176 Marina Dr
Marineland, FL 32080

Phone: (386)232-8060
Craig@TownOfMarineland.org

THERE WILL BE A REGULAR MEETING OF THE MARINELAND TOWN COMMISSION ON **THURSDAY, APRIL 15, 2021** AT **6:00PM** IN THE **COASTAL POLICY CENTER** IN THE MAIN CONFERENCE ROOM.

IN ACCORDANCE WITH THE GUIDELINES FROM THE CENTER FOR DISEASE CONTROL AND PREVENTION REGARDING THE ONGOING COVID-19 PANDEMIC, PLEASE **WEAR A MASK** AND PRACTICE **PHYSICAL DISTANCING** AT ALL TIMES WHILE INSIDE THE BUILDING.

Agenda

1. **Call to order: Pledge of Allegiance**
2. **Additions, Deletions and Modifications to the Agenda**
3. **Announcements by the Mayor**
4. **Recognitions, Proclamations and Presentations**
    i. None
5. **Community Outreach:** This thirty-minute time period has been allocated for public comment on any consent agenda item or topic not on the agenda. Each speakerwill be allowed up to three (3) minutes to address the Commission. Speakers should approach the podium, identify themselves and direct comments to the Chair.
6. **Consent Agenda**
    a. Approval of Minutes
        i. March 18, 2021 Minutes
        ii. March 24, 2021 Special Meeting Minutes
    b. Recurring FPL Bills
        i. Invoice 2459
        ii. Invoice 6138
        iii. Invoice 6527
    c. Town Staff Invoices
        i. Fleet Inv # 2387
        ii. Fleet Inv # 2388
        iii. Storehouse Treasures Inv # 7021
        iv. Suzanne Dixon Invoice #1
        v. Suzanne Dixon Invoice #2
        vi. Suzanne Dixon Invoice # 3
    d. Intercoastal Bank Loan#40000792
    e. CRA Invoice # 454

7. **General Business**
    a. Town Financial Director
        i. Town Financial Reports
        ii. Marina Financial Reports
8. **Consideration of a Resolution of the Town of Marineland Commission: Adopting the Local Mitigation Strategy Plan**
    a. Staff Report
    b. FL DEM Letter 1
    c. FL DEM Letter 2
    d. LMS Plan Review
    e. Flagler County LMS 2016
9. **Consideration of FPL Street Light Shut Off**
    a. Requested by Town Financial Planner due to upcoming Turtle Nesting Season
10. **Special Event – Bike MS**
    a. Staff Report
    b. Application
    c. Site Plan
    d. Safety Plan
11. **Additional Reports & Comments**
    a. Town Manager Report/Comments
        i. Weddings
    b. Town Planner Report/Comments
        i. Selection of possible Comp Plan Special Meeting Date
    c. Town Attorney Report/Comment
    d. Town Clerk Report/Comment
    e. Town Marina Manager Report/Comments
12. **Public Comment:** This time has been allocated for public comment on any item or topic not on the agenda. Each speaker will be allowed up to three (3) minutes to address the Commission. Speakers should approach the podium, identify themselves and direct comments to the Chair.
13. **Commissioners Reports & Comments**
14. **Next Town Meeting May 20, 2021 6:00 pm**
15. **Adjournment**

Section 286.0105, Florida Statutes states that if a person decides to appeal any decision made by a board agency, or commission with respect to any matter considered at a meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based.

In accordance with the Americans with Disabilities Act, persons needing assistance to participate in this meeting should contact the (386) 232 - 8060 at least 48 hours prior to the meeting.

176 Marina Dr
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Call to order: 06:03 pm

Ajornment: 08:26 pm

Attendance: C. Lenniger, G. Inks, A. TenBroeck, L. Montgomery, S. Dixon, J. Fleet, T. Webley (Mobius marine), Members of the public

1. **Call to order: Pledge of Allegiance**- Meeting called to order at 6:03 pm.
2. **Additions, Deletions and Modifications to the Agenda**
   - **a.** Addition of proclamation (4ii) to the agenda.
   - **b.** Motion to move agenda items 7c and 7e to follow agenda item 5

     (G. Inks, 2nd A. TenBroeck), Approved unanimously
3. **Announcements by the Mayor**- None heard.
4. **Recognitions, Proclamations and Presentations**
   - i. Water Conservation Month

     Read into record on 3/18/2021 at 06:07 pm by G. Inks.

     Motion to Approve

     (A.TenBroeck, 2nd G. Inks) Approved unanimously
   - ii. Suzanne Dixon Day

     Read into record 3/18/2021 at 06:09 pm by C. Lenniger.

     Motion to Approve

     (A.TenBroeck, G. Inks) Approved unanimously

5. **Community Outreach:** None Heard.
7. **General Business**
   - a. River to Sea trail race

     Motion to amend the motion to table the permit hearing for the River to Sea trail race until April and allow the hearing to be conducted at the March regular commission meeting

     (A. TenBroeck, 2nd G. Inks) Approved unanimously

     Dawn Lisenby, race coordinator, presented about the race and fielded questions about the permit application and race details.

*Mayor Lenniger reminded Mrs. Lisenby that she needs to rent the pavilion through the Flagler county website.

Motion to approve the River to Sea trail race special event permit

(G. Inks, 2nd A. TenBroeck) Approved unanimously

e. Turtle Fest- Beth Libert, Flagler turtle patrol, presented on the Turtle Fest event and permit application details.

Motion to approve the Turtle Fest special event permit

(G. Inks, 2nd A. TenBroeck) Approved unanimously

6. **Consent Agenda**
   a. Approval of Minutes
      i. February 18, 2021 Minutes
   b. Recurring FPL Bills
   c. Town Staff Invoices
   d. Center for Sustainable Agriculture Excellence and Conservation

Motion to approve consent agenda

(A. TenBroeck, 2nd G. Inks)

7. **General Business**
   a. Town Financial Director
      i. Town Financial Reports- Nothing out of the ordinary. The Town is in good financial standings.
      ii. Marina Financial Reports- Nothing out of the ordinary. The marina is in good financial standings.
      iii. FPL follow-up- The monthly metered rate will not increase by canceling service and the reactivation fee has increased from $12 to $14.80.

Motion to approve the financial director's report

(G. Inks, 2nd A. TenBroeck) Approved unanimously

   b. Town Comprehensive Plan Discussion (requested by J. Fleet)- Janice Fleet, Town planner, presented to the Town on the current status of the comprehensive plan update. She asked the commission to be thinking about how they want to handle the Town's flood zones and coastal high hazard zones. A workshop date will be set at the regular commission meeting in April.

8. **Additional Reports & Comments**
   b. Town Planner Report/Comments
      i. Marineland attraction expansion- Mrs. Fleet is working with the attraction to ensure the meet all requirements of their permit approval.

ii. Food truck- Mrs. Fleet does not have all of the information needed for the food truck's conditional use permit. She will have a report for the commission at the next meeting.

*Per the Town of Marineland code, all uses that are not expressly permitted require a conditional use permit.

All vendors are required to obtain an LBTR.

c. River to Sea Trail Race- Moved to after agenda item 5.
d. 4th Annual King of Clubs Contest- Susanne will contact the contest coordinators about getting LBTR's from their vendors

Motion to approve the 4th annual King of Clubs special event permit

(G. Inks, 2nd A. TenBroeck) Approved unanimously

e. Turtle Fest- Moved to after agenda item 5.

8. Additional Reports & Comments

a. Town Manager Report/Comments
   i. Sun & Sea Weddings- the company will pay its fees online.
   ii. Huddleston/Brignoni Wedding (July 4th)- Fee was received.
   iii. Foutz/Sellars Wedding (May 15th)- Mrs. Dixon will remind them that they must reserve the pavilion through the Flagler county website to ensure it is available for their use.
   iv. Heffelfinger/ Griffin- Fee was received.

   Motion to approve the above wedding permits

   (G. inks, 2nd A. TenBroeck) Approved unanimously

   v. Bike MS- The Bike MS coordinators need a W-9 from the Town. Mrs. Montgomery has already sent it to them.
b. Town Planner Report/Comments- Moved up to be in conjunction with Agenda item 7 b.
c. Town Attorney Report/Comment- Nothing to report.
d. Town Clerk Report/Comment- The clerk, with the help of the Mayor, will begin cataloguing the Town records at the Flagler county records archives.
e. Town Marina Manager Report/Comments- None heard.

9. Public Comment:

a. Felicia Cook, GM Marineland Dolphin Adventure (MDA), she reiterated that MDA supports the Town's water conservation month proclamation. She also wanted to advise the commission that the attraction is reestablishing their parking facilities and invites anyone who wants a century or aloe plant to come get them, as they are being removed from MDA premises.

10. Commissioners Reports & Comments

a. A. TenBroeck- Commissioner TenBroeck asked the Mayor to look into what, if any, stimulus funds for which the Town may be eligible.
   * The Mayor will look into potential stimulus money. He is also looking into waste water grants and funds.
   Commissioner TenBroeck is worried about potential poaching of parakeets and deer in the Town.
   * All present are asked to call the sheriff immediately if any poaching (or other illegal activity) is suspected.
b. G. Inks- Commissioner Inks congratulated Mrs. Dixon and thanked her for her years in service of the Town.
c. C. Lenniger- Mayor Lenniger informed the Town that Scenic A1A just received national byway recognition. He will be working with them to bring some of their celebratory events to Marineland. They are also starting a carry-in, carry-out pilot program for trash and Marineland was selected as the test site. Starting May 1st, the Town will no longer have trash cans and patrons will be asked to take their trash with them. Flagler county will monitor the effectiveness of the program.

11. Special Meeting March 24, 2021 5:30 pm

12. Next Town Meeting April 15, 2021 6:00 pm

13. Adjournment- 8:26 pm

Motion to adjourn

(G. Inks, 2nd A. TenBroeck) Approved unanimously

Section 286.0105, Florida Statutes states that if a person decides to appeal any decision made by a board agency, or commission with respect to any matter considered at a meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based.

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Call to order: 05:30 pm

Adjournment: 05:57 pm

Attendance: C. Lenniger, G. Inks, A. TenBroeck, G. Hanson, B. Bosch, S. Dixon, C. Kelley, L. Montegomery, J. Fleet, B. Mellin, members of the public

Minutes

1. **Call to order: Pledge of Allegiance**
2. **General Business**
    a. **Review of Conditional Use Permit Application**
        i. **Ragga Surf Café**: (J. Fleet)- Mrs. Fleet gave her staff report on the conditional use permit application from Ragga Surf Café. All fees have been received, the property owner approves, and Mrs. Dixon will send the applicants LBTR information.

Mrs. Fleets recommends approval of the permit with the following conditions:

The approval is for the application submitted, which include:

1. 1 Food truck, 1 sales vehicle, and 7 picnic tables.

2. A revised site plan needs to be submitted indicating the location of the shade sails near the picnic tables and the location of the sale vehicle.

3. Any expansion of the project site, including the number of food trucks, sales vehicles or picnic tables would require review and approval by the Commission.

4. The applicant shall be responsible for removal of trash on the site at the end of each day.

5. Any signs on the property shall be removed from the site at the end of each day.

6. No loud noises or music shall be played at the site.

7. The applicant shall assure the parking is limited to the parking area identified on the site plan and does not obstruct traffic on Oceanshore Boulevard (A1A).

8. No construction of temporary or permanent structures is allowed on the site.

9. The applicant shall obtain a business license for Ragga Surf Cafe and for Raggamuffin Shop.

10. The applicant shall obtain and comply with all applicable State of Florida and Flagler County permits related the Raga Surf Cafe and Raggamuffin Shop.

11. If any of the approved conditions are not complied with, the Town Commission can revoke the approval and require any operation on the site to cease immediately.

Mrs. Fleet answered questions on her recommendations. The applicants answered questions on generator noise mitigation.

*Commissioner TenBroeck disclosed that the Center for Sustainable Agricultural Excellence and Conservation, for which she is the president, does the property maintenance.

Motion to Approve with the following conditions:

1. 1 Food truck, 1 sales vehicle, and 7 picnic tables.

2. A revised site plan needs to be submitted indicating the location of the shade sails near the picnic tables and the location of the sale vehicle.

3. Any expansion of the project site, including the number of food trucks, sales vehicles or picnic tables would require review and approval by the Commission.

4. The applicant shall be responsible for removal of trash on the site at the end of each day.

5. Any signs on the property shall be removed from the site at the end of each day.

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11. If any of the approved conditions are not complied with, the Town Commission can revoke the approval and require any operation on the site to cease immediately.

Approved (G. Inks, 2nd C. Lenniger) approved unanimously

3. **Next Town Meeting April 15, 2021 6:00 pm**
4. **Adjournment**

Section 286.0105, Florida Statutes states that if a person decides to appeal any decision made by a board agency, or commission with respect to any matter considered at a meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based.

In accordance with the Americans with Disabilities Act, persons needing assistance to participate in this meeting should contact the (386) 232 - 8060 at least 48 hours prior to the meeting.

Electric Bill Statement
For: Feb 26, 2021 to Mar 30, 2021 (32 days)
Statement Date: Mar 30, 2021
Account Number: 19454-02459
Service Address:
9507 OCEANSHORE BLVD # SL
SAINT AUGUSTINE, FL 32084

TOWN OF MARINELAND,
Here's what you owe for this billing period.

CURRENT BILL

$709.75
TOTAL AMOUNT YOU OWE

Apr 20, 2021
NEW CHARGES DUE BY

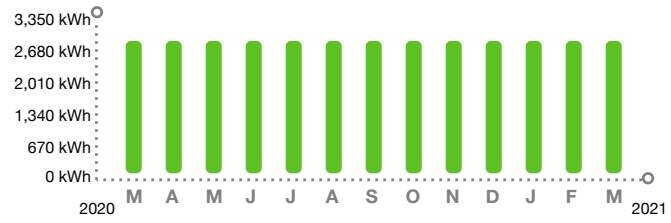
BILL SUMMARY

Amount of your last bill	709.75
Payments received	-709.75
Balance before new charges	0.00
Total new charges	709.75
Total amount you owe	**$709.75**

(See page 2 for bill details.)

FPL has asked the Florida Public Service Commission for a rate adjustment to fuel charges. Learn more: FPL.com/Rates.

ENERGY USAGE HISTORY



KEEP IN MIND

- Payment received after June 17, 2021 is considered LATE; a late payment charge of 1% will apply.
- Charges and energy usage are based on the facilities contracted. Facility, energy and fuel costs are available upon request.

Customer Service:	1-800-375-2434	Report Power Outages:	1-800-4OUTAGE (468-8243)
Outside Florida:	1-800-226-3545	Hearing/Speech Impaired:	711 (Relay Service)

/ 27 13201945402459457907000000

The amount enclosed includes the following donation:
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9507 N OCEAN SHORE BLVD
ST AUGUSTINE FL 32080-8610

FPL
GENERAL MAIL FACILITY
MIAMI FL 33188-0001

Visit **FPL.com/PayBill** for ways to pay.

19454-02459	$709.75	Apr 20, 2021	$
ACCOUNT NUMBER	TOTAL AMOUNT YOU OWE	NEW CHARGES DUE BY	AMOUNT ENCLOSED

BILL DETAILS

Amount of your last bill		709.75
Payment received - Thank you		–709.75
Balance before new charges		$0.00
New Charges		
Rate: SL-1 STREET LIGHTING SERVICE		
Electric service amount **	666.01	
Gross receipts tax	4.30	
Franchise charge	39.44	
Taxes and charges	43.74	
Total new charges		$709.75
Total amount you owe		**$709.75**

**** Your electric service amount includes the following charges:**

Non-fuel energy charge:	$0.031940 per kWh
Fuel charge:	$0.023570 per kWh

METER SUMMARY

Next bill date Apr 28, 2021.

Usage Type	**Usage**
Total kWh used	3024

ENERGY USAGE COMPARISON

	This Month	**Last Month**	**Last Year**
Service to	Mar 30, 2021	Feb 26, 2021	Mar 27, 2020
kWh Used	3024	3024	3024
Service days	32	29	29
kWh/day	95	104	104
Amount	$709.75	$709.75	$697.67

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Learn more ›

Help your neighbors

Contribute to Care to Share and help a neighbor in need during this challenging time.

Donate today ›

For: 02-26-2021 to 03-30-2021 (32 days)
kWh/Day: 95
Service Address:
9507 OCEANSHORE BLVD # SL
SAINT AUGUSTINE, FL 32084

Detail of Rate Schedule Charges for Street Lights

Component Code	Watts	Lumens	Owner/ Maint *	Quantity	Rate/Unit	kWh Used	Amount
HPS0400	400	50000	F	18		3,024	
Energy					5.140000		92.52
Non-energy							
Fixtures					6.640000		119.52
Maintenance					2.580000		46.44
PMC0001				18			
Non-energy							
Fixtures					7.160000		128.88
UCNP				4,194			
Non-energy							
Maintenance					0.040510		169.90
UCUP				338			
Non-energy							
Maintenance					0.098970		33.45

* F - FPL OWNS & MAINTAINS E - CUSTOMER OWNS & MAINTAINS R - CUSTOMER OWNS, FPL RELAMPS
H - FPL OWNS & MAINTAINS FIXTURE, CUST OWNS OTHER

TOWN OF MARINELAND
9507 N OCEAN SHORE BLVD
ST AUGUSTINE FL 32080-8610

For: 02-26-2021 to 03-30-2021 (32 days)
kWh/Day: 95
Service Address:
9507 OCEANSHORE BLVD # SL
SAINT AUGUSTINE, FL 32084

Component Code	Watts	Lumens	Owner/ Maint *	Quantity	Rate/Unit	kWh Used	Amount
					Energy sub total		92.52
					Non-energy sub total		498.19
					Sub total	3,024	590.71
					Energy conservation cost recovery		1.27
					Capacity payment recovery charge		0.48
					Environmental cost recovery charge		0.82
					Storm protection recovery charge		1.45
					Fuel charge		71.28
					Electric service amount		**666.01**
					Gross receipts tax incr		4.30
					Franchise charge		39.44
					Total	**3,024**	**709.75**

* F - FPL OWNS & MAINTAINS E - CUSTOMER OWNS & MAINTAINS R - CUSTOMER OWNS, FPL RELAMPS
H - FPL OWNS & MAINTAINS FIXTURE, CUST OWNS OTHER

Electric Bill Statement
For: Feb 26, 2021 to Mar 30, 2021 (32 days)
Statement Date: Mar 30, 2021
Account Number: 69626-26138
Service Address:
101 TOLSTOY LN # MRNLD DOCK
SAINT AUGUSTINE, FL 32080

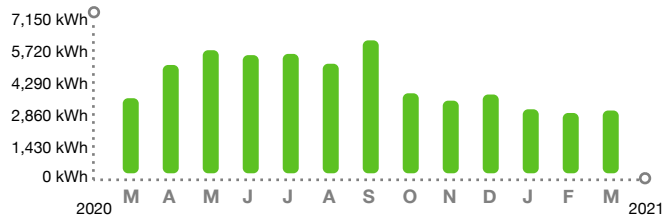
TOWN OF MARINELAND,
Here's what you owe for this billing period.

CURRENT BILL

$396.98
TOTAL AMOUNT YOU OWE

Apr 20, 2021
NEW CHARGES DUE BY

ENERGY USAGE HISTORY



BILL SUMMARY

Amount of your last bill	378.46
Payments received	-378.46
Balance before new charges	0.00
Total new charges	396.98
Total amount you owe	**$396.98**

(See page 2 for bill details.)

KEEP IN MIND

- Payment received after June 17, 2021 is considered LATE; a late payment charge of 1% will apply.

FPL has asked the Florida Public Service Commission for a rate adjustment to fuel charges. Learn more: FPL.com/Rates.

Customer Service:	1-800-375-2434	Report Power Outages:	1-800-4OUTAGE (468-8243)
Outside Florida:	1-800-226-3545	Hearing/Speech Impaired:	711 (Relay Service)

/ 27 13206962626138489693000000

The amount enclosed includes the following donation:
FPL Care To Share: _____

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ATTN TOWN OF MARINELAND
9507 N OCEAN SHORE BLVD
ST AUGUSTINE FL 32080-8610

FPL
GENERAL MAIL FACILITY
MIAMI FL 33188-0001

Visit **FPL.com/PayBill** for ways to pay.

69626-26138	$396.98	Apr 20, 2021	$
ACCOUNT NUMBER	TOTAL AMOUNT YOU OWE	NEW CHARGES DUE BY	AMOUNT ENCLOSED

BILL DETAILS

Amount of your last bill		378.46
Payment received - Thank you		–378.46
Balance before new charges		$0.00
New Charges		
Rate: GSD-1 GENERAL SERVICE DEMAND		
Customer charge:	$26.48	
Non-fuel: *($0.023540 per kWh)*	$72.03	
Fuel: *($0.024490 per kWh)*	$74.94	
Demand: *($11.30 per KW)*	$192.10	
Electric service amount	365.55	
Gross receipts tax	9.37	
Franchise charge	22.06	
Taxes and charges	31.43	
Total new charges		$396.98
Total amount you owe		**$396.98**

METER SUMMARY

Meter reading - Meter KU32298. Next meter reading Apr 28, 2021.

Usage Type	Current	-	Previous	x	Const	=	Usage
kWh used	06154		06103		60		3060
Demand KW	.29				60.00		17

ENERGY USAGE COMPARISON

	This Month	Last Month	Last Year
Service to	Mar 30, 2021	Feb 26, 2021	Mar 27, 2020
kWh Used	3060	2940	3660
Service days	32	29	29
kWh/day	95	101	126
Amount	$396.98	$378.46	$440.03

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Learn more ›

Help your neighbors

Contribute to Care to Share and help a neighbor in need during this challenging time.

Donate today ›

Electric Bill Statement
For: Feb 26, 2021 to Mar 30, 2021 (32 days)
Statement Date: Mar 30, 2021
Account Number: 41225-56527
Service Address:
101 TOLSTOY LN
SAINT AUGUSTINE, FL 32080

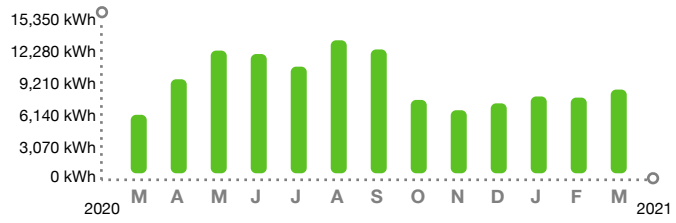
TOWN OF MARINELAND,
Here's what you owe for this billing period.

CURRENT BILL

$780.20
TOTAL AMOUNT YOU OWE

Apr 20, 2021
NEW CHARGES DUE BY

ENERGY USAGE HISTORY



BILL SUMMARY

Amount of your last bill	760.92
Payments received	-760.92
Balance before new charges	0.00
Total new charges	780.20
Total amount you owe	**$780.20**

(See page 2 for bill details.)

KEEP IN MIND

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FPL has asked the Florida Public Service Commission for a rate adjustment to fuel charges. Learn more: FPL.com/Rates.

Customer Service:	1-800-375-2434	Report Power Outages:	1-800-4OUTAGE (468-8243)
Outside Florida:	1-800-226-3545	Hearing/Speech Impaired:	711 (Relay Service)

/ 27 13204122556527102087000000

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ST AUGUSTINE FL 32080-8610

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GENERAL MAIL FACILITY
MIAMI FL 33188-0001

Visit **FPL.com/PayBill** for ways to pay.

41225-56527	$780.20	Apr 20, 2021	$
ACCOUNT NUMBER	TOTAL AMOUNT YOU OWE	NEW CHARGES DUE BY	AMOUNT ENCLOSED

BILL DETAILS

Amount of your last bill		760.92
Payment received - Thank you		–760.92
Balance before new charges		$0.00
New Charges		
Rate: GSD-1 GENERAL SERVICE DEMAND		
Customer charge:	$26.48	
Non-fuel: *($0.023540 per kWh)*	$206.21	
Fuel: *($0.024490 per kWh)*	$214.53	
Demand: *($11.30 per KW)*	$271.20	
Electric service amount	718.42	
Gross receipts tax	18.42	
Franchise charge	43.36	
Taxes and charges	61.78	
Total new charges		$780.20
Total amount you owe		**$780.20**

METER SUMMARY

Meter reading - Meter KU55682. Next meter reading Apr 28, 2021.

Usage Type	Current	-	Previous	x	Const	=	Usage
kWh used	03276		03203		120		8760
Demand KW	.20				120.00		24

ENERGY USAGE COMPARISON

	This Month	Last Month	Last Year
Service to	Mar 30, 2021	Feb 26, 2021	Mar 27, 2020
kWh Used	8760	7920	6120
Service days	32	29	29
kWh/day	273	273	211
Amount	$780.20	$760.92	$634.75

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Learn more ›

Help your neighbors

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Donate today ›

FLEET & ASSOCIATES
ARCHITECTS/PLANNERS, INC.
11557 Hidden Harbor Way Jacksonville FL 32223
(904) 666-7038 AA C001226

Mayor Craig Lenniger
Town of Marineland
176 Marina Drive
Marineland, FL 32080

Re: Town Planner Consultant Services

INVOICE

PROJECT NO. 20220

INVOICE NO. 2387
DATE: April 9, 2021

Professional Services for March 12, 2021 – April 9, 2021

LMS Review and Resolution	2.0 hrs. x $125	$	250.00
CRA Reporting	1.0 hrs. x $125	$	125.00
Ragu Surf Café Conditional Use Application	3.0 hrs. x $125	$	375.00
Commission Meeting – 3/18/2021	2.5 hrs. x $125	$	312.50
Special Commission Meeting – 3/24/2021	0.5 hrs. x $125	$	62.50
CRA Meeting – 3/24/2021	1.0 hrs. x $125	$	125.00
Total Due		**$**	**1,250.00**

FLEET & ASSOCIATES
ARCHITECTS/PLANNERS, INC.
11557 Hidden Harbor Way Jacksonville FL 32223
(904) 666-7038 AA C001226

Mayor Craig Lenniger
Town of Marineland
176 Marina Drive
Marineland, FL 32080

Re: Town Planner Consultant Services - Comprehensive Plan Update
(Approved upset of $12,000 at the August 2020 Commission Meeting)

INVOICE

PROJECT NO. 20190

INVOICE NO. 2383
DATE: April 9, 2021

Professional Services for March 12, 2021 – April 9, 2021

Comprehensive Plan Update	6.5 hrs. x $125	$ 812.50
Goals, Objectives, and Policies Conservation/Coastal Management Element Recreation and Open Space Element		
Total Due		**$ 812.50**

Storehouse Treasures, LLC
250 Palm Coast Pkwy NE STE 607-104
Palm Coast, FL 32137 US
(386) 283-0987
jbradshaw@storeht.com
www.storeht.com

Invoice 7021

BILL TO
Town of Marineland
176 Marina Drive
St Augustine, FL 32080-8619

SHIP TO
Town of Marineland
176 Marina Drive
St Augustine, FL 32080-8619

DATE	PLEASE PAY	DUE DATE
04/01/2021	**USD 375.00**	05/01/2021

DATE	ACTIVITY	DESCRIPTION	QTY	RATE	AMOUNT
	Accounting & QuickBooks Service	Accounting and QuickBooks Monthly Service per agreement, Month of April 2021	1	375.00	375.00

Thank you for your business.

TOTAL DUE **USD 375.00**

THANK YOU.

WEDDING PERMIT INVOICE

Suzanne Dixon

5455 Windantide Rd

St. Augustine FL 32080

INVOICE #	DATE
1	4/12/2021

BILL TO

Town of Marineland
176 Marina Dr
Marineland, FL 32080

TERMS

Due Upon Receipt

DESCRIPTION	QTY	UNIT PRICE	AMOUNT
Simple Wedding 1-25 People (List Wedding Name Here)		$ 25.00	$ -
26-99 Person Wedding (Huddleston/Brignoni)	3	$ 25.00	$ 75.00
100-999 Person Wedding (List Wedding Name Here)		$ 50.00	$ -
1000+ Person Wedding (List Wedding Name Here)		$ 100.00	$ -
(Foutz/Sellars) (Heffelfinger/Griffin)		$ -	$ -
Thank you for your business!	**TOTAL**		**$ 75.00**

If you have any questions about this invoice, please contact
Suzanne Dixon, 904-471-1870, Suzanne@TownOfMarineland.org

Staples

1775 US Highway 1 South Suite
SAINT AUGUSTINE, FL 32084
(904) 819-1256

SALE 1972781 6 003 22870
1071 03/19/21 02:34

QTY SKU PRICE

REWARDS NUMBER 5397913590

1 NOTE SEAL GOLD LBL
072782058685 7.99

SUBTOTAL 7.99
Standard Tax 6.50% 0.52
TOTAL $8.51

US DEBIT USD$8.51
Card No.: XXXXXXXXXXX3884 [C]
Chip Read
Auth No.: 002075
AID.: A0000000980840
Verified By PIN

TOTAL ITEMS 1

TRU RED
Business essentials designed
thoughtfully to work beautifully.

Shop Smarter. Get Rewarded.
Staples Rewards members get up to 5%
back in Rewards.
Exclusions Apply. See an associate for
full program details or to enroll.

THANK YOU FOR SHOPPING AT STAPLES!

10710319212287003

$8.51
11.00
$19.51

UNITED STATES POSTAL SERVICE.

SAINT AUGUSTINE
99 KING ST
SAINT AUGUSTINE, FL 32084-9998
(800)275-8777

03/31/2021 05:48 PM

Product	Qty	Unit Price	Price
Garden Beauty Bk	1	$11.00	$11.00

Grand Total: $11.00

Debit Card Remitted $11.00
Card Name: VISA
Account #: XXXXXXXXXXXX3884
Approval #: 124481
Transaction #: 157
Receipt #: 021811
Debit Card Purchase: $11.00
AID: A0000000980840 Chip
AL: US DEBIT
PIN: Verified

****
USPS is experiencing unprecedented volume
increases and limited employee
availability due to the impacts of
COVID-19. We appreciate your patience.
****

In a hurry? Self-service kiosks offer
quick and easy check-out. Any Retail
Associate can show you how.

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Track your Packages
Sign up for FREE @
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Earn rewards on your business account
purchases of Priority Mail labels
with the USPS Loyalty program by
using Click and Ship. Visit
www.usps.com/smallbizloyalty
for more info.

or call 1-800-410-7420.

UFN: 118145-0660
Receipt #: 840-53200031-1-3338771-1
Clerk: 50

Bank of America Online Banking

Adv Plus Banking - 8204: Account Activity Transaction Details

Post date:	03/22/2021
Amount:	-27.68
Type:	Debit card
Purchaser:	SUZANNE M DIXON
Description:	STAPLES 00110718 03/20 PURCHASE SAINT AUGUSTI FL
Merchant category:	Stationery, Office, and School Supply Stores
Merchant category code:	5943
Merchant name:	STAPLES
Transaction category:	Shopping & Entertainment: General Merchandise

Bill

Town of Marineland
176 Marina Drive
Saint Augustine, FL 32080-8619

Date	Ref. No.
05/01/2021	05012021

Vendor
Intracoastal Bank 1290 NW Palm Coast Parkway Palm Coast, FL 32137

Bill Due	05/31/2021
Terms	
Memo	Loan #40000792, May 2021, Qtrly Pmt

Expenses

Account	Memo	Amount	Customer:Job
Debt Service	Loan #40000792, May 2021, Qtrly Pmt	5,093.19	
Loan Interest	Loan #40000792, May 2021, Qtrly Pmt	1,825.96	

Expense Total : 6,919.15

Bill Total : $6,919.15

Town of Marineland
Due From CRA Fund Activity
As of 2/28/2021

	Type	Date	Num	Name	Memo	Debit	Credit	Balance
1350 · Due From CRA Fund								
	General Journal	09/30/2018			-MULTIPLE-	350.00		350.00
	General Journal	09/30/2018			2-to record the amount due to the CRA Fund		525.00	-175.00
	Bill	08/31/2020	6165	Storehouse Treasures	CRA budget work, 2 hrs @ $35 per hour	70.00		
	Bill	08/14/2020	2351	Fleet & Associates ArchitectsPlanners Inc	CRA Status research & analysis, 3.5 hrs @ $125, Meet with Mayor on CRA, 7/16/20, .5 hrs @ $125	500.00		
	Bill	09/16/2020	2356	Fleet & Associates ArchitectsPlanners Inc	CRA Status Research and Analysis, 1 hr	125.00		-50.00
	Bill	09/30/2020	2359	Fleet & Associates ArchitectsPlanners Inc	CRA Budget/Review/Update, .5 hrs	62.50		12.50
	Bill	10/15/2020	679	FL Dept of Econcomic Activity	Annual State Fee	175.00		
	Bill	10/30/2020	6383	Storehouse Treasures	CRA budget work, 1.25 hrs @ $35 per hour	43.75		
	Bill	11/13/2020	2363	Fleet & Associates ArchitectsPlanners Inc	Comprehensive Plan Update, 11.5 hrs @ $125, Updating data analysis for 10 hours and mtg with Council on Perils of Floo	1,437.50		
	Bill	12/11/2020	2368	Fleet & Associates ArchitectsPlanners Inc	Nov 14 - Dec 11, 2020Comprehensive Plan Update, 10 hrs @ $125, Updating data analysis	1,250.00		
	Bill	01/15/2021	2373	Fleet & Associates ArchitectsPlanners Inc	Dec 12 - Jan 15, Comprehensive Plan Update, 4 hrs @ $125, Goals, Obejectives: Future Land Use, ...	500.00		1,257.50
	Bill	01/31/2021	6752	Storehouse Treasures	Jan CRA Work, 1/19 .75 hrs email to auditor, 1/21 .25 hrs qtrly mtg prep, 1/29 .25 hrs drive to St Aug to deposit ck	43.75		3,988.75
	Bill	02/12/2021	2380	Fleet & Associates ArchitectsPlanners Inc	Jan 16 - Feb 11, 2021, Comprehensive Plan Update, 5 hrs @ $125, GIS Maps	625.00		4,657.50
Total 1350 · Due From CRA Fund						5,182.50	525.00	4,657.50
TOTAL						**5,182.50**	**525.00**	**4,657.50**

Town of Marineland
Deposit Detail
March 2021

Type	Num	Date	Name	Account	Amount
Deposit		**03/01/2021**		**1000B · Cash - Operating - CSB #0321**	**3,875.00**
Sales Receipt	15320	02/25/2021	Allstate Property & Casualty Ins Co	1499 · Undeposited Funds	-2,500.00
Payment	1905	02/25/2021	Marineland Leisure, Inc	1499 · Undeposited Funds	-1,375.00
TOTAL					-3,875.00
Deposit		**03/12/2021**		**1000B · Cash - Operating - CSB #0321**	**115.00**
Sales Receipt	15319	03/12/2021	Barnett, Fawn	1499 · Undeposited Funds	-15.00
Sales Receipt	15318	03/12/2021	Sun and Sea Beach Weddings Inc	1499 · Undeposited Funds	-100.00
TOTAL					-115.00
Deposit		**03/17/2021**		**1000B · Cash - Operating - CSB #0321**	**103.94**
Payment		03/17/2021	Shearer, Cameron	1499 · Undeposited Funds	-103.94
TOTAL					-103.94
Deposit		**03/18/2021**		**1000B · Cash - Operating - CSB #0321**	**45.00**
Sales Receipt	15323	03/17/2021	Markert, Bill	1499 · Undeposited Funds	-15.00
Sales Receipt	15324	03/17/2021	Clement, Glen	1499 · Undeposited Funds	-15.00
Sales Receipt	15325	03/17/2021	Block, Mattie	1499 · Undeposited Funds	-15.00
TOTAL					-45.00
Deposit		**03/19/2021**		**1000B · Cash - Operating - CSB #0321**	**2,086.53**
Sales Receipt	15326	03/19/2021	Volusia Turtle Patrol, Inc	1499 · Undeposited Funds	-250.00
Sales Receipt	15327	03/19/2021	Kona Ice of Flagler County LLC	1499 · Undeposited Funds	-15.00
Sales Receipt	15328	03/19/2021	Friends of the Marine Science Center	1499 · Undeposited Funds	-15.00
Payment	1569	03/19/2021	Ripple Effect Ecotours	1499 · Undeposited Funds	-479.65
Payment	1016	03/19/2021	Mobius Marine, Inc.	1499 · Undeposited Funds	-1,139.38
Payment	1951	03/19/2021	Marineland Leisure, Inc	1499 · Undeposited Funds	-187.50
TOTAL					-2,086.53
Deposit		**03/21/2021**		**1000B · Cash - Operating - CSB #0321**	**311.19**
Payment	REC...	03/19/2021	Powell, Kate	1499 · Undeposited Funds	-311.19
TOTAL					-311.19
Deposit		**03/25/2021**		**1000B · Cash - Operating - CSB #0321**	**469.92**
Sales Receipt	15329	03/25/2021	Cat's Creations	1499 · Undeposited Funds	-15.00
Sales Receipt	15330	03/25/2021	A Touch of Glass	1499 · Undeposited Funds	-15.00
Sales Receipt	15331	03/25/2021	Hornkohl, Frederick	1499 · Undeposited Funds	-15.00
Payment	3237	03/25/2021	Sun and Sea Beach Weddings Inc	1499 · Undeposited Funds	-100.00
Sales Receipt	15332	03/25/2021	State of Florida	1499 · Undeposited Funds	-198.66
Sales Receipt	15333	03/25/2021	State of Florida	1499 · Undeposited Funds	-126.26
TOTAL					-469.92
Sales Receipt	**15343**	**03/26/2021**	**Florida Power & Light**	**1001A · Invest Acct - CenterState 3736**	**1,275.93**
				33 · Franchise Fee - FPL	-1,275.93
TOTAL					-1,275.93

Town of Marineland
Deposit Detail
March 2021

Type	Num	Date	Name	Account	Amount
Deposit		**03/29/2021**		**1000B · Cash - Operating - CSB #0321**	**311.82**
Payment	REC...	03/25/2021	Sun and Sea Beach Weddings Inc	1499 · Undeposited Funds	-207.88
Payment	REC...	03/25/2021	Sun and Sea Beach Weddings Inc	1499 · Undeposited Funds	-103.94
TOTAL					-311.82
Deposit		**03/30/2021**		**1000B · Cash - Operating - CSB #0321**	**15.85**
Payment		03/26/2021	Shearer, Cameron	1499 · Undeposited Funds	-15.85
TOTAL					-15.85
Deposit		**03/31/2021**		**1000B · Cash - Operating - CSB #0321**	**47.25**
Payment	Visa	03/29/2021	Powell, Kate	1499 · Undeposited Funds	-47.25
TOTAL					-47.25
Deposit		**03/31/2021**		**1000B · Cash - Operating - CSB #0321**	**160.00**
Sales Receipt	15334	03/30/2021	Gallery of Local Art	1499 · Undeposited Funds	-15.00
Sales Receipt	15335	03/30/2021	Rock & Roll Kettle Corn	1499 · Undeposited Funds	-15.00
Sales Receipt	15336	03/30/2021	Flagler Surf Art & Stuff	1499 · Undeposited Funds	-15.00
Sales Receipt	15337	03/30/2021	Mimi's Original Art	1499 · Undeposited Funds	-15.00
Payment	3296	03/30/2021	Sun and Sea Beach Weddings Inc	1499 · Undeposited Funds	-100.00
TOTAL					-160.00
Deposit		**03/31/2021**	**CenterState Bank**	**1001A · Invest Acct - CenterState 3736**	**7.63**
				41 · Interest Income	-7.63
TOTAL					-7.63
Deposit		**03/31/2021**		**1002A · Cap Improve-CenterState 3745**	**0.22**
				41 · Interest Income	-0.22
TOTAL					-0.22
Deposit		**03/31/2021**		**1000B · Cash - Operating - CSB #0321**	**9.07**
				41 · Interest Income	-9.07
TOTAL					-9.07

Town of Marineland
A/P Aging Detail
As of March 31, 2021

Type	Date	Num	Name	Open Balance
Current				
Bill	03/31/2021	6962...	FP&L	396.98
Bill	03/30/2021	4122...	FP&L	780.20
Bill	03/31/2021	1945...	FP&L	709.75
Total Current				1,886.93
1 - 30				
Total 1 - 30				
31 - 60				
Total 31 - 60				
61 - 90				
Total 61 - 90				
> 90				
Total > 90				
TOTAL				**1,886.93**

Town of Marineland
A/R Aging Detail
As of March 31, 2021

Type	Date	Num	Name	Open Balance
Current				
Invoice	03/31/2021	467	Mobius Marine, Inc.	1,177.18
Invoice	03/18/2021	455	Marineland Leisure, Inc	62.50
Total Current				1,239.68
1 - 30				
Invoice	03/19/2021	459	CRA Account, Town of Marineland	2,272.50
Invoice	03/25/2021	462	Sun and Sea Beach Weddings Inc	52.12
Total 1 - 30				2,324.62
31 - 60				
Invoice	02/28/2021	454	CRA Account, Town of Marineland	4,657.50
Total 31 - 60				4,657.50
61 - 90				
Total 61 - 90				
> 90				
Invoice	11/09/2020	82076	Ripple Effect Ecotours	325.78
Total > 90				325.78
TOTAL				**8,547.58**

Town of Marineland
Statement of Financial Position
As of March 31, 2021

	Mar 31, 21	Mar 31, 20
ASSETS		
Current Assets		
Checking/Savings		
1000B · Cash - Operating - CSB #0321	40,028.08	38,840.08
1001A · Invest Acct - CenterState 3736	79,659.61	100,948.68
1002A · Cap Improve-CenterState 3745	1,017.18	1,014.61
1014 · Intracoastal Capital Chkg -4017	46,148.48	5,719.98
Total Checking/Savings	166,853.35	146,523.35
Accounts Receivable		
1200 · Accounts Receivable	8,547.58	4,795.59
Total Accounts Receivable	8,547.58	4,795.59
Other Current Assets		
1300 · Prepaid Expenses	2,387.52	0.00
1350 · Due From CRA Fund	0.00	-175.00
1499 · Undeposited Funds	518.45	41,514.02
Total Other Current Assets	2,905.97	41,339.02
Total Current Assets	178,306.90	192,657.96
TOTAL ASSETS	**178,306.90**	**192,657.96**
LIABILITIES & EQUITY		
Liabilities		
Current Liabilities		
Accounts Payable		
2000 · Accounts Payable	1,886.93	4,226.78
Total Accounts Payable	1,886.93	4,226.78
Other Current Liabilities		
2201 · Sales Tax Payable	0.00	3.54
Total Other Current Liabilities	0.00	3.54
Total Current Liabilities	1,886.93	4,230.32
Total Liabilities	1,886.93	4,230.32
Equity		
1110 · Retained Earnings	61,961.78	0.00
1111 · Fund Balance Assigned	46,148.48	5,719.97
1112 · Fund Balance Unassigned	124,220.74	164,649.25
Net Income	-55,911.03	18,058.42
Total Equity	176,419.97	188,427.64
TOTAL LIABILITIES & EQUITY	**178,306.90**	**192,657.96**

