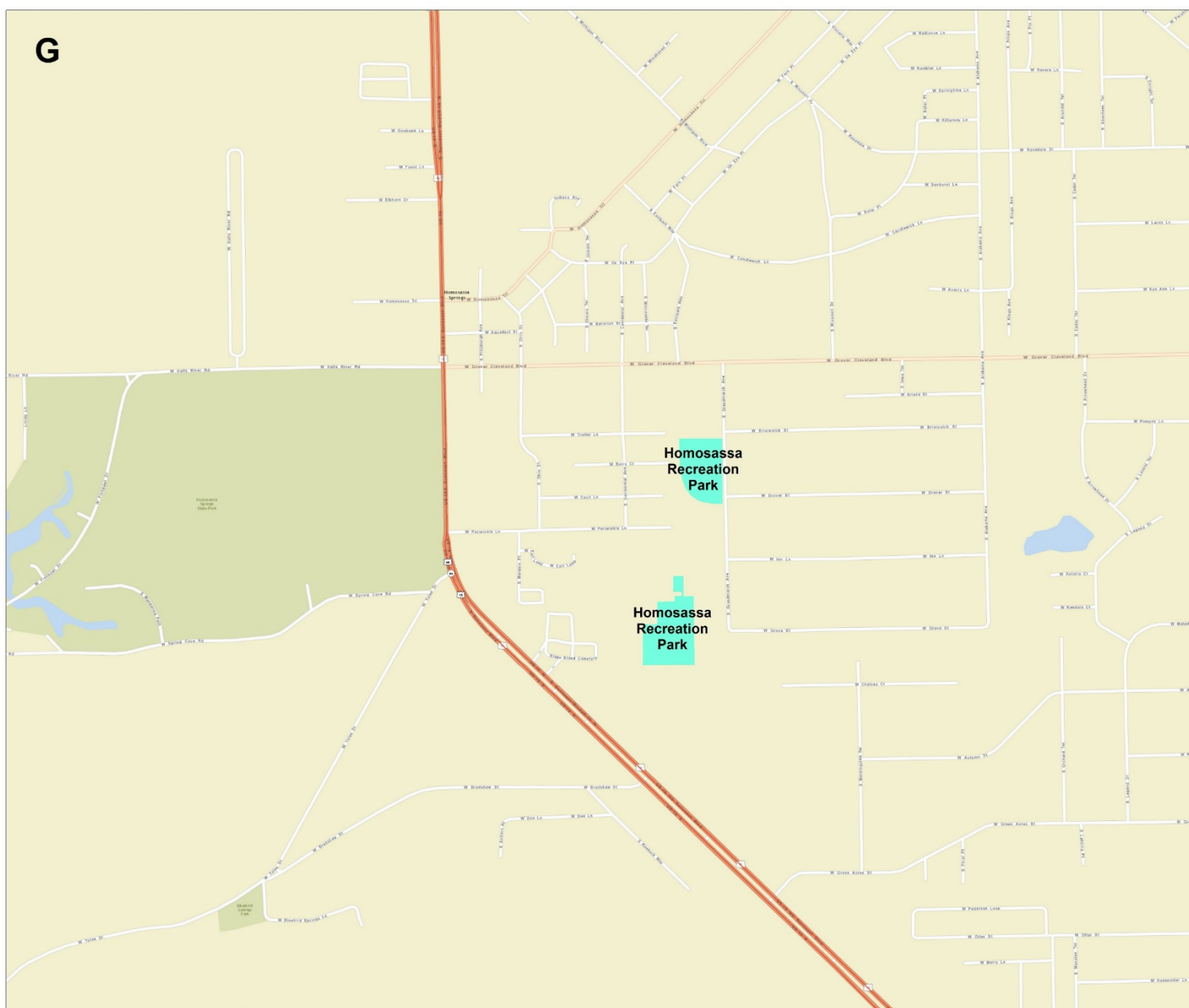
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BMAP: Terry Hansen/terry.hansen@dep.state.fl.us
Created: 05-14-16

0 0.075 0.15 0.3 Miles





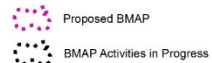
G



Citrus County

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[BMAP] Terry Hansen@gap.state.fl.us
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0 0.05 0.1 0.2 Miles





Sports Turfgrass Fertilizer

Field / park	Contact	Lb-N/yr	BMAP
Crystal River HS	John Colastini	2,256	CR/KB
Citrus HS	John Colastini	2,448	Hom.
Lecanto HS	John Colastini	2,400	Hom.
Homosassa Recreation Park	Bob Glancy	1,367	Hom.
Bicentennial Park	Bob Glancy	1,350	CR/KB
Central Ridge District Park	Bob Glancy	1,487	CR/KB
Holden Comm. Park	Bob Glancy	1,113	CR/KB



Fertilizer Reduction Strategies

- October 18, 2016 at 9:00 AM
 - Joint meeting for Crystal River/Kings Bay and Weeki Wachee stakeholders at SWFWMD headquarters in Brooksville.
 - Nanette O'Hara, Public Outreach Coordinator, Tampa Bay Estuary Program.
 - Robyn Felix and Robin Grantham, SWFWMD Communications.





Septic System Testing Data



Fertilizer Ordinance Updates



Basin Management Action Plan

Contact: Terry Hansen, P.G.

terry.hansen@dep.state.fl.us <http://www.dep.state.fl.us/water/>

<http://fdep.maps.arcgis.com/apps/MapJournal/index.html?appid=e71ecaa35bdd4caa7ba7a0c411691dfa7>

[http://publicfiles.dep.state.fl.us/DEAR/BMAP/Springs Coast/BMAPs/CR_KB_BMAP/](http://publicfiles.dep.state.fl.us/DEAR/BMAP/Springs%20Coast/BMAPs/CR_KB_BMAP/)