Town of Marineland
Statement of Revenue & Expenses, Budget vs. Actual
October 2020 through March 2021

	Oct '20 - Mar 21	Budget	$ Over Budget
Ordinary Income/Expense			
Income			
30 · Ad Valorem Taxes	4,531.35	5,900.00	-1,368.65
31 · Interest on Ad Valorem Taxes	17.78	0.00	17.78
33 · Franchise Fee - FPL	8,478.78	8,499.00	-20.22
34 · FL Communications Services Tax	1,743.03	555.00	1,188.03
35 · Local Business Receipts Tax	1,215.00	1,320.00	-105.00
36 · Other Permits & Fees	3,600.00	1,026.00	2,574.00
37 · Rental Income	2,400.00	2,400.00	0.00
39 · Miscellaneous Income	0.66	0.00	0.66
41 · Interest Income	177.94	90.00	87.94
Total Income	22,164.54	19,790.00	2,374.54
Gross Profit	22,164.54	19,790.00	2,374.54
Expense			
01 · PERSONNEL SERVICE			
001 · Town Manager	1,000.00	750.00	250.00
002 · Town Clerk	1,200.00	1,200.00	0.00
003 · Director of Finance	2,880.00	2,520.00	360.00
004 · Legal	3,982.50	9,999.00	-6,016.50
005 · Town Planner			
005.3 · Town Planner	5,500.00	5,001.00	499.00
005.5 · Town Planner, Reimbursed	-2,625.00	0.00	-2,625.00
Total 005 · Town Planner	2,875.00	5,001.00	-2,126.00
006 · Annual Audit	6,746.50	6,747.00	-0.50
007 · Commissioner Stipends	2,625.00	3,000.00	-375.00
008 · Payroll Taxes	18.14	22.00	-3.86
Total 01 · PERSONNEL SERVICE	21,327.14	29,239.00	-7,911.86
02 · OPERATING EXPENDITURES			
050 · Office/ Miscellanous Expense	17.98	170.00	-152.02
051 · Donation & Dues	520.00	500.00	20.00
052 · Postage & Printing	13.60	0.00	13.60
053 · Legal Advertisement	0.00	300.00	-300.00
056 · Bank Service Charges	40.00	0.00	40.00
056.5 · Merchant Services Fees	-2.72	0.00	-2.72
057 · Insurance	2,387.48	2,930.00	-542.52
058 · Licenses and Permits	0.00	900.00	-900.00
060 · Technology Expense	1,648.91	2,499.00	-850.09
070 · Building Rental	400.00	0.00	400.00
Total 02 · OPERATING EXPENDITUR...	5,025.25	7,299.00	-2,273.75
03 · Physical Environment			
054 · Street Lights, Utility Service	4,211.15	4,150.00	61.15
59.1 · Marina Electricity Expense	6,897.37	0.00	6,897.37
59.2 · Marina Electricity Reimbursed	-6,897.37	0.00	-6,897.37
Total 03 · Physical Environment	4,211.15	4,150.00	61.15
Total Expense	30,563.54	40,688.00	-10,124.46
Net Ordinary Income	-8,399.00	-20,898.00	12,499.00
Other Income/Expense			
Other Income			
Marina Income	2,500.00	0.00	2,500.00
Planning Revenue	1,770.00	0.00	1,770.00
Possessory Interest Tax Revenue	597.28	622.00	-24.72
Total Other Income	4,867.28	622.00	4,245.28

Town of Marineland
Statement of Revenue & Expenses, Budget vs. Actual
October 2020 through March 2021

	Oct '20 - Mar 21	Budget	$ Over Budget
Other Expense			
Community Redevelopmnt Area Exp	37,943.73	0.00	37,943.73
Possessory Interest Tax Exp	597.28	622.00	-24.72
200 · Loan Interest	3,711.07	3,635.00	76.07
201 · Debt Service	10,127.23	10,203.00	-75.77
Total Other Expense	52,379.31	14,460.00	37,919.31
Net Other Income	-47,512.03	-13,838.00	-33,674.03
Net Income	**-55,911.03**	**-34,736.00**	**-21,175.03**

Town of Marineland
Statement of Revenues and Expenses By Month
October 2020 through March 2021

	Oct 20	Nov 20	Dec 20	Jan 21	Feb 21	Mar 21	TOTAL
Ordinary Income/Expense							
Income							
30 · Ad Valorem Taxes	0.00	0.00	2,587.99	1,943.36	0.00	0.00	4,531.35
31 · Interest on Ad Valorem Taxes	0.00	0.00	0.00	17.78	0.00	0.00	17.78
33 · Franchise Fee - FPL	1,515.95	1,595.13	1,293.18	1,338.73	1,459.86	1,275.93	8,478.78
34 · FL Communications Services Tax	266.54	273.40	276.09	46.65	341.40	538.95	1,743.03
35 · Local Business Receipts Tax	840.00	75.00	45.00	0.00	0.00	255.00	1,215.00
36 · Other Permits & Fees	400.00	200.00	300.00	0.00	800.00	1,900.00	3,600.00
37 · Rental Income	400.00	400.00	400.00	400.00	400.00	400.00	2,400.00
39 · Miscellaneous Income	0.00	0.00	0.00	0.00	1.00	-0.34	0.66
41 · Interest Income	28.53	36.14	36.96	36.74	22.65	16.92	177.94
Total Income	3,451.02	2,579.67	4,939.22	3,783.26	3,024.91	4,386.46	22,164.54
Gross Profit	3,451.02	2,579.67	4,939.22	3,783.26	3,024.91	4,386.46	22,164.54
Expense							
01 · PERSONNEL SERVICE							
001 · Town Manager	125.00	125.00	125.00	125.00	125.00	375.00	1,000.00
002 · Town Clerk	200.00	200.00	200.00	200.00	200.00	200.00	1,200.00
003 · Director of Finance	620.00	410.00	375.00	725.00	375.00	375.00	2,880.00
004 · Legal	0.00	1,406.25	1,170.00	1,406.25	0.00	0.00	3,982.50
005 · Town Planner							
005.3 · Town Planner	687.50	1,437.50	1,937.50	1,000.00	-187.50	625.00	5,500.00
005.5 · Town Planner, Reimbursed	0.00	0.00	0.00	0.00	-4,332.50	1,707.50	-2,625.00
Total 005 · Town Planner	687.50	1,437.50	1,937.50	1,000.00	-4,520.00	2,332.50	2,875.00
006 · Annual Audit	0.00	0.00	0.00	6,746.50	0.00	0.00	6,746.50
007 · Commissioner Stipends	375.00	375.00	375.00	500.00	500.00	500.00	2,625.00
008 · Payroll Taxes	9.07	0.00	0.00	9.07	0.00	0.00	18.14
Total 01 · PERSONNEL SERVICE	2,016.57	3,953.75	4,182.50	10,711.82	-3,320.00	3,782.50	21,327.14
02 · OPERATING EXPENDITURES							
050 · Office/ Miscellanous Expense	0.00	17.98	0.00	0.00	0.00	0.00	17.98
051 · Donation & Dues	0.00	0.00	520.00	0.00	0.00	0.00	520.00
052 · Postage & Printing	0.00	0.00	0.00	13.60	0.00	0.00	13.60
056 · Bank Service Charges	0.00	47.00	-12.00	0.00	0.00	5.00	40.00
056.5 · Merchant Services Fees	0.00	0.00	0.00	0.00	0.34	-3.06	-2.72
057 · Insurance	397.91	397.91	397.91	397.91	397.92	397.92	2,387.48
060 · Technology Expense	0.00	1,648.91	0.00	0.00	0.00	0.00	1,648.91
070 · Building Rental	100.00	100.00	0.00	0.00	200.00	0.00	400.00
Total 02 · OPERATING EXPENDITUR...	497.91	2,211.80	905.91	411.51	598.26	399.86	5,025.25
03 · Physical Environment							
054 · Street Lights, Utility Service	678.28	701.81	701.81	709.75	709.75	709.75	4,211.15
59.1 · Marina Electricity Expense	1,107.51	1,060.26	1,135.28	1,277.76	1,139.38	1,177.18	6,897.37
59.2 · Marina Electricity Reimbursed	-1,107.51	-1,060.26	-1,135.28	-1,277.76	-1,139.38	-1,177.18	-6,897.37
Total 03 · Physical Environment	678.28	701.81	701.81	709.75	709.75	709.75	4,211.15
574030 · Special Events	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Expense	3,192.76	6,867.36	5,790.22	11,833.08	-2,011.99	4,892.11	30,563.54
Net Ordinary Income	258.26	-4,287.69	-851.00	-8,049.82	5,036.90	-505.65	-8,399.00
Other Income/Expense							
Other Income							
Marina Income	0.00	0.00	0.00	0.00	2,500.00	0.00	2,500.00
Planning Revenue	0.00	2,770.00	0.00	1,375.00	-4,145.00	1,770.00	1,770.00
Possessory Interest Tax Revenue	0.00	597.28	0.00	0.00	0.00	0.00	597.28
Sales Tax Collection Allowance	0.60	-0.60	0.00	0.00	0.00	0.00	0.00
Total Other Income	0.60	3,366.68	0.00	1,375.00	-1,645.00	1,770.00	4,867.28
Other Expense							
Community Redevelopmnt Area Exp	218.75	0.00	0.00	-218.75	0.00	37,943.73	37,943.73
Possessory Interest Tax Exp	0.00	597.28	0.00	0.00	0.00	0.00	597.28
200 · Loan Interest	0.00	1,885.11	0.00	0.00	1,825.96	0.00	3,711.07
201 · Debt Service	0.00	5,034.04	0.00	0.00	5,093.19	0.00	10,127.23
Total Other Expense	218.75	7,516.43	0.00	-218.75	6,919.15	37,943.73	52,379.31
Net Other Income	-218.15	-4,149.75	0.00	1,593.75	-8,564.15	-36,173.73	-47,512.03
Net Income	**40.11**	**-8,437.44**	**-851.00**	**-6,456.07**	**-3,527.25**	**-36,679.38**	**-55,911.03**

Town of Marineland
Transaction Detail By Account
March through April 2021

Type	Date	Num	Name	Memo	Credit	Balance
35 · Local Business Receipts Tax						
Sales Receipt	03/12/2021	15319	Barnett, Fawn	Local Business Tax for the Turtle Fest on April 10, 2021	15.00	15.00
Sales Receipt	03/17/2021	15323	Markert, Bill	Local Business Tax for Turtle Fest, 4/10/2021	15.00	30.00
Sales Receipt	03/17/2021	15324	Clement, Glen	Local Business Tax for Turtle Fest, 4/10/2021	15.00	45.00
Sales Receipt	03/17/2021	15325	Block, Mattie	Local Business Tax for Turtle Fest, 4/10/2021	15.00	60.00
Sales Receipt	03/19/2021	15327	Kona Ice of Flagl...	Local Business Tax	15.00	75.00
Sales Receipt	03/19/2021	15328	Friends of the Ma...	Local Business Tax	15.00	90.00
Sales Receipt	03/25/2021	15329	Cat's Creations	Local Business Tax, Turtle Fest 2021	15.00	105.00
Sales Receipt	03/25/2021	15330	A Touch of Glass	Local Business Tax, Turtle Fest 2021	15.00	120.00
Sales Receipt	03/25/2021	15331	Hornkohl, Frederick	Local Business Tax, Turtle Fest 2021	15.00	135.00
Invoice	03/25/2021	464	Shearer, Cameron	King of Clubs Surf Event 4.10.2021, Local Business Tax Rec...	15.00	150.00
Invoice	03/25/2021	465	Powell, Kate	-MULTIPLE-	45.00	195.00
Sales Receipt	03/30/2021	15334	Gallery of Local Art	Local Business Tax, Turtle Fest	15.00	210.00
Sales Receipt	03/30/2021	15335	Rock & Roll Kettl...	Local Business Tax, Turtle Fest	15.00	225.00
Sales Receipt	03/30/2021	15336	Flagler Surf Art & ...	Local Business Tax, Turtle Fest	15.00	240.00
Sales Receipt	03/30/2021	15337	Mimi's Original Art	Local Business Tax, Turtle Fest	15.00	255.00
Sales Receipt	04/08/2021	15338	Origami Owl	Local Business Tax, Turtle Fest	15.00	270.00
Sales Receipt	04/08/2021	15339	Jeffe, Kareen	Local Business Tax, Turtle Fest	15.00	285.00
Sales Receipt	04/08/2021	15340	Clear Purpose Cr...	Local Business Tax, Turtle Fest	15.00	300.00
Sales Receipt	04/08/2021	15341	Nancy's Palm Fro...	Local Business Tax, Turtle Fest	15.00	315.00
Sales Receipt	04/08/2021	15342	Livin' Alive	Local Business Tax, Turtle Fest	15.00	330.00
Total 35 · Local Business Receipts Tax					330.00	330.00
TOTAL					**330.00**	**330.00**

Town of Marineland
Transaction Detail By Account
March through April 2021

Type	Date	Num	Name	Memo	Credit	Balance
36 · Other Permits & Fees						
Sales Receipt	03/01/2021	15312	Sun and Sea Beach Weddings Inc	Edwards/Randolph 5/01/21 Wedding	100.00	100.00
Invoice	03/11/2021	453	Shearer, Cameron	King of Clubs Surf Event 4.10.2021, Special Event Permit	100.00	200.00
Sales Receipt	03/12/2021	15318	Sun and Sea Beach Weddings Inc	Huddleston - Brignoni Wedding	100.00	300.00
Invoice	03/18/2021	456	National MS Society	Special event permit application fee, greater than 1,000 participa...	500.00	800.00
Sales Receipt	03/19/2021	15326	Volusia Turtle Patrol, Inc	Turtle Fest Permit Fee, April 10, 2021	250.00	1,050.00
Invoice	03/19/2021	458	Powell, Kate	Application Fee for Conditional Use Permit	300.00	1,350.00
Invoice	03/23/2021	460	Sun and Sea Beach Weddings Inc	-MULTIPLE-	200.00	1,550.00
Invoice	03/23/2021	461	Sun and Sea Beach Weddings Inc	Perret/Lund Wedding 7/14/2021	100.00	1,650.00
Invoice	03/25/2021	462	Sun and Sea Beach Weddings Inc	Edwards/Randolph Wedding 5/01/2021	150.00	1,800.00
Invoice	03/25/2021	463	Sun and Sea Beach Weddings Inc	Vernotz/Denney Wedding 7/17/2021	100.00	1,900.00
Invoice	04/06/2021	468	Sun and Sea Beach Weddings Inc	-MULTIPLE-	150.00	2,050.00
Total 36 · Other Permits & Fees					2,050.00	2,050.00
TOTAL					**2,050.00**	**2,050.00**

RESOLUTION 2021-____

A RESOLUTION OF THE TOWN OF MARINELAND COMMISSION; ADOPTING THE LOCAL MITIGATION STRATEGY PLAN AS UPDATED; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5165, as amended provides for States, Tribes, and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning; and

WHEREAS, the National Flood Insurance Act of 1968, as amended, reinforced the need and requirement for mitigation plans, linking flood mitigation assistance programs to State, Tribal and Local Mitigation Strategy (LMS); and

WHEREAS, the Federal Emergency Management Agency (FEMA) has implemented various hazard mitigation planning provisions through regulation at 44 CFR § 201.6, requiring local governments to have a FEMA approved LMS in order to apply for and/or receive project grants; and

WHEREAS, the LMS supports and integrates with the Comprehensive Emergency; and

WHEREAS, 44 CFR 201.6(d)(3) requires each local jurisdiction to review and revise its LMS to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and then resubmit it for approval within five (5) years in order to continue to be eligible for mitigation grant funding; and

WHEREAS, the LMS was transmitted to the Florida Division of Emergency Management and found in compliance with State and Federal requirements.

NOW THEREFORE, be it resolved by the Town Commission of the Town of Marineland that:

1. The Flagler County Local Mitigation Strategy (LMS) is adopted and is declared a workable program for planning, identifying, and implementing hazard mitigation programs, policies, and projects.

2. Adoption of the LMS shall not obligate the Town to spend local funds for mitigation initiatives. The Town also shall not be obligated to apply for future hazard mitigation grant funds if such actions are not in the best interest of the Town.

3. The Town Commission of the Town of Marineland hereby adopts the Flagler County LMS Multi-Jurisdictional Plan to identify and implement hazard mitigation initiatives to reduce the Town's susceptibility to numerous hazards.

4. This resolution shall become effective upon adoption.

TOWN COMMISSION OF THE TOWN OF MARINELAND

ATTEST:

_____
Craig Lenniger, Mayor

_____
Brandon Mellin, Town Clerk

APPROVED AS TO FORM:

_____
William Bosch, Town Attorney

LOCAL MITIGATION PLAN REVIEW TOOL

The Local Mitigation Plan Review Tool demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Check list provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional work sheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this Local Mitigation Plan Review Guide when completing the Local Mitigation Plan Review Tool.

Jurisdiction:	**Title of Plan:**	**Date of Plan:**
Flagler County	Flagler County LMS	2/2/2021
Local Point of Contact: Lea Tardanico	**Address:** 1769 E. Moody Blvd., Bldg. 3 Bunnell, FL 32110	
Title: Emergency Management Planner		
Agency: Flagler County Emergency Management		
Phone Number: 386-313-4244	**E-Mail:** ltardanico@flaglercounty.org	

State Reviewer:	**Title:**	**Date:**
Kristin Buckingham, Dan Curcio	Mitigation Planner	
Date Received by FDEM	2/4/2021, 2/19/2021; 2/24/2021	
Plan Not Approved	2/12/2021, 2/23/2021	
Plan Approvable Pending Adoption	3/3/2021	
Plan Approved		

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region IV		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this Plan Review Guide in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST Regulation (44CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 2, pgs. 2-1 to 2-4; Appendix A and B	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 2, pgs. 2-2 and 2-3	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 2, pg. 2-3; Appendix B	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 5.4, pg. 5.15	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 5, pg. 5-18	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 5, pgs. 5-17 to 5-19	X	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST Regulation (44CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 4; Appendix C	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 4; Appendix C	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 4; Appendix C	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 4; pgs. 4-36 and 4-37	X	
ELEMENT B: REQUIRED REVISIONS			

1. REGULATION CHECKLIST Regulation (44CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 5, pgs. 5-15 to 5-16; Appendix G	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 4, pgs. 4-33	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 5, pgs. 5-1 to 5-3	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Appendix E and F	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 5, pgs. 5-3 to 5-10; Appendix D, Appendix E; Appendix F	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 5, pgs. 5-15- to 5-16	X	
ELEMENT C: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Sections 3, 3-11 to 3-15	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Appendix E	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 5, 5-1	X	
ELEMENT D: REQUIRED REVISIONS			

ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))			X
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))			X
ELEMENT E: REQUIRED REVISIONS			
The plan must include documentation of plan adoption, usually a resolution by the governing body or other authority. If adopted after FEMA review, adoption must take place within one calendar year of receipt of FEMA's "Approvable Pending Adoption." Every jurisdiction that is included in the plan must have its governing body adopt the plan, even when a regional agency has the authority to prepare such plans. (For additional information, please see the "Local Mitigation Plan Review Guide", Element E: Plan Adoption dated October 1, 2011, Pages 28-29).			

ELEMENT F. ADDITIONAL STATE REQUIREMENTS			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the
The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in
Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could

Element A: Planning Process

Strengths:

The plan includes a good discussion of how the LMSWG will continue public participation throughout the maintenance phase.

Opportunities for Improvement:

Element B: Hazard Identification & Risk Assessment

Strengths:

The Risk Assessment did a good job of looking at jurisdictional risk and the use of charts and figures did a good job of supplimenting the information to provide for a better narrative.

Opportunities for Improvement:

Element C: Mitigation Strategy

Strengths:

It was interesting and forward thinking to include the addition of FEMA Lifelines as a consideration of the prioritization process. The plan includes a good description of the process of integration of the LMS into local planning mechanisms.

Opportunities for Improvement:

The project list and scope of mitigation actions could be improved by including outreach and planning projects.

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

Strengths:

The information does a good job of laying out how the plan will be maintained and updated, annually and every five years.

Opportunities for Improvement:

The informaiton about plan maintenance and update would be more easily understood if broken up into sub-sections between the different phases of maintenance.

B. Resources for Implementing Your Approved Plan

Section 2 B: Resources for Implementing Your Approved Plan

The State of Florida Enhanced Hazard Mitigation Plan lists a number of funding and educational/training resources available to communities (http://www.floridadisaster.org/Mitigation/State/Index.htm). We list a number of federal and state resources here:

- The FEMA Hazard Mitigation Assistance provides funding opportunities for pre- and post-disaster mitigation through:
  - The **Pre-Disaster Mitigation (PDM) Grant Program** which provides funds on an annual basis for mitigation planning and mitigation project implementation prior to a disaster. For additional information on the PDM visit (www.fema.gov/pre-disaster-mitigation-grant-program).
- The **Flood Mitigation Assistance (FMA) Program** which provides funds on an annual basis so that communities can take measures to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program (NFIP). For additional information on the FMA visit https://floridadisaster.org/dem/mitigation/flood-mitigation-assistance-program/
- Additional tools regarding flood insurance, through the **National Flood Insurance Program (NFIP)** administered by FEMA is available at (https://www.floodsmart.gov/floodsmart/pages/partner/tools_resources.jsp)
  Technical assistance to retrieve flood hazard information specific to your planning area is available through the **FEMA Flood Map Service Center** (http://msc.fema.gov/portal).
- For assistance after a Presidential disaster declaration, consider the **Hazard Mitigation Grant Program (HMGP)** which assists in implementing long-term hazard mitigation measures in accordance with State, Tribal and local priorities. The HMGP is offered to both public and individual assistance. For additional information on the HMGP visit (http://www.floridadisaster.org/Mitigation/Hazard/)
- For assistance during the immediate repair phase following disaster events consider Hazard Mitigation Funding under the **Public Assistance (PA) Grant Program** which funds cost-effective mitigation efforts in repairing disaster-damaged public facilities. Additional information may be found at (https://www.fema.gov/public-assistance-local-state-tribal-and-non-profit)
- For the mitigation, management, and control of fires on publicly or private owned forests or grasslands consider the **Fire Management Assistance Grant (FMAG) Program** which is initiated at the request for assistance to the FEMA Regional Director at the time a "threat of major disaster" exists. The FMAG provides a 75 percent Federal cost share with the State paying the remaining 25 percent of costs. Additional information on the FMAG may be found here (https://www.fema.gov/fire-management-assistance-grant-program)
  - For assistance with how to better integrate the LMS with other plans, see FEMA's Plan Integration document http://www.fema.gov/media-library-data/1440522008134-ddb097cc285bf741986b48fdcef31c6e/R3_Plan_Integration_0812_508.pdf
- State resources are additionally available through
  - **Hurricane Loss Mitigation Program (HLMP)** through the Florida Division of Emergency Management which receives funding from the Florida Hurricane Catastrophe Trust Fund. A significant portion of the funding is to be used to improve the wind resistance of residences through loans, subsidies, grants demonstration projects, direct assistance, and cooperative programs with local and federal governments. For additional information on the RCMP visit https://floridadisaster.org/dem/mitigation/hurricane-loss-mitigation-program/
  - Any smaller communities may be eligible for the **Florida Small Cities Community Development Block Grant**. This program provides federal funding for low income housing rehabilitation and community development. For additional information on this program visit (http://www.floridajobs.org/community-planning-and-development/assistance-for-governments-and-organizations/florida-small-cities-community-development-block-grant-program)
  - **Fire Wise Communities** provides information and links to resources for wildfire mitigation (www.firewise.org). The program provides resources on defensible space, construction tools/materials, and preparation for wildfire season.

MULTI-JURISDICTION SUMMARY SHEET

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; instead **simply fill in the names and type of each jurisdiction (columns C and D)** participating in the Plan.

MULTI-JURISDICTIONAL SUMMARY SHEET							
#	Jurisdiction Name	Type of Jurisdiction (school board, non-profit, special district, city, town, etc.)	Requirements Met (Y/N)				
			A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption
1	Flagler	County	Y	Y	Y	Y	N
2	Beverly Beach	Town	Y	Y	Y	Y	N
3	Bunnell	City	Y	Y	Y	Y	N
4	Flagler Beach	City	Y	Y	Y	Y	N
5	Palm Coast	City	Y	Y	Y	Y	N
6	Marineland	Town	Y	Y	Y	Y	N
7	Flagler County School Board	Special District	Y	Y	Y	Y	N
8	Grand Haven Community Development	Special District	Y	Y	Y	Y	N
9							
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THE TOWN OF MARINELAND FLORIDA
ESTABLISHED 1940
FLORIDA'S FIRST REMARKABLE COASTAL PLACE

9507 N. Oceanshore Blvd.,
St. Augustine, FL 32080

Phone: (386)232-8060
mayor.marineland@gmail.com

TO: Town Commission

FROM: Janis K. Fleet, AICP

DATE: April 9, 2021

SUBJECT: Approval of the Flagler County Local Mitigation Strategy (LMS) Update

The LMS outlines Flagler County's strategy towards identifying community disaster risks and hazards, providing the processes to prioritize funding for projects that will reduce those risks. The LMS must be updated every 5 years and the updated LMS submitted to FEMA and the State of Florida for approval. The Flagler County LMS applies to the entirety of Flagler County, including its municipalities. The LMS is key to ensuring that a coordinated system is in place to mitigate critical assets from the impacts of future disasters.

Chapter 27P-22, F.A.C. and Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act 42 U.S.C. 5165, as amended, outline the processes for application, project selection, and distribution of funds under the Hazard Mitigation Grant Program (HMGP), to include the minimum components of an LMS. In order to qualify to apply for HMGP funds, each county must have a FEMA approved LMS and a formal LMS Working Group. The State of Florida has delegated authority, from FEMA, to review and approve a county's LMS.

The updated LMS is attached for review. The attached resolution needs to be adopted by the Town Commission in order for the Town to receive FEMA funds after a disaster.

STATE OF FLORIDA

DIVISION OF EMERGENCY MANAGEMENT

Ron DeSantis
Governor

Jared Moskowitz
Director

March 3, 2021

Jonathan Lord, Director
Flagler County Emergency Management
1769 East Moody Boulevard #3,
Bunnell, Florida 32110

Re: Flagler County Local Hazard Mitigation Plan Approved Pending Adoption

Dear Director Lord,

This is to confirm that we have completed a State review of the Flagler County Local Mitigation Strategy (LMS) update for compliance with the federal hazard mitigation planning standards contained in 44 CFR 201.6(b)-(d). Based on our review and comments, Flagler County developed and submitted all the necessary plan revisions and our staff has reviewed and approved these revisions. We have determined that the Flagler County LMS plan is compliant with federal standards, subject to formal community adoption, for the jurisdictions below:

Flagler County, Unincorporated
City of Beverly Beach
City of Bunnell
City of Flagler Beach
City of Palm Coast
Town of Marineland
Flagler County School Board
Grand Haven Community Development District

Upon submittal of a copy of all participating jurisdictions' documentation of their adoption resolutions to our office, we will send all necessary documentation to the Federal Emergency Management Agency (FEMA) who will issue formal approval of the Flagler County LMS.

If you have any questions regarding this matter, please contact your LMS Liaison Kristin Buckingham at Kristin.Buckingham@em.myflorida.com or 850-815-4519.

Respectfully,

Miles E. Anderson

Digitally signed by Miles E. Anderson
DN: cn=Miles E. Anderson, o=DEM, ou=Mitigation, email=Miles.anderson@em.myflorida.com, c=US
Date: 2021.03.05 10:19:40 -05'00'

Miles E. Anderson,
Bureau Chief, Mitigation

State Hazard Mitigation Officer

MEA/kb

Attachments: MEMORADUM: State approval of LMS plans under Program Administration by States (PAS)

cc: FEMA Region IV, Mitigation Division – Risk Analysis Branch

STATE OF FLORIDA

DIVISION OF EMERGENCY MANAGEMENT

Ron DeSantis
Governor

Jared Moskowitz
Director

MEMORANDUM

TO: Local Mitigation Strategy Working Group Chair

FROM: Miles E. Anderson, Mitigation Bureau Chief, FDEM MEA

DATE: January 28, 2019

SUBJECT: Local Mitigation Strategy Plan Review Process

Florida operates under Federal Emergency Management Agency's (FEMA) Program Administration by States (PAS) with regard to the review and approval of Local Mitigation Strategy (LMS) plans. Under this designation, the Florida Division of Emergency Management (FDEM) manages the approval of LMS plans with minimal FEMA oversight. FEMA sends final approval letters to the state for dissemination their county jurisdictions.

Updated LMS plans must be submitted to the FDEM six (6) months prior to the plan expiration date. Plans submitted later than this timeframe will be reviewed in the order they are received after timely submissions have been attended to. FDEM will attempt to complete reviews within 30 days whenever possible. The official submission shall consist of:

- Electronic copy (Excel version) of the Florida LMS Review Tool, completed as described in the Review Tool's instructions
- Electronic copy (uploaded to SharePoint or CD) of all the plan document(s) to be reviewed

The LMS working group must notify their state LMS liaison (via email or phone call) that their plan has been submitted. The assigned state mitigation planner will provide a confirmation of receipt. Upon completion of the review the state mitigation planner will inform the LMS chairperson that the plan is:

a. Approved Pending Adoption (APA)
OR
b. In need of revision. In this case, the plan must be revised and resubmitted to FDEM within 30 days of notification.

Once the county receives FDEM's APA letter, you may then take it to your jurisdictions to begin the adoption process. There is no specific order requirement for jurisdiction adoption. A copy of all adoption Resolutions must be submitted to FDEM for transmittal to FEMA.

Upon FDEM's receipt of each of your jurisdiction's resolutions, the FDEM Mitigation Planning Unit will send them to FEMA and await their approval letter. Once FDEM receives it, we will send it to the county for their records and further disbursement to your jurisdiction.

If you have any questions about this process, please speak with your state LMS liaison.

MEA/ms

Flagler County Local Mitigation Strategy Plan 2016

Table of Contents

Section 1 – Introduction

Section 2 – Planning Process

Section 3 – County Profile

Section 4 – Risk Assessment

Section 5 – Mitigation Strategy

Appendix A – Working Group Contact List

Appendix B – Meeting Documentation

Appendix C – Additional Wildfire Risk Assessment Information

Appendix D – Hazard Summary Table

Appendix E – Project Prioritization Process

Appendix F – Prioritized Project List

Appendix G – Project Information Sheets

Appendix H – Policy Evaluation

Appendix I – CRS Documentation

Appendix J – Approval Letter and Resolutions

1.0 – Introduction

Under Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) enacted under the Disaster Mitigation Act of 2000 (DMA2K), states and local governments are required to have a Federal Emergency Management Agency (FEMA)-approved hazard mitigation plan in order to be eligible for federal hazard mitigation funding. DMA2K requires communities to develop a plan that follows a planning process to identify risks and prioritize projects. Local plans must be updated and adopted by all participating jurisdictions every five years in order to remain eligible for funding. Developing a Local Mitigation Strategy (LMS) gives Flagler County and its municipalities the opportunity to determine what all-hazards mitigation actions need to be taken to minimize damage before the next disaster strikes.

Communities face a variety of hazards. A hazard is any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other structural and financial loss. Three types of hazards profiled within this plan include:

- *Natural hazards*- result from acts of nature, such as hurricanes, earthquakes, tornadoes, wildfires, animal disease outbreak, pandemics, or epidemics.
- *Technological hazards*- result from accidents or the failures of systems and structures, such as hazardous materials spills or dam failures.
- *Human-caused incidents*- result from the intentional actions of an adversary, such as a threatened or actual chemical attack, biological attack, or cyber incident.

The Flagler County LMS focuses on the major hazards that could potentially affect Flagler County and all of the participating jurisdictions in this plan. By evaluating hazards, identifying vulnerabilities and proposing solutions to them, Flagler County will be able to more efficiently meet the needs of its constituents. Hazards fully profiled in this plan include:

- Erosion
- Drought
- Extreme heat
- Flooding
- Tornadoes
- Tropical cyclones
- Severe storms
- Coastal flooding
- Storm surge
- Wildfire

Additionally, there are several natural hazards, as well as technological and human-caused incidents, that while not profiled to the same extent as those above, have been evaluated, and identified to be researched and monitored further.

The concept and practice of hazard mitigation is defined by FEMA as “Any action taken to reduce or eliminate the long term risk to human life and property from hazards”. While the threat from hazardous events may never be fully eliminated, by minimizing the impact of hazards upon our built environment, we can prevent such events from escalating into major disasters.

The purpose of the LMS is to establish an ongoing process that will make hazard mitigation part of the daily routine for the entire community. The LMS identifies hazards based on the history of their occurrences and lists goals, objectives, strategies, and actions that will reduce or eliminate long-term risk to life and property from these hazards. Hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs. It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. Implementation of planned, pre-identified, and cost-effective mitigation measures not only helps reduce loss of life, destruction of property, and damage to the environment, but also aides in the decision making process during the recovery and reconstruction following a disaster.

The 2016 LMS has undergone major revisions from the previous version. In spring of 2014 Flagler County Emergency Management hired a full-time mitigation planner. This newly created position was the impetus that inspired a renewed and energetic approach by the county toward mitigation initiatives. Future updates to the plan will be conducted in conjunction with the LMS Working Group and will continue to be a foundation for mitigation projects and prioritization throughout county government, municipalities, and other organizations within the county.

2.0 – Planning Process

The Flagler County LMS was originally developed in 1999 by a multi-jurisdictional Working Group including officials from Flagler County, the Town of Beverly Beach, City of Bunnell, City of Flagler Beach, City of Palm Coast, Town of Marineland, representatives from local businesses, and civic groups. Since 1999, the LMS plan has been updated every 5 years and adopted by each of the municipalities in Flagler County. The Flagler County School Board, although they have participated in previous years, will formally adopt the 2016 LMS for the first time.

When Flagler County Emergency Management (FCEM) came under new leadership in 2014, the decision was made to hire a full-time mitigation planner to enhance the county's capabilities. The newly created mitigation planner position's main task was to build a comprehensive county-wide mitigation program that brought all stakeholders together and maximized funding opportunities.

With the help of a dedicated mitigation planner, the nearly defunct LMS Working Group was given new life. Today, the Working Group email distribution list contains more than 150 individuals representing all municipalities and many public and private entities throughout the county and region. The distribution list specifically contains contact information for people from all six Flagler municipalities, elected officials, state level partners, non-governmental stakeholders, such as the Red Cross and local businesses, neighboring counties, and many other interested parties and individuals. The full contact list can be found in **Appendix A.**

The LMS Working Group acts as a local coordination committee to support and recommend projects for various grant programs; recommends to other regulating agencies or organizations ideas on how to better mitigate the community against natural disasters; and provides educational outreach to the general public about ways to prepare for disaster and mitigation opportunities for their homes and businesses. The Working Group identifies local and regional government agencies that perform mitigation related functions and continually reviews existing plans, policies, and ordinances for mitigation elements. The Working Group also continually develops and updates the list of hazard mitigation initiatives, which is sent to the Florida Division of Emergency Management (FDEM) every January to satisfy Florida Administrative Code (F.A.C.) 27P-22.

The 2016 plan was completely rewritten and reorganized. Updates include comments received by FDEM via the previous plan crosswalk and the inclusion of information relating to new guidance material from the state, FEMA and other organizations and incorporation of components from FEMA's Community Rating System (CRS) program's floodplain management plan (Section 510) requirements. Each section of the updated LMS details how the material was reviewed, how it was determined changes needed to occur, and a brief description of the revisions that were made.

The LMS update process was overseen by the county's mitigation planner. In the summer of 2015, the mitigation planner was able to recruit two graduate students majoring in planning for

the fourteen week summer semester. Together these three formed the Planning Sub-group and took responsibility for scheduling meetings, proposing various subgroups, presenting concepts to the Working Group, collecting information from stakeholders, and revising the plan.

It was determined that the most efficient way to gather information and input would be through the use of sub-groups, a proposal that was supported by the Working Group. Sub-groups could harness the knowledge of subject matter experts while not overburdening others. In addition to the Planning Sub-group, a Floodplain Management/CRS Sub-group was created to ensure the updated LMS is able to capitalize on the potential points available under Section 510. A Community Wildfire Protection Plan (CWPP) Sub-group was formed to put emphasis on one of Flagler County's most threatening hazards. A Strategy Sub-group was formed with people who had an interest in providing input into the prioritization process, project list, maintenance, and the strategic direction of the LMS.

Incorporating requirements of the CRS section 510 floodplain management planning process for both the LMS and CRS required a group that met at various times to discuss the drafting of the plan. The CRS Sub-group that was established was required to include both stakeholders and participants from the public in order to meet the needs of CRS 512 1(b). The CRS floodplain management planning components are incorporated extensively throughout this LMS. The CRS Sub-group met three times during the update process for the LMS. These meetings were coordinated with the LMS Working Group so that any members who wanted to participate could. All meetings were posted at least two weeks in advance on the Flagler County website with accompanying emails sent out for reminders.

During the 2016 update process, a number of meetings were held. Each meeting was publicly advertised on the county website calendar and all LMS Working Group members were notified via e-mail and were encouraged to spread the word. Attendance records (sign in sheets) for each of the meetings have been included in **Appendix B**. A snapshot of the meetings held during the update process can be found below and more details are available in **Appendix B**. Before 2014 only a few formal mitigation meetings were held and documentation of previous meetings was not retained.

It should be noted that the Town of Beverly Beach and the Town of Marineland, though represented in the Plan on the Working Group with mitigation initiatives on the list, do not have the resources to attend all LMS meetings. Beverly Beach is a small community of less than 340 people and the Town of Marineland has less than 10 people residing within their respective jurisdictions; neither municipality has any full-time employees. Flagler County and Flagler County Emergency Management represent the interests of these groups when they are not available to attend meetings. Information sharing is accomplished by communicating in person, over the phone, and through email status updates.

Table 2.1: Summary of meetings held during the 2016 LMS update process

Date	Participants*	Agenda/Purpose
7/29/14	LMS Working Group	Annual Meeting – reconstitute the LMS Working Group
3/23/15	LMS Working Group	LMS Update Kickoff Meeting – present update schedule
4/27/15	CRS/Floodplain Management Sub-group	Kick-off – Discussed which areas to target for points, process, who should be included in the group and the development of a stand-alone floodplain management plan
6/15/15	LMS Working Group	Update meeting – Discussed the addition of sub-groups, overview of hazards, vulnerabilities, and goals
6/23/15	CRS/Floodplain Management Sub-group	Update meeting – Provided progress updates, CRS hazard assessment, information gaps and requests
6/29/15	Strategy Sub-group	Reviewed finalized goals and objectives, prioritization process
7/9/15	Wildfire Sub-group	Kick-off – Discussed Community Wildfire Protection Plan (CWPP) steps to take and went over SWRAP website
7/16/15	Strategy Sub-group	Finalized project prioritization process and plan maintenance process
10/26/15	LMS Working Group	Update Meeting– Discussed progress of plan sections, presented ideas from Strategy Sub-group, asked for volunteers to review particular hazards, discussed final steps to the update process
1/11/16	CRS/Floodplain Management Sub-group	Review proposed language regarding flood-related hazards, gathered municipal specific flood information, discussed best practices from surrounding counties
2/29/16	LMS Working Group	Provided instructions on how to access draft plan and submit comments on the near final draft of the plan, provided information on open grant cycles

See sign in sheets in **Appendix B for detailed attendance records*

During all LMS meetings, public feedback was encouraged with input documented by the FCEM team. All comments and suggestions were discussed and incorporated into the plan where applicable. Sections or portions of sections were distributed to members of the working group for their review, comment and approval. Working Group members were asked to sign up to review either all or certain hazards from Section 4 at the October 2015 meeting (see **Appendix B** for the sign up sheet). A copy of the community profile was provided to each municipality for their review and approval in November. The public was given an opportunity to participate and provide comment throughout the update process. Instructions for public comment were provided at the February 2016 LMS meeting and the draft plan was posted on the county website for comment along with instructions to submit comments.

3.0 – County Profile

Flagler County lies in the north central part of Florida, roughly sixty miles south of its closest major metropolitan area, the City of Jacksonville. The county's widest east-west length is about 23 miles, and its longest north-south length is about 29 miles. It is bounded on the north by St Johns County, on the east by the Atlantic Ocean- with about 18 miles of beach front- on the south by Volusia County, and on the west by Crescent Lake, which it shares with its western neighbor, Putnam County.

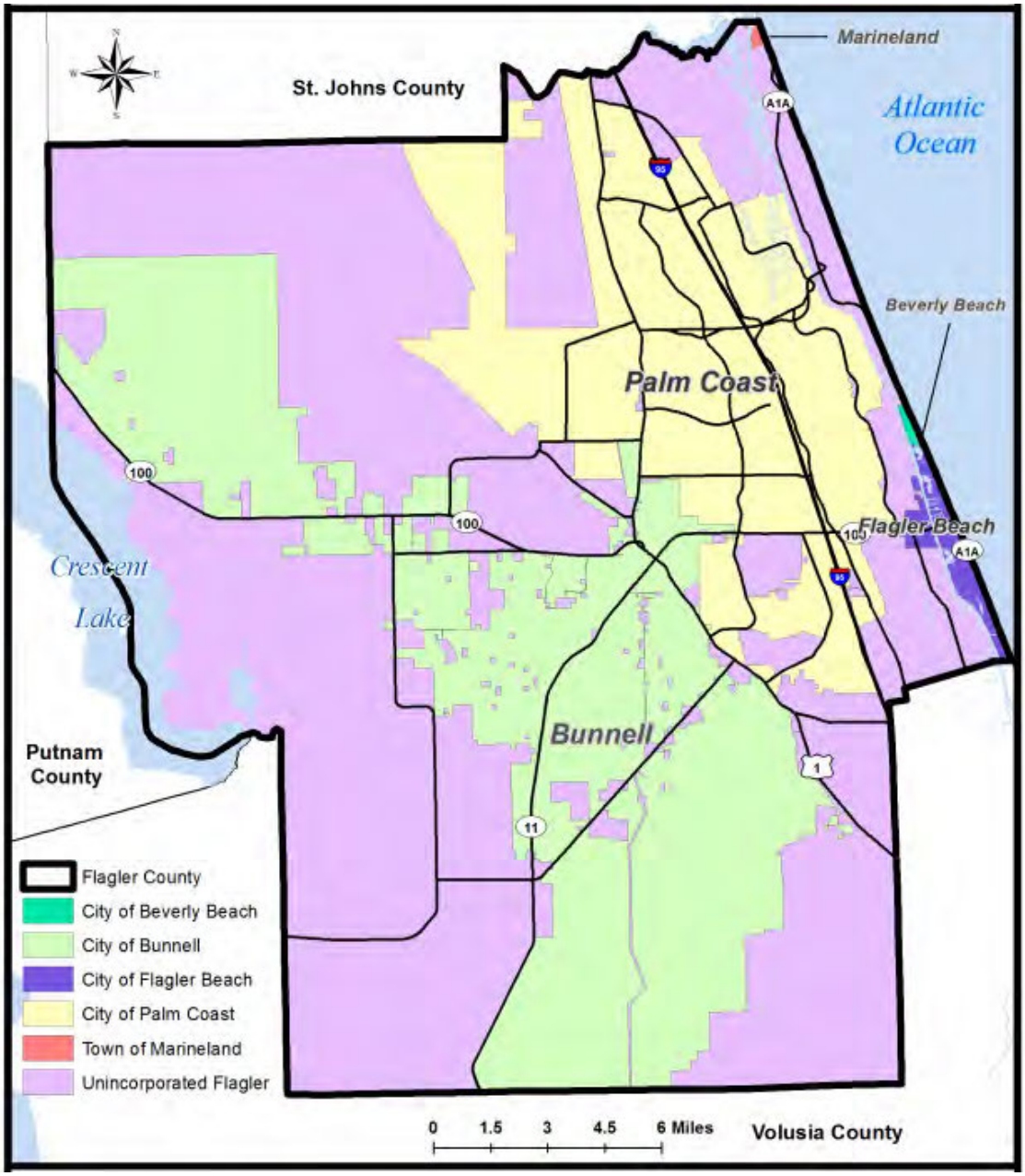

Figure 3.1: Flagler County's Municipal Boundaries

Flagler County occupies 571 square miles, of which approximately 86 square miles are water and 132.5 square miles are marshy wetlands. In addition to unincorporated Flagler County, there are the municipalities of Beverly Beach, Bunnell, Flagler Beach, Marineland, and the largest city by population—Palm Coast. The City of Bunnell, situated in the geographical center of Flagler County, is the county seat and lies near the intersection of U.S. Highway 1 and State Road 100.

3.1 Topography

Ecologically, Flagler lies entirely within the Eastern Flatlands habitat, a diverse region that runs along Florida's east coast from Jacksonville to north of Ft. Lauderdale, and inland to Orlando (Glenn Griffith). The region is entwined with low sand ridges, shallow valleys and low swamps. The dominant feature in this region is the St. Johns River which lies outside of Flagler County's borders to the west; however, the county is home to approximately 29 miles of Intracoastal Waterway (ICW) — a man-dredged canal begun in 1881 by private investors with an eye toward commerce. When completed in 1912, the canal did not have the width and depth necessary to make it profitable. In 1927 Florida Inland Navigation District (FIND) was created by Florida's state legislature to acquire additional right-of-way and increase the size. Today the canal is 100 feet wide and 8 feet deep, connecting Matanzas River in St. Johns County to the north and Volusia County's Halifax River in the south, and is used by business and pleasure craft alike.

Figure 3.2: Flagler County Topography

Flagler County is composed of a series of marine terraces, formed by tidal erosion during glacial-interglacial cycles and in response to tectonically rising landmasses. As sea level dropped, smooth terraces were exposed. There are three marine terraces recognized in Flagler County—Silver Bluff, Pamlico, and Talbot. Together they form a relatively flat plain that slopes towards the Atlantic Ocean to the east and toward Crescent Lake on the west. The average elevation of the plain is about 25 feet above sea level, but some of the ridges rise above 40 feet. Along the coast is a low ridge region roughly 5 miles wide which alternates between sandy ridges and swamps. Along the coast are barrier islands bordered by the Intracoastal Waterway to the west and the Atlantic Ocean to the east. These islands vary in width from a few hundred yards to about a mile at their widest.

3.2 Total Building Stock

As Flagler County evolves, so does its stock of buildings. The following table is an updated inventory of buildings separated by common types:

- *Residential* – Includes rural estates, single-family residences of all sizes, multi-family residences, and duplexes
- *Commercial* – Includes office buildings, tourist spots, sales and services, and anything else commerce related
- *Industrial*- Includes manufacturing and production plants
- *Mixed Use*- Includes structures with both a commercial and residential use
- *Agriculture* – Includes farm structures, timberland farm structures, and anything related to agriculture, but not industrial use
- *Other* - Includes public buildings, conservation parcels, right-of-way structures, and other uncategorized buildings.

Table 3.1: Property Value, Count and Type throughout Flagler County

Jurisdiction	Total Appraised Value	Building Count (Critical Facilities)	Building Count by Use*					
			Residential	Commercial	Industrial	Mixed Use	Agriculture	Other
Beverly Beach	$70,944,299	341 (2)	308	14	0	0	0	8
Bunnell	$296,347,647	1,720 (20)	513	368	191	4	272	81
Flagler Beach	$758,097,531	3,422 (7)	2,373	431	22	0	0	317
Marineland	$14,212,312	20 (0)	0	5	0	4	0	11
Palm Coast	$6,173,770,332	35,704 (68)	31,545	1068	204	**	9	952
Unincorporated	$2,769,043,022	9,397 (17)	5,740	911	300	233	1,057	416
Total:	**$9,671,498,308**	**49,495 (114)**	**40,497**	**2,797**	**717**	**241**	**1,338**	**1,785**

Source: Flagler Property Appraiser, Flagler Planning and Zoning (June, 2015)
**Building count for zoning may not add up to the appraisal building count due to differences in land use data and what structures are included in the count.*
*** Palm Coast has separate zoning codes that combine residential and mixed use buildings into the residential category.*

The following table provides information on when structures were built throughout the county. Unfortunately, there is no breakdown of structures built between 1999 and 2015 at this time. Florida had major changes in the building codes in 1994 and 2002 that resulted in homes that would be better able to withstand the potential devastation from hurricane winds.

Table 3.2: Year Range When Structures Were Built

Years Built	Flagler Total	Beverly Beach	Bunnell	Flagler Beach	Marineland	Palm Coast	Unincorporated
Built before '40	111	0	35	3	0	68	48
'40-49	293	21	27	38	0	179	82
'50-59	508	1	22	127	0	180	180
'60-69	704	9	41	208	0	152	259
'70-79	3,696	66	27	727	1	2,225	803
'80-89	9,427	317	600	1,061	3	6,260	2,179
'90-98	11,328	184	452	568	3	8,520	2,859
After '98	22,528	105	1,126	729	3	18,138	3,436
Total:	**48,595**	**703**	**2,330**	**3,461**	**10**	**35,722**	**9,846**

3.3 Economic and Critical Assets

An assessment of the economic assets of Flagler County serves as a springboard for analyzing the impacts of various hazards on each jurisdiction. The first step is was to collect an inventory of items in order to conduct a more complete analysis. This inventory includes:

- Building count by jurisdiction
- Appraisal values
- Population per block group
- Critical facilities
- Vulnerable populations, such as those on the list of Persons with Special Needs
- Major employers
- High density development
- Historic buildings and parks

These categories will aid in summarizing the most vulnerable areas of the county, and give a more exact impact of each hazard according to the value of the land and the economic disruption that could occur during and after a hazard event.

3.3.1 Critical Facilities

Critical facilities do not have an exact definition, but are determined to be structures of extreme importance in the county. Critical facilities can vary by municipality but essentially are facilities that are important to life safety, must operate every day (provide an important service), house things that cannot be replaced (historic items), or have the potential to harm people (hazardous material sites). Such facilities in Flagler County's database include:

- Hazardous material facilities (sites that contain high quantities of hazardous materials)
- Communications towers
- Emergency Operations Centers
- Fire stations
- Government buildings
- Hospitals and nursing homes (public and private)
- Assisted living facilities

- Law enforcement stations
- Schools
- Evacuation shelters
- Transportation facilities
- Utilities such as power substations, pump stations and waste management centers

According to GIS data, there are 114 critical facilities in Flagler County. An official assessment to determine both mission critical and standard critical facilities is still underway and the number of critical structures may change depending upon the completion of the assessment. Currently, the database determines assisted living facilities, some of which are in private residences, to be critical facilities.

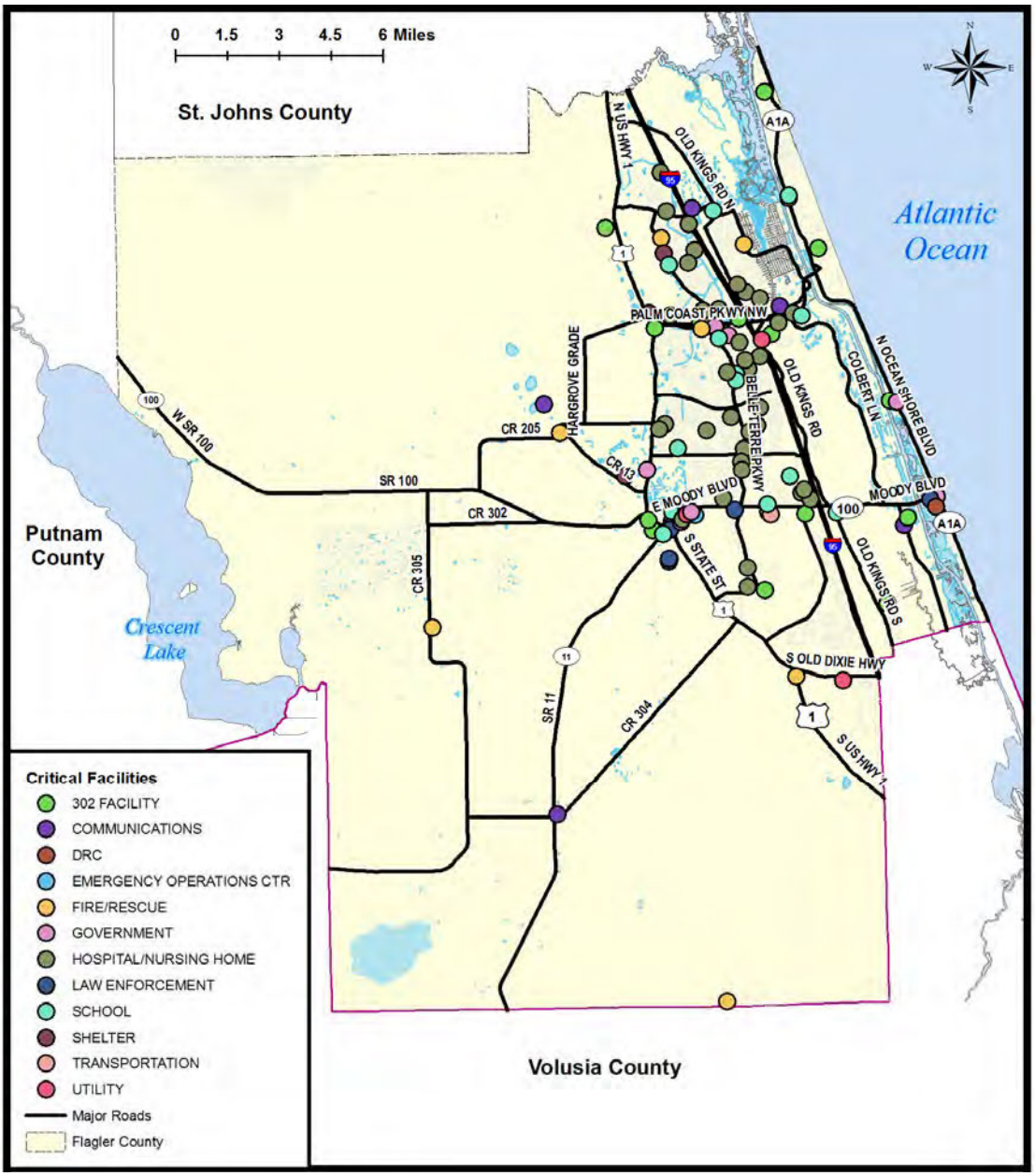

Figure 3.3: Flagler County Critical Facilities

3.3.2 Persons with Special Needs (PSN)

There are currently 349 people registered with Flagler County's Persons with Special Needs Program. An extensive assessment has been launched to verify and update the information of everyone on the list. This population is especially vulnerable not only because of their disabilities, but because they may also need to transportation and supplies very quickly before, during, and after a disaster event. This places a heavy responsibility on emergency services, and plans are currently in place to use as many transportation options as possible to transfer special needs patients to the appropriate shelters and care for them in the short term.

4.0 Major Employers

The county prides itself on its school system, which currently holds the top employment spot with over a thousand employees. Palm Coast Data, a magazine subscription handler, is a distant second at 721 employees. With a large elderly population, the medical industry also thrives in Flagler County.

There is a distinct lack of industry in Flagler County. Palm Coast signifies itself as a "bedroom community", where the majority of workers commute out of the county. The vast majority of the land area of Flagler is used for agriculture and timberland. A table summarizing Flagler County's industries and largest employers can be found in the following two tables.

Table 3.3: Industries in Flagler County

Industries	Total
Trade, Transportation, and Utilities	18.8%
Government	18.1%
Leisure and Hospitality	17.0%
Education and Health Services	13.3%
Professional and Business Services	10.9%
Construction	5.5%
Financial Activities	4.0%
Manufacturing	3.9%
Other Services	3.6%
Natural Resource and Mining	0.7%
Information	N/A
Total Businesses:	**30,197**

Table 3.4: Largest Employers in Flagler County

Employer Name	Number of Employees
Flagler School Board	1,069
Palm Coast Data	721
Sea Ray Boats	700
Memorial Hospital	800
Publix Supermarkets	568
Wal-Mart	463
Reunion Club	450
City of Palm Coast	303
Darden Restaurants (Olive Garden, etc.)	290
Flagler Board of County Commissioners	280
Flagler Sheriff	270
Winn Dixie Supermarket	244
McDonald's	205
Grand Oaks Health and Rehab	200
Hammock Dunes Community	193
Target	188
Outback and Carrabba's	174
Flagler Pines	150
Post Office	140
Pizza Hut/KFC/Taco Bell	139
Lowe's Home Improvement	130
Cracker Barrel	125
Home Depot	125

Source: Flagler Department of Economic Opportunity

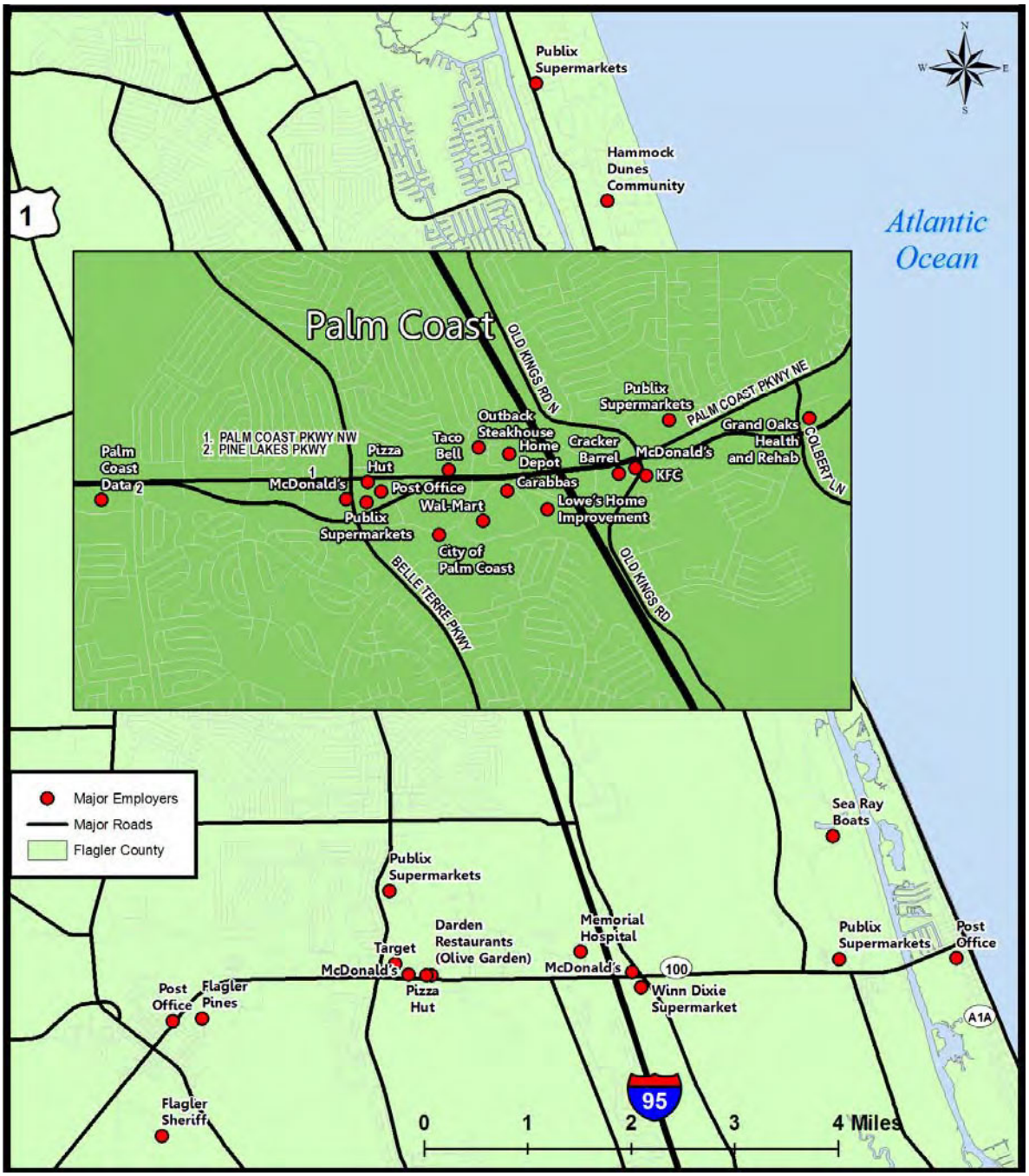

Figure 3.4: Major Employers in Flagler County

3.1 Growth and Development

Flagler County has seen tremendous growth since Palm Coast was incorporated in 1999. From 2000 to 2010, Palm Coast was ranked as the fastest growing city in the nation, and that echoed a high growth rate across the county. In the year 2000, Flagler County had 49,832 residents; by 2010 that number nearly doubled to 95,696 (92% increase).

Generally, Flagler County population can be divided into two sections: East of U.S. Route 1 (SR 5), and east of it. The majority of the population of the county lives nearer to the coast, east of U.S. 1, in the planned communities of Palm Coast, Flagler Beach, Beverly Beach and portions of Bunnell. There are several arterial routes that carry traffic to and from the beach. Major roads include scenic route A1A that runs directly along the coastline, and state road 100 that carries traffic from inland Florida to Flagler Beach. A balmy climate year-round as well as an aggressive marketing campaign in New York in the 1980s and 90s has attracted a sizeable retirement population to the beaches. The inland areas west of I-95 have more of a mixed demographic that plays host to a variety of income levels, ages, and family sizes. Homes vary in age from recently built to over fifty years old in some spots, especially east of I-95, where Palm Coast originated.

The vast majority of the county that lies west of U.S. 1 is zoned for agricultural uses or for environmental conservation with two exceptions. The community of Daytona North lies to the east of Crescent Lake on higher ground. The town of Hastings lies in the northwestern part of the county, but is under the jurisdiction of St. Johns County

When the national economy took a downfall in 2008, the growth slowed to a crawl. Since the development of the 2011 LMS, the population has surged past the 100,000 mark— a 7% change in just 4 years. When comparing 2014 numbers to the 2000 census, where Flagler County was populated by only about 50,000 people, it results in over a 100% increase in 14 years. Examining the number of residential building permits issued for the most populated areas within the county over the last five years further illustrates the growth that has occurred since the economic downturn.

Table 3.5: Residential Building Permits Issued During the Last Five Years

Building Permits Issued Per Year					
Municipality	**2011**	**2012**	**2013**	**2014**	**2015**
Flagler County	75	75	160	193	195
Bunnell	0	0	0	2	1
Flagler Beach	2	12	22	28	35
Palm Coast	79	155	263	338	355

Contrary to its name, Palm Coast does not extend to the coast. The City of Palm Coast was developed by ITT Corporation as a pre-planned community. It contains about 75% of the county's population, with a 2013 estimate of about 78,000 people. The predicted maximum population of the area is around 250,000 within the next 100 years. Streets are laid out amorphously, with sharp curves to aid in traffic calming. Neighborhoods are planned and built to accommodate new homes and businesses.

The principle beach destination is the City of Flagler Beach. State Route A1A, built on top of its primary frontal dune (except for the one mile stretch at Gamble Rogers State Park), is under the jurisdiction of the Florida Department of Transportation (FDOT). This scenic highway is vulnerable to coastal flooding and has been partially undercut in the past. Beach revetment efforts by FDOT have included importation of erosion-resistant granitic rocks to the seaward side of the dune from South 7th to South 28th Street, a distance of 1¾ miles.

According to the US Census Bureau, Flagler Beach's population has declined by 400 in the decade between counts, perhaps due to the economic downturn. There are no projections for 2015. Even with the loss of population, there are still 4,500 people living in the city, some of whom are vulnerable to the hazards outlined in this plan. The city's Fire Department also maintains a database of people with special needs who may need evacuation, which it shares with the County.

Table 3.6: Estimated Population Growth in Flagler County

City	2000 Population	Estimated Current Population	% Change
Palm Coast	32,732	78,740 (2013)	140%
Flagler Beach	4,926	4,424 (2010)	-9%
Bunnell	2,122	2,741 (2013)	23%
Beverly Beach	547	336 (2013)	-38%
Marineland	6	16 (2013)	160%
TOTAL INCORPORATED:	**40,033**	**86,257**	**115%**
TOTAL FLAGLER:	**49,832**	**99,956 (2013)**	**100%**

Source: U.S. Census data.

The towns of Beverly Beach and Marineland have been largely static in terms of development. Beverly Beach has had a population decrease over the past 15 years because of a higher than average mortality rate and for economic reasons. The average age in Beverly Beach is around 67 years old. The Town of Marineland houses a marine laboratory run by the University of Florida, a dolphin adventure center (Marineland Aquarium) and currently has only six homes. The town has a relatively small footprint; any major development in the next few years is unlikely.

Unincorporated Flagler County houses around 10-15% of the total population and is mostly agricultural. The community of Daytona North lies in the western part of the county and has about 2,000 residents and a few businesses. Development in this part of the county is sparse. Other unincorporated communities include Bimini, Cody's Corner, Dupont, Espanola, Favoretta, Flagler Estates, Hammock Dunes, Korona, and Painter's Hill.

4.1.1 Future Land Use Trends

4.1.1a Flagler County (unincorporated)

Flagler County's Comprehensive Plan includes a section about future land use activities. The goal of the county is to "achieve orderly, harmonious and judicious use of the land through a distribution of compatible land uses, fostering the viability of new and existing communities while maintaining the agricultural pursuits of the County, and recognizing and preserving the integrity of the natural environment."

Conservation plays a large role in preserving the delicate ecosystems of Flagler County. Large portions of the county are dedicated to these efforts, and the future land use element of the Comprehensive Plan makes sure that these lands stay pristine by requiring mitigation efforts and

using “innovative zoning techniques” where applicable. The plan places large restrictions on building near or on conservation lands and water bodies, designating 8 creeks and 9 lakes as protected; this is a recurring theme in the future land use element, and rapid expansion westward will be restrained by these regulations.

New communities that arise in unincorporated Flagler County will be subject to a Development of Regional Impact review, and must have certain public facilities such as schools and central water utility services. In contrast to incorporated Palm Coast, new and old rural communities are required to have a compact “grid” style to save on street maintenance costs and allow for ease of access. The communities must also transition spatially from a higher density in the center, stepwise to agricultural density on the outskirts; this is called the “village center” concept which provides “an attractive and functional mix of living, working, shopping and recreational activities.”

The largest unincorporated community in Flagler County is Daytona North, a mobile home estate subdivision close to Crescent Lake to the west that hosts around 2.000 residents. The area is chiefly rural, with unpaved roads and some small businesses that also serve a nearby campground. Flagler Estates is another large community, with an estimated population of 1,000 to 1,500 residents on 10,000 acres of land. Homes in this community are on large, one acre+ lots, with some growth projected in the future as considerations are being made to extend local roads. Both Daytona North and Flagler Estates are expected to expand as the County grows.

Remaining communities such as Cody’s Corner, Bimini, Dupont, Favoretta (formerly Favorita), Espanola, Hammock, Korona, Painter’s Hill, and the subdivisions south of Marineland (Marineland Acres included), are either remnants of trading posts and crossroads from very early in the County’s history, or are young, small communities that are not expected to become incorporated or grow much further in the future. Most unincorporated communities in Flagler County were family owned and run farms and trading posts or were the vision of small developers.

4.1.1b City of Palm Coast

The City of Palm Coast, recently incorporated in 1999, has steadily crafted a very in-depth land use code. The city limits the development of several activities and structures such as livestock operations, dog farms, incinerator plants, junkyards and salvage yards, race tracks, and paper mills. The city uses a master planned development standard that will aid largely in the construction of single-family homes and smaller retail spaces with limited high-rise offices limited to less than three stories and big-box stores less than 50,000 feet. As a pre-planned community of 45,000 single-family lots, Palm Coast’s housing supply is composed mainly of single-family homes on ¼ acre lots. The supply of multi-family housing is limited, however, the City’s Comprehensive Plan and land development code includes policies and regulations to promote master planned development(s). Such master planned development(s) allows and permits greater flexibility in the development of alternative housing supply (multi-family, duplexes, etc.) as well as the development of mixed use buildings in the city. Such flexibility is intended to promote a greater diversity and better balance in the City’s housing variety and to promote walkable, pedestrian-friendly developments such as the Palm Coast Town Center.

4.1.1c City of Flagler Beach

Flagler Beach was incorporated in 1925. It has a standard land use code, with some exceptions. Building height is restricted to 35 feet above existing grade. The City's most recently adopted floodplain ordinance requires two feet of freeboard above base flood elevation for all new construction. The Florida Department of Environmental Protection enforces its Coastal Construction Control Line through the building permitting process, which limits building seaward of the line to non-permanent structures, like dune stairways. Many of the wetland parcels bordering the ICW have been zoned for preservation. On individual privately owned parcels bordering the wetlands, a 25-foot buffer exists from the wetland boundary to the allowable building footprint. The City's Comprehensive Plan, which has been incorporated into its land development regulations, has goals, objectives, and policies that provide safeguards for future development within these sensitive areas and design guidelines for its historic downtown area.

4.1.1d City of Bunnell

Bunnell is the third most populated city in Flagler County, but the largest in terms of land area. Its future land use plan takes into account the myriad of conservation areas and natural resources that it encompasses. Because of the flood zones in the city's area, Bunnell's first policy is to ensure that future developers take steps to mitigate this hazard by building above the standard base flood elevation by at least one foot and clustering as many structures away from floodplains as possible.

Bunnell takes it majority rural status seriously, and the future land use plan allows for incentives in order to keep as much green space as possible. Like Flagler County, Bunnell adopted a "clustering" technique that keeps development into one central area with appropriate transitions to agricultural zones.

4.1.1e Town of Beverly Beach

The Town of Beverly Beach has an area of less than one-half square mile. Despite the town's small size, it has various components within its boundaries. One part is a campground overlooking the ocean with up to 155 spaces, and a small oceanfront motel. Residential developments include Surfside Estates, a 55-and-older mobile home community, Shelter Cove, Osprey Point, and Oceanside Condominiums. Currently on the upswing in population, permanent residents number approximately 350, with another 150 seasonal residents. Although the population has declined in recent years, it is thought that the population should rebound above 350 in 2015 due to an increase in development, according to the town clerk. Sunset Inlet, a new 31 unit single-family home development, with each home having two or three stories and private boat slips, is nearing completion, with about half of the homes occupied. Several single-family homes are also in the planning and construction phase in Osprey Point and Shelter Cove, as well as on the oceanfront. These all are contributing to the increasing population of the town. In addition, there two commercial properties in the planning stage for additional development.

4.1.1f Town of Marineland

The Town of Marineland has a population that includes both part time and full time residents, fluctuating between six and sixteen throughout the year. Its residents are generally comprised of students and teachers from the University of Florida who research marine life at the college-owned Whitney Laboratory. The 0.35 square mile town's jurisdiction extends out 3 miles to

international waters and is comprised of land in northeastern most portion of Flagler County and southeastern most portion of Saint John's County. Marineland's most significant economic drivers primarily consists of the Whitney Laboratory and dormitories, dock and marina facilities, and the Marineland Dolphin Adventure--an entertainment and swim-with-the-dolphins marine mammal park that is also listed on the National Register of Historic Places as Marine Studios. Future development within the next 10 years will most likely include phase 2 of the marina expansion, a new seafood restaurant, and other commercial additions near the town center.

4.1.2 Land Use

The following maps provide an overview of the land use and future land use throughout the county.

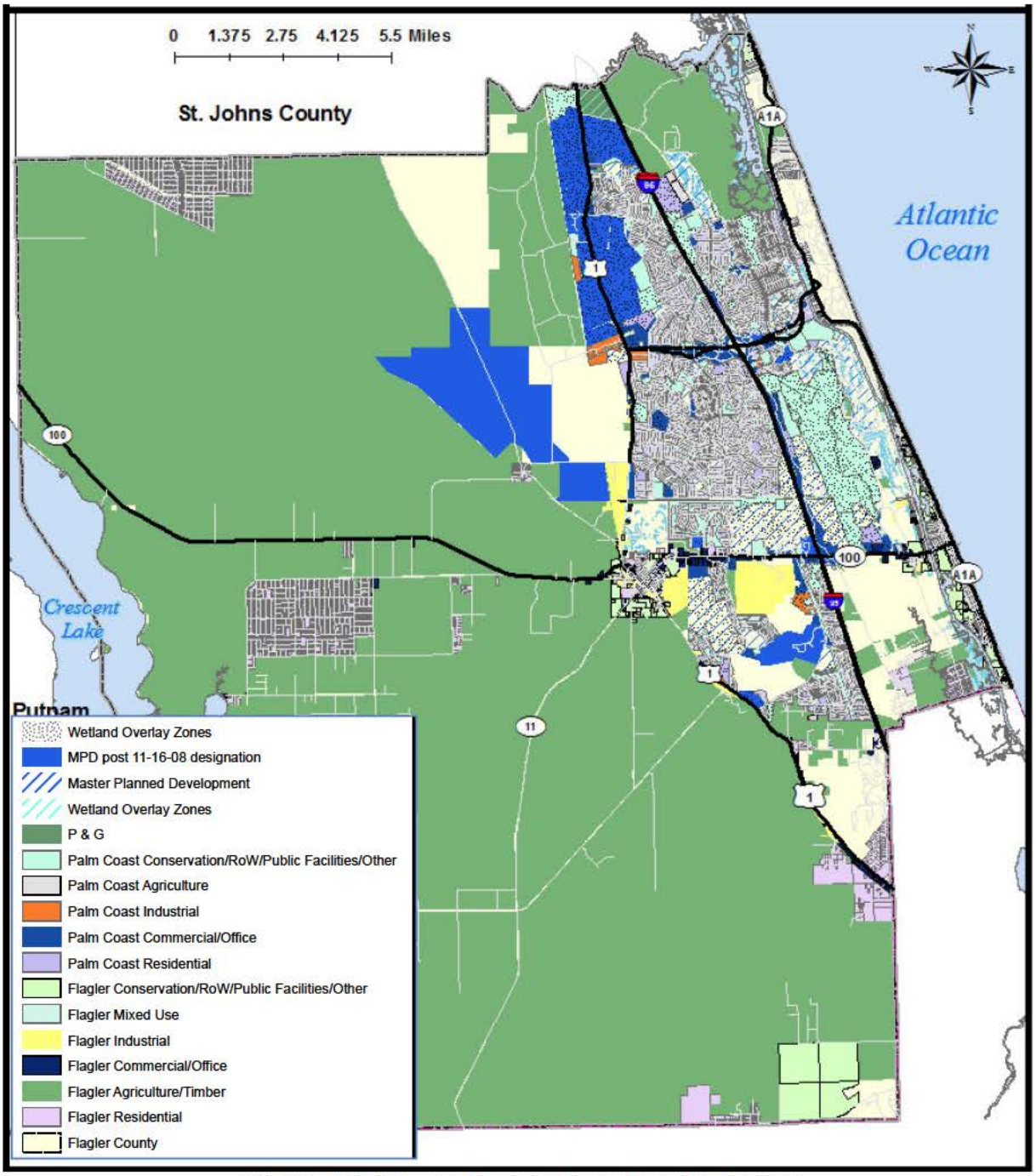

Figure 3.5: General Land Use in Flagler County

Sources: Flagler County Planning and Zoning, Palm Coast Planning Division

Palm Coast uses a different set of land use codes than Flagler County. For ease of analysis, Flagler County and Palm Coast have been grouped into several general categories, such as residential, commercial, and industrial, making it easier map reading in higher density areas where there may several use codes per census block. Note that Palm Coast does have 5 designations for single family residential, and 3 for commercial intensity. For the purposes of this plan, all have been grouped into one category for consistency.

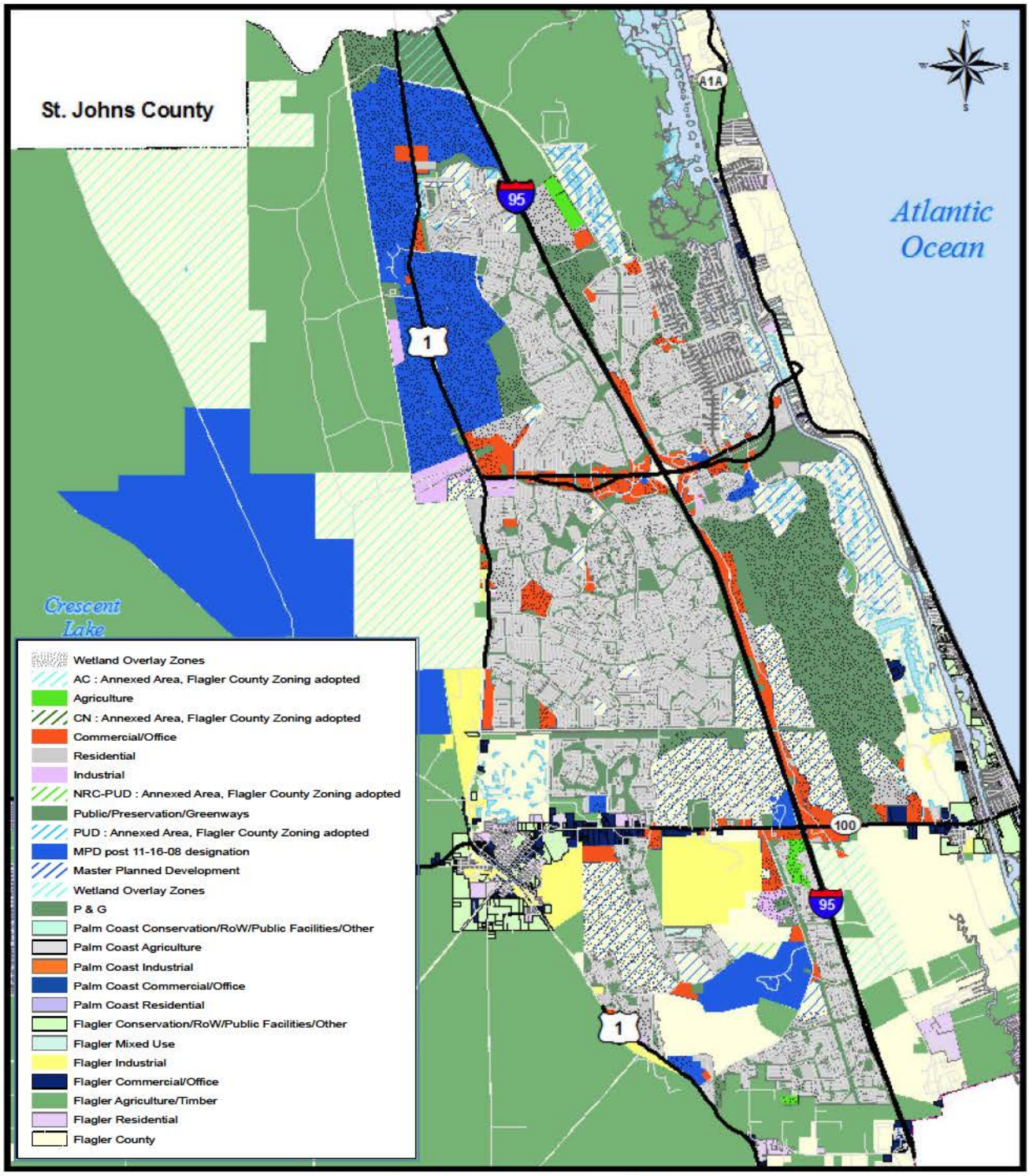

Figure 3.6: Palm Coast General Land Use

Sources: Flagler County Planning and Zoning and Palm Coast Planning Division

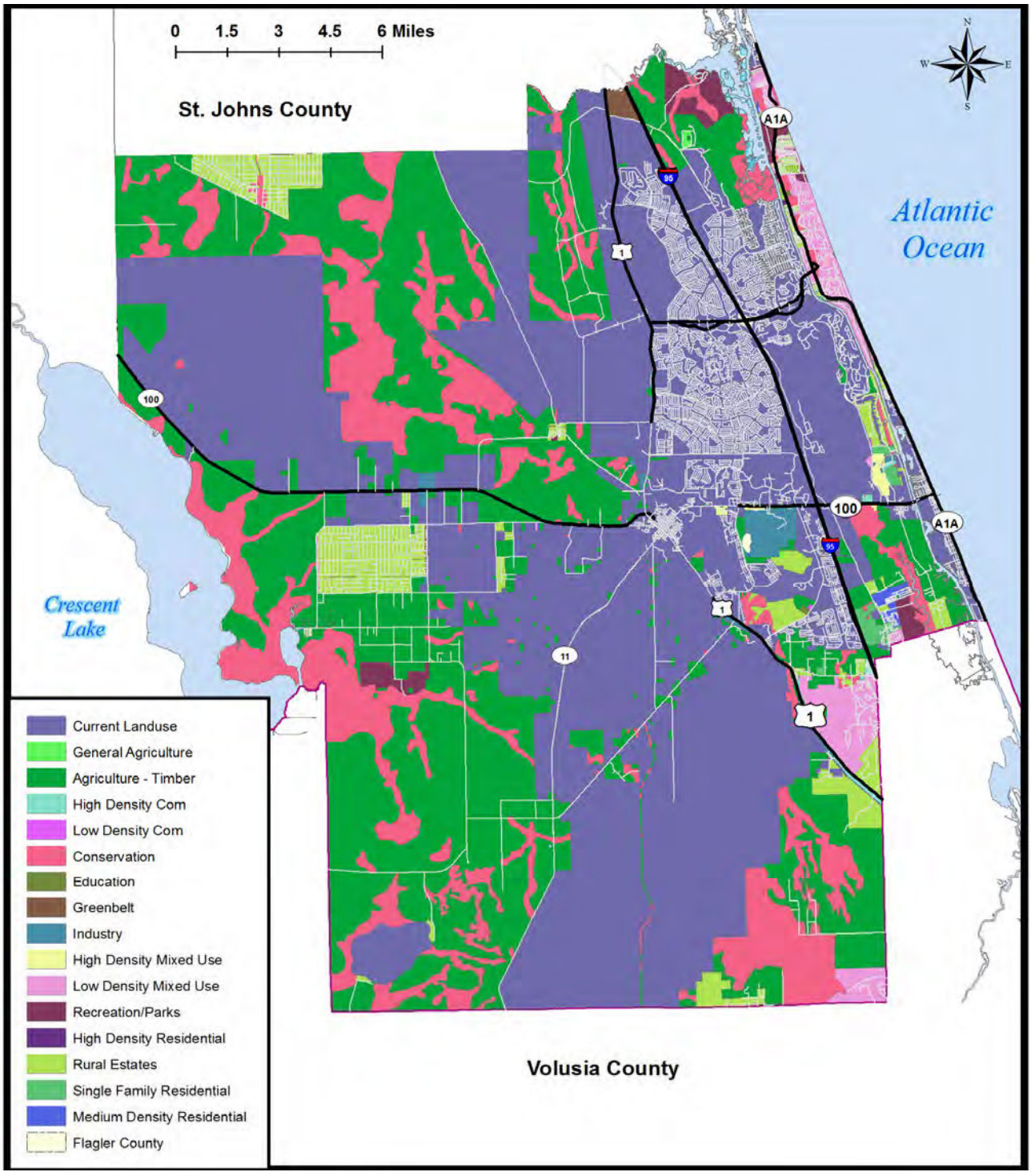

Figure 3.7: Future Land Use in Flagler County

Source: Flagler County Planning and Zoning

4.0 – Risk Assessment

Flagler County has a long history of dealing with hazards, specifically several types of natural hazards. Due to its subtropical location and long coastline, the county is particularly susceptible to severe tropical weather and the heavy wind and rains it brings. As such, this plan will focus heavily on tropical events and the mitigation of wind, floods, and storm surge hazards. In addition, Flagler has a marked history of extreme wildfire events that occur frequently during drought conditions. Tornadoes and severe thunderstorms also present a frequent threat to the community and efforts are in place to educate the community about what to do during a storm event.

In order to better understand mitigation, it is important to thoroughly understand every hazard that commonly affects Flagler County- natural, technological, and human-induced. This hazard assessment also helps to supply information to the county's Comprehensive Emergency Management Plan (CEMP). To fully comprehend the hazards that could affect Flagler County, research on their characteristics and historical impacts was conducted and must be periodically reviewed and revised as conditions change. For the 2016 plan update, the LMS Planning Sub-group first considered the general types of hazards that exist, researched Flagler's history, and then determined which ones commonly occurred in the county. The list of hazards was presented to the LMS Working Group for their concurrence and input. In addition, minor historical occurrence updates were added to all of the existing hazard profiles. Drought was adjusted to include both the Keetch-Byram Index and the Palmer Severity Index in order to capture more information. Some additional hazards were profiled for this update, including erosion, coastal flooding, extreme heat, and severe storms, as their likelihood of occurrence and impacts have been sufficiently recognized and documented, while one hazard, freeze/winter storm/severe winter weather, was removed due to the unlikely occurrence and limited impacts. Another hazard, nor'easters, was removed from the profile as its occurrence and impacts are more often captured as other profiled hazards. The hazard previously identified as hurricanes has now been changed to tropical cyclones to be more inclusive of the impacts and occurrences of tropical storms not reaching the hurricane definition. Sinkholes and earthquakes were both considered for profiling inclusion, but ultimately determined not to be a hazard affecting Flagler County. Additional natural hazards included, but profiled to a lesser extent due to a current lack of research, records, and monitoring, include tsunamis, salt water intrusion, and sea level rise. Manmade hazards, to include technological hazards and human-induced incidents, have also been considered and profiled, to the best extent possible given the information available.

Throughout **Section 4** numerous places will refer to "Flagler County", which is used to reference all of the area within the county boundary. The terms "unincorporated county" or "unincorporated Flagler County" are used when referencing only the areas under the jurisdiction of the county government. For the purposes of this risk assessment analysis, buildings owned by the School Board will be covered by their respective municipal location's analysis; the same is true for other participating non-profit organizations like the Red Cross. For instance, if a school is located in Bunnell, it will be evaluated as a part of Bunnell's building count and value unless a separate analysis was deemed necessary.

The 2016 risk assessment used a variety of sources to gather information. Examples of resources used include National Weather Service (NWS) personnel, local subject matter experts, the previous LMS plan, websites such as the NWS and National Climatic Data Center (NCDC), historic newspapers, and other existing plans. The NCDC storm events database is referenced often throughout this section. While it is one of the best, most comprehensive resources available, it has its limitations. The NCDC serves as a good starting point for historic information, but where possible, local knowledge has been used to supplement its shortcomings. Flagler County Emergency Management will continue to keep good records of events as they occur so that the NCDC will not need to be as heavily relied upon.

The table below lists common hazards that occur throughout the United States. The table then explains whether each hazard has been considered for inclusion in the LMS or if it has been omitted. There are no other hazards that represent a significant threat to Flagler County. Should any new hazards be identified over the next five years, an analysis will be conducted and included in an interim update.

Table 4.1: Common Hazards in the U.S. That May Affect Flagler County

Hazard & Section #	Does it occur in Flagler?	Evaluated further in LMS?	Comments
Severe Storms §4.1	Yes	Yes	Flagler County is particularly vulnerable to severe weather during much of the year. Severe storms can contain other hazards such as high winds, hail, and lightning.
Tornadoes §4.2	Yes	Yes	Though they are often small, the tornadoes that occur in Flagler County can still cause extensive damage.
Tropical Cyclones §4.3	Yes	Yes	Flagler has been affected by hundreds of tropical systems since records have been kept- nearly 30 of which have passed directly over the county. In 2004 the county was in close proximity to three major hurricanes within a six week period.
Flooding §4.4	Yes	Yes	Flagler County's geography and climate make it prone to heavy rainfall events and flood impacts.
Coastal Flooding §4.5	Yes	Yes	Coastal flooding occurs periodically in the county due to high wind events and astronomically high tides. Coastal flooding can exacerbate erosion, cover roadways in water and has the potential to inundate structures.

Storm Surge §4.6	Yes	Yes	Impacts of storm surge can exacerbate the effects of flooding and erosion within Flagler, particularly in and around the shoreline, Intracoastal Waterway, and Crescent Lake. Many homes could be damaged or destroyed by storm surge.
Wildfire §4.7	Yes	Yes	Flagler County is prime territory for wildfires because of its thick pine forests with dense underbrush. The entire county was once evacuated because of the severity of multiple fires.
Extreme Heat §4.8	Yes	Yes	Florida is known for its heat. Average temperatures in Flagler reach 90°F or higher in the summer with even higher heat indices. There are some recorded cases of heat indices reaching 107°F+ and impacts to the population can be wide-ranging.
Drought §4.9	Yes	Yes	Droughts occur cyclically in the area, especially during La Niña. Both the Floridan and Surficial Aquifers that run through the state are important to the drinking water supply. Droughts can have a high impact on the population, but little impact on infrastructure and buildings.
Erosion §4.10	Yes	Yes	Because of the frequency of tropical cyclones and coastal storms in the area, erosion has caused major problems and millions of dollars in damages.
Tsunami §4.11.1	Not Yet	Partially	While there is some tsunami hazard for the Atlantic Coast, they are an extremely rare hazard in Florida, and the probability of future tsunami events is considered 'low' by the 21013 State of Florida Enhanced Hazard Mitigation Plan. This is an example of a low-frequency, high-damage event that every coastal community should prepare for, but will not be evaluated as extensively as other hazards in this plan.
Saltwater Intrusion §4.11.2	Yes	Partially	This is a newly identified hazard in Flagler County. Saltwater intrusion can ruin drinking water supplies and cause the abandonment of drinking water wells. Much is still not known about this hazard and how it will impact the county.
Sea Level Rise §4.11.3	Yes	Partially	Sea level rise is a slow process that is occurring along the Atlantic coast as a result of the changing climate. This newly identified hazard will require observation and planning for increased impacts from other hazards such as coastal flooding, storm surge, and erosion.

Infectious Disease Outbreak §4.11.4	Not Yet	Partially	This county has not seen any large epidemics within the past century, but it should remain ready for a possible outbreak.
Technological: Hazardous Materials §4.12.1a	Yes	Partially	Although a major hazmat incident has a low probability of occurring, there have been a few historical occurrences over the past few decades and it should be considered in this document due to the potential population impacts. This analysis will include transportation, 302 facilities, and other hazardous material related incidences.
Human-caused: Terrorism §4.12.2a	Not Yet	Partially	Significant terrorism incidents have not historically occurred within the county and are not probable to occur. If a terrorism incident were to occur it would be very difficult to predict and could potentially harm a large portion of the community.
Human-caused: Civil Disturbance §4.12.2b	Yes	Partially	Civil disturbance incidents have occurred in Flagler County, though not in significant numbers or having significant impact. This hazard can be very difficult to predict, but the likelihood of future occurrence is probable. Depending on the type of disturbance, the effect could range from small and insignificant impact, to large and damaging.
Earthquake	No	No	Tremors have occurred far off-shore, but there are no recorded major earthquakes in the county's history and no major fault lines nearby. Florida sits on the trailing margin, also known as a passive margin, of the North American tectonic plate. For this reason Florida is in a very stable position in terms of its location with respect to tectonic plates and earthquakes are extremely rare. According to the 2014 U.S. Geological Survey (USGS) National Seismic Hazard Map, the peak ground acceleration (PGA) with a 2% probability of exceedance in 50 years for Flagler County is between 2-4% gravity (g), the second-lowest probability level mapped. As such, this hazard, though considered, will not be further evaluated in this plan.
Nor'easters	Yes	No	Nor'easters were profiled as a standalone hazard in the previous LMS. It is a cold-core, low-pressure extra-tropical cyclonic system that moves along the east coast with winds that blow over coastal areas from a northeasterly direction. These storms however, usually develop north of Flagler County, and generally move north or northeastward, making their likelihood of occurrence low. Furthermore, when nor'easters do affect Flagler, their impacts are more often captured as other profiled hazards such as severe storms, tropical cyclones, flooding, coastal flooding, storm surge, or erosion. As

			such, this hazard has been removed from further evaluation in this plan.
Severe Winter Weather	Yes	No	Flagler County is in a subtropical zone that does not regularly see freezing temperatures even during the winter. There are some cases of hard freezes that have impacted crop development and prompted warnings for residents; however, these cases are of very low frequency and property damage is kept to a minimum. Overall, severe winter weather is a low- frequency, low-impact hazard that has been removed from further evaluation in this plan.
Sinkholes	No	No	Naturally occurring sinkholes have not occurred in Flagler County and are not likely to occur due to the soil makeup and high water table. As a result, this hazard though considered, will not be further evaluated in this plan.
Technological: Dam Failure	Yes	No	The 2013 State of Florida Enhanced Hazard Mitigation Plan ranks Flagler County as 'No High or Significant Hazard' for dam failure, as there are no dams in Flagler. There are weirs however, that slow the flow of water along drainage canals for easier control. A complete failure of a weir is not expected to cause any drastic flooding. If a weir failure were to occur, it could pose a minor threat to some infrastructure but the water behind each is not immense, and a failure of one weir would not cause a chain reaction to others. Weirs are closely monitored and well maintained; therefore, their potential failure will not be evaluated further as a hazard in this plan.

4.1 Severe Storms

Florida is considered the thunderstorm capital of the United States. A thunderstorm forms when moist, unstable air is lifted vertically into the atmosphere. The lifting of this air results in condensation and the release of latent heat. The process to initiate vertical lifting can be caused by:

- Unequal warming of the surface of the Earth
- Orographic lifting due to topographic obstruction of airflow
- Dynamic lifting because of the presence of a frontal zone.

Flagler County and the rest of central and north Florida are particularly susceptible to severe weather, especially during the summer months. This is because of a local weather phenomenon called the sea breeze. The sea breeze is a result of uneven heating in the daytime between the land and surrounding ocean. This pressure difference causes winds to flow onto the peninsula during the daytime since land heats faster than water.

Thunderstorms affect a relatively small area when compared to a hurricane. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Despite their small size, all thunderstorms are dangerous. Of the estimated 100,000 thunderstorms that occur each year in the United States, about 10 percent are classified as severe. A severe storm is defined by the NWS as a storm that produces hail of at least 1 inch in diameter, or contains winds of at least 58 mph. Severe storms often come with the potential for flooding, tornadoes, and frequent lightning.

Thunderstorms in Florida may be best known for their prolific lightning. Lightning, an integral component to a thunderstorm, strikes an average of 1.2 million times each year in Florida[1], the second most of any state, even though it is ranked 22nd in total land area. This means that there is an average of 21 flashes per square mile per year, the highest density of any state. It occurs when the positively charged area, often on the ground but can also be another part of the cloud, is met with negative charges in the clouds, causing a discharge of intense heat and energy. Lightning is a culprit in many forest fires, structure fires, and personal injuries and deaths.

While storms may be best known for their lightning, they can also pack a major punch when it comes to winds. Storms can contain microbursts, downbursts and straight-line winds. These winds have the potential to reach in excess 100 mph and are their damages are often confused by the public to be from tornados. Damage from severe thunderstorm winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Most thunderstorm winds that cause damage at the ground are a result of outflow generated by a thunderstorm downdraft. Storms with severe straight-line winds often also have hail and tornadoes.

Hail forms when a strong updraft of warm air circulates into a severe thunderstorm, bringing moisture with it. Water droplets are lifted far into the atmosphere and freeze at great heights eventually falling back down when their weight exceeds the force of the updraft. If this process is repeated several times for the same droplet of water, then it is frozen over and over, creating a

[1] http://www.lightningsafety noaa.gov/stats/05-14_Flash_Density_State.pdf

ball of ice with many layers—the longer the process, the larger the ball of ice. When it finally hits the ground, hail can cause serious damage not only to people and animals, but to crops, buildings and vehicles as well. The following table explains the standards used for measuring hail by the NWS.

Table 4.2: Hail Size Measurements

Hail Size	
Size	**Comparison**
¼ inch	Pea
½ inch	Plain M&M
¾ inch	Dime/Penny
7/8 inch	Nickel
1 inch	Quarter (considered severe)
1 ½ inches	Ping-pong ball
1 ¾ inches	Golf ball
2 ½ inches	Tennis ball
2 ¾ inches	Baseball
3 inches	Tea cup
4 inches	Grapefruit
4 ½ inches	Softball

4.1.1 Location

All of Flagler County has the equal potential to be impacted by severe thunderstorms and the associated lightning, wind and hail.

4.1.1 History

Typically, high wind events occur in the severe storm season between June and September, and in the busy winter season between January and March. According to the NCDC, Flagler County has 208 reports of wind damages (1975-June 2015) on 136 different days. In 1993 severe winds destroyed roofs and uprooted trees causing $500,000 in damage. Another incident occurred in 1989 with 84 mph estimated winds. In early March 2011, a thunderstorm downburst winds were reported in northeast Palm Coast when a 62 mph wind gust was measured. Pool screen damage, dime size hail, fallen trees and power lines and a roof being blown off a mobile home on Starboard Drive were all reported. Since the last LMS, there have been many reports of fallen trees and power line but nothing widespread or of high damage value related to thunderstorm winds was reported.


The Flagler Tribune

Hail Devastates Part Of County

Disaster Status Is Requested

Cabbage, Potato Crops Hard Hit; Cars, Too, In Bunnell Vicinity

Pre-Paid

Figure 4.1: Flagler Tribune Featuring an Article on the 1980 Hail Event

On March 30, 1960, 2.5 inch hail was reported with no additional information. This was the largest recorded hail until April 19, 1980 when a severe storm occurred that earned the name "the worst agricultural disaster to strike the county in the last 10 years" by the Flagler Tribune.

Baseball-sized hail fell upon crops and dented mobile homes and cars, causing $2 million in damage in just 15 minutes. This was in a time where the county was only sparsely populated; damage today would have been markedly worse. Farmers were struck the hardest; major losses were reported to cabbage and potato crops, while a car dealership lost nearly $800,000 in new vehicles inventory to the hail. The storm that struck the area pelted Flagler with hail until it reached the ocean where the stones shrank to around pea-sized.

Most recently (2014-2015), there have been 10 entries into NCDC for 6 different hail events with sizes ranging from .75 inches to 1.75 inches. In all, the NCDC list contains 78 reports for 62 different days with hail. Hail stone sizes varied from pennies to baseballs (1960-June 2015).

Flagler is no stranger to lightning incidents either. The NCDC lists 32 separate significant incidents since 1998. In that time period, almost a quarter million dollars in damages were reported, along with 8 injuries. In 2009, a 12 year old boy was struck unconscious and partially paralyzed. In 2011, lightning sparked a house fire in Palm Coast causing $50,000 in estimated damage. In 2014, a young male was struck while inside an outdoor tent. He had to be resuscitated and was subsequently hospitalized for a week. Most recently, in September 2015 a radio control tower at the Emergency Operations Center was struck by lightning. The strike and resultant power surge damaged the electrical and technological devices on the tower including antennae, transfer switch controls, a solar beacon, and hvac system, estimated to total over $11,000 in damages.

4.1.2 Extent

Thunderstorms themselves are not measured in magnitude, however, the components of a thunderstorm are. Winds can be extreme and anything over 58 mph (50kts) is considered severe but winds can reach in excess of 100 mph. Tornadoes (profiled separately) spawning from severe storms can easily be associated with winds of over 100 mph. Based on historic events, Flagler County could expect to see thunderstorm winds between 80-100 mph during a severe event.

Hail can also have far-reaching impacts. Magnitudes of up to nearly 3 inches have been previously described, which has the potential to devastate crops, cause significant injuries or deaths, severely damage cars and homes, and cause roadway accidents due to shattered windshields. The largest hail that has been recorded in the State of Florida has been 4.5 inches. While extremely rare, it is possible for Flagler County to see hail that large, but a more likely extreme scenario would be hail of up to 3 inches in diameter.

The magnitude of lightning can be measured by its frequency on a scale called Lightning Activity Level (LAL). This scale is used by the NWS as part of fire weather forecasts. The LAL is the number of cloud to ground lightning strikes observed or forecasted to occur within a 30 mile radius of an observation site.

According to the NWS, a level 6 does not occur in Florida, as dry storms occur mostly in the western United States. However, a LAL of 5 can occur, and it only takes one lightning strike to the ground to spark a massive wildfire or cause extensive damage to a structure.

Table 4.3: Lightning Activity Level Scale

Lightning Activity Level	Description	Cloud to Ground Strikes in a 5 Minute Period
1	No thunderstorms	N/A
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1 to 5
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	6 to 10
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent	11 to 15
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	15 +
6	Similar to LAL 3 except thunderstorms are dry.	9 to 15 (with greater potential impact)

4.1.3 Probability

Flagler County is particularly susceptible to severe weather since the Atlantic sea breeze effect is generated just off the coast. A strong Gulf breeze is also capable of pushing thunderstorms to the east over Flagler especially from June to September. It is common for thunderstorms to occur daily somewhere in the county during the summer months. In conjunction with storms resulting from frontal passages, Flagler County can expect to see multiple stormy days throughout any given year, including storms that contain high winds, hail and excessive, damaging lightning.

According to the NCDC, there have been 78 recorded incidents of hail over 62 separate days in Flagler County since 1960. The probability that hail will occur in a given year is approximately 100-percent, as on average there are 1.1 days with hail per year. Since hail is unpredictable and can occur in small spatial extents, some incidents may not have been reported, recorded or even seen, especially in rural areas of the county.

Between 1975 and June 2015 there have been 208 entries into the NCDC database for wind related events (high winds, strong wind, and thunderstorm wind) on 136 different days. The results conclude that there have been, on average, 3.4 days with high wind events per year over the last 40 years.

4.1.4 Vulnerability

All of Flagler County and its jurisdictions are vulnerable to severe storms, including lightning, hail, and strong winds; however, some structures will be affected more than others. Since most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft, anyone living in thunderstorm-prone areas of the world is at risk for experiencing this hazard. People living in mobile homes are especially at risk for injury and death. Even anchored mobile homes can be seriously damaged when winds gust over 80 mph.

Buildings and infrastructure that rely on power are vulnerable to damages from lightning. Lightning's intense heat can cause fires and electrical surges that enter into homes damaging expensive appliances. Buildings with surge protectors or lightning mitigation, which typically consists of providing a path with wire for the electricity to follow down to the ground instead of through the building, may be less vulnerable to the damaging effects of lightning. However, lightning is unpredictable and even the best efforts to reduce vulnerability may be fruitless. People and animals, particularly those outside, are also vulnerable to lightning.

Hail can cause serious damage to roofs, automobiles, aircraft, skylights, livestock, and crops. Metal roofs are fairly resistant to hail damage but may accumulate cosmetic damage in the form of dents and damaged coatings. While death from hail is not that common, individuals and animals that do not seek shelter during large hail events could be injured or killed.

For the purposes of better understanding Flagler County's vulnerability to severe storms, a GIS analysis was done to determine the value of the structures perceived to be the most vulnerable in the county, particularly to the most common threat experienced locally—wind. It was decided by the Planning Sub-group that the analysis would look at older structures and mobile homes.

There are nearly 2,000 mobile homes in Flagler County (see map below) that are particularly vulnerable to severe weather, among other hazards. These mobile homes are sometimes in areas that are far from shelters and have little police or fire coverage.

Table 4.4: Vulnerable Mobile Homes in Flagler County

Mobile Homes at Risk in Flagler County for Severe Weather									
Mobile Homes in Flagler County	**Number of Mobile Homes in Flagler**			**Value of Mobiles Home Properties**			**Number of People in Mobile Homes**		
	Total	**In Hazard area**	**% In Hazard Area**	**Total in $**	**$ In Hazard Area**	**% In Hazard Area**	**Total (with overlap)**	**# In Hazard Area**	**% In Hazard Area**
Total	**1,782**	**1,782**	**100%**	**$110,364,102**	**$110,364,102**	**100%**	**4,720**	**4,720**	**100%**

The median year built for mobile homes in Flagler County is 1992, long before stronger building codes were put into place, making these properties exceptionally vulnerable to strong winds. In 2013, 206 mobile homes were determined to be vacant. The average appraised value of these properties (including land) is $129,883.

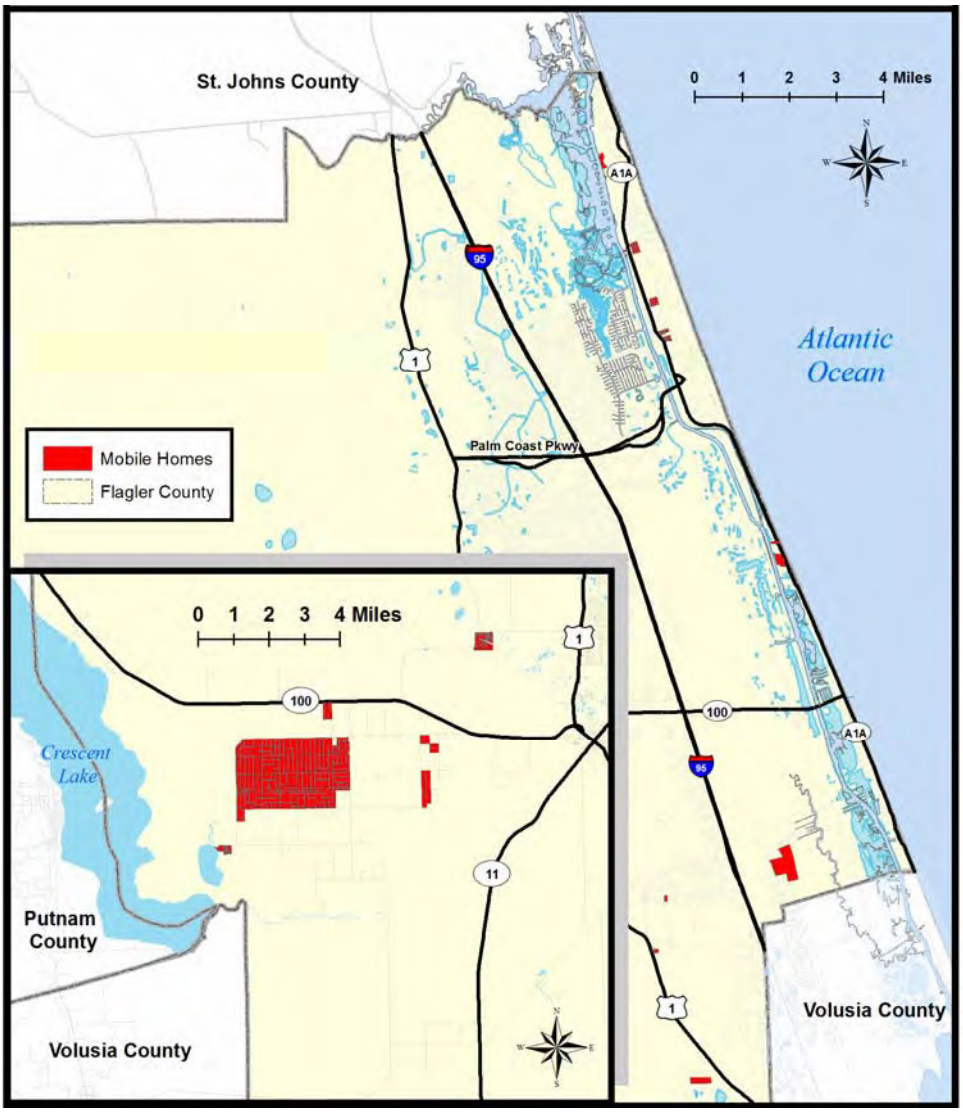

Figure 4.2: Flagler County Mobile Homes

To analyze older homes within the county, data was obtained from the Census Bureau which detailed the year built for homes. The data contained information for homes built between 1940 and 1998 and is currently the most updated available (even as of 2015). In 1993, Florida officials scrambled to correct the Building Code that failed during Hurricane Andrew. In March of 2002 the revised Florida Building Code went into effect. The code changes made the following improvements:

1. Resilience against wind pressures
2. Protection against wind-borne debris
3. Improved roof covering
4. A product approval system to ensure that all construction materials are of quality and up to code
5. Improvements to window ratings and labeling- this data assumes that the homes built before 1999 in the dataset have not been retrofitted or improved against high winds and the associated hazards.

Table 4.5: Year Homes Were Built in Flagler County

Homes Built Between 1940 and 1998			
Year Built	**Number of Homes in Severe Storm Hazard Area**		
	Total	**In Hazard Area**	**% In Hazard Area**
1940-1949	293	293	100%
1950-1959	508	508	100%
1960-1969	704	704	100%
1970-1979	3,696	3,696	100%
1980-1989	9,427	9,427	100%
1990-1998	11,328	11,328	100%

According to this information, more than 25,000 homes in Flagler County were built before strong building codes were in place. A lot of development has also occurred in the county after the major changes to the building code were implemented, resulting in a safer, less vulnerable community in comparison to others throughout Florida and the country. Research is continually being done with building materials and codes to reduce the vulnerabilities that exist from high wind events.

4.2 Tornadoes

Tornadoes are violently rotating columns of air that extend from the base of a thunderstorm cloud to the ground, kicking up debris and damaging many things as the storm moves. Often tornadoes in the U.S. occur in the Midwest during the pre-summer months, but Florida is especially vulnerable year-round. The strength of a tornado is determined by its wind speed, among other factors. Tornadoes are classified on the Enhanced Fujita (EF) Scale by the National Weather Service (NWS). Changes to the classification were adopted by the NWS in 2007. Tornadoes that occurred prior to 2007 were classified in a similar fashion using the Fujita (F) scale. The original F-Scale was revised to reflect better examinations of tornado damage surveys, so as to align wind speeds more closely with associated storm damage. Better standardizing and elucidating what was previously subjective and ambiguous, it also adds more types of structures and vegetation, expands degrees of damage, and better accounts for variables such as differences in construction quality.

Tornadoes that form over large bodies of water are called waterspouts. Often the clouds that form waterspouts are not even thunderstorms and tend to stay over the warm waters. However, when waterspouts form from storm clouds the thunderstorms can carry them onshore where they can cause damage to structures. Researchers estimate about 500 waterspouts form off Florida–the waterspout capital of the U.S. Winds from waterspouts can reach 80-100 mph and pose a particular threat to people in the water, like boaters.

Figure 4.3: Waterspout off of Flagler Beach, July '07

Tornado damage ranges from light to inconceivable. It is important to note that Florida receives the greatest concentration of tornadoes per square mile in the United States. This is because of the very high

frequency of thunderstorm activity due to the sea breeze actions described in the section on severe storms. It is also important to note that tropical cyclones will spawn small tornadoes most often in the right front quadrant of the storm. These tornadoes are weak and move very fast, often with little warning and with a reduced visibility because of the torrential rains surrounding it. Tropical cyclone generated tornadoes usually occur around the perimeter and in "training" thunderstorms that drag behind the storm as it moves. Hurricane Ivan in 2004 spawned as many as 50 small tornadoes across its path, killing 6 people in Florida alone.

Table 4.6: Enhanced Fujita Tornado Scale

Operational EF Scale		
EF Number	**Wind Speed (mph)**	**Description**
0	65-85	*Light damage*– Shingles blown off, fences torn up, trees blown down, weak mobile homes are destroyed.
1	86-110	*Moderate damage*– Roofs blown off of poorly constructed homes, mobile homes that aren't tied down and tossed about, windows are broken.
2	111-135	*Considerable damage*– Roofs are torn off of even well constructed homes, all mobile homes are completely destroyed, lighter objects become deadly missiles.
3	136-165	*Severe damage*– Entire stories of well-constructed houses destroyed, severe damage to large buildings such as shopping malls, trains overturned, trees debarked; heavy cars lifted off the ground and thrown, structures with weak foundations are badly damaged.
4	166-200	*Devastating damage*– Frame houses, commercial buildings with few floors, and most other structures are completely leveled and debris is flung for miles.
5	Over 200	*Incredible damage*– Strong framed, well built houses leveled off foundations and swept away, steel-reinforced concrete structures are critically damaged, tall buildings collapse or have severe structural deformations, some cars, trucks and train cars can be thrown approximately 1 mile.

4.2.1 Location

All of Flagler County can be impacted by tornadoes, including the beaches and large bodies of water.

4.2.2 History

The majority of tornadoes in Flagler County are a weak in nature (EF0) but occasionally stronger tornadoes can and do occur. For instance, in 1970 an F2 tornado caused some minor damage across the unpopulated portions of the county, and in August of 1983, an F1 tornado struck a mobile home park in Beverly Beach, destroying two homes and damaging others, flinging debris along a half-mile path near the beachfront. Damage was estimated at about a quarter-million dollars. In November of that same year, an F2 tornado tore through farm areas, destroying barns and recreational structures, causing another quarter million dollars in damages.

The most recent tornado was in December of 2013. During the evening hours, between 6:55 pm and 7:10 pm on December 14, a tornado with a maximum strength of EF1 touched down in and crossed northern sections of Palm Coast. The tornado initially touched down north of Espanola on an intermittent track. The tornado then intensified to its maximum strength of 95-110 mph across the B section and western F sections of Palm Coast on a continuous path ranging in width from approximately 75 yards to a maximum of around 150 yards on Bannbury Lane. The tornado weakened as it moved northeast toward the coast with a path width of 25 to 50 yards across in the eastern F section and Hammock area. It destroyed seven houses and damaged 162 others. The damage was estimated at more than $5 million, but thankfully no injuries were reported. The area was cluttered with downed trees and house debris. The tornado downed power lines, blew out windows, knocked down trees and power poles and ripped away roof shingles.

Between 1970 and July 2015, Flagler County has had 22 reports of tornadoes, according to the NCDC. Of those, two were F2, three were F1 or EF1, and 17 were classified as F0 or EF0.

Table 4.7: Reported Tornadoes in Flagler County

Jurisdiction	Date	Scale	Property Damage ($)
UNINCORPORATED	7/5/1970	F2	25,000
UNINCORPORATED	7/3/1979	F1	2,500
UNINCORPORATED	9/3/1979	F0	2,500
UNINCORPORATED	6/22/1983	F0	250
UNINCORPORATED	8/12/1983	F1	250,000
UNINCORPORATED	11/20/1983	F2	250,000
UNINCORPORATED	3/14/1986	F0	0
UNINCORPORATED	3/14/1986	F0	25,000
UNINCORPORATED	3/7/1987	F0	2500
UNINCORPORATED	12/15/1987	F0	25,000
UNINCORPORATED	3/3/1991	F0	250
UNINCORPORATED	9/17/1994	F0	0
CODYS CORNER (UNINC.)	9/14/2001	F0	0
MANTANZAS (PALM COAST)	9/14/2001	F0	500
BUNNELL	9/14/2001	F0	500
FLAGLER BEACH	9/14/2001	F0	1,500
MANTANZAS	9/5/2004	F0	0
FLAGLER BEACH	9/25/2004	F0	0
CODYS CORNER	9/26/2004	F0	0
BUNNELL FLAGLER ARPT	3/16/2007	EF0	0
FLAGLER BEACH	7/22/2007	EF0	0
ESPANOLA (UNINC.)	12/14/2013	EF1	5,000,000

**Source: NCDC Storm Events Database from 1970- June 2015. Not adjusted for inflation.*

4.2.3 Extent

According to the best available sources, the most severe tornado Flagler County has had was an F2 tornado. All other tornado occurrences were weaker. The most severe tornado to occur in all of Florida was an F4. While not common or highly likely, a tornado of similar magnitude, EF4 or even an EF5, could occur.

4.2.4 Probability

According to the NCDC, Flagler County has recorded 22 tornadoes since 1970, 45 years ago. This means there is an average of one tornado every two years, or a roughly 50% chance of having a tornado touchdown every year.

4.2.5 Vulnerability

Tornadoes can occur with very little to no warning. The entire area of Flagler County is vulnerable to them. Not even the strongest houses in Flagler County can withstand a direct hit from 200 mph winds, meaning there is an estimated $10 billion of property that is exposed, including nearly 50,000 buildings and 114 critical facilities. Due to the high water table, basements and cellars cannot be built; therefore, all tornado shelters must be above ground, except in very few circumstances. It is unknown how many houses have indoor storm shelters, but it is expected that there are not many. There are several mobile home parks in Flagler County that are particularly susceptible to high winds and flying debris. These homes are often populated by the elderly or low-income families.

To get an idea of a more pointed tornado scenario, one was created using the Department of Homeland Security's Standard Unified Modeling, Mapping, and Integration Toolkit (SUMMIT). Since this program is in beta, the data available may not be extremely accurate; however, it is sufficient for the purposes of this plan, especially since HAZUS-MH does not cover tornadoes, nor is it recommended to use its wind models for these purposes.

SUMMIT covers a variety of disasters, but Flagler County will use its tornado function in this case. As stated in the Hazard Profile section, the county typically does not receive damage from anything above an EF2 tornado. The maximum tornado strength for the purposes of this vulnerability analysis will be EF3 (136-165 mph). The default maximum width of the EF3 tornado is 1613 feet in SUMMIT; this was left unchanged for this plan. The maximum wind speed default is 151 mph; this was also left unchanged.

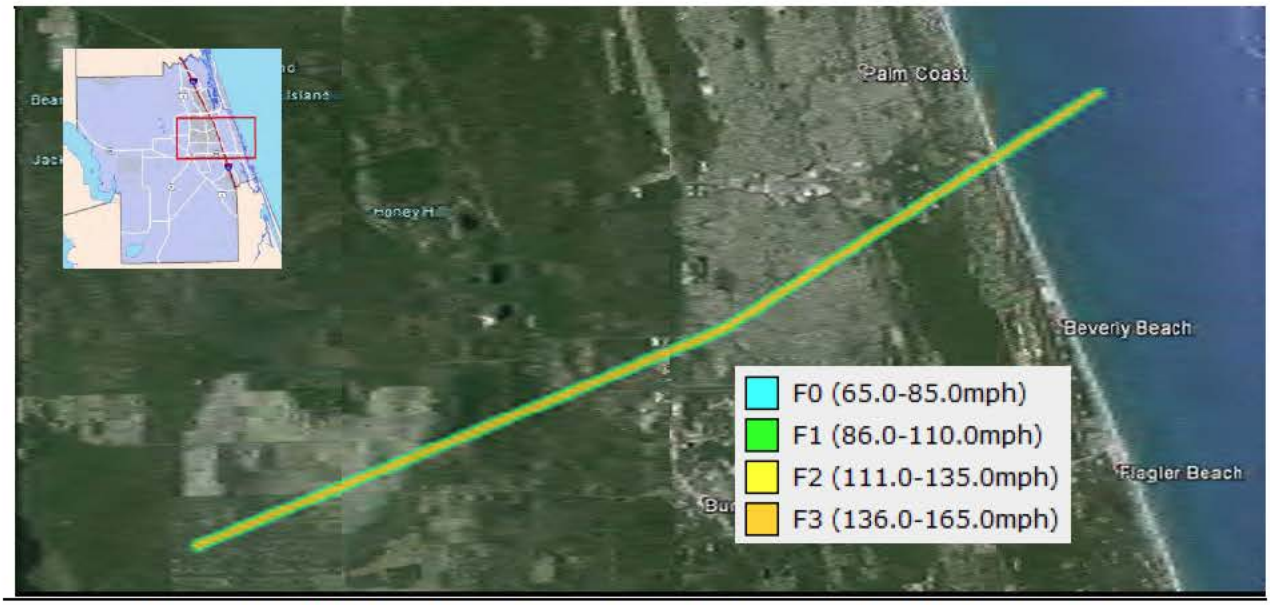

Figure 4.4: Fictitious Worst Case Scenario Tornado for Flagler County

As illustrated in the figure above, an imaginary EF3 tornado path was drawn using integrated Google Earth API available from SUMMIT. The orange color down the middle of the path indicates winds of up to 165 mph. Subsequent color contours decrease in EF intensity stepwise to EF0 (light blue). This particular tornado path was chosen in order to maximize potential damage. The vortex touches the ground in Daytona North, a subdivision comprised of many mobile homes, and then it crosses several agricultural areas before it arrives in the most densely populated neighborhoods in Palm Coast. Finally, the tornado dissipates over the Atlantic Ocean, but not before it causes damage to some of the most valuable beachfront property in Flagler County. All the while, extreme winds are tossing vehicles and signs over at least three major roads: US 1, Interstate 95, and State Road A1A. The damage potential of this type of tornado would be catastrophic.

As stated, the program is in a beta state, meaning it is not completely free of bugs at this point. When drawing imaginary tornado lines, the program does not take into account several variables. For example, a tornado may increase or decrease in intensity as it continues along its path, but the tools only allow for a Euclidean buffer zone that does not increase or decrease along the path. In addition to graphical limitations, results are also limited to GDP (Gross Domestic Product) loss and estimated employee days affected. Results are based upon census information and HAZUS's wind-effect equations. The reliability of census information is limited to the most recent population data from 2010, and not from 2015 population projections. While Flagler County has grown since 2010, the SUMMIT program will still do an adequate job of relaying general information that is sufficient for this vulnerability assessment. According to the SUMMIT analysis, 1,261 people residents were possibly directly within the path of this tornado. The resulting estimates from SUMMIT do not take into account property damage. Instead, a manual method was used to overlay the imaginary tornado path over property appraiser GIS shape files to estimate the loss of property through a selection and identification method.

The GIS analysis was done through ArcMap; it was found that in the path of the 1600 foot wide tornado were 2,929 buildings on 4,993 parcels with 5,383 valued properties. The following table separates the effects of the tornado by each jurisdiction, and is an overestimation of the potential damage, using appraised values June 2015.

Table 4.8: Potential Damage Caused by Tornado Scenario

Jurisdiction	Number of Parcels	Number of Appraised Lands	Number of Buildings	Total Appraised Value (June 2015)
Palm Coast	4,000	4,332	2,536	$422,614,438
Bunnell	53	81	15	$8,536,417
Unincorporated	942	976	380	$98,993,417
Total Path	**4,993**	**5,383**	**2,929**	**$529,151,929**

Though there is no exact modeling software, SUMMIT's attempt at this endeavor has provided an opportunity for emergency managers and other researchers to create valid scenarios for tornadoes and other natural hazards. The results of the above simulation, though overestimated, still paint a frightening picture of the power of potential tornadoes in Flagler County.

4.3 Tropical Cyclones

A tropical cyclone is a rapidly rotating storm system characterized by a warm, low-pressure center, strong winds, and a spiral arrangement of thunderstorms that produce heavy rain. Depending on its location and strength, a tropical cyclone is referred to by names such as hurricane, typhoon, tropical storm, cyclonic storm, tropical depression, and cyclone.

During the early stages of formation, prior to hurricane development, tropical systems are often designated as tropical depressions. Tropical depressions form when a low pressure area is accompanied by thunderstorms that produce a circular wind flow with maximum sustained winds below 39 miles per hour. Tropical depressions are watched closely for development but not tracked for historical purposes. If any impacts occurred from tropical depressions, they would be reported as severe storms, erosion or flooding. Tropical depressions are designated as a tropical storm once the maximum sustained winds reach or exceed 39 miles per hour. Once reaching tropical storm status, storms are given a name for historical tracking purposes. Tropical storms strengthen over warm waters (80+ degrees Fahrenheit) while interaction with the upper levels of the atmosphere, also known as wind shear, remains non-turbulent. When conditions are right, the center of circulation closes tightly and rain bands begin to form as wind speeds rise. At 74 miles per hour, the winds become severely damaging and the storm is called a hurricane.

Tropical cyclones typically form over large bodies of relatively warm water. They derive their energy through the evaporation of water from the ocean surface, which ultimately re-condenses into clouds and rain when moist air rises and cools to saturation. This energy source differs from that of mid-latitude cyclonic storms, such as nor'easters and European windstorms, which are fueled primarily by horizontal temperature contrasts.

Commonly, with some notable exceptions, the storms that affect Flagler County form during hurricane season (June 1st through November 30th) and originate at varying locations in the Atlantic Ocean, Caribbean Sea, and the Gulf of Mexico. The magnitude of hurricanes is measured in distinct categories ranging from 1 to 5, known as the Saffir-Simpson Scale, with 5 being the most intense. Storms reaching category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage.

Tropical cyclones are often associated with storm surge, which is the greatest threat to life and property from a hurricane along the coast. The size of a hurricane and how fast it is moving, the depth of the water along the coastline and the topography where the storm makes landfall affect the surge produced. In years past, a certain range of storm surge was associated with each category of hurricane on the Saffir-Simpson scale; however, in 2010 it was removed because of the number of factors that went into determining how bad storm surge could be for each storm. Storm surge is profiled in this plan as a separate hazard.

Table 4.9: Saffir-Simpson Scale

Saffir-Simpson Hurricane Scale			
Category	**Wind Speed**		**Description**
	mph	**knots**	
1	74-95	65-83	*Some damage*: Damage mainly to trees, shrubbery, and unanchored mobile homes. Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely to result in power outages that could last days.
2	96-100	84-95	*Extensive damage:* Some trees blown down; major damage to exposed mobile homes; some damage to roofs of buildings. Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-130	96-113	*Devastating damage:* Foliage removed from trees; large trees blown down; mobile homes destroyed; some structural damage to small buildings. Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	131-155	114-134	*Catastrophic damage:* All signs blown down; extensive damage to roofs, windows and doors; complete destruction of mobile homes. Well-built framed homes can sustain severe damage with loss of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, blocking roads, along with downed power poles. Most of the area will be uninhabitable for weeks or months.
5	Over 156	Over 135	*Near total destruction:* Severe damage to windows and doors; extensive damage to roofs of homes and industrial buildings; small buildings overturned and blown away; gusts over 200 mph are not uncommon at this point. Many homes will be completely destroyed, and the area will be uninhabitable for weeks or months. Power outages will last for weeks or months.

4.3.1 Location

Tropical cyclones and their effects represent an extreme threat to the entirety of the county. Tropical cyclones are large storms and are likely to impact the entire county during any instance.

4.3.2 History

Since records were kept in the mid to late 1800s, Flagler County has been affected by numerous tropical cyclones. Data before storms were named in 1950 remains incomplete, but since the county was mostly undeveloped before the 1920s, reports may have been sporadic at best for this specific area. Of those records that do exist, there have been 29 tropical cyclones reported to have crossed the county boundary at least once.

Figure 4.5: Historic Tropical Cyclone paths near Flagler County

Tropical Storm Gordon – November 13, 1994

Gordon approached first from the Gulf Coast, weakening, but still dumping 7 inches of rain with wind gusts up to 50 mph. Its erratic path looped the storm back to the east coast roughly 100 miles south of Flagler County. Damage was caused by inland flooding as well as weak rain-logged roofs. Though Gordon was weak, the storm killed over 1,100 people in Haiti, and its slow, looping path left Flagler County open for beach erosion. Flooding inundated the county and overwhelmed sewage systems, roadways, and winds knocked out utility poles and signs.

Hurricane Floyd – September 15, 1999

This powerful Cape Verde hurricane skirted the coastline of Florida in the early morning hours as a category 5 storm. Though it did not make landfall until the Carolinas, its effects were still severe in Flagler County. Winds in excess of 80 mph were recorded along Flagler Beach, and thousands were evacuated from low lying areas east of I-95. A small storm surge caused some erosion along the coastal route A1A, inflicting damage to the road and the famous Flagler Beach pier. Because of the northeasterly direction of the wind, the town of Marineland received some heavy wind damage along the coast. Floyd went on to become a memorable flood event in the northeastern United States. According to the Daytona Beach News Journal of October 9, 1999, damages totaled approximately $1.9 million for Flagler County.

Hurricane Irene – October 17, 1999

Irene formed in the Caribbean Sea near Honduras and moved across Cuba, striking southwest Florida as a category 1 hurricane, producing light wind damage, but heavy flooding. 10 to 20 inches of rain were dropped on South Florida, but in Flagler County this impact was lessened to only about 1 to 3 inches. Typically, hurricanes that approach from this southwesterly angle have a less significant impact due to the fact that Flagler avoids the right-front quadrant of the storm—the area that usually contains the most severe weather, including small tornadoes and a greater storm surge. Despite the lighter winds and rains, Flagler County still sustained some damages: 3 single family homes and 1 multi-family structure received major damage. 167 single family homes, 6 multi-family homes, 18 mobile homes, and 18 businesses reported minor damage. Some minor beach erosion occurred and a 74 mph wind gust was recorded by the fire department. Damage was estimated at around $600,000 throughout the county.

Hurricane Charley – August 13, 2004

Charley was a small, but powerful hurricane that strengthened very rapidly in the Caribbean before striking Punta Gorda in southeast Florida as a category 4. The intense winds flattened entire pine forests and scattered debris far inland on a thin path of destruction. Charley also moved very quickly, lessening the flood and wind impacts over Flagler County. Despite this, the county still suffered power outages and some street flooding, as well as school and road closures in some areas. Flagler County sustained $23.3 million in damages to homes and businesses according to local news reports. Charley was the first of three hurricanes to affect Flagler County in a six week period and was a testament to the complacency that occurs after years of relative silence in the tropics; the sudden easterly variance in its track caught many residents off guard. According to a NOAA report, "media and residents seemed to have focused only on the exact forecasted track of the center of Charley, rather than the cone of uncertainty which NHC (National Hurricane Center) had included in these track forecasts."

Hurricane Frances – September 7, 2004

Frances formed in the deep tropical Atlantic in late August and reached category 4 strength a few days later. The slow-moving storm meandered west-northwest until it stalled between the Bahamas and the eastern coast of Florida as a category 2. Frances' disorganized eyewall meant that winds were kept to a bare minimum on the surface, but its extreme size and slow movement meant that a Texas sized area was encompassed with massive amounts of rainfall and often sustained tropical storm force winds for periods of 12 to 24 hours. Over 20 tornadoes touched down, causing sporadic damage across the state. Because of Flagler County's position relative to the storm, the beaches sustained significant storm surge and severe beach erosion. Over a 72 hour period, Flagler accumulated 4 to 8 inches of rain by radar estimate. This flooded homes and rivers were pushed to flood stage.

Hurricane Jeanne – September 27, 2004

After days of looping around in the Atlantic basin, Hurricane Jeanne made landfall in nearly the same location as Frances only weeks earlier. The system moved on a similar path as Frances, but at a greater speed. Flagler was again left in the periphery of the storm, sustaining tropical storm force winds and torrential rains. Structural damage was associated mostly with mobile homes and weak roofs that had already sustained a beating from the previous two storms. Wave heights of 20 feet were recorded along with a small surge associated with high astronomical tides. Beach erosion was once again extensive because of the long duration of off-shore winds as well as the on-shore flow of water caused by the rotational angle of the storm. Days of flooding from Charley and Frances were compounded by Jeanne who dumped rain on already heavily saturated ground for many hours. What would have been a sustainable rain event of just 3 to 5 inches of water turned into sheet flooding, river flooding, and washed out roads.

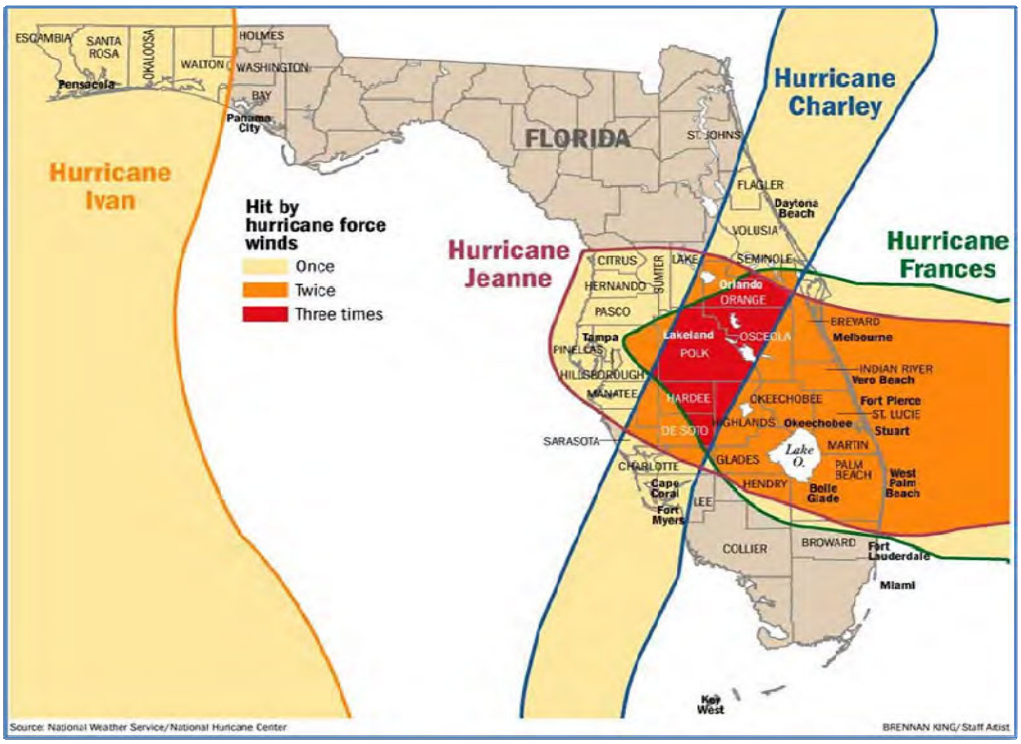

Figure 4.6: Hurricane Strength Wind Swaths from 2004 in the State of Florida

Tropical Storm Tammy – October 5, 2005

Tammy was a short lived relatively weak tropical storm that passed close to Flagler's shores from south to north. Because of the disorganized open circulation, rainfall was kept to a minimum, but some minor flooding did occur. Beach erosion of up to two feet was reported in both Flagler and St. Johns counties as a result of storm surge.

Hurricane Wilma – October 24, 2005

Hurricane Wilma was one of the most powerful hurricanes to hit the Caribbean basin in recorded history. Peak sustained winds reached an incredible 175 mph and the storm was used as an example of the increasing hurricane strengths and frequencies that have been seen over the past few decades. Flagler County sustained some minor damages as winds reached over 50 mph sustained in Flagler Beach with some minor street flooding reported elsewhere. A fast moving cold front picked up the storm and sent it out to sea rapidly.

Tropical Storm Alberto – June 13, 2006

Alberto made landfall along the northeast Gulf coast and moved north-northeast across northern Florida. Flagler County was caught in the more powerful northeastern quadrant, which in this case contained the bulk of the rainfall and severe weather. Trees and power lines were downed across the area, and wave heights reached 6-9 ft on the beaches. Rainfall totals in northeast Florida ranged from 2 to 6 inches, causing some minor flooding along low lying roadways. The rainfall was much needed at the time since the area was recovering from a minor drought period.

Tropical Storm Andrea – May 9, 2007
Andrea formed off the southeast coast of the United States and was the eighth earliest cyclone in recorded history and the first May cyclone since 1981. High surf occurred at Flagler Beach with 6 to 8 foot breakers. Andrea caused significant beach erosion along Flagler County beaches. Due to high surf and storm surge, the famous Flagler Beach Pier was closed to visitors during this time, and the Florida Department of Transportation had to fill in areas near the seawall with sand to prevent instability in both the wall and on A1A.

Tropical Storm Barry – June 3, 2007
Though Barry was quickly classified as a tropical depression, high winds still impacted the coast of northeastern Florida as the broad area of circulation moved across the state from the Gulf of Mexico. Rainfall totals were estimated at 1-3 inches in Flagler County once again relieving an extended drought occurring in this year. The Flagler Beach Pier was also closed again due to high waves.

Tropical Storm Fay – August 23, 2008
Fay moved from the Gulf of Mexico across the Florida peninsula into the Atlantic Ocean. Fay then slowly curved to the west and made landfall near Flagler Beach. Sustained winds were between 40 and 50 mph with higher gusts, with minimal storm surge. Because of the slow movement of the system, Fay dumped nearly 15 inches of rain on Flagler over a 72 hour period, causing massive flooding in all areas of the county. Trees and power lines were downed across the county, though structural damage was minor. A major disaster was declared for the state on August 24, and nearly $30 million was approved for assistance statewide.

Tropical Storm Beryl – May 27-28, 2012
As a weak tropical system, Beryl produced heavy rainfall across Florida even before it became a tropical storm. The system slowly formed and drifted north along the Atlantic coast, dropping 2.25 to 5.43 inches of rain on Flagler County over a period of one week. Beryl finally made landfall near Jacksonville with minimal wind speeds, but bringing high surf and rip currents to Flagler County. A surfer was killed in Daytona Beach (30 miles south of Flagler County) due to the large, powerful waves. Winds peaked at around 50 mph along the beach in Flagler County. Some trees were downed on top of power lines, but no damage estimates were presented for the county.

Tropical Storm Debby – June 25, 2012
An intense rain event, Tropical Storm Debby produced anywhere from 5 inches to over 2 feet of rain over northeastern Florida, causing historic river flooding. Spotters reported over 7 inches of rain in Palm Coast. Winds blew trees down onto power lines. A major disaster was declared on July 3rd for Florida, but Flagler County was not included in the incident zone, unlike its neighbor Putnam, who received public and individual assistance declarations. No damage estimates were provided for Flagler County.

Hurricane Sandy – October 25-27, 2012
Though Sandy did not directly hit Florida, the powerful hurricane exemplified how these storms can still produce effects far from the center of circulation. As Sandy passed by the east coast, it blasted the beaches with strong surf and high winds. Storm surge was felt as far south as Miami

and even flooded streets. In Flagler County, very minor tidal flooding was reported from the Intracoastal Waterway south of Flagler Beach. In town, water covered some of the lower lying roads, but no other roads were affected and no damage estimates were recorded.

Table 4.10: Tropical Cyclones Affecting Flagler County Since 1994

Recent Tropical Cyclones				
Year	**Name**	**Intensity at Initial US Landfall***	**Rainfall in Flagler County**	**Wind Gusts in Flagler County****
1994	Gordon	TS	7 in	50mph
1999	Floyd	H5	1-3 in	84mph
1999	Irene	H1	10-20in	n/a
2004	Charley	H4	6 in	80mph
2004	Frances	H2	5-15 in	74mph+
2004	Jeanne	H4	3-7 in	n/a
2005	Tammy	TS	3-6 in	n/a
2005	Wilma	H2	6-9 in	53mph
2006	Alberto	TS	2-6 in	46mph+
2007	Andrea	TS	n/a	n/a
2007	Barry	TS	1-3 in	38mph
2008	Fay	TS	15 in	60mph+
2012	Beryl	TS	2-5.75 in	50mph
2012	Debby	TS	7+ in	n/a
2012	Sandy	H1	n/a (surge)	n/a

**TS = Tropical Storm, H1-H5 = Hurricane category 1 through 5*
***N/A = not available or negligible*

4.3.3 Extent

Historically, the area has not been directly struck by high intensity hurricanes from the Atlantic. Theoretically, this is because of the angle of the coastline combined with the fact that Cape Verde storms often curve north and eastward once they approach the eastern seaboard. However, Flagler has been in the "cone of uncertainty" for many powerful hurricanes in the past, including several that have reached category 5 status merely hours before their landfall to the north or south of the county. Hurricane Floyd is a great example of an extremely powerful storm that, even though the center of circulation was almost 200 miles to the east, powerful winds and torrential rains still lashed the coast with great ferocity, causing power outages, widespread damage and local flooding over a relatively short period of time. It is important to realize that the center of circulation is not always the most powerful or damaging part of a storm. Often, especially in tropical storms, the heaviest rains and frequent tornadoes are contained in the outer rain bands that can stretch for hundreds of miles in any direction. Because of Flagler County's proximity to the Atlantic Ocean and its low, swampy topography, to the west, the entire county is vulnerable to all effects of a tropical cyclone. While Flagler County has not been directly hit by a category 5 hurricane, it is entirely possible that one day it does get hit, or at a minimum, severely impacted by one.

4.3.4 Probability

Each year a number of predictions are made on the number of named tropical cyclones expected. The National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center, in collaboration with hurricane experts from the National Hurricane Center (NHC) and the Hurricane Research Division (HRD), makes predictions based on current and expected conditions/trends, as does Colorado State University and the Weather Channel.

The graphic below provides a variety of probabilities for a tropical cyclone activity in Florida, the area surrounding Flagler County, and the area specific to Flagler County. This information is provided yearly by Colorado State University, but it also contains calculations using 50 years of climatological data. The 50-year analysis yields a 40.4% chance of one or more named storms making landfall in Flagler County.

2015 Tropical Cyclone Landfall Probabilities

Please Select a State: Florida

Please Select a County: Flagler

Current State Data (Climatology in Parentheses):

State Name	Probability of Hurricane Impact	Probability of Major Hurricane Impact
Florida	22.1% (51.0%)	7.0% (21.0%)

Current Regional Data (Climatology in Parentheses):

Region Number	Probability of 1 or More Named Storms Making Landfall in the Region	Probability of 1 or More Hurricanes Making Landfall in the Region	Probability of 1 or More Intense Hurricanes Making Landfall in the Region
7	6.7% (17.9%)	3.0% (8.3%)	.8% (2.3%)

Current County Data (Climatology in Parentheses):

County Name	Probability of 1 or More Named Storms Making Landfall in the County	Probability of 1 or More Hurricanes Making Landfall in the County	Probability of 1 or More Intense Hurricanes Making Landfall in the County	Probability of Tropical Storm-Force (>= 40 mph) Wind Gusts in the County	Probability of Hurricane-Force (>= 75 mph) Wind Gusts in the County	Probability of Intense Hurricane-Force (>= 115 mph) Wind Gusts in the County
Flagler	.4% (1.0%)	.2% (.5%)	<0.1% (.1%)	3.5% (9.6%)	.9% (2.7%)	.3% (1.0%)

50 Year Regional Data:

Region Number	50 Year Probability of 1 or More Named Storms Making Landfall in the Region	50 Year Probability of 1 or More Hurricanes Making Landfall in the Region	50 Year Probability of 1 or More Intense Hurricanes Making Landfall in the Region
7	>99.9%	98.9%	60.7%

50 Year County Data:

County Name	50 Year Probability of 1 or More Named Storms Making Landfall in the County	50 Year Probability of 1 or More Hurricanes Making Landfall in the County	50 Year Probability of 1 or More Intense Hurricanes Making Landfall in the County	50 Year Probability of Tropical Storm-Force (>= 40 mph) Wind Gusts in the County	50 Year Probability of Hurricane-Force (>= 75 mph) Wind Gusts in the County	50 Year Probability of Intense Hurricane-Force (>= 115 mph) Wind Gusts in the County
Flagler	40.4%	20.3%	6.0%	99.5%	74.6%	39.5%

Figure 4.7: 2015 Tropical Cyclone Probability Report from Colorado State University

Probability can also be looked at in terms of return periods. The NHC used a program called HURISK to calculate return periods for coastal counties along the Gulf of Mexico and the Atlantic Ocean. The figures below show a hurricane return period within 50 nm for Flagler County of approximately 12-13 years and a longer return period of 36-37 years for a major (category 3-5) hurricane. Note: The information on return periods is generated with the 1987 HURISK program, but uses data through 2010.

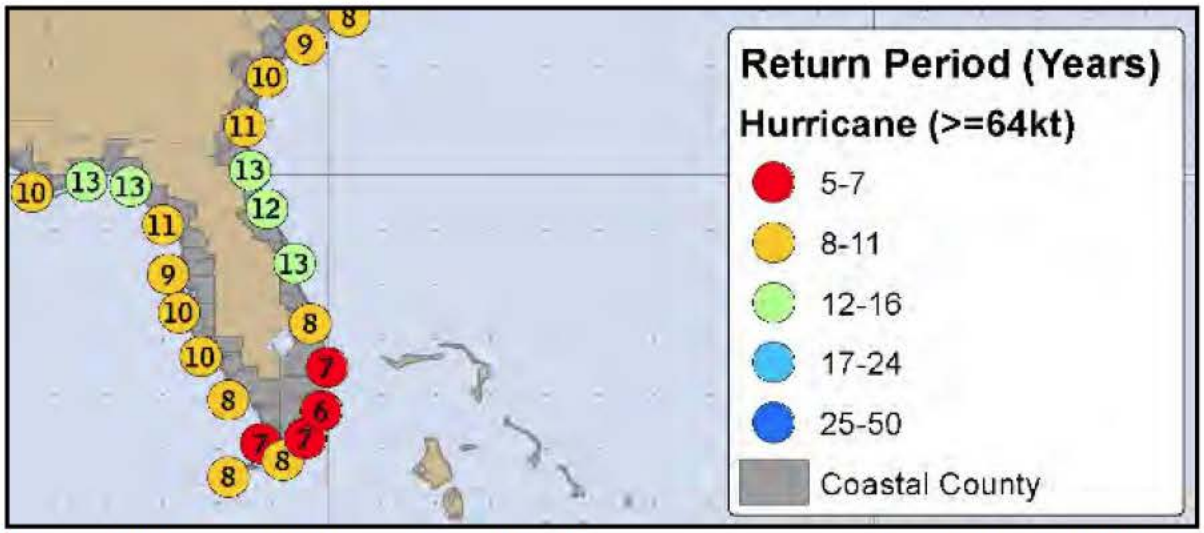

Figure 4.8: Estimated Return Period for Hurricanes passing within 50 Nautical Miles of Various Locations on the U.S. Coast

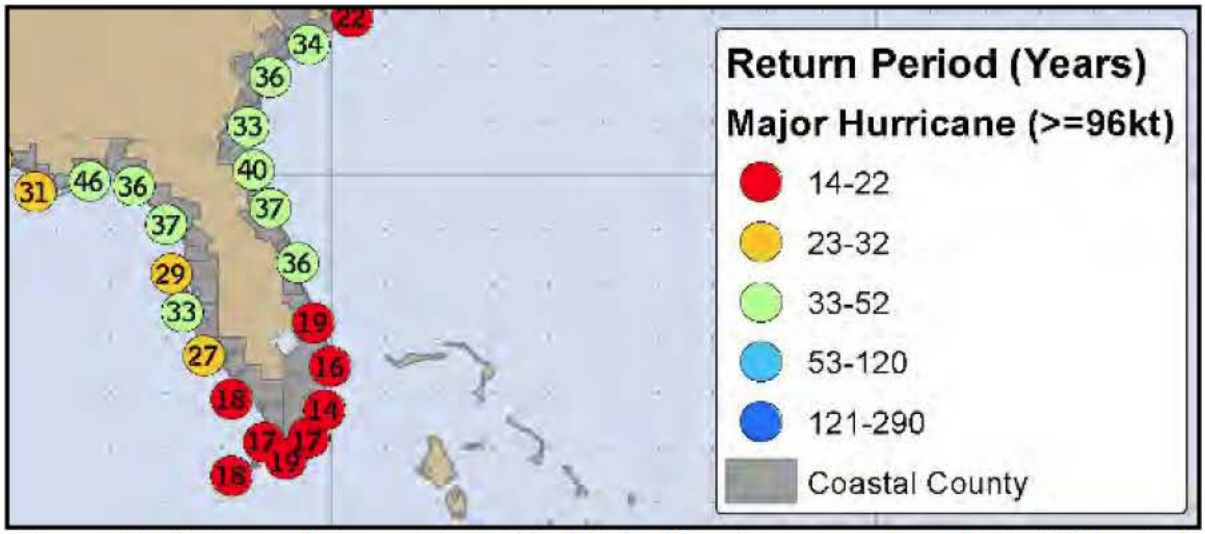

Figure 4.9: Estimated Return Period for Major Hurricanes passing within 50 Nautical Miles of Various Locations on the U.S. Coast

Hurricane return periods are the frequency at which a certain intensity of hurricane can be expected within a given distance of a location. For example, if during a 100 year time period a hurricane occurred somewhere an average of 5 times, the hurricane return period for that location would be 20 years. This does not mean that a hurricane will occur regularly once every 20 years, or that if a hurricane occurs, it will be 20 years before another one does. It represents that, *in any given year*, the probability a hurricane may occur there is equal to the inverse of the return period (1/20 years) or about a 5% chance in any given year.

4.3.5 Vulnerability

Tropical cyclones are a major part of the weather history of Flagler County, and a large volume of data has been collected about their impacts on all jurisdictions. Due to its small size and

proximity to the Atlantic Ocean, the entire area of Flagler County is vulnerable to tropical cyclones; however, some structures are built to withstand hurricane force winds and would fare better than others. This section will focus mostly on the wind impacts from tropical weather. Flood related vulnerabilities are discussed in the flooding and storm surge sections.

4.3.5a Methods and Limitations

Using the FEMA-provided risk assessment program HAZUS (Hazards of the U.S.), an assessment was done to recognize the effects of a powerful fictional hurricane that makes a path through Flagler County at a certain speed. Named "Hurricane Maximum", the storm makes a direct path through Flagler County, bisecting the area and evenly splitting the wind fields. For the purpose of this assessment, the hurricane is not the most powerful, but is instead an average of tropical cyclone intensities that typically have the potential to strike Flagler County at or near the county boundaries. The goal was to create a storm that could potentially strike Flagler with a reasonable wind speed, track, and forward speed.

Limitations occur in the Comprehensive Data Management System (CDMS) database that accompanies HAZUS. This database contains census information for Flagler County which is not completely updated, especially since it has been five years since the last US census. The building stock has lagged behind as well, and some structures, such as Flagler's Emergency Operations Center, have been inserted into the model manually. Not all buildings are accounted for. The model that was run and the results of it are for informational purposes only and provide a broad overview of the damage potential in a large hurricane.

4.3.5b HAZUS-MH 2.2 – "Hurricane Maximum" Storm Track and Derivation

The following is the imaginary storm track that was produced manually using HAZUS-MH 2.2. A reasonable wind speed, trajectory, and track were selected to mirror past hurricanes that have brushed or struck Flagler County directly. Hurricane Floyd (1999) was an inspiration for this analysis, because of its high intensity (about 145 mph maximum wind speed) and its close proximity to Flagler. "Hurricane Maximum" is a what-if scenario that makes assumptions about the impact of Floyd if it had veered to the west and struck Flagler County instead of continuing its track northward into the Carolinas as a weaker storm.

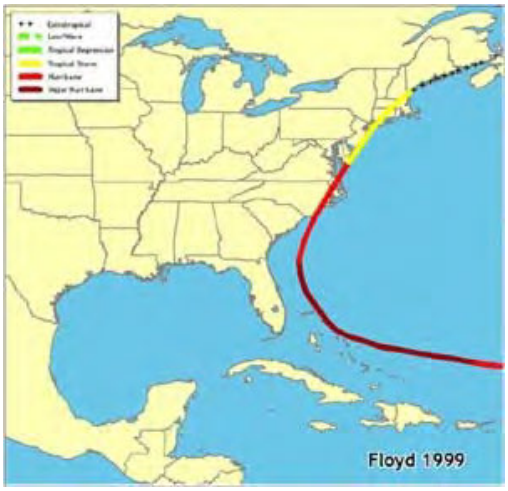

Figure 4.10: Hurricane Floyd-- 1999 Track

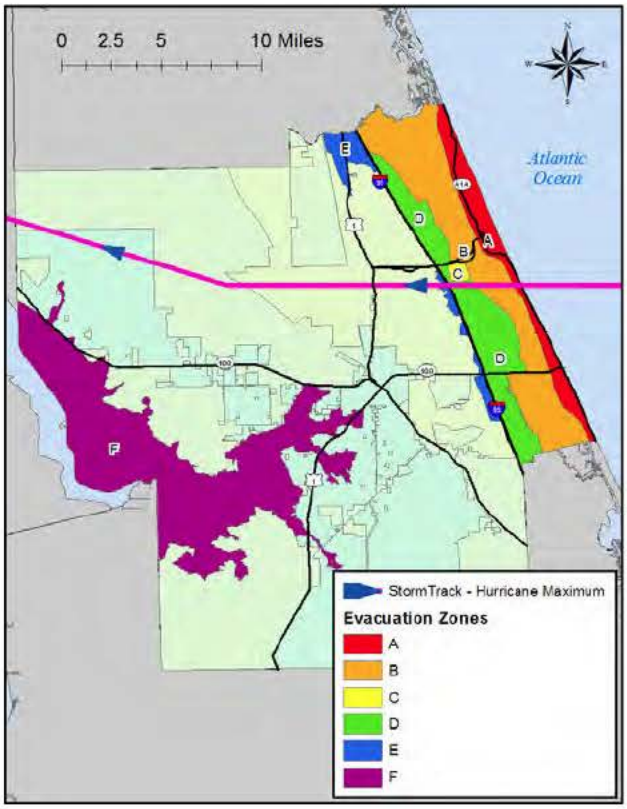

Figure 4.11: "Hurricane Maximum" Storm Track from HAZUS

The following table outlines the coordinates and wind speeds for "Hurricane Maximum." All variables are partially arbitrary and were selected based upon reasonable estimates for a hurricane of that size and scope.

Table 4.11: Estimated Wind Speeds for "Hurricane Maximum"

Longitude (Degrees)	Translation Speed (miles/hr)	Time (Hours)	Radius to Max Winds (miles)	Wind Speed (mph @ 10m)	Central Pressure (mBar)	Profile Parameter	Inland
-79.90	10.00	0.00	40.00	145.00	930.00	1.77	☐
-80.36	8.00	3.56	35.00	150.00	915.00	1.63	☐
-81.05	8.00	8.80	38.00	145.00	920.00	1.61	☐
-81.37	6.00	12.03	50.00	135.00	935.00	1.74	☑
-81.76	8.00	15.16	50.00	100.00	960.00	1.48	☑
-82.09	15.00	17.68	55.00	75.00	975.00	1.07	☑

HAZUS produces estimations for several variables. Since some spatial analyst tools were unavailable at the time, there are only wind damage estimates for this analysis. Storm surge and flooding analyses were completed using different strategies, described in their respective sections.

4.3.5c HAZUS-MH 2.2 Report on "Hurricane Maximum"

Wind speeds

- Maximum sustained winds – 139 mph
- Peak gust – 176 mph

These winds are at a height of 10 meters and are generally not at full force unless there is little to block them. For example, buildings at the beach or on a hill with no trees would probably experience these winds. Buildings on the ground with sufficient shielding from other structures, trees, and terrain may see a 30 mph or greater reduction in wind speeds.

Table 4.12: Damage Report for "Hurricane Maximum"

Occupancy	Building Count	Dollar Exposure ($ Million)
Residential	44,430	$10,196
Commercial	382	$943
Other	140	$428
Total	**44,952**	**$11,568**

Source: HAZUS-MH 2.2 (FEMA, Census Bureau)

Table 4.13: Potential Losses for "Hurricane Maximum" Scenario

Capital Stock Losses					Income Losses				
	Building Damage	Contents Damage	Inventory Loss	Loss Ratio (%)	Relocation Loss	Capital Related Loss	Wages Loss	Rental Income Loss	Total Loss
Total	**$9,187,588**	**$4,533,949**	**$36,214**	**79**	**$1,096,969**	**$134,242**	**$154,103**	**$393,396**	**$15,556,461**

Source: HAZUS-MH 2.2 (FEMA, Census Bureau)

Table 4.14: Damage Probability by Occupancy Type

	Damage Probability (%)					
	Square Footage (Thousands of sq. ft)	None	Minor	Moderate	Severe	Destruction
Agriculture	451.44	0.42	1.50	10.60	56.38	31.09
Commercial	6,712.55	0.73	1.20	7.80	71.87	18.41
Education	263.68	1.00	1.53	7.38	84.51	5.58
Government	173.10	0.98	1.45	6.93	84.62	6.02
Industrial	2,237.53	0.92	1.40	6.86	80.18	10.63
Religion	553.27	0.60	1.23	7.91	72.72	17.55
Residential	76,467.47	0.13	1.44	8.44	31.11	58.88
Total	**86,859.03**	**0.14**	**1.44**	**8.43**	**31.60**	**58.40**

Source: HAZUS-MH 2.2 (FEMA, Census Bureau)

The above table displays the probably that a particular building type will be damaged or destroyed. Each row adds up to 100%. For example, it is estimated that 80.18% of all industrial buildings in Flagler County will sustain severe damage from "Hurricane Maximum."

Table 4.15: Buildings Damaged or Destroyed by Occupancy Type

Building Damage	None	Minor	Moderate	Severe	Destruction	Total
Agriculture	0	0	1	8	6	15
Commercial	3	5	30	280	64	382
Education	0	0	0	3	0	3
Government	0	0	1	13	1	15
Industrial	1	1	5	59	8	74
Religion	0	0	3	24	6	33
Residential	57	653	3,691	13,290	26,739	44,430
Total	**61**	**660**	**3,732**	**13,675**	**26,823**	**44,952**

Source: HAZUS-MH 2.2 (FEMA, Census Bureau)

Table 4.16: Total Potential Debris Generated from "Hurricane Maximum"

Debris Type (tons)	Brick, Wood and Other	Reinforced Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
Flagler County	**1,778,429**	**265,793**	**248,892**	**2,161,323**	**4,454,437**

The HAZUS scenario estimates that there will be a total of 34,000 displaced households with only a total of 8,000 people needing short-term shelter. While HAZUS is a good tool to plan with, one must keep in mind that it is just a model and outcomes for a real life event similar in scope could significantly differ.

Flagler County is exceptionally vulnerable to a powerful hurricane such as Hurricane Maximum. The past several seasons have been quiet and uneventful, and since tropical seasons are typically cyclical in nature, the Atlantic basin is due for an active hurricane season very soon. The vast majority of Flagler's infrastructure will be directly damaged or destroyed by a category 4 hurricane, according to HAZUS models. In addition, millions of tons of debris will be generated, which could exacerbate stormwater systems and worsen flooding, or dry out on the ground in wooded areas only later to increase wildfire fuels.

Three of five incorporated municipalities are within one mile of the Atlantic coastline (Marineland, Beverly Beach, and Flagler Beach), two of which rely entirely on county resources for police, fire, and medical rescue. These jurisdictions, along with parts of unincorporated Flagler County, are especially vulnerable to the effects of tropical cyclones, because of open exposure to the highest winds and storm surge. On the coast, there are no hindrances to block the full effect of the wind from severely damaging buildings along State Road A1A. Inland, almost every parcel contains tall pine or oak trees that are prone to being snapped or uprooted. The timberland farms that take up the majority of western Flagler are vulnerable in that way, and the economic loss incurred by hurricane winds to that industry could be catastrophic. In addition, trees and vegetation that are uprooted and are also not cleaned up will eventually wither and become fuel for wildfires.

Nearly all of the county's building stock could be exposed to a major hurricane, and according to the HAZUS reports, over half could be destroyed as a result. The remaining buildings have the potential to be severely damaged, and very few would be spared from some type of damage. According to the HAZUS reports, nearly $10 billion of property could be damaged or destroyed in a powerful hurricane, and nearly $5 billion in contents are also exposed, both of which could lead to extreme insurance claim backups and issues.

Newer buildings are slightly less vulnerable to tropical cyclone winds if they were built according to code and they will be even less vulnerable if they are built above code. Several of the Flagler County's schools have been approved as hurricane evacuation shelters, meaning they have been built to high standards or they have been retrofitted. As of January 2016, buildings 300, 400, 500, 600 and 700 of Belle Terre Elementary School, building 13 at Bunnell Elementary School, buildings 3 and 4 of Matanzas High School, building 400 at Wadsworth Elementary School, buildings 2, 7 and 8 of Palm Coast High School, and buildings 4, 6 and 7 of Rymfire Elementary School have been inspected and designated as safe evacuation shelters. In addition, building 9 at Bunnell Elementary School is in the process of being retrofitted with new windows and doors so that it can be better able to withstand hurricane force winds.

4.4 Flooding

Flooding is a general term that encompasses a wide variety of water inundation events. FEMA defines a flood as, "A general and temporary condition of partial or complete inundation of 2 or more acres of normally dry land area or of 2 or more properties from:

- Overflow of inland or tidal waters; or
- Unusual and rapid accumulation or runoff of surface waters from any source; or
- Mudflow."

Flooding in Flagler County can occur as a result of many different weather events including severe thunderstorms, tropical cyclones, tsunamis, storm surge, high astronomical tides, or high groundwater coupled with seasonal rains. Flooding can also be caused by poor drainage resulting from flat topography, nonporous surfaces, clogged drainage systems, or overwhelmed or insufficient drainage systems. The county is dotted with numerous stormwater retention ponds, canals, storm drains, and weirs that hold back and retain water. However, even with these measures in place, the inundation of heavy rain or a period of several days or even weeks can test the fortitude of these flood control devices. In addition, the Floridan Aquifer lays only a few feet underground in some places, meaning there is little room for water to soak into the ground.

Flooding that occurs along the immediate coastline, or pushes inward from that point, is referred to as coastal flooding. While coastal flooding can be seen as a subsection of flooding because of its more limited geographic description, it is further profiled as its own hazard in this plan because of the specific nature associated with it. Additionally, while storm surge is one contributing factor to coastal flooding, it also is specifically profiled as a standalone hazard.

Floods can present many health-related hazards. After a flood has affected a structure, it can leave behind various contaminants that should be considered before re-entry. Things to consider include; damaged electric supplies, damaged structures, wild animals, broken glass, food

contamination, water contamination, mosquitoes, mold growth, sewage overflow, and asbestos debris.

National Flood Insurance Program (NFIP)

The NFIP is a program administered by FEMA's Federal Insurance Administration that enables homeowners, business owners and renters in participating communities to purchase flood insurance, whether they are located in or out of the flood zone. All of Flagler County's municipalities, including the unincorporated county, participate in the NFIP. Insurance covers residential buildings up to $250,000 and non-residential up to $500,000.

In order to remain compliant with NFIP, each municipality must complete a number of tasks on an ongoing basis. Minimum requirements of the NFIP include:

- Maintain elevation certificates on file for all new construction in the Special Flood Hazard Area (SFHA) or for substantial improvements to properties in the SFHA
- Maintain public records and make them available for review
- Maintain records pertaining to Letters of Map Amendments (LOMA) and Letters of Map Revisions (LOMR)
- Provide information related to flood to the public upon request
- Promote flood insurance to property owners
- Continue to update the public and enable their participation in the flood remapping project
- Where feasible, continue to identify/acquire land in the SFHA open space/preservation
- Maintain and enforce an approved and adopted flood ordinance.

Community Rating System (CRS)

Administered by FEMA and the Insurance Services Office (ISO), the Community Rating System (CRS) program seeks to reward communities for the additional activities and programs they undertake, beyond the minimum requirements of the NFIP that minimize flood damages. Participation is voluntary, but incentives exist such as the lowering of flood insurance premiums for policy holders. This program also enhances public safety, and works to reduce damage to property and public infrastructure, avoid economic loss, reduce human suffering, and protect the environment.

Table 4.17: Methods to Protect Property from Floods

Property Flood Protection Methods	
Elevation	Raising structures on elevated support structures to place it above future flood waters.
Relocation	Moving structures to a new location where there is not a threat of flooding.
Levees	In areas of shallow and moderate flooding depths with low velocity, this is a method of creating a barrier of compacted soil to keep water away from a structure.
Floodwalls	In areas of low to moderate flooding depths, floodwalls are designed to keep water away from a structure through construction of materials such as masonry block and reinforced concrete.
Closures	Techniques for protecting gaps that have been left open for day-to-day conveniences, such as walkways, doors, and driveways.
Sealants	Also known as dry floodproofing, sealants are used in areas of shallow flooding to seal a structure against water entry.

Utility Protection	Low-cost measures that prevent damage to systems such as heating, air conditioning, electrical, and plumbing systems—may include elevating utilities off the ground.

4.4.1 Location

Examining the effects of flooding is extremely important because so much of the county lies in a floodplain or storm surge area, though even those outside of those areas can still experience flooding. The inland areas subject to a high risk of flooding are those located in area known as the 1-percent annual chance of flooding areas, also known as the 100-year flood zone. These areas are defined by FEMA and delineated on a Flood Insurance Rate Map (FIRM). Flagler County has five flood zone delineations—A, AE, VE, X and the 0.2%. More than 20% of flood insurance claims and one-third of disaster assistance for flooding occur outside of mapped high-risk areas. Changes to the landscape or development may cause flooding in areas that aren't identified on the FIRMs. Flood maps are not updated very often due to the time and expenses required. Flagler County is expected to get new draft coastal flood maps in 2016, which will update portions of the county's FIRMs when they become effective sometime in 2017.

Table 4.18: FEMA Flood Zone Definitions

FEMA Flood Zones in Flagler County	
Zone	**Definition**
A	Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. These properties have a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage.
AE	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. These properties have a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage.
VE	Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
0.2% (Shaded X)	Areas that have a 0.2% probability of flooding every year (also known as the "500-year floodplain"). Properties in Shaded Zone X are considered to be at moderate risk (the risk of being flooded is reduced but not completely removed) of flooding under the National Flood Insurance Program (NFIP). Areas outside the 1-percent-annual-chance flood zone submit over 20% of NFIP claims and receive one-third of disaster assistance for flooding. Flood insurance isn't federally required in moderate-to-low areas, but it is recommended for all property owners and renters.
X (Unshaded)	Areas that are above the 0.2% flood elevation. Properties in unshaded Zone X are considered to be at low risk of flooding under the NFIP. Areas outside the 1-

	percent-annual-chance flood zone submit over 20% of NFIP claims and receive one-third of disaster assistance for flooding. Flood insurance isn't federally required in moderate-to-low areas, but it is recommended for all property owners and renters.

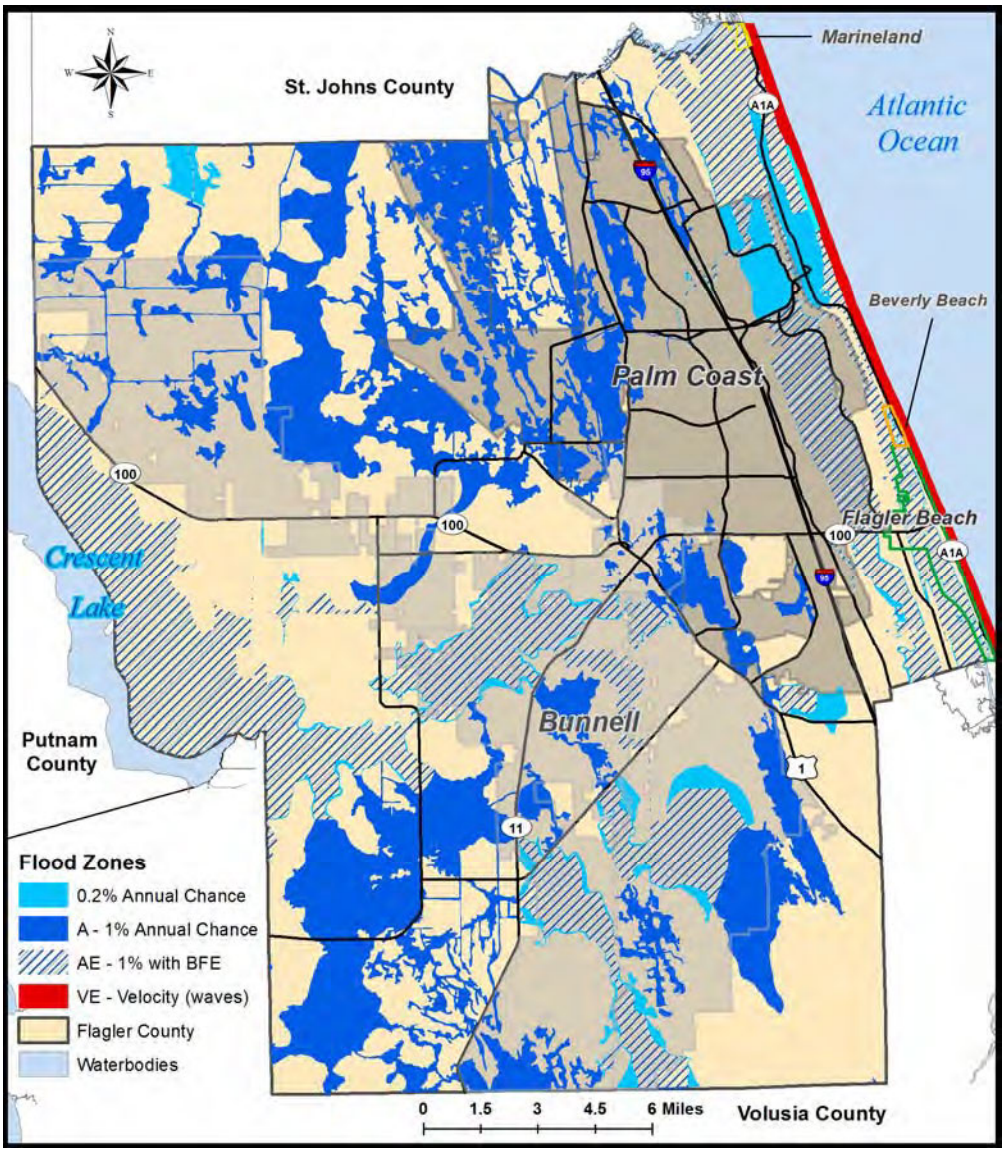

Figure 4.12: Flagler County Flood Zones, August 2015

Flagler County has several natural and manmade waters and low-lying areas that have greater potential to flood. In western Flagler, there is a system of lakes, including Crescent Lake, that are prone to flooding. In addition to the floodplains surrounding large water bodies and their tributaries, there are large areas within the county's interior which experience periodic flooding. These flood prone areas are generally the result of flat, poorly drained land where accumulated rainfall can overwhelm stormwater systems and result in water ponding on the surface. Flooding involving river flows and broad expanses of floodplains occur around Crescent Lake, Lake Disston, and the headwater area of Haw Creek, Dead Lake, the Matanzas River, and parts of the

Intracoastal Waterway. Flooding involving stream flow in narrow confined channels occurs along Bulow Creek, Pellicer Creek, parts of Haw Creek, Blackwater Branch, Sweetwater Branch, and the central portion of the Intracoastal Waterway. State Road A1A in Flagler Beach is prone to nuisance flooding/ponding during the typical summer afternoon thunderstorms. The flooding does not always pose a threat to structures, but it can cause rather significant puddles on the roadway and on the side of the roadway that can cause dangerous driving conditions.

Other notable areas of flooding include the following:

- Marineland Acres
- Bird of Paradise in the City of Palm Coast
- Old Kings Road North and Princess Place Area
- Otis Stone Hunter Road and Hargrove Grade in Palm Coast
- Daytona North and Water Oak Road
- Old Haw Creek Road
- Old Dixie Highway near I-95
- Korona in Bunnell and
- County Road 304 and Florida State Road 11.

Flagler County currently does not have any dams or levees, but does contain a number of weirs. Weirs are a low dam built across a river or canal to raise the level of water upstream or regulate its flow. Many of the weirs in Flagler County are "low-headed," meaning the amount of water controlled behind them is not immense. Weirs are closely monitored and well maintained. A complete failure of a weir is not expected to cause any drastic flooding, though it could pose a minor threat to some infrastructure. Furthermore, if a weir failure were to occur, it would not cause a chain reaction to other weirs. A complete failure of the largest weir, L-4, would cause water to be released into Graham Swamp, which would not affect any homes.

Impervious surfaces are a major cause of flooding in Flagler County, but there are areas within the floodplain that provide natural mitigation functions against flood and storm hazards. These include the wetlands in northeastern Flagler County, the riparian buffer surrounding Crescent Lake (the Crescent Lake Conservation Area), the wetlands within Haw Creek Preserve, the dune line along the coast, Flagship Park, Gamble Rogers State Park, timberland areas, and various other swampy areas. Wetlands in particular, act as a sponge that trap and control flood waters. Contaminants and sediments that may have been collected as the flood waters traveled are filtered out from the various vegetation that that slows the water down.

4.4.1a Repetitive Loss

Each year FEMA produces a list of Repetitive Loss (RL) properties. As defined by the NFIP, a RL property is a property for which two or more flood insurance claims of more than $1,000 have been paid by the NFIP within a rolling 10-year period since 1978. If a property has had four or more claims of more than $5,000 or has had two or more losses that total more than the value of the structure, it is considered a Severe Repetitive Loss (SRL) property. All RL and SRL properties are subject to the Privacy Act of 1974, which means FEMA's list is for official use only and communities are not allowed to publish any data or maps that may indicate specific addresses or locations. Communities may display RL information in the form of Repetitive Loss Areas (RLA), which are portions of the community that includes buildings on FEMA's RL list

and any nearby properties that are subject to the same or similar flooding conditions. By displaying RLAs, members of the public cannot discern which of the properties may be classified as RL or SRL properties. Within Flagler County, there are a total of 17 RL properties, a majority of them existing within the 'AE' zone and zero SRL properties.

Table 4.19: Repetitive Loss Properties by Type

Municipality	Single Family	Multi-Family	Commercial	Industrial/Other
Marineland	0	0	0	0
Flagler County	4	1	0	0
Bunnell	0	0	0	0
Palm Coast	0	0	0	0
Flagler Beach	10	0	1	0
Beverly Beach	1	0	0	0

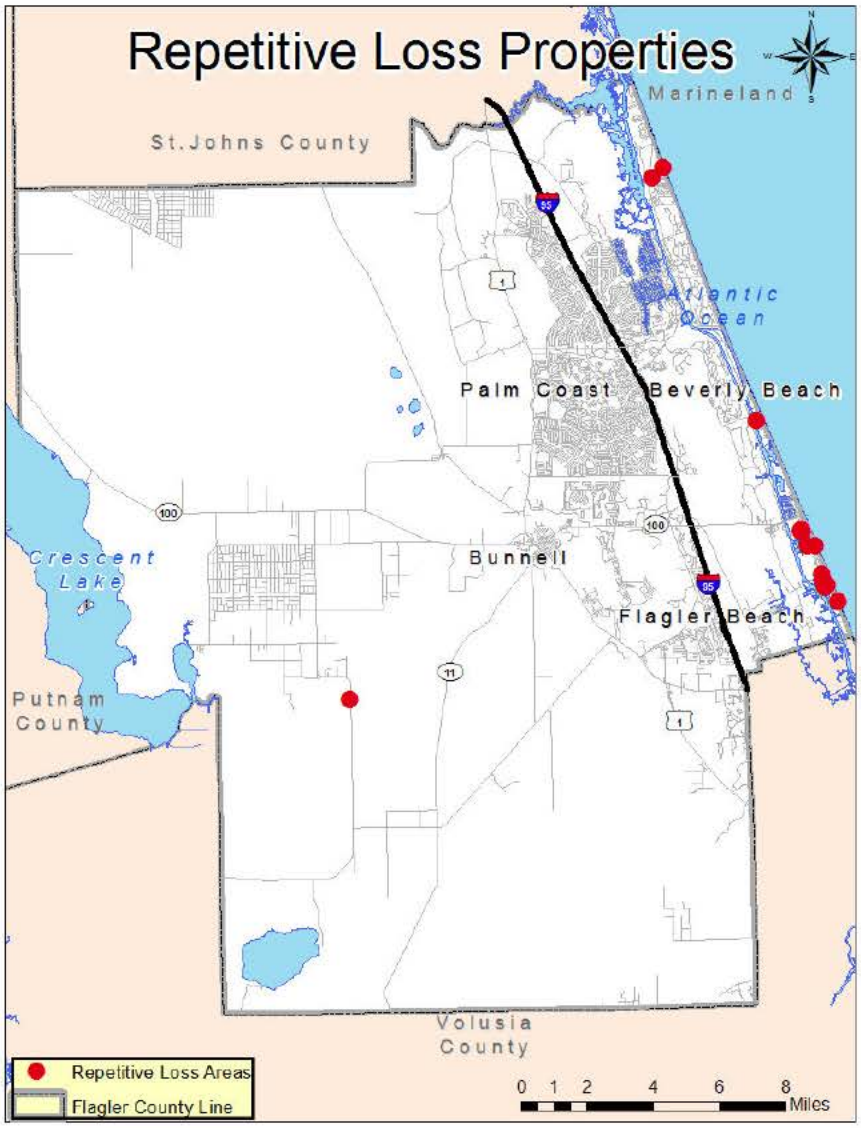

Figure 4.13: Repetitive Loss Areas within Flagler County

4.4.2 History

Prior to the 1990s, much of the county was unincorporated and uninhabited. As the county continues to grow and more impervious surfaces are built, the climate changes, and sea level rises, the county will likely see increasing impacts from floods. Some of the most notable (recorded) flood occurrences are described below.

One of the most extreme rainfall events in Flagler County was on October 11, 1989, when stationary thunderstorms dumped over 16 inches of rain in one day in Palm Coast. This caused flooding, stalled vehicles and road closures. However, due to the drought that year, once the rain ended the water drained off fairly quickly.

Tropical Storm Gordon in November 1994 luckily only impacted Flagler County with heavy rain and flooding. As many as a thousand people were killed as the storm tracked through Central America, the Caribbean, and South Florida.

In March 1998, heavy rain was recorded countywide, as well as significant flooding. Approximately $25,000 of damages was reported as a result, but likely there were no injuries.

In October 2003, the heavy rain from a severe thunderstorm caused significant flooding of Florida Park Drive in Palm Coast resulting in the temporary closure of the road.

Hurricane Frances in early September 2004 produced some countywide flooding as well as coastal flooding from storm surge. It was quickly followed by Hurricane Jeanne later that month which similarly resulted in countywide flooding.

Tropical Storm Arlene in June 2005 had significant rainfall amounts across Flagler County, and had localized flooding in several areas, as well as coastal flooding. In September 2005, Tropical Storm Ophelia dumped upwards of 8 inches of rain across the county, flooding a few buildings and closing several roads. And just a month later Tropical Storm Tammy, with a rainfall average of only about 3 inches, several streets and neighborhoods were again flooded.

In July 2006, significant flooding occurred as a result of thunderstorms, covering some Palm Coast streets (St. Joe Plaza near Palm Coast Parkway) in up to 2 feet of water and flooding many streets and driveways in Bunnell.

In February 2007, a major squall line with multiple super cell thunderstorms moved across north and central Florida with tornadic activity in Flagler County and flooded parts of the unincorporated Daytona North community in western Flagler. One mile of County Road 205 between Daytona North and State Road 100 closed due to 2+ feet of flooding. Later that year in October, widespread heavy rainfall from an extra-tropical storm dumped between 2 and 11 inches of rainfall across several areas of the County. Low lying, flood prone areas were the most heavily impacted, as well as coastal regions.

In August 2008, Tropical Storm Fay made landfall for the third time in Florida near Flagler Beach. Sustained winds along the coast were between 40 and 50 mph with gusts in the 60 to 65 mph range. Storm surge ranged from 2 to 4 feet along the open coast. Areal flooding occurred

over much of northeast Florida with roads and small creeks flooded. Minor flooding of structures occurred across the area. Rainfall approached 15 inches for Flagler County.

2009 was a year that had quite a few flooding events. Between May 16th and 22nd, an unseasonable cold front pushed through Flagler County while the ground was already saturated by previous rains. From the 17th to the 19th alone, over 11 inches of rain fell, and when the storms finally tapered by the 22nd, over 2-3 feet of water covered roads. In the vulnerable Daytona North community, several people needed to be rescued from homes. The rain turned agricultural fields into lakes, and nearly $45 million in crops were lost between Flagler, Putnam and St. Johns counties. The May floods produced 36 inches of rainfall within a week. Two months later in July, Palm Coast was subject to heavy rainfall amounts from a severe thunderstorm that camped over the city. Belle Terre Parkway, a major thoroughfare, was flooded in several places as a result. August brought more significant rain events with Bunnell, Palm Coast, and the Daytona North area of Unincorporated Flagler County all reporting street flooding and several road closures. Converging showers in early September finished off the significant flooding for 2009 when 3-5 inches of rain left sections of US1 flooded. No property damage was reported from that event.

The May showers of 2010 brought two different flooding events in a two and a half week time span. Bunnell was subject to between 2 and 3 inches of rain in a very short period of time which resulted in some street flooding on SR 100, and then Palm Coast just 15 days later received between 2 and 5 inches of rain and several flood streets in the B section neighborhoods.

In October of 2012, a cold front stalled over northeast Florida and dumped over 6 inches of rain in some places in the county. This event exposed a vulnerable road in Palm Coast, Barrington Drive, which had over 2 feet of water, and resulted in at least $1,000 reported property damages.

In May 2013, severe local weather produced rainfall in excess of 7 inches. Several lakes overflowed and flooded surrounding areas and streets. No homes were reported damaged. However, during heavy rain events in July and August of 2013 there was flooding in the western portions of the county significant enough to cause roadway flooding and at least one washout, as well as several hundred dollars worth of property damage.

2014 was another year of flooding events. Late July afternoon storms produced high rainfall amounts in short durations. Street and localized flooding was reported in the B section neighborhood. Heavy rainfall in early September flooded many of the secondary roads in the Daytona North area, before a series of slow moving storms moved through on September 26-27, producing up to 16 inches of rain in across several areas of Flagler County. Water drainage systems were overwhelmed as rainfall rates exceeded the flow rates. As a result, streets were flooded, pools overflowed, motorists stranded in flooded vehicles, and ultimately residents were asked to stay home and limit their water use to prevent unnecessary added strain on the system. In all, it was reported that 34 structures received minor damage from the floods, most of which did not have flood insurance. Though damages were estimated to be approximately $380,000, nobody was required to evacuate their homes. The flooded areas were mostly concentrated in the B and W sections, including the vulnerable road, Barrington Drive, with a few other reports in the S and L sections, and only had limited impacts to the agriculture sector. Localized flooding

was again reported in late November when between 4 and 5 inches of rain fell in the county. Particularly impacted by this heavy precipitation was the E section neighborhood in Palm Coast, with localized flooding reported in the Eaton Drive area and its surroundings.

Figure 4.14: Flooded Roadways in Flagler's B Section (2014)

Within the last thirty years (as of August 2015), Flagler County has had 419 flood insurance claims recorded for Flagler Beach, Beverly Beach, Palm Coast, Marineland, and Bunnell. Of these claims, over two million dollars has been paid out.

Table 4.20: NFIP Statistics for Flagler County, August 2015

NFIP Insurance Report FLORIDA								
CID	**Geographic Area**	**Total Premium**	**V-Zone**	**A-Zone**	**Number of Policies**	**Total Coverage**	**Total Claims Since 1978**	**Total Paid Since 1978**
120569	Beverly Beach	$68,297	6	29	141	$27,564,700	33	$100,085
120086	Bunnell	$49,193	0	18	43	$11,018,900	8	$189,167
120087	Flagler Beach	$938,115	33	955	1,964	$456,927,700	170	$1,332,137
120085	Flagler County	$2,000,475	26	2,036	4,487	$1,253,581,900	178	$553,943
120570	Marineland	$109,774	3	5	8	$3,516,600	0	$0
120684	Palm Coast	$1,630,168	0	712	4,448	$1,262,126,000	30	$54,177
Countywide Total:		**$4,796,022**	**68**	**3,755**	**11,091**	**$3,014,736,400**	**419**	**$2,229,509**

4.4.3 Extent

Flagler County often experiences nuisance flooding that temporarily affects the streets. Nuisance flooding is typically damaging. Even under extreme rain events, Flagler County has received only fairly limited damages outside of the agricultural industry. In the future Flagler can continue to expect to receive periods of heavy rain that temporarily overwhelm the stormwater systems. Base flood elevations in Flagler County in the AE zone range from 4 feet to 11 feet and 12 feet

to 16 feet in the VE zone along the coast. Though rare, Flagler County could expect to see flood depths of up to 11 feet in some areas. A more probable extreme flood scenario would be similar to the September 2014 event where 2-3 feet of water covered roads.

The extent and magnitude of flooding is expected to get worse as the climate continues to change. According to the 2009 National Climate Assessment, the intensity and frequency of heavy rains have increased over the past 50 years, which may lead to increased flooding. However, proper drainage systems and planning can help mitigate increased rainfall and runoff amounts.

4.4.4 Probability

On average, there are 70-90 storms per year in Flagler County, some of which occur one after the other, day after day. Historically, Flagler County can expect to see flood conditions somewhere in the county at least annually.

The NWS has a Hydrometeorological Design Studies Center that displays Precipitation Frequency Data Server (PFDS) information. This website provides precipitation frequency estimates for a given map point. A central point of Flagler County was used to collect the figures below. The first figure displays precipitation amounts based on a given duration and the average recurrence interval in years. The second figure is a different display of the same information. This precipitation recurrence interval information is a good planning resource, but doesn't necessarily correspond directly to flood probabilities. While it may be indicative of flooding situations, ground saturation plays a big role in how the area will handle high amounts of rain.

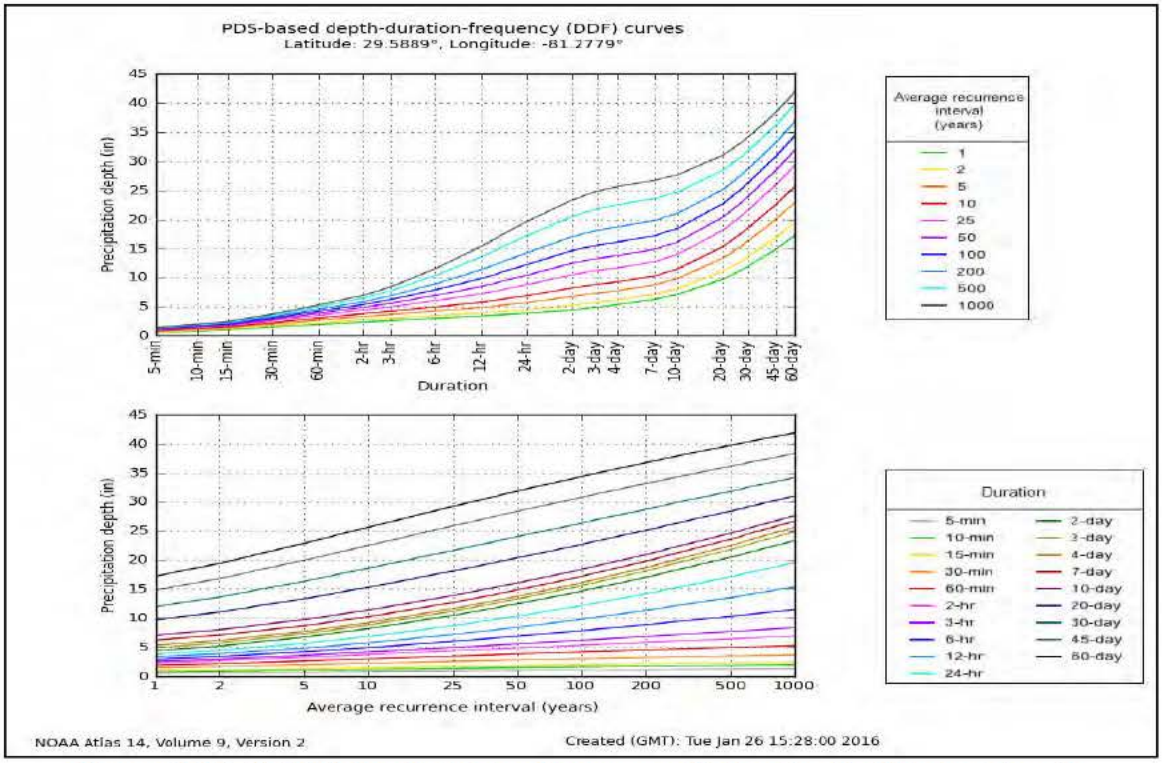

Figure 4.15: NOAA Precipitation Frequency Estimates for Flagler County

Source: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=fl

4.4.5 Vulnerability

As the history shows, Flagler County is quite vulnerable to floods. A GIS analysis conducted to determine more specifics of Flagler's vulnerability by overlaying property appraisal data with flood zone data. Each zone in the county was considered (X, VE, AE, A, and 0.2%). Afterward, this information was coupled with planning data and critical facilities points to determine the types of buildings that reside in the flood zones. All zones are still considered somewhat vulnerable to flooding, even X and 0.2%. For the purposes of this vulnerability assessment, parcels that lie in zones A, AE, and VE will be considered "in a flood zone", and parcels that lie in zone X and in .2% will be considered "not in a flood zone".

The following map identifies schools in and near the floodplain. Some schools belong to the school board and others are operated by other entities within the county and/or state. The school most at risk to flooding is Daytona State College. Many other schools, particularly those under the Flagler County School Board's jurisdiction border flood zones and may be at risk during extreme events.

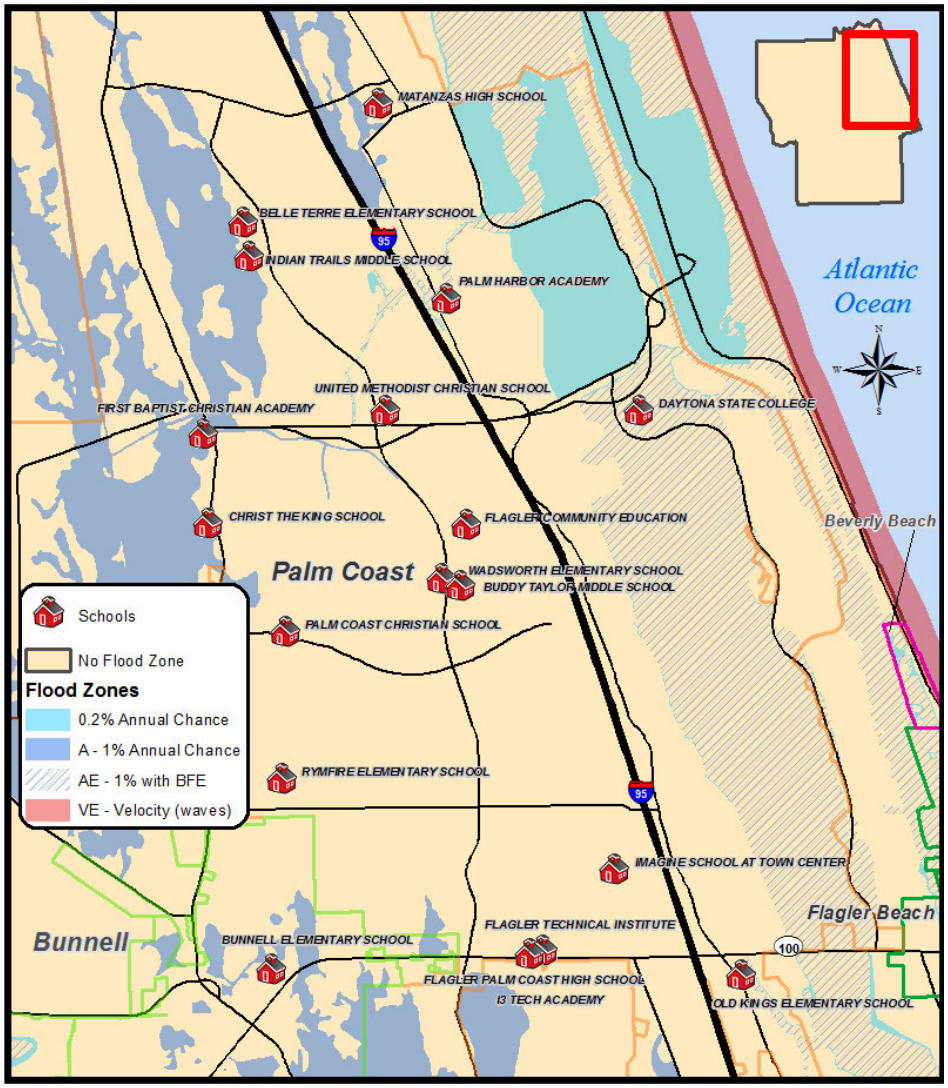

Figure 4.16: Schools in the Vicinity of Flood Zones

The tables below are made up of the following sections:

- *Type of Structure* – the corresponding general zoning category on which the structure is built. Some jurisdictions will not have every category (i.e. Beverly Beach does not have industry, mixed use, or agriculture zones).
- *Number of Structures on a Parcel in a Flood Zone* – the number of buildings with a parcel that *intersects* a floodplain. Some parcels are both in and out of a floodplain, and these counts are included in the table.
- *Value of Structures in Flood Zones* – the value, in USD, of all structures that are built on the parcels from the previous category. These buildings may not lie within the flood zone, but their parcel, at a minimum, intersects with the flood zone boundary.
- *Number of People (estimated) on Parcels in Flood Zones* – these columns are created from census block data. Some census blocks will contain more than one zone. For example, one census block may contain both residential structures and commercial buildings. For this reason, the "total" column will not be summed. The population numbers are from the 2010 census with 2013 projections.

Table 4.21: Flood Vulnerability in Palm Coast

Flood Vulnerability in Palm Coast									
Type of Structure	**Number of Structures on a parcel in a Flood Zone (A, AE, VE)**			**Value of Structures in Flood Zones**			**Number of People (estimated) on Parcels in Flood Zones**		
	Total	**In Hazard Area**	**% In Hazard Area**	**Total in $ (NOT in a Flood Zone)**	**$ In Hazard Area**	**% In Hazard Area**	**Total**	**# In Hazard Area**	**% In Hazard Area**
Residential	31,775	742	2%	$4,747,936,062	$216,102,316	5%	76,639	14,414	19%
Commercial	1068	69	6%	$499,574,531	$63,663,333	13%			
Industrial	204	56	27%	$47,394,766	$25,031,129	53%			
Agriculture/ Timberlands	63	9	14%	$13,796,398	$5,580,215	40%			
Conservation/ Public/Other	3,220	1,279	40%	$1,165,216,686	$506,173,176	43%			
Total/Total %	**36,330**	**2,155**	**6%**	**$6,473,918,443**	**$816,550,169**	**13%**			

Table 4.22: Flood Vulnerability in Marineland

Flood Vulnerability in Marineland									
Type of Structure	**Number of Structures on a parcel in a Flood Zone (A, AE, VE)**			**Value of Structures in Flood Zones**			**Number of People (estimated) on Parcels in Flood Zones**		
	Total	**In Hazard Area**	**% In Hazard Area**	**Total in $ (NOT in a Flood Zone)**	**$ In Hazard Area**	**% In Hazard Area**	**Total**	**# In Hazard Area**	**% In Hazard Area**
Mixed Use (Residential)	4	4	100%	$1,429,043	$1,429,043	100%	16	16	100%
Commercial	5	5	100%	$7,182,180	$7,182,180	100%			
Conservation/ Public/Other	11	11	100%	$5,578,089	$5,578,089	100%			
Total/Total%	**20**	**20**	**100%**	**$14,189,312**	**$14,189,312**	**100%**			

Table 4.23: Flood Vulnerability in Beverly Beach

Flood Vulnerability in Beverly Beach									
Type of Structure	Number of Structures on a parcel in a Flood Zone (A, AE, VE)			Value of Structures in Flood Zones			Number of People (estimated) on Parcels in Flood Zones		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in a Flood Zone)	$ In Hazard Area	% In Hazard Area	Total	# In Hazard Area	% In Hazard Area
Residential	313	165	53%	$60,579,814	$27,325,353	45%	782	782	100%
Commercial	12	8	67%	$5,671,832	$4,767,289	84%			
Conservation/ Public/Other	8	0	0%	$2,405,742	$1,949,304	81%			
Total/Total %	**333**	**173**	**52%**	**$68,657,388**	**$34,041,946**	**60%**			

Table 4.24: Flood Vulnerability in Bunnell

Flood Vulnerability in Bunnell									
Type of Structure	Number of Structures on a parcel in a Flood Zone (A, AE, VE)			Value of Structures in Flood Zones			Number of People (estimated) on Parcels in Flood Zones		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in a Flood Zone)	$ In Hazard Area	% In Hazard Area	Total	# In Hazard Area	% In Hazard Area
Residential	800	115	14%	$83,763,814	$21,267,927	25%	2,741	894	32%
Commercial	421	87	21%	$104,349,776	$53,612,260	51%			
Industrial	230	46	20%	$71,218,707	$22,303,477	31%			
Agriculture/ Timberlands	229	55	24%	$59,838,123	$22,889,212	38%			
Conservation/ Public/Other	283	92	33%	$120,849,487	$53,105,131	44%			
Total/Total%	**1,963**	**395**	**20%**	**$440,019,907**	**$173,178,007**	**39%**			

Table 4.25: Flood Vulnerability in Unincorporated Flagler County

Flood Vulnerability in Unincorporated Flagler County									
Type of Structure	Number of Structures on a Parcel in a Flood Zone (A, AE, VE)			Value of Structures in Flood Zones			Number of People (estimated) on Parcels in Flood Zones		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in a Flood Zone)	$ In Hazard Area	% In Hazard Area	Total	# In Hazard Area	% In Hazard Area
Residential	2,962	1,077	36%	$464,386,108	$269,216,208	58%	20,623	13,603	66%
Commercial	270	36	13%	$92,119,014	$15,203,942	17%			
Industrial	166	23	14%	$73,591,939	$32,346,724	44%			
Agriculture/ Timberlands	1,262	469	37%	$309,289,336	$168,336,786	54%			
Conservation/ Public/Other	4,682	3,330	71%	$1,760,857,839	$1,416,068,705	80%			
Total/Total %	**9,342**	**4,935**	**53%**	**$2,700,244,236**	**$1,901,172,365**	**70%**			

Table 4.26: Flood Vulnerability in Flagler Beach

Flood Vulnerability in Flagler Beach									
Type of Structure	Number of Structures on a Parcel in a Flood Zone (A, AE, VE)			Value of Structures in Flood Zones			Number of People (estimated) on Parcels in Flood Zones		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in a Flood Zone)	$ In Hazard Area	% In Hazard Area	Total	# In Hazard Area	% In Hazard Area
Residential	2,481	1,074	43%	$543,888,259	$274,094,862	50%	4,548	3,337	73%
Commercial	556	252	45%	$129,989,424	$51,008,108	39%			
Industrial	15	6	40%	$3,660,847	$3,046,871	83%			
Conservation/ Public/Other	893	705	79%	$214,925,513	$177,072,371	82%			
Total/Total %	**3,945**	**2,037**	**52%**	**$892,464,043**	**$505,222,212**	**57%**			

Table 4.27: Flood Vulnerability in All of Flagler County

Total Flood Vulnerability in All of Flagler County									
Type of Structure	Number of Structures on a Parcel in a Flood Zone (A, AE, VE)			Value of Structures in Flood Zones			Number of People (estimated) on Parcels in Flood Zones		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in a Flood Zone)	$ In Hazard Area	% In Hazard Area	Total	# In Hazard Area	% In Hazard Area
Residential	38,331	3173	8%	$5,901,983,100	$809,435,709	14%	95,696	27,410	29%
Commercial	2,332	457	20%	$838,886,757	$195,437,112	23%			
Industrial	1,877	131	7%	$195,866,259	$82,728,201	42%			
Agriculture/ Timberlands	4,978	537	11%	$382,923,861	$196,806,217	51%			
Conservation/ Public/Other	9,097	5,417	60%	$3,269,833,356	$2,159,946,776	66%			
Total/Total %*	**56,615**	**9,715**	**17%**	**$10,589,493,333**	**$3,444,354,015**	**33%**			

**Due to some issues in the dataset, there was some overlap in the building count. As a result of using intersection selection methods, some parcels were in more than one selection, therefore the building count total is slightly inflated. Using other selection methods rendered nearly the same result with almost exactly the same percentages.*

The following conclusions can be drawn from the vulnerability analysis:

- About a third of Flagler County is covered in flood zones, and nearly a third of the value of parcels is in flood zones.
- Nearly 10,000 structures lie on flood zone parcels. Though this does not necessarily mean that the buildings are directly within flood zones, their close proximity is still a concern.
- Nearly 30% of the population of Flagler County lives on a parcel that at a minimum intersects a flood zone boundary. This does not include the X zone, which also has the potential to flood, although typically with less frequency.

4.4.5a Future Threats

As part of the Community Rating System (CRS), an analysis was conducted on the areas that are likely to be flooded or have flood problems worsened by the following three events. The

projections are based on future development trends and plans for Flagler County as well as the calculated annual average sea level rise. The following table shows the analysis.

Table 4.28: Future Flood Threats

	Changes in Floodplain Development and Demographics	Changes in Development in the Watershed	Climate Change or Sea Level Rise
Areas Likely to be Flooded	Palm Coast, unincorporated Flagler County, Bunnell	Western Flagler County	Areas east of I-95, southwestern Flagler County along Crescent Lake
Areas that Could Have Flood Problems Worsened	Palm Coast, Daytona North	Western Flagler County	Palm Coast along canal systems, Flagler Beach, Beverly Beach, Marineland, and unincorporated county areas along the coast and Intracoastal Waterway

**Two watersheds exist within Flagler County, including the Lower St. Johns and the Upper East Coast.*

These future flooding conditions will have an effect on people, property, and natural floodplain functions. Palm Coast has the highest proportion of constituents within the county as well as the largest number of residential structures. Although the future land use map (see **Section 3**) identifies Palm Coast to be mostly built out, surrounding areas that are zoned for development will decrease the available permeable surface and could increase the amount of floodwaters present. This is particularly problematic in the floodplains, as the loss of this natural flood mitigation will likely cause increased flooding in surrounding structures. However, drainage/runoff is something each of the municipalities evaluates when looking at potential Development of Regional Impacts. As such, proper planning to ensure adequate drainage areas will mitigate many of the future impacts from flooding.

4.5 Coastal Flooding

Coastal flooding is a term that refers to weather events that have the possibility of flooding the immediate coastline or even further inland. NOAA describes several factors that contribute to coastal flooding:

- Local severe weather events, such as tropical cyclones or extra-tropical storms, create meteorological conditions that drive up the water level, creating a storm surge.
- Large waves, driven by local winds or swells from distant severe weather, can raise average coastal water levels and cause large and damaging waves to reach land.
- High tide levels caused by normal variations in the astronomical tide cycle.
- The combination of storm surge and heavy rain events, whether locally or in the upland watershed.
- Other larger scale regional and ocean scale variations, caused by seasonal heating and cooling and ocean dynamics, can contribute to high water levels[2].

Coastal flooding can be extremely dangerous, and any factor alone or in combination with another can cause severe damage. Not only does coastal flooding have the potential of destroying

[2] http://www.stormsurge.noaa.gov/overview_causes.html

property and lives, but it has strong environmental effects and can have major impacts on the local economy. Though coastal flooding in Flagler County is often the result of storm surge, there are some instances of high astronomical tides that have combined with intense pressure gradients to produce coastal floods.

4.5.1 Location

Areas subject to coastal flooding include those that are in an area called the Coastal High Hazard Area- also known as the area of special flood hazard- that extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The coastal high hazard area is identified as Zone V on FEMA's Flood Insurance Rate Maps (FIRMs).

The location of coastal flooding in Flagler County is similar to that of storm surge (see flood zone map in section 4.3.3). However, due to the nature of the events that cause coastal flooding, it is not expected to extend as far inland as storm surge, and as such is not likely to impact Bunnell. The areas in Flagler County most likely to be affected by coastal flooding would be those along the Atlantic coast and ICW, including Marineland, Beverly Beach, Flagler Beach, and unincorporated county, and the unincorporated low lying areas along Crescent Lake. Notably, along the Atlantic coast is Beverly Beach's large neighborhood of Seaside Estates. Situated in a low-lying area between the ocean and the ICW, this neighborhood is fully developed with mobile homes and is very susceptible to coastal flooding.

4.5.2 History

While coastal flooding is sometimes only reported as flooding, there have been documented 'coastal flooding' events in Flagler County in the past. Furthermore, there have been 2 coastal flood warnings and over 70 advisories, statements, and watches since 2006 in Flagler County[3].

The first recorded coastal flooding event found dated only as far back as September 29, 2003. It was noted that a high astronomical tide combined with a strong northeast flow led to minor coastal flooding and beach erosion.

In September 2004, Hurricane Frances not only produced countywide flooding, but the storm surge, high tides, and heavy rain combined in Flagler Beach to produce coastal flooding along the ICW.

In June 2005 when Tropical Storm Arlene dumped heavy rain across the county, the combination of that heavy rain and the storm surge from the tropical storm resulted in coastal flooding in Flagler Beach along A1A. Later that year in October, Tropical Storm Tammy also brought Flagler County some coastal flooding, this time along the ICW.

In October 2007 another coastal flooding event occurred, attributed to the high tides coupled with the large waves produced from Tropical Storm Noel in the Bahamas. This storm caused seas to rise about 2 feet in neighboring St. Johns County. Flagler County did not have a recorded sea level rise as St. Johns County did, but coastal flooding at Princess Place Preserve along Pellicer Creek was noted, and water levels reportedly topped seawalls in Flagler Beach.

[3] Iowa Environmental Mesonet – mesonet.agron.iastate.edu

In August 2011, Hurricane Irene formed several hundred miles southeast of Flagler County, sending wind and waves to the county's shores. Luckily, there were no reports of widespread coastal flooding, though at least one seawall had water levels encroach upon and reach the top. Also in 2011, Flagler County was positioned in the tight contours between a high and a low pressure gradient. High winds of over 60mph were recorded along the beaches during squall lines presented by the low pressure situated in the Gulf of Mexico. Water crested the seawall on the beach and thousands of dollars of damage were recorded in Flagler County.

In October 2012, Hurricane Sandy passed by offshore producing coastal flooding effects that are covered in section 4.03.

In May 2013, the combination of heavy rain and storm surge again resulted in coastal flooding along A1A in Flagler Beach.

In 2014, a very strong high pressure over Canada combined with a coastal trough offshore to funnel winds into a tight pressure gradient along the coast of North Florida. In Flagler, some minor overflow was reported in Hammock Beach on a road close to the beach. No damage estimates were reported.

4.5.3 Extent

One may expect the maximum extent of coastal flooding in Flagler County to be similar in scope to that of a Category 1 storm surge. Rain combined with coastal flooding from the Atlantic, ICW, or Crescent Lake may produce locally flooded areas with depths between 1 and 4 feet, although there is limited data available to support this conclusion. Damaged or destroyed homes and buildings, damaged or destroyed vehicles, damaged electrical, debris, mold, food and water contamination, vector-borne illness, crop loss, water and sewage system interruption/overflow, dangerous driving conditions, road blockages/closures, and school and business interruptions are all potential effects of coastal flooding in extreme circumstances.

4.5.4 Probability

Given the geography and that there have been 72 advisories, statements, watches, and warnings in the past 9 years, and 9 documented events in the last 12 years, it is quite probable to expect coastal flooding to occur about once per any given year. Whether it is through storm surge from a tropical cyclone or from a passing storm system, coastal flooding will remain a threat, amplified by future sea level rise.

4.5.5 Vulnerability

For the purposes of this plan, vulnerability from coastal flooding will be considered akin to storm surge since both are similar in scope. As such, the greatest vulnerability exists for homes and structures located within or intersecting the A, AE, and VE flood zones in coastal areas including those areas along the Atlantic, Intracoastal Waterway, Crescent Lake, connected waterways, and surrounding low-lying areas, as well as homes in and around those areas that were built below base flood elevation or slab on grade.

4.6 Storm Surge

A storm surge is an influx of sea or lake water pushed ashore by the strong winds in a storm. The vast majority of storm surges are tiny—usually a foot or two, if that—and only affect the immediate coastline with something locals would probably consider nuisance flooding. Stronger storms can create a storm surge great enough to destroy homes and businesses near the coast, and historic hurricanes like Katrina or Camille can generate a devastating storm surge that pushes the ocean miles inland, destroying thousands of structures, and potentially killing hundreds of people along the way. Damaged or destroyed homes and buildings, damaged or destroyed vehicles, damaged electrical, debris, mold, food and water contamination, vector-borne illness, crop loss, water and sewage system interruption/overflow, dangerous driving conditions, road blockages/closures, and school and business interruptions, are all potential effects of storm surge.

Storm surge is very unpredictable because it is exceptionally sensitive to even the slightest changes in a storm, including the radius of the wind core, the trajectory, angle of approach, central pressure, and the shape of the coastal features. Localized features like bays, concave/angled coastlines and high tide can make storm surge worse. In addition, since the continental shelf bordering northeastern Florida is more gently tapered, storm surge effects are potentially greater than with a more sharply angled slope such as in South Florida.

In Flagler County, storm surge events are not very frequent, and those that have occurred have not resulted in any recorded loss of life; however, events from both tropical systems and other weather features have resulted in some intense beach erosion, especially in the last few decades. As development continues to occur near the coastline, there is greater risk for sand dune depletion. Sand dunes are key to holding back the strong wave action.

4.6.1 Location

Storm surge can occur along any coastline within the county. Areas most susceptible to storm surge impacts and the resulting flood inundation include the barrier islands (specifically communities in the northeastern section of the unincorporated county area, the Town of Marineland, the Town of Beverly Beach, the City of Flagler Beach), land west of the Intracoastal Waterway, land in Palm Coast surrounding the canals, and areas surrounding Crescent Lake. The unincorporated community of Daytona North also has the potential to be affected by storm surge when it flows down the river from the north into Crescent Lake.

Since storm surge is mostly wind driven, a hurricane approaching from the south east or south west has the potential to increase the magnitude of the problem, especially if Flagler County is in the northern quadrant of the storm, when winds from the east can blow water further inland. Depending on the wind direction during a storm event, the surge can affect different portions of surrounding water bodies. For instance, in the event that high winds are blowing to the northeast, more of the eastern sections of residences surrounding Crescent Lake will be affected. High winds sustained to the west/northwest region could cause surge to flood more western portions of the county past I-95 in some areas.

SLOSH (Sea, Lake, and Overland Surges from Hurricanes) maps are the basis for Flagler County's evacuation zones, as show on the map on the following page. Zones A through E in eastern Flagler County correspond to a storm surge inundation from the Atlantic Ocean. Zone F

lies along Crescent Lake to the west and corresponds to a storm surge that travels along the river and from the lake itself.

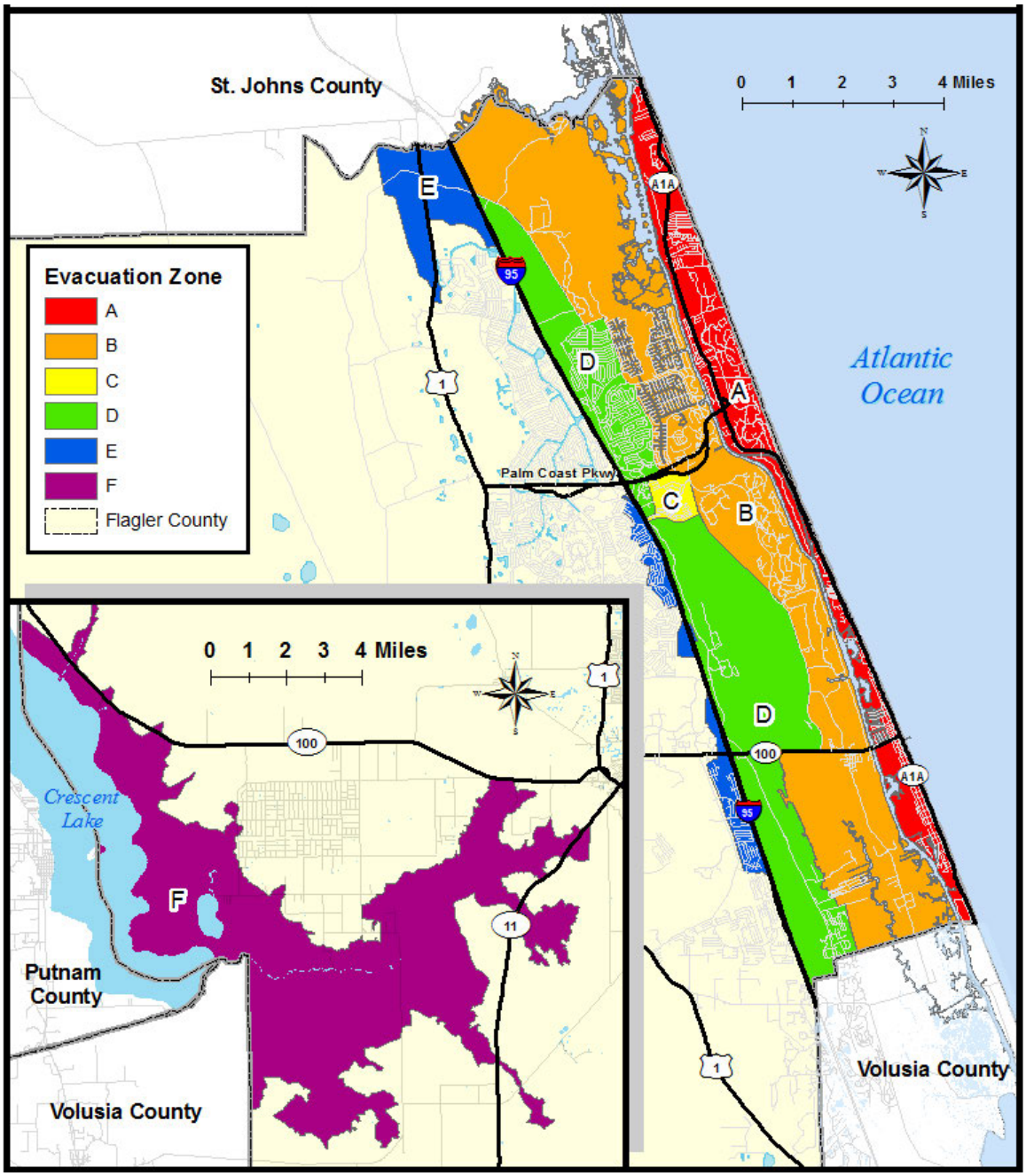

Figure 4.17: Storm Surge Evacuation Zones in Flagler County (2015)

4.6.2 History

Since 1999, there have been 10 documented storm surge events that have occurred within the Flagler County region. There have been no major storm surge events recorded between 2012 and January 2016.

Table 4.29: Historic Storm Surge Events

Date	Description
9/13-15/1999	Hurricane Floyd caused storm surge flooding along the Intracoastal Waterway, flooded A1A at Marineland, and flooded parts of Flagler Avenue in Flagler Beach.
10/17/1999	Hurricane Irene, though not a strong hurricane, resulted in some minor storm surge and beach erosion along the coast of Flagler County.
9/13/2001	Tropical Storm Gabrielle caused an estimated 4-6 foot storm surge in the Intracoastal Waterway, which flooded Flagler Avenue in Flagler Beach, threatened mobile homes in Beverly Beach, and flooded a number of county parks. Surge also came up to other buildings on the Intracoastal Waterway but did there were no reports of water entering structures.
9/7/2004	Hurricane Frances was an extremely large and low moving hurricane. Because of Flagler County's position relative to the storm, the beaches sustained significant storm surge and severe beach erosion.
9/27/2004	After days of looping around in the Atlantic basin, Hurricane Jeanne made landfall in nearly the same location as Frances only weeks earlier. Wave heights of 20 feet were recorded along with a storm surge associated with high astronomical tides. Beach erosion was once again extensive.
9/7-9/2005	Water levels reached the top of canal walls in NE Palm Coast due to strong onshore wind flow from severe weather. The water reportedly spilled over at times, but no homes or other structures were threatened.
10/5/2005	Tropical Storm Tammy was a short lived relatively weak tropical storm that passed close to Flagler's shores from south to north. Beach erosion of up to two feet was reported in both Flagler and St. Johns counties as a result of storm surge.
5/9/2007	Tropical Storm Andrea: High surf occurred at Flagler Beach with 6 to 8 foot breakers. Due to high surf and storm surge, the Flagler Beach Pier was closed. Andrea also caused significant beach erosion along Flagler County beaches.
5/17/2009	A strong nor'easter caused some Intracoastal Waterway surge flooding, mostly noted in Flagler Beach. Water was on Flagler Avenue in the south side of the city as well as areas along South 24th Street.
10/25-27/2012	As Hurricane Sandy passed by the east coast, it blasted the beaches with strong surf and high winds. Storm surge was felt as far south as Miami and even flooded streets. In Flagler County, very minor tidal flooding was reported from storm surge along the Intracoastal Waterway south of Flagler Beach.

Note: Date compiled from NCDC and historical records.

4.6.3 Extent

Flagler County tides have a mean tidal range of 4.3 feet and mean spring tides around 5.1 feet. When a hurricane or other storm event occurs, these heights can grow and vary depending on the extent of the storm. In a major tropical cyclone event, Flagler Beach and portions of the county near Matanzas Inlet could have storm surge depths between 20 and 42 feet, according to the GIS data provided as a part of the Northeast Florida Regional Council's Hurricane Evacuation Study. However, the Evacuation Study Maximum of Maximum runs state that the maximum depth of storm surge would be approximately 22.8 feet. A storm surge this high would breach the dune system and drive water inland causing damage to residences as far inland as Palm Harbor

Parkway. The figure on the following page provides predicted storm surge depths for a worst case scenario.

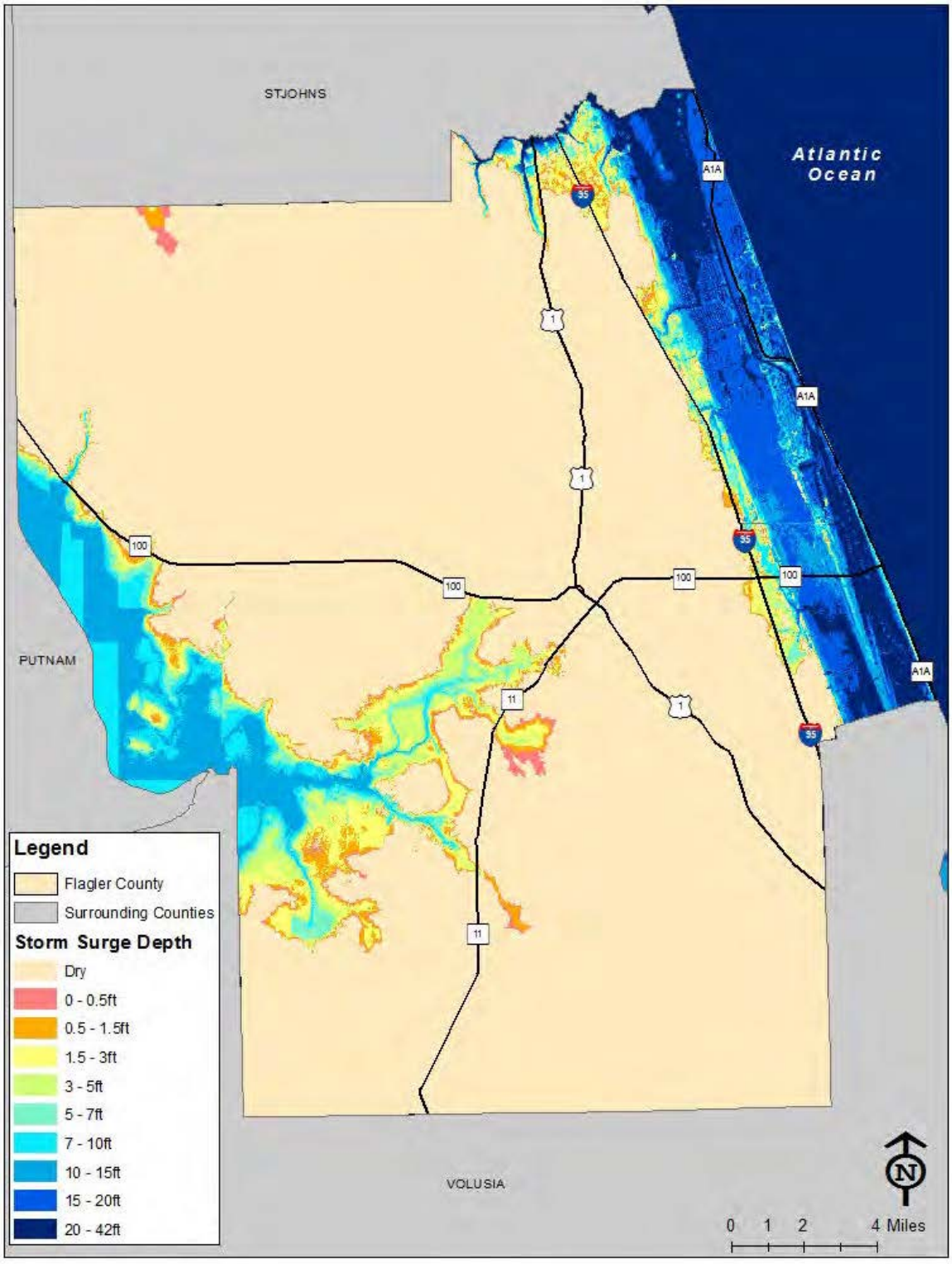

Figure 4.18: Predicted Storm Surge Depths for Flagler County

4.6.4 Probability

Historic data for storm surge in Flagler County is not comprehensive. Using the historical documentation that is available, the probability of a storm surge event during any given year seems to be about a 55-60% chance, or roughly one event every 2 years.

4.6.5 Vulnerability

Hurricane evacuation studies were conducted throughout Florida to estimate the potential impacts from storm surge based upon several different hurricane scenarios. The SLOSH model takes into account the elevation of the land harnessed from LiDAR (Light Detection and Ranging) data. The variables in these equations include shoreline geology, water depths, bridges and roads, levees and dams. The final result was used to determine how far surge will inundate and at what depth. Emergency officials use these SLOSH maps to determine evacuation zones for hurricanes.

SLOSH models are applied to several areas along the Atlantic and Gulf coasts call basins. Flagler County is a part of the jx3 basin in the Jacksonville area. The SLOSH models that are produced are an amalgam of the above mentioned variables, and a complete scenario includes a Maximum Envelope of Winds (MEOW) diagram juxtaposed with its own Maximum of Maximums (MOMs). These maximums are not a part of any single storm, but are in fact a composite picture of the very worst a storm can do.

The following maps are the most updated SLOSH models from June, 2015. The red arrow on each map represents the direction the storm is moving, but not necessarily the exact path.

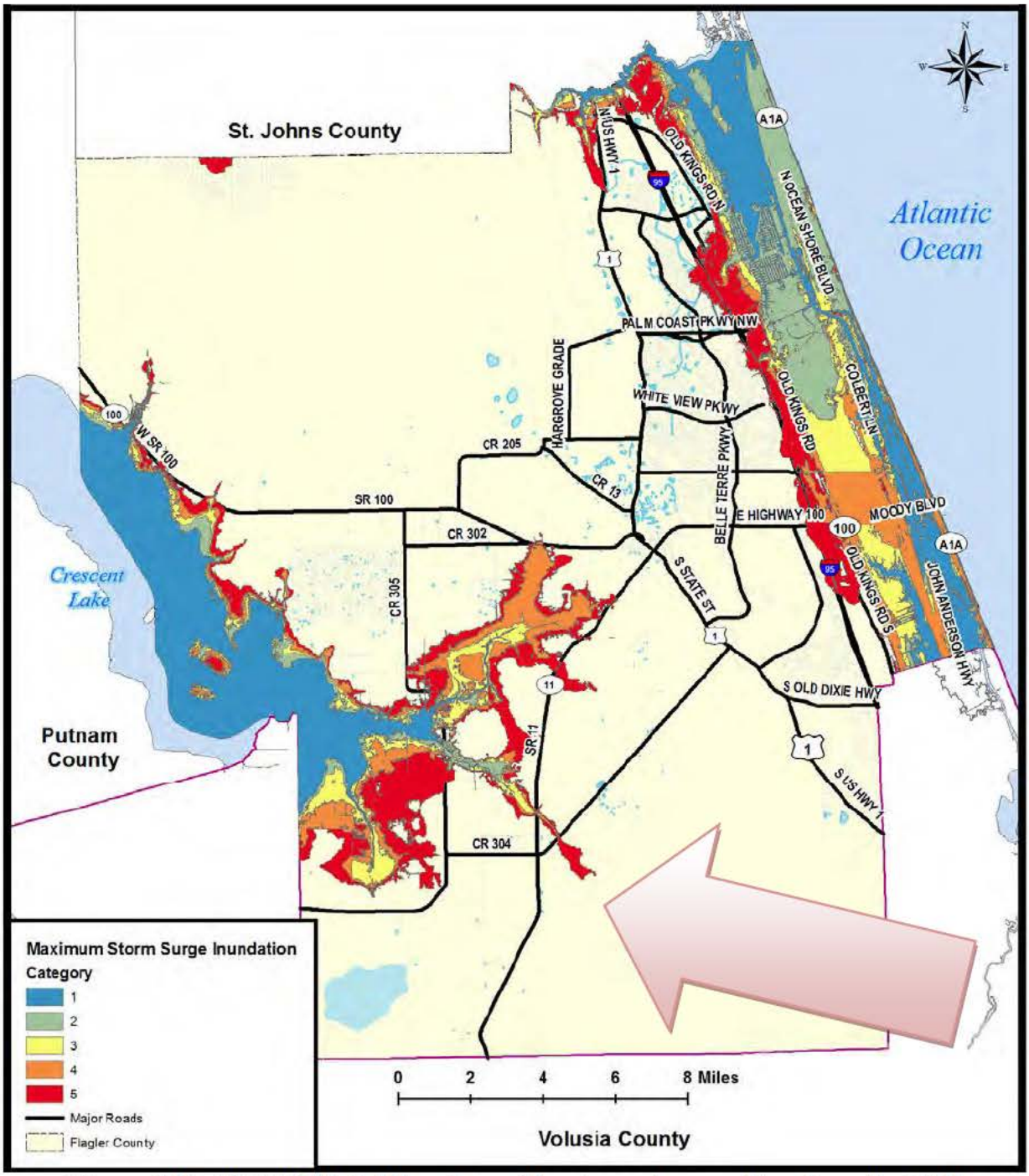

Figure 4.19: SLOSH Model Based on a Hurricane Approaching from the ESE (Moving WNW)

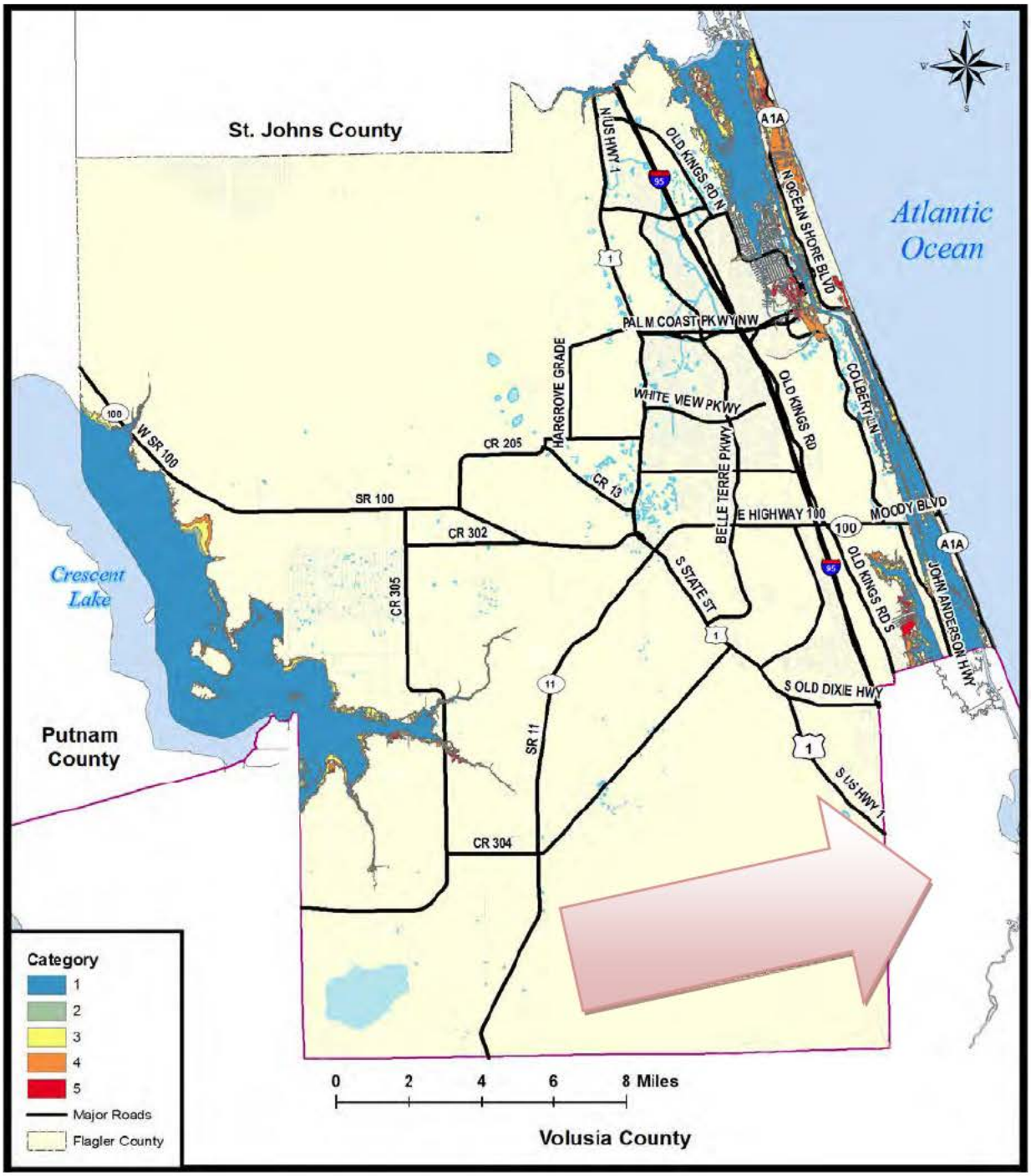

Figure 4.20: SLOSH Model Based on a Hurricane Approaching from the WSW (Moving ENE)

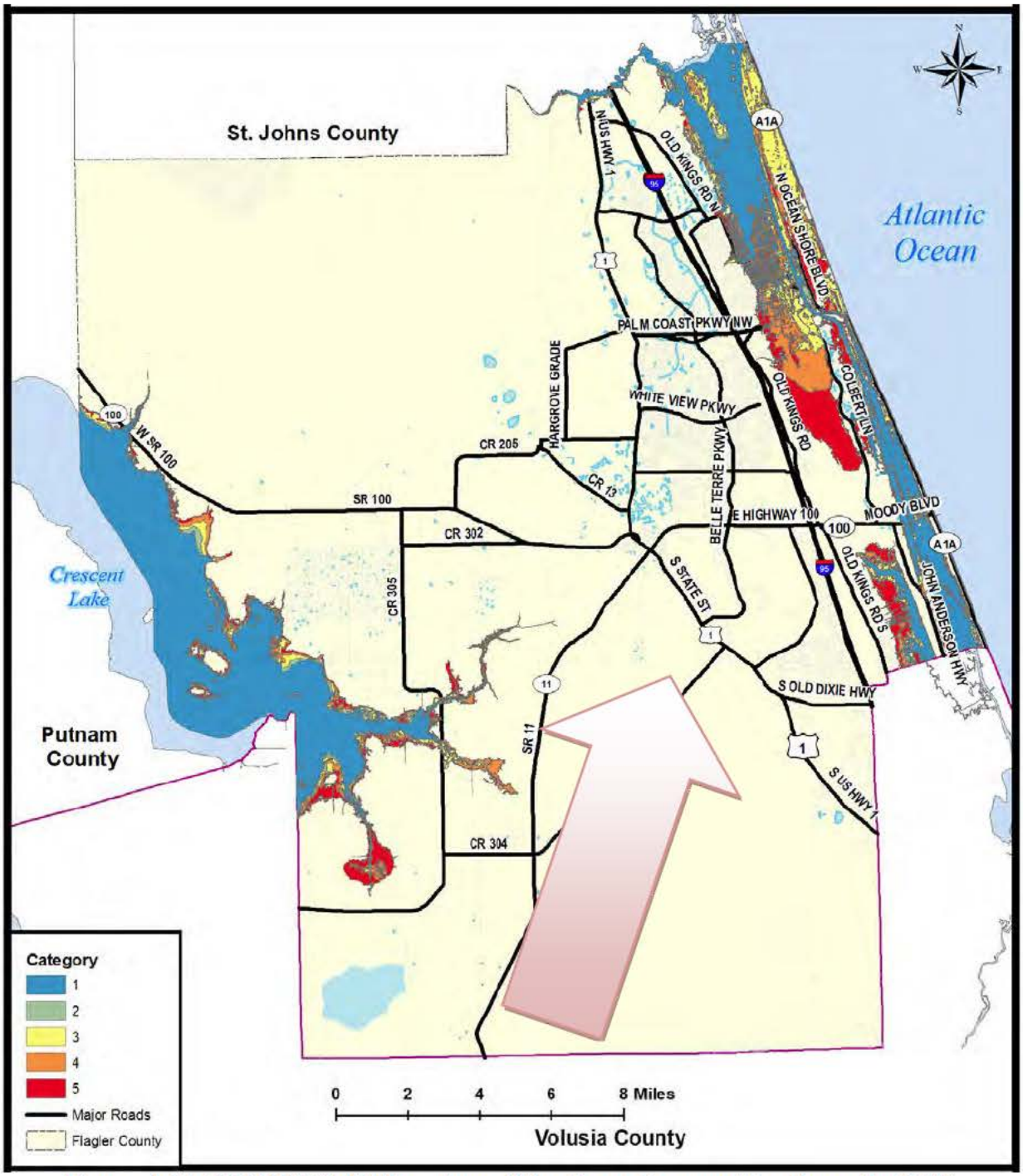

Figure 4.21: SLOSH Model Based on a Hurricane Approaching from the SSW (Moving NNE)

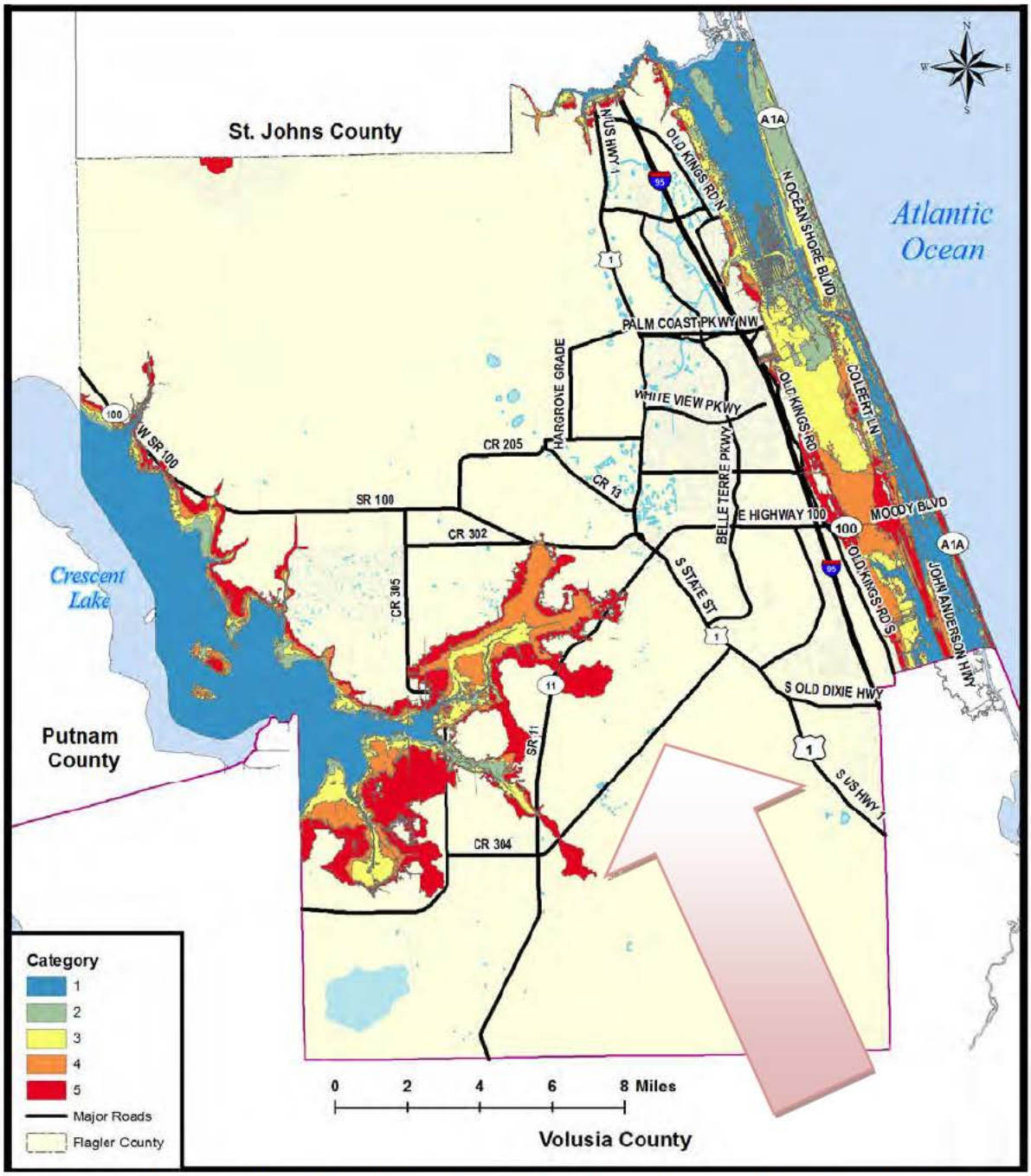

Figure 4.22: SLOSH Model Based on a Hurricane Approaching from the SSE (Moving NNW)

The following figure displays the schools in Flagler County in relation to their evacuation zone. If schools are located in an evacuation zone they cannot be used as hurricane evacuation shelters. Only two schools under the school board's jurisdiction are at risk to storm surge, including Matanzas High School and Old Kings Elementary School. In order for them to be affected by storm surge, it would have to be a significant storm. Daytona State College is slightly more at risk as it is closer to the coast and within a 100-year flood zone. Palm Harbor Academy, a small privately run elementary school, is also at risk to storm surge.

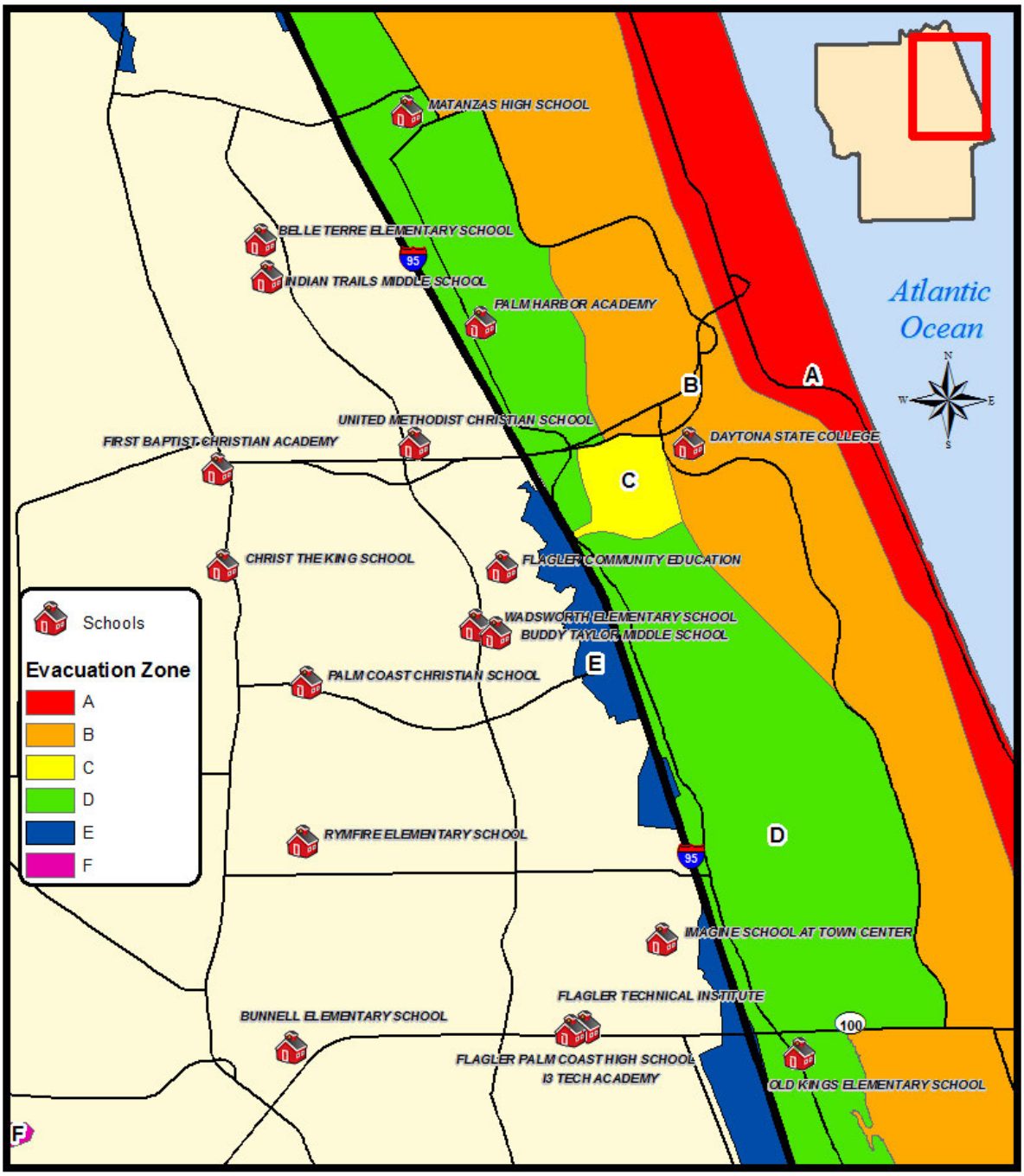

Figure 4.23: Schools in Flagler County in Hurricane Evacuation Zones

The following table is an estimate of the losses that could be incurred if the Maximum of Maximums were to occur. Though this estimate seems extremely high (over half of the property value of the county), it is important to note some peculiarities. First, storm surge in the western parts of the county would come from Crescent Lake which is attached to a network of rivers that flow from the north and begin at the Atlantic Ocean. High winds and low pressure have the potential to push water down these rivers and into Flagler County. This is the reason for the "F" evacuation zone that lines Crescent Lake. Next, there is a network of canals in Palm Coast that line residential properties that, in the event of major storm surge, could easily overflow into

homes and businesses. Most of these canals border highly valuable properties and could drive up the damage estimates in extreme situations.

Table 4.31: Economic Vulnerability to the Maximum (Category 5) Storm Surge

Storm Moving WNW (Worst Case Scenario)					
Jurisdiction	**Number of Parcels**	**Number of Appraised Lands**	**Number of Buildings**	**Total Appraised Value as of June 2015**	**Population (estimated) Affected**
Beverly Beach	488	530	341	$70,932,270	
Bunnell	178	87	61	$8,287,112	
Flagler Beach	4,482	4,919	3,421	$758,104,840	
Palm Coast	15,793	19,347	11,606	$2,339,174,816	
Marineland	18	24	18	$14,211,392	
Unincorporated	8,976	10,379	5,646	$2,118,262,589	
Total	**29,309**	**35,286**	**21,093**	**$5,308,973,019**	**35,978***

Source: Flagler County Property Appraiser
**Population estimates are derived from intersecting parcels, which may inflate the number.*

Flagler County is vulnerable to the effects of storm surge on both sides of the county. Inundation could occur several miles inland during an extreme storm, as indicated by the SLOSH maps. Particularly vulnerable are the towns of Marineland, Beverly Beach, and the City of Flagler Beach, as well as the coastal areas of unincorporated Flagler County. To the west, most of the inundation would occur in sparsely populated areas, but the unincorporated community of Daytona North, which lies near Crescent Lake, may be surrounded by flood waters, impeding travel during or after an event. Palm Coast has several wealthy communities that lie near the beachfront with homes worth over a million dollars that have driven up vulnerability estimates. In addition, there are several canals in the 'C' and 'F' section neighborhoods that are predicted by the SLOSH models to flood homes in the event of a major storm surge. Marineland and Beverly Beach lie entirely within a half mile of the beachfront, and all of their properties are susceptible to storm surge from a category 2 and beyond. Flagler Beach lies at a lower elevation than its northern counterparts, and is more vulnerable to the effects of a category 1 storm. Bunnell is further inland and would only be affected by the very worst of storm surges.

4.7 Wildfire

A wildfire is any uncontrolled fire in combustible vegetation that occurs in a wilderness area. Wildfires are characterized in terms of the cause of ignition, their physical properties (i.e. speed of propagation), the combustible material present, and the effect of weather on the fire. A wildfire differs from other fires by its extensive size, the speed at which it can spread out from its original source, its potential to change direction unexpectedly, and its ability to jump gaps such as roads, rivers, and fire breaks. The local differentiation between a brushfire and a wildfire depends primarily upon the size and fuel for the fire, though there are no strict criteria for such.

The Keetch-Byran Drought Index (KBDI), also discussed in the drought hazard section, was designed specifically for fire potential assessment. It is a number representing the net effect of

evapotranspration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers. It is a continuous index, relating to the flammability of organic material in the ground.

- KBDI = 0 - 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation.
- KBDI = 200 - 400: Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- KBDI = 400 - 600: Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.
- KBDI = 600 - 800: Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

It is important to reiterate the majority of Flagler's residents reside in areas surrounded by brush, called the 'wildland-urban interface'. Mitigating fires is very difficult in these areas since this brush must be contained and pruned frequently to prevent overgrowth. Efforts to mitigate wildfire include fuel reduction, also known as prescribed burning, ordinances to regulate the growth of underbrush, and community-wide campaigns to encourage building with fire-resistant materials and landscaping.

4.7.1 Location

The entirety of Flagler County is vulnerable to wildfires in some fashion, whether it be from fire or smoke. The local ecology is made up of a few ecosystems: pine flatwoods, mesic scrub, forested wetlands, and cypress swamps near the peripheral of the county. Most of the land is made up of pine flatwoods due in part to its natural occurrence and because of timber farms in the western parts of the county. Flatwoods are characterized by tall pines (mostly slash pines) with heavy underbrush of saw palmettos and flammable pine needles, and other scrubs. Mesic scrub habitats are endangered to development and are made up of sand live oaks with sand or slash pines. Ground cover is usually sandy, making this ecosystem slightly less prone to fires. Flagler is also home to the typically wet cypress swamps, which usually do not burn except for once every 50 to 100 years.

4.7.2 History

There are many well recorded wildfire events in the county's history and two extreme wildfire complexes that have escalated mitigation efforts in the past 30 years. The seven or eight fires that comprised the fires of 1985 occurred in three parts of Flagler County- through Palm Coast, Bunnell, and the small community of Korona. Fueled by 40 mph winds and a high drought index, these fires destroyed 202 homes and damaged an estimated 393 others. In 1998, there were 14 separate wildfires that burned over 82,000 acres over a period of 2 months. All but one fire was caused by lightning. El Niño had caused strong rainfall the preceding year, which increased the growth of vegetation. Hard freezes then killed crops and increased fuel for fires by early spring. In 1998, La Niña replaced El Niño, causing an intense drought. The average drought index for these fires was in the 790s out of a possible 800. The fires started in June, sweeping through Palm Coast burning over 1,100 acres, destroying 20 homes and damaging 17

others. Then in early July, numerous fire evacuations were ordered, culminating in an evacuation of the entire county beginning July 3rd and continuing through the morning of July 6th. During the first days of July, an additional 51 homes were destroyed and 175 damaged. In total, 71 homes were destroyed, 192 damaged, over 82,000 acres had burned and approximately $3.7 million had been expended by the county.

The remarkable difference between these two great fires lies in the evacuation efforts. In 1985, there were approximately 10,000 residents affected by these fires, and only a few subdivisions were evacuated. By 1998, efforts to fight fires had improved considerably; however, there were now 40,000 residents and the fires that year converged in a way which forced the evacuation of the entire county, the first event of its kind in the history of the United States.

There were four incidents of wildfire during 1999 affecting the entire county with at least 500 acres burned. In 2000 there was one wildfire recorded, and another in 2007 that burned at least 6,575 acres. During the 2011 summer wildfires, nearly 7,000 acres of property within the county were burned as a result of 135 different wildfire events. While no structures or vehicles were damaged and there were no injuries or fatalities, a state of emergency was declared by the Governor as a result of the fires. In 2012, a dangerous, fast-moving wildfire burned nearly 50 acres of land in March, which was then followed up by another wildfire in early April that while only burning the equivalent of two city blocks, forced the temporary evacuation of more than 10 homes.

In March 2013, what started as a small backyard brushfire in Beverly Beach grew to about an acre, consuming parts of a beach front home, the entirety of its palmetto-brush backyard, and parts of neighboring backyards. It also jumped State Road A1A, demolishing a segment of a beach access set of stairs. Complicating the firefighting efforts were strong winds, which carried embers into new locations and reignited areas that had since calmed down. Every local fire department – Flagler Beach, Palm Coast, and Flagler County, had units at the scene, as did the Florida Forest Service, then referred to as the Division of Forestry. Additionally, FireFlight, the county's helicopter, was on the scene, working in concert with bulldozers from Florida Forest Service to combat and contain the flames. It was the first time in many years that an area beach-side had experienced a fire danger of that magnitude. Just a few days later, a wildfire started southwest of Bunnell in a pine and cypress forest that burned over 200 acres.

Though there have been many wildfires since then, the severity of the 1998 fires has not since been surmounted. These fires spawned a number of preventative efforts including a mitigation plan, several ordinances, a county emergency website, and an annual underbrush burning program run by the Florida Forest Service. Palm Coast and Flagler Beach each have wildfire mitigation ordinances to regulate the growth and maintenance of underbrush and hazardous vegetation within a prescribed distance of a structure. The county also utilizes prescribed burns to reduce hazardous fuel buildups.

The following map displays the points of origin of brush fires and wildfires from 1991 to 2012 from the Florida Forest Service. Not all of these reported points of origin resulted in large fires, but each ultimately had the potential to, given the presence of appropriate fire weather.

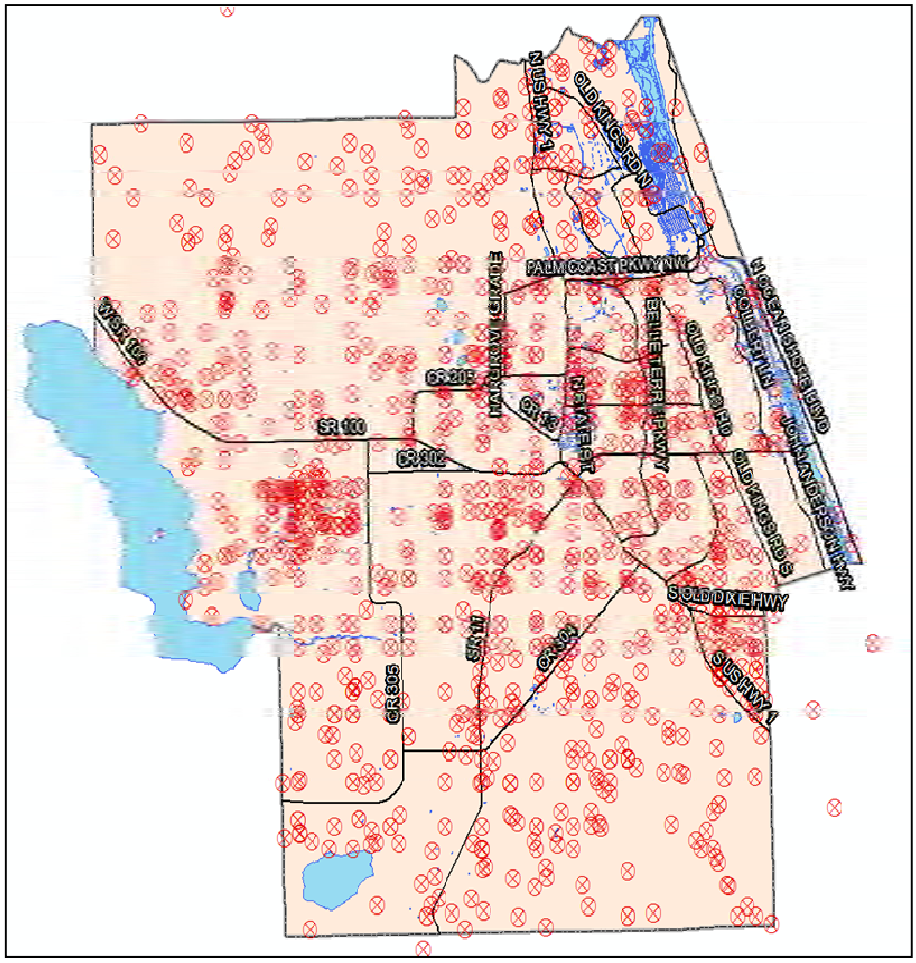

Figure 4.24: Fire Ignition Points from 1991 to 2012
Source: Florida Forest Service

4.7.3 Extent

The magnitude of wildfires depends upon the above mentioned weather conditions. When certain conditions are met, such as high temperature, high winds, and significant drought, fires are far more intense and can spread faster. While it is unlikely a wildfire of 1998's magnitude will occur again in Flagler due to the changes in mitigation, prevention, and equipment available to the county, something similar to the 2011 fires is more likely. In other words, 80,000 acres is not expected to burn at one time again, but it is reasonable to estimate a fire where 10,000 acres burns, per the Flagler County Fire Chief.

4.7.4 Probability

Droughts are important indicators for predicting the probability for wildfire to occur. Less moisture content creates conditions that are favorable for the occurrence and spread of wildfires. If prolonged drought occurs, more fuel becomes available for combustion. High values of the KBDI are an indication that conditions are favorable for the occurrence and spread of wildfires, but drought is not by itself a prerequisite for wildfires. Other weather factors, such as wind, temperature, relative humidity, and atmospheric stability play a major role in determining the actual fire danger present.

Fire weather occurs frequently in Flagler County, particularly during the months with minimal rainfall. Florida's natural ecosystems are adapted to fire, but vegetative suppression efforts have a spotty history. Controlled burns in Flagler County are not as frequent as they once were, and the potential for a fire that starts from lightning is extremely high, especially in the dry periods after winter rains and June thunderstorms.

Wildfire ignition density is the probability of a wildfire igniting in an area. The Southern Group of State Foresters created a Wildfire Risk Assessment Portal that modeled historic wildfire ignition figures from 1981 through 2007. Level 1 is considered "very low" probability, while Level 7 is "very high." Of interest is the fact that the level 7 areas are mostly around heavily populated neighborhoods and inhabited agricultural fields where debris burning is common. The Level 1 areas are lightly populated or are conservation zones; while these areas are thickly forested, the lack of human interaction has kept fires to a relative minimum. Areas in white are considered non burnable.

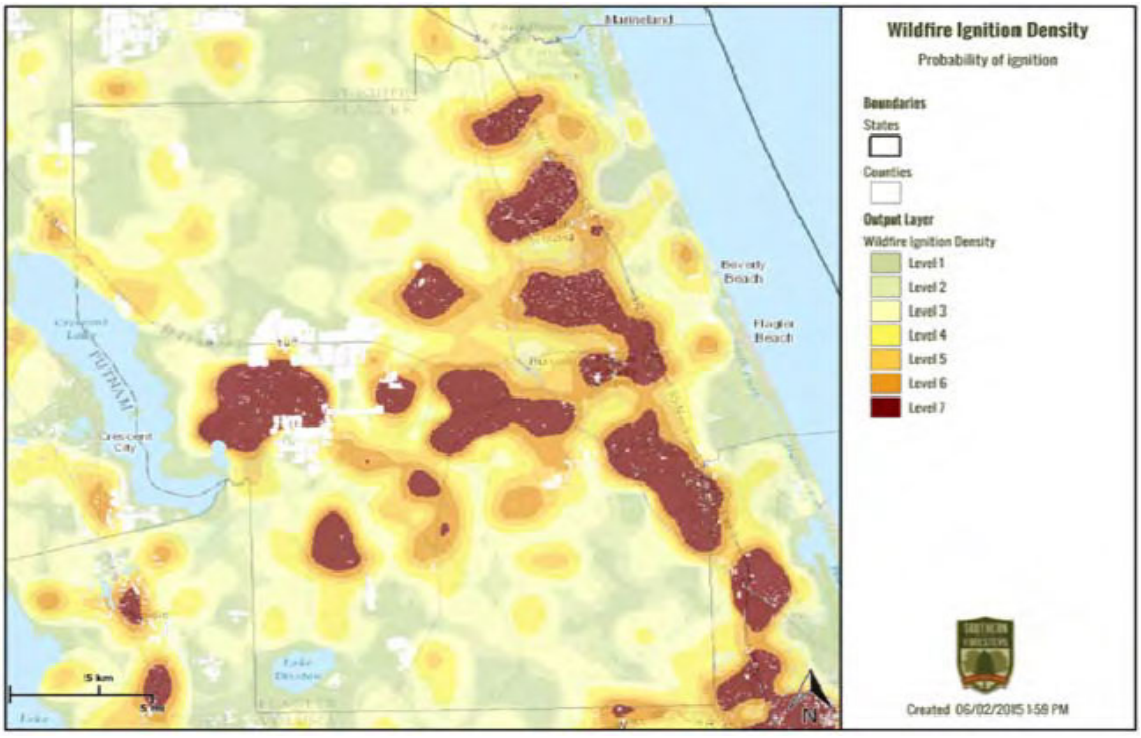

Figure 4.25: Wildfire Ignition Probability

Wildfire events, such as large brush fires, in Flagler County will continue to occur annually. However, one could expect significant wildfires to occur less frequently or approximately every 10-15 years.

4.7.5 Vulnerability

All of Flagler County is vulnerable to the impacts of wildfires. The western timberlands are exposed to intense heat during the summer, and unfavorable weather events may cause drought, rendering dense forests as dangerous tinder. Wetlands that dot the landscape of the county often contain tall, overgrown vegetation which, if dried out, has the potential to burn more fiercely

than other areas. The vast majority of structures in Flagler County are within the moderate to extreme wildfire risk area. Furthermore, in the Eastern portion of the county, there is a lot of connectivity between high wildfire risk areas where wildfire can easily spread throughout the whole area.

When wildfires do occur, they bring with them a host of potential impacts. Besides the fire damage itself to structures, agriculture, wildlife, infrastructure, and people, wildfires can have tremendous secondary impacts. While smoke can create visibility and health problems, when smoke combines with high humidity in the evenings and early morning hours, dense fog can occur. This further impedes visibility and can cause large traffic accidents. Roads may need to be closed, restricting travel and commerce, schools and businesses may need be closed, and homes may need to be evacuated.

The Wildland Urban Interface Index (WUI) measures the vulnerability of homes that border burnable vegetation. The information herein will rely on GIS and reports from the Southern Wildfire Risk Assessment Portal (SWRAP) tool from the Southern Group of State Foresters, a non-profit organization that is made up of representatives from the 13 Southern states, as well as Puerto Rico and the Virgin Islands[4].

The goal of SWRAP is to gather information quickly and efficiently about wildfire risk assessment in the southern 13 states. The data from SWRAP is gathered from a number of different wildfire plans; Florida incorporated its 2010 risk assessment. The result is a number of map layers that can be used to identify areas that are the most vulnerable to wildfire, which in turn can be used in a number of different plans in order to justify budgeting and emergency response priorities. SWRAP can also be used for more specific needs, such as prioritizing areas for reducing potential wildfire fuel, or teaching communities about their explicit wildfire vulnerabilities; all of this can ultimately lead up to a change or strengthening of mitigation priorities and community policy.

In order to conduct vulnerability analysis, GIS was used to match property appraiser and population data with data from the SWRAP Professional Viewer. SWRAP also has the ability to generate an automatic report with a detailed risk assessment for a chosen area. A comprehensive report for Flagler County has been included as **Appendix C**. According to SWRAP, WUI is a "rating of the potential impact of a wildfire on people and their homes." This layer combines urban density and fire susceptibility with a "response function" that assigns a net worth change of a structure based upon how vulnerable it is to wildfire. The ratings range from -1 to -9, with -9 representing the most "negative" impact. The most negative ratings are achieved in areas where urban density and flame lengths are high; vice versa for -1 ratings. For example, homes next to high fuel areas (dense underbrush, tightly grouped vegetation, or tall grasses) will reside in a -9 area, while buildings that are not surrounded by any fuels will receive a -1 or 0 rating if an area is not burnable (lakes, parking lots, etc.). SWRAP's WUI Risk Index is computed by building density; therefore, the data cannot be broken down in separate land uses (commercial, industrial, etc.).

[4] http://www.southernwildfirerisk.com/

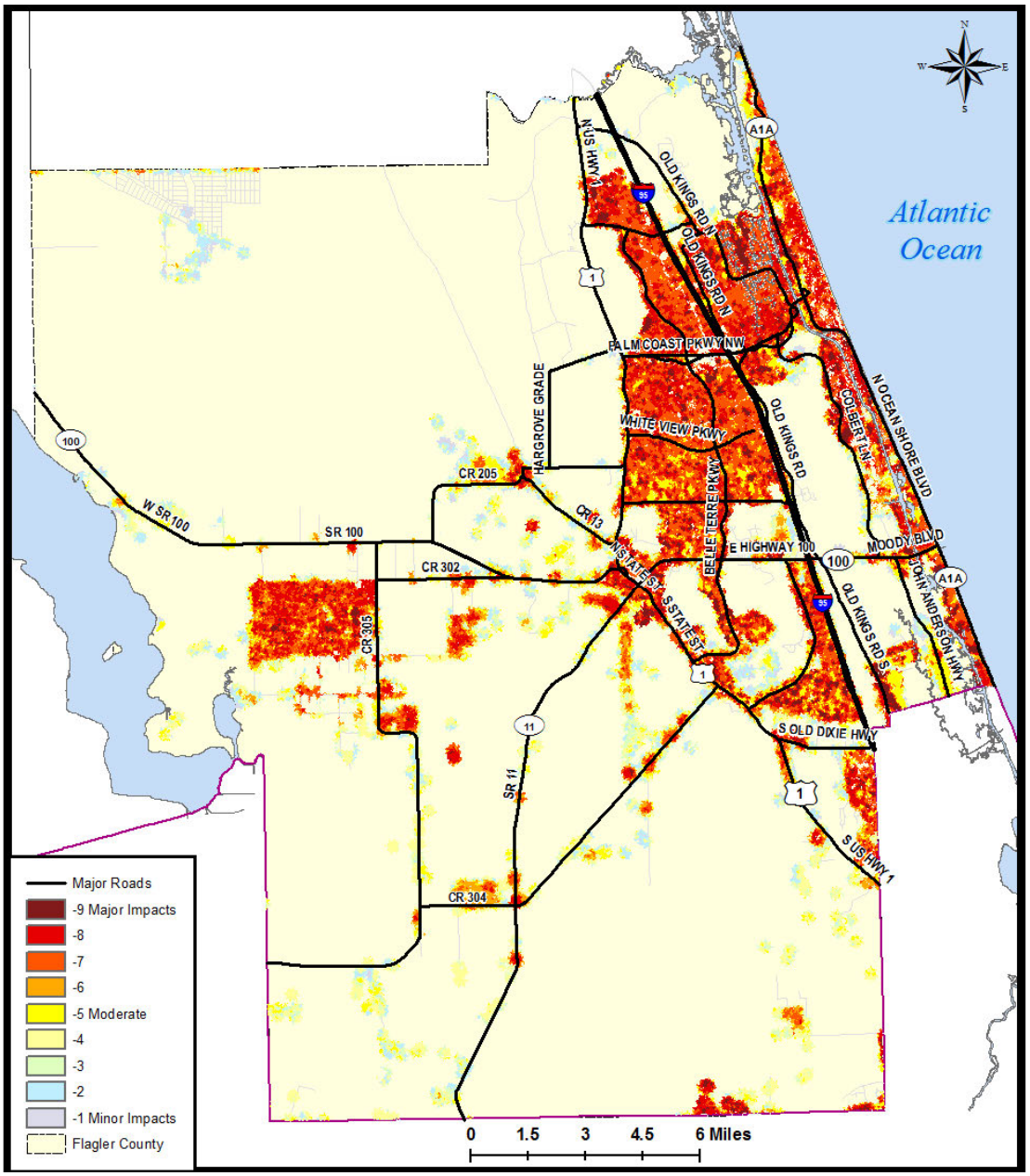

Figure 4.26: Wildland Urban Interface (WUI) in Flagler County

Source: Southern Wildfire Risk Assessment Portal

Table 4.32: Beverly Beach Wildfire Vulnerability

Beverly Beach Wildfire Risk									
Type of Structure	Number of Structures in a WUI Risk Area of -5 (High Moderate Risk) to -9 (Severe Risk)			Value of Structures in the WUI Risk Area of -5 to -9			Number of People (estimated) on Parcels in WUI Risk Areas		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in WUI Risk Area)	$ In Hazard Area	% In Hazard Area	Total (with overlap)	# In Hazard Area	% In Hazard Area
Total/Total %	333	314	94	68,657,388	64,870,228	94	782	28	4

Table 4.33: Bunnell Wildfire Vulnerability

Bunnell Wildfire Risk									
Type of Structure	Number of Structures in a WUI Risk Area of -5 (High Moderate Risk) to -9 (Severe Risk)			Value of Structures in the WUI Risk Area of -5 to -9			Number of People (estimated) on Parcels in WUI Risk Areas		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in WUI Risk Area)	$ In Hazard Area	% In Hazard Area	Total (with overlap)	# In Hazard Area	% In Hazard Area
Total/Total %	1,963	1,192	61	440,019,907	196,386,147	45	5,933	1,212	20

Table 4.34: Flagler Beach Wildfire Vulnerability

Flagler Beach Wildfire Risk									
Type of Structure	Number of Structures in a WUI Risk Area of -5 (High Moderate Risk) to -9 (Severe Risk)			Value of Structures in the WUI Risk Area of -5 to -9			Number of People (estimated) on Parcels in WUI Risk Areas		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in WUI Risk Area)	$ In Hazard Area	% In Hazard Area	Total (with overlap)	# In Hazard Area	% In Hazard Area
Total/Total %	3,945	3,176	81	892,464,043	670,431,402	75	4,548	1,782	39

Table 4.35: Marineland Wildfire Vulnerability

Marineland Wildfire Risk									
Type of Structure	Number of Structures in a WUI Risk Area of -5 (High Moderate Risk) to -9 (Severe Risk)			Value of Structures in the WUI Risk Area of -5 to -9			Number of People (estimated) on Parcels in WUI Risk Areas		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in WUI Risk Area)	$ In Hazard Area	% In Hazard Area	Total (with overlap)	# In Hazard Area	% In Hazard Area
Total/Total %	20	11	55	14,189,321	3,848,942	27	16	n/a	n/a

Table 4.36: Palm Coast Wildfire Vulnerability

Palm Coast Wildfire Risk									
Type of Structure	Number of Structures in a WUI Risk Area of -5 (High Moderate Risk) to -9 (Severe Risk)			Value of Structures in the WUI Risk Area of -5 to -9			Number of People (estimated) on Parcels in WUI Risk Areas		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in WUI Risk Area)	$ In Hazard Area	% In Hazard Area	Total (with overlap)	# In Hazard Area	% In Hazard Area
Total/Total %	36,330	34,716	96	6,473,918,443	5,731,997,883	89	76,639	30,486	40

Table 4.37: Unincorporated Flagler County Wildfire Vulnerability

Unincorporated Wildfire Risk									
Type of Structure	Number of Structures in a WUI Risk Area of -5 (High Moderate Risk) to -9 (Severe Risk)			Value of Structures in the WUI Risk Area of -5 to -9			Number of People (estimated) on Parcels in WUI Risk Areas		
	Total	In Hazard Area	% In Hazard Area	Total in $ (NOT in WUI Risk Area)	$ In Hazard Area	% In Hazard Area	Total (with overlap)	# In Hazard Area	% In Hazard Area
Total/Total %	9,342	8,259	88	2,700,244,236	2,327,232,612	86	20,623	2,113	10

4.8 Extreme Heat

An extreme heat event is an extended period of time (several days or more) where unusually hot weather conditions combine with high relative humidity to form dangerous heat indices that can potentially harm human health. During extremely hot and humid weather, the body's ability to cool itself is challenged. Often too much fluid or salt is lost through sweating and dehydration and body temperature rises leading to a heat-related illness. Discomfort, fatigue, heat cramps, and increases in emergency room visits and hospitalizations have occurred. As our climate changes, extreme heat events in the United States may become more frequent, longer lasting, and more severe. Heat advisories are issued by the National Weather Service (NWS) when temperatures and relative humidity reach dangerous levels.

Urban areas can exacerbate extreme heat. Built-up locations are hotter than nearby rural areas and can affect the summertime peak high temperatures. Buildings, roads, and other infrastructure that replaces open land and vegetation create more surfaces that absorb the Sun's heat rather than reflecting it back. Tall buildings and narrow streets can heat air trapped between them and reduce the air flow. Trees and vegetation naturally cool the temperature by providing shade and evaporation of water from soil and leaves.

The table below assists the NWS to classify the potential dangers of heat based on the relative humidity and temperature.

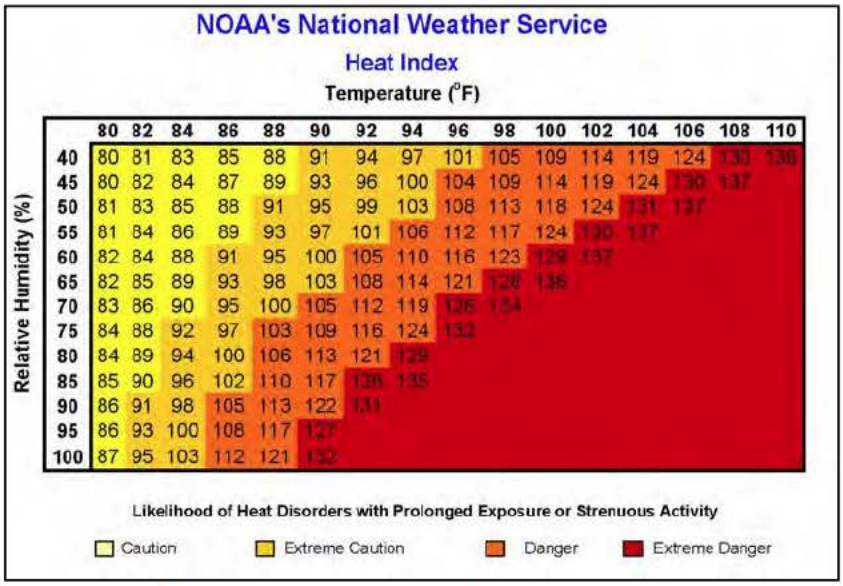

Figure 4.27: NWS's Heat Index Chart

Mild effects of heat related health problems are common and affect a greater proportion of the populations. In extreme cases, heat related deaths have occurred. Extreme heat events not only cause health problems but can also exacerbate previously existing health conditions.

4.8.1 Location

Extreme heat often occurs over a small to large region of land, and can occur throughout the entire county. Urbanized areas, including the City of Palm Coast, are more susceptible to higher temperatures. The Atlantic Ocean helps moderate the temperature along the coast for areas like Marineland, Beverly Beach and Flagler Beach. Uneven heating between the ocean and the land often results in a sea breeze that helps make being outside in the summer months more bearable in Flagler County. During extremely warm, humid days, all of Flagler County can be at risk to extreme heat.

4.8.2 History

Flagler County has experienced many periods in time where heat advisories were issued. When a heat advisory is issued it indicates that the maximum daytime high exceeded the locally defined criteria. No major impacts have been recorded as a result of any of the previous heat advisories issued for Flagler County.

Table 38: NWS Heat Advisories for Flagler County (as of August 6, 2015)

Event	Significance	Issue Date	Expiration Date
Heat	Advisory	Tue. Aug. 07, 2007 13:00	Fri. Aug. 10, 2007 20:00
Heat	Advisory	Sat. Aug. 11, 2007 12:00	Sat. Aug. 11, 2007 20:00
Heat	Advisory	Sat. Jun. 20, 2009 10:00	Sun. Jun. 21, 2009 20:00
Heat	Advisory	Sat. Jul. 31, 2010 11:37	Sat. Jul. 31, 2010 19:00
Heat	Advisory	Fri. Aug. 13, 2010 11:00	Fri. Aug. 13, 2010 14:19
Heat	Advisory	Fri. Aug. 05, 2011 02:59	Fri. Aug. 05, 2011 20:05
Heat	Advisory	Sat. Aug. 06, 2011 02:39	Sat. Aug. 06, 2011 17:26

Heat	Advisory	Mon. Jul. 28, 2014 13:00	Mon. Jul. 28, 2014 19:00
Heat	Advisory	Thu. Aug. 21, 2014 12:00	Thu. Aug. 21, 2014 20:00
Heat	Advisory	Fri. Aug. 22, 2014 12:00	Fri. Aug. 22, 2014 20:00
Heat	Advisory	Sat. Aug. 23, 2014 12:00	Sat. Aug. 23, 2014 20:00
Heat	Advisory	Wed. Jul. 22, 2015 12:00	Wed. Jul. 22, 2015 18:00
Heat	Advisory	Thu. Jul. 23, 2015 12:00	Thu. Jul. 23, 2015 18:00

Source: https://mesonet.agron.iastate.edu/vtec/search.php

4.8.3 Extent

High temperatures are common in Flagler County and the rest of Florida. Often, temperatures in the mid summer months can reach over 90° Fahrenheit with humidity levels near 100%. As a result, heat indices are well over 100° sometimes for several days at a time. A Heat Advisory is issued within 12 hours of the onset of extremely dangerous heat conditions, when the maximum heat index temperature is expected to be between 108° to 112°. As such, it is reasonable to expect heat index temperatures up through 112° F in the area. Though afternoon thunderstorms can help with cooling, it is important for citizens to stay hydrated, stay inside in air conditioning and wear light, loose fitting clothing.

4.8.4 Probability

Historically, Flagler County has not encountered many extreme heat events, but heat advisories have been issued. Based on the past nine years of recorded heat advisory data, it is reasonable to expect 1-2 heat advisories yearly. Although this may not be the most pressing hazard within the county, the combination of extreme heat and other hazards such as drought may help fuel wildfires. Current trends, population growth, consumption of fossil fuels, and scientific projections show that climate change will continue to affect world temperatures. As temperatures annually increase, this could show more occurrences within the county. The Center for Disease Control (CDC) projects that by the end of this century, extremely high temperatures that currently occur every 20 years could happen as often as every two to four years.

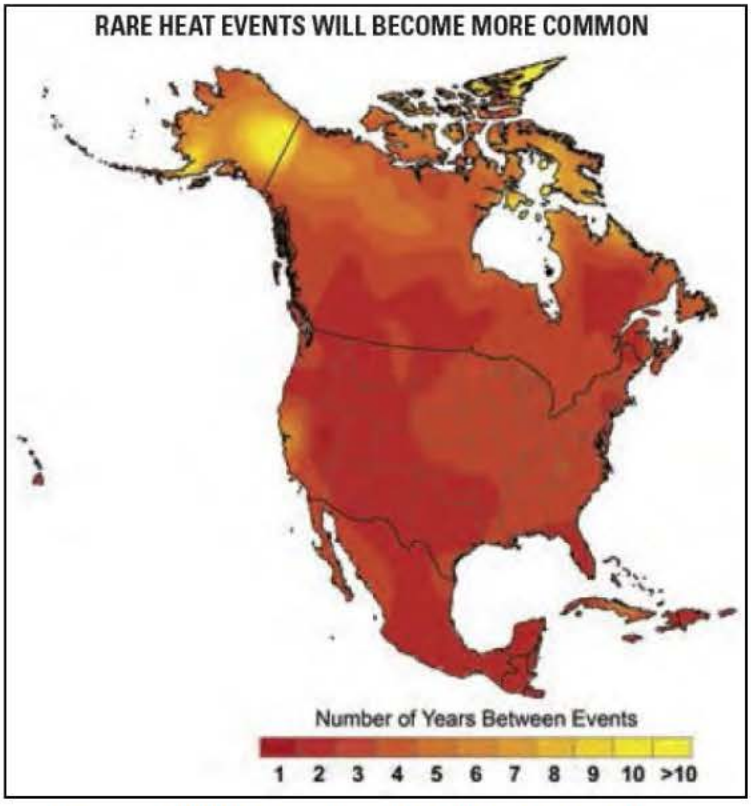

Figure 4.28: Future Predicted Number of Years between Rare Heat Events According to the CDC

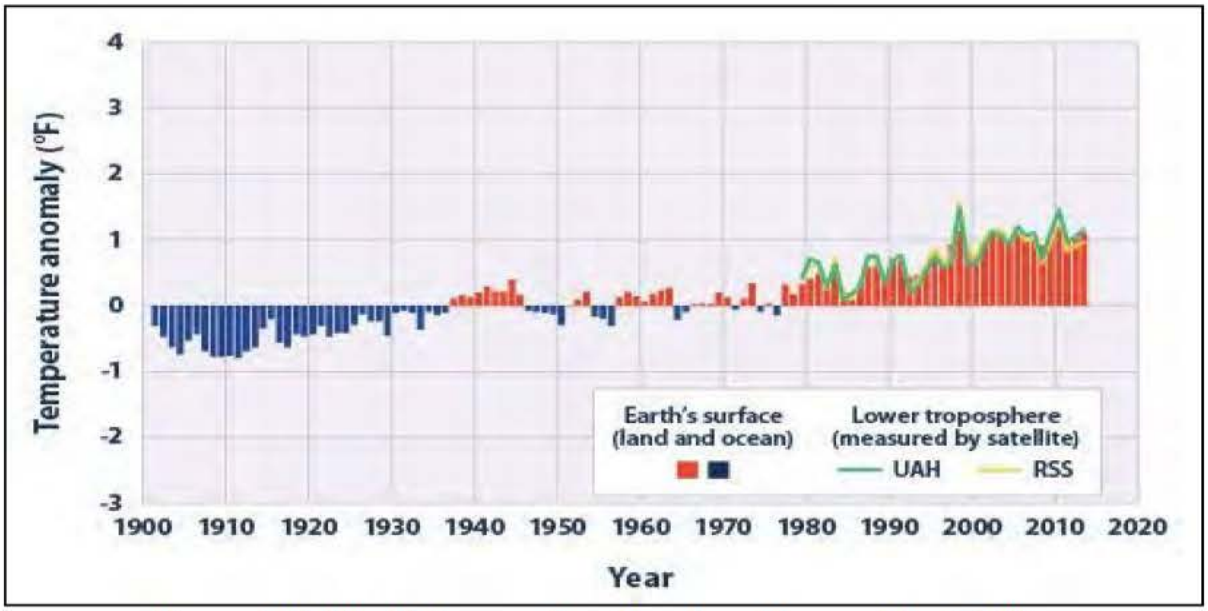

Figure 4.29: World Temperature Trends as Measured by Satellite

Source U.S. Environmental Protection Agency, May 2014

4.8.5 Vulnerability

Extreme heat events can be harmful for all populations but homes with little to no air conditioning, construction workers, children and older adults are some of the most vulnerable to extreme heat. The most danger exists for vulnerable and disadvantaged populations such as elder adults, small children, persons with disabilities, transient persons, socio-economically disadvantaged and those that are sick or overweight. Flagler County is made up of 27.4% elder adults over the age of 65, 4.3% of children under the age of 5, and 16.6% of persons living below the poverty line. Firefighters are also vulnerable to extreme heat situations, especially if coupled with fighting wildfires.

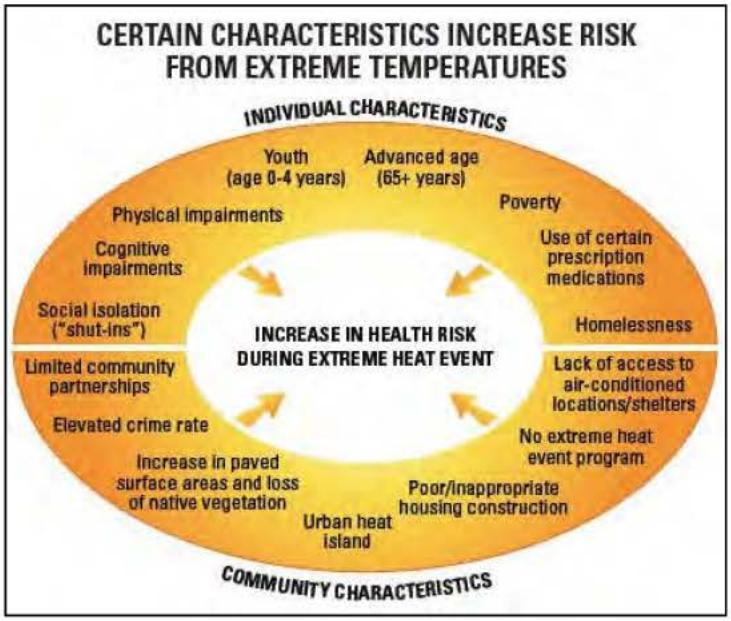

Figure 4.30: Characteristics that Increase Vulnerability to Extreme Heat

4.9 Drought

Drought is a normal, recurrent feature that occurs almost everywhere on the planet. It describes a deficiency in precipitation over an extended period of time, usually a season or more, resulting in a water shortage that causes adverse impacts on vegetation, animals, and/or people. Drought

differs from permanent features of climate in regions where low precipitation is the norm, such as in desert ecosystems. Human factors play a role in exacerbating the impact of drought. Inefficient water use, particularly within residential, agricultural, and municipal areas, can lead to a shortage of water.

A sustained drought can reduce water table levels and impact systems dependent on the shallow aquifer. While droughts have no direct adverse impacts on buildings and infrastructure, they may cause social, environmental and economic impacts. Some impacts expected from droughts in Flagler County, now and in the future, include:

- Crop loss
- Loss of wetlands and navigable waterways
- Threat to public safety from increased risk of wildfires
- Poor soil quality
- Water restrictions
- Decreased availability of food and drinking water for wild animals
- Increased water fees
- Anxiety or depression about economic losses caused by drought

One method of measuring drought conditions is the Palmer Drought Severity Index (PDSI). It provides standardized measurements of moisture conditions so that comparisons can be made between locations and between months. The PDSI is used for determining long-term meteorological drought and is not as reliable with short-term forecasts. This scale uses a 0 as normal and shows decreasing (negative) numbers for increased drought severity.

Table 4.39: Long-Term Drought Severity Index Classifications

Palmer Drought Severity Index (PDSI)	
4.0 or more	Extremely Wet
3.0 to 3.99	Very wet
2.0 to 2.99	Moderately Wet
1.0 to 1.99	Slightly Wet
0.5 to 0.99	Incipient Wet Spell
0.49 to -0.49	Near Normal
-0.5 to -0.99	Incipient Dry Spell
-1.0 to -1.99	Mild Drought
-2.0 to -2.99	Moderate Drought
-3.0 to -3.99	Severe Drought
-4.0 or less	Extreme Drought

Droughts can also be measured according to the Keetch-Byram Drought Index (KBDI), which measures the amount of precipitation necessary to return the soil to full saturation. This system ranks from 0-800 and represents a moisture regime from 0 to 8 inches of water through the soil layer. When there is 8 inches of water, the KBDI assumes saturation with an index of 0, as there is no moisture deficiency. The maximum probability that drought is possible occurs at an index of 800. Each point on the scale essentially indicates the amount of net rainfall that is required to reduce the index to zero (full saturation).

The figure to the right identifies recent KBDI levels for the state of Florida, in which Flagler County can be seen between 400 and 449. There is no immediate risk of drought but this may change as the year progresses.

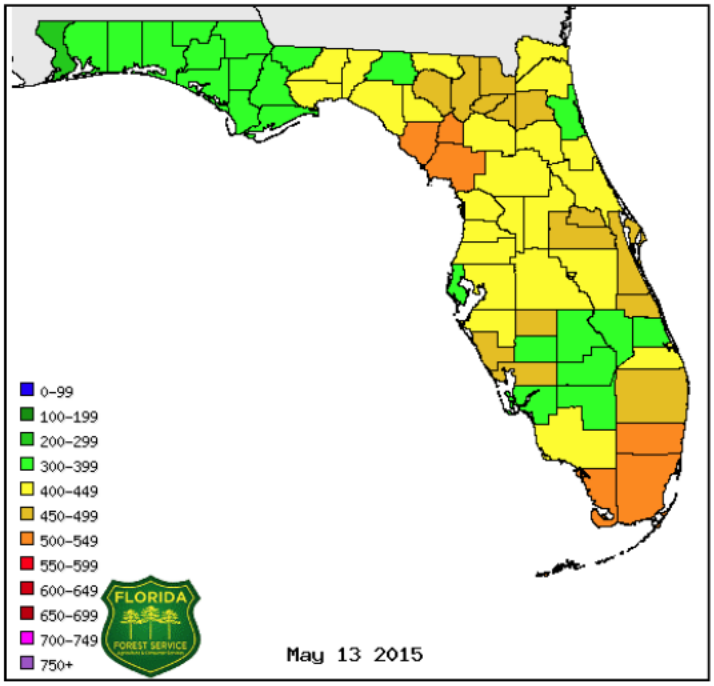

Figure 4.31: KBDI Measurements as of 6/31/15

4.9.1 Location

Drought usually affects large areas at a time. While impacts may vary based on land use, the entire region is usually affected in some way. All of Flagler County is equally susceptible to the occurrence of drought.

4.9.2 History

Historically, there have only been four extreme drought events within the region. Drought conditions existed in Florida from 1965 through 1982 before returning to normal. The most damaging drought occurred between 1998 and 2001, where the PDSI did not reach above -3.0 (severe drought) and remained largely categorized as a -4.0 or less (extreme drought). In 1998, a time when Flagler County suffered many major wildfires and required a countywide evacuation, the KBDI hit an all-time high of 790. During these drought periods farmers had to drill deeper wells to access water and water use restrictions were imposed.

Table 4.40: Historical Droughts in Flagler with PDSI Rating

Historical Drought Occurrences in Flagler County	
Date	**PDSI Rating**
March 1956- February 1957	Severe Drought
September 1961 – September 1962	Severe Drought
April 1967	Severe Drought
June 1977-October 1977	Severe Drought
June 1981- December 1981	Severe Drought
March 1985- August 1985	Severe Drought
October 1986- December 1986	Severe Drought

September 1987-November 1987	Severe Drought
August 1990- March 1991	Extreme Drought
August 1993- January 1994	Severe Drought
June 1998- August 2001	Extreme Drought
May 2002- June 2002	Severe Drought
July 2006- July 2008	Extreme Drought
April 2009- May 2009	Severe Drought
October 2010- June 2012	Extreme Drought
February 2013- May 2013	Severe Drought

4.9.3 Extent

At the highest severity of drought (a PDSI of -4.0 or less or a KBDI of 800) implications will involve adverse effects on human health, infrastructure, and local economies. Based on previous occurrences, it is likely that in the future Flagler County will experience extreme drought.

4.9.4 Probability

There is no one way to predict when a drought will occur or how long it may last. Long periods of drought can be abruptly ended by rains from tropical cyclones or other storm systems. Based on historical data and trends, it is likely that severe droughts will occur at least once every 10 years with less severe droughts occurring every 3-4 years. Severe and extreme drought periods can last for several years while less severe droughts may only last a few months.

There is a lot of talk that as the climate continues to change places throughout the world may see a change in the severity and intervals at which droughts typically occur. At this time it is unknown how the changing climate will impact the occurrence of drought in Flagler County. Water conservation methods and drought mitigation are items considered when Flagler County and the municipalities design new stormwater projects. Until more concrete scientific evidence is made available on the changing return period of droughts in Florida or Flagler County, Flagler County will continue to monitor and prepare for the next drought with mitigation efforts.

4.9.5 Vulnerability

People, crops, and livestock are the most vulnerable to drought in Flagler County. Drought is not likely to cause damage to infrastructure in Flagler County; however, high drought indices can be directly correlated to the wildfire threat which does pose a threat to buildings and infrastructure, as well as the people, flora, and fauna in the county.

4.10 Erosion

Erosion is the process of natural forces, such as wind and water, wearing away portions of soil, rock, and sand. Erosion often occurs over a period of months or years, but the process can be accelerated due to natural phenomena, such as tropical cyclones, or human impact, such as improper coastal construction or interruption/damage of sand dunes and other natural mitigation systems. These factors have caused erosion along the coastal and interior water bodies of Flagler County, endangering buildings and infrastructure.

Generally, erosion is a cyclical process wherein the shoreline extents shift daily, seasonally and over geographic time scales. Shorelines can be drastically impacted by powerful wave action caused by strong winds and exacerbated by tidal forces. Eroded materials can be transported to and deposited in unconventional areas, such as between barrier islands and into nearby lagoons. In terms of its effects on the built environment, coastal erosion can cause:

- Loss of homes and property damage
- Loss of public space and recreation lands
- Infrastructure destruction
- Loss of natural habitats and mitigation systems.

The primary force driving beach erosion is waves, specifically those caused by storms such as tropical cyclones, and nor'easters. Along the First Coast region that runs from Nassau to Flagler County, historic trends show that sea level is rising at 2.29mm/year. With higher sea levels, there is a landward movement of erosion on the beaches closer to natural and manmade structures. This landward creep of the water line, in association with higher energy waves, expands the area that can potentially be eroded, leading to depletion of the beach itself. Beaches help to dissipate wave energy and can help to protect natural and man-made structures landward. Natural structures such as beach dune systems act as mitigation tools to lessen the intensity of storms on homes and other infrastructure.

Waves continually migrate sand parallel to the coast line, replacing existing sand with deposits up-current. Erosion can be intensified by armoring structures; in these situations it depletes the sand deposits on the beach and creates a wash out affect. This can lead to depletion of sand dunes and exposure and instability of vegetation. The ability of waves to cause erosion depends on factors such as the erodibility (hardness) of the beach, the power of waves crossing the beach, and the natural or human-made tools in place to dissipate the wave energy. The following table outlines factors that contribute to the overall rate of erosion.

Table 4.41: Erosion Contribution Factors

First Order	Second Order	Third Order
• Geological structure and lithology • Hardness • Height • Fractures/faults • Wave climate • Prevailing wave direction • Subaerial (surface) climate • Weathering (frost, etc.) • Stress relief swelling/shrinkage • Water level change • Groundwater fluctuations • Tidal range • Geomorphology (the origin and evolution of the topography)	• Weathering and transport slope processes • Slope hydrology • Vegetation • Cliff foot erosion • Cliff foot sediment accumulation • Resistance of cliff foot sediment to attrition and transport	• Coastal land use • Resource extraction • Coastal management

Human forces also play a role in the rate in which erosion occurs. There is a growing desire to live near the beach despite warnings of sea level rise and coastal erosion. Poorly planned coastal developments may aid in the progression of coastal erosion. As existing infrastructure, including homes, public spaces, and commercial buildings, becomes susceptible to erosion measures must be taken to protect what is left. These measures, often called armoring, help to protect structures in the short-term, but also exacerbate the rate of erosion in the long-term.

Sand mining and armoring projects such as groins, jetties, and seawalls, interrupt the normal flow of sediment, and can lead to the depletion of sand dunes and increased exposure of vulnerable vegetation, which often acts as a natural barrier to erosion and coastal flooding. With the erosion of these natural barriers, other structures become more susceptible, increasing the extent and magnitude of damages.

Beach management practices are administered by federal, state, and local jurisdictions. These practices allow for guidelines to be set in place to slow the rate of erosion and help protect the structures inland. Historically, the authority to manage land use and development has been delegated by the states to local governments. Coastal localities have the authority to adopt basic land use management tools which can influence the rate of erosion that occurs. Management tools within the state to protect infrastructure include setback requirements according to the mean high water line and vegetation. Despite these tools, annual tropical cyclones and strong storms cause substantial erosion to Flagler's beaches, resulting in budgetary allocations for beach restoration efforts.

The Beach Management Funding Assistance Program (BMFA), formerly known as the Beach Erosion Control Program, provides funding assistance for beach and inlet management projects to restore and maintain critically eroded beaches. For an area to be considered "critically eroded" there must be a threat to, or loss of, upland development, recreation, wildlife habitat, or important cultural resources. The Florida Department of Environmental Protection's (FDEP) Division of Water Resource Management evaluates beach erosion problems throughout the state in order to find potential solutions. The BMFA Program then works in concert with local government to achieve protection, preservation, and restoration of the coastal beaches. Since 1998, $626.6 million has been appropriated to local and federal projects. This has resulted in the restoration and maintenance of over 227.8 miles, or nearly 56% of the state's 407.3 miles of critically eroded beaches.

Table 4.42: Shoreline Armoring in Flagler County

Geographic Location	Length (feet)	Description
Marineland	1,350	Granite revetment at Marineland Aquatic Park
		Five Partially removed coquina groins
	1,500	Steel seawall currently covered by dune and boardwalk
Varn Park	260	10' tall stand-alone seawall with no structures behind the wall
Beverly Beach	1,560	Concrete steel seawall fronting Camptown RV park
Flagler Beach	565	Small section of aging concrete seawall
	9,240	Coquina and granite revetment with regions of damage
	153	Concrete capped steel sheet-pile seawall

	152	Small segment of concrete seawall and small segment of wooden seawall

4.10.1 Location

All coastal areas within Flagler County are susceptible to coastal erosion. All 18 miles of Flagler's sandy shoreline were authorized for Federal study, though the most recent feasibility study only investigated 9.7 miles of the coastline. The FDEP designated 4.8 of those miles as "critically eroded." Describing the location of erosion is somewhat more difficult than describing the location of other hazards because areas that are identified as critically eroded at one point may naturally be replenished. For instance, a 2009 report from FDEP listed six areas of the county's coast as "critically eroded," yet by 2014 two of those areas no longer met the criteria for being designated as "critically eroded" because sand was deposited along the beaches naturally.

While erosion is most often discussed in the context of coastal areas, there are some instances of erosion occurring on creeks, canals, and the Intracoastal Waterway, mostly due to bridge construction and large water pipes with high pressure outflows. These areas have not yet been investigated to the same extent as coastal areas, and as such do not have the same level of information available for hazard profiling. The following table describes the three locations of critically eroded beaches that currently exist within the county.

Table 4.43: Critically Eroded Areas along the Atlantic Ocean

Location	Description
Northern 0.6 mile of beach	Rock revetment and coquina rock groins; possibly threatening Development and recreational interests at Marineland.
0.9 mile segment at north Flagler Beach city limits	Critically Eroded
3.3 miles along southern Flagler Beach	Erosion threatens state road A1A. Much of this southern area has a rock revetment

4.10.2 History

In addition to the naturally occurring cyclic erosion, the Flagler County coastline has experienced sporadic accelerated erosion rates from hurricanes, tropical storms, and nor'easters. Following storm damage by Hurricane Floyd in 1999, revetment was restored and new revetment was constructed in Flagler Beach. Minor beach erosion was reported as a result of Hurricane Irene in 1999 as well. During the fall of 2001, Tropical Storm Gabrielle caused significant erosion prompting FDEP to include some areas of Flagler County, for the first time, as critically eroded beaches. Over 2 miles of coastline were eroded due to the impacts of the 2004 hurricane season, where two major storms, Hurricane Frances and Hurricane Jeanne, impacted Flagler County directly. Even small tropical storms, such as Tammy in October 2005 and Andrea in 2007, have contributed to critical beach erosion along Flagler's coast. In 2007 alone, the Florida Department of Transportation (FDOT) performed 15 emergency or temporary repairs to the Flagler Beach revetment along SR A1A at a cost of $847,000 and Tropical Storm Andrea intensified erosion in an area of Painters Hill enough to add it to the 2008 critically eroded beaches listing. Tropical Storm Fay in 2008 and Hurricane Sandy in 2012 also caused erosion in Flagler County, affecting A1A in Flagler Beach.

4.10.3 Extent

Erosion alone is estimated to cause billions of dollars in damage yearly along the coasts of the United States. Flagler County has an overall long term shoreline change rate of -1 ft/year. Coastal erosion in Flagler County threatens oceanfront infrastructure, including the National Scenic Highway along SR A1A, and over 1,476 structures, with a combined structural and content value of approximately $340 million. According to the Feasibility Study, 300 feet is the approximate extent of shoreline recession Flagler County can expect from a 100-year storm, and that an estimated 1,320,000 cubic yards of sand would be required to replenish just the 9.7 miles of coastline studied.

4.10.4 Probability

While there have been 7 documented erosion events in Flagler County over the past 16 years, the probability that coastal erosion will occur in the future is 100%. A Florida DEP shoreline change rate study conducted in 1999 concluded that Flagler County beaches are subject to cyclic erosion and accretion. Since erosion is a natural process, coastal communities will constantly struggle with its consequences, especially as sea levels rise and storm intensity increases. Furthermore, as coastal development continues to increase, Flagler County may experience accelerated erosion-related consequences.

4.10.5 Vulnerability

The coastal areas, including those areas along the Intracoastal Waterway, are most vulnerable to erosion. While Flagler County has significantly armored sections of its shoreline to provide some level of erosion control and protection, it remains one of the least armored shores along Florida's east coast. When erosion is intensified by armoring structures, it depletes the sand deposits on the beach and creates a wash out affect. This can lead to depletion of sand dunes and exposure and instability of vegetation.

Groin in Marineland, May 19, 2015

Washout effects within Marineland, 2015

Figure 4.32: Flagler County Armoring and Erosion Impacts

Erosion puts thousands of residential, commercial, and public structures at risk of collapse. Erosion can reduce the embedment and damage the foundations of residential, commercial, and public structures if left unchecked, which may significantly compromise the structural integrity of the buildings. Structures located in and along the VE flood zone are some of the most vulnerable to this hazard. The impacts from erosion can also affect the habitat of endangered species such as the loggerhead sea turtle, the green sea turtle, the hawksbill sea turtle, the leatherback sea turtle, and shorebirds like the piping plover. Flagler Beach is dependent on the tourism economy which would be negatively impacted by major erosion incidents. Exposure of

buried infrastructure and the eroding of roadways can result in logistical and public safety issues for residents and tourists alike as access to homes, businesses, and transportation routes are impacted. Furthermore, SR A1A is the only north-south evacuation route for communities along the coastline, and as such, is an essential transportation corridor.

4.11 Natural Hazards to be Researched and Monitored Further

This section incorporates all other hazards that can occur within Flagler County, but not enough information is known at this time to do a complete analysis. Flagler County Emergency Management and its participating jurisdictions will continue to monitor these hazards and add information when possible.

4.11.1 Tsunami

Tsunami is a Japanese word meaning "harbor wave", and it is a series of long waves generated by a disturbance that rapidly displaces a large amount of water. These disturbances are primarily associated with large, shallow earthquakes in coastal or deep ocean regions. Other triggers include landslides, volcanic eruptions, nuclear device detonation, and objects from outer space landing in the water. Although occurrences in Florida are rare, the impacts from tsunamis could be devastating. There is often no advance warning of an approaching tsunami, though an earthquake felt near a body of water may be considered an indication that a tsunami will shortly follow. They are sometimes called the "forgotten danger" because of their infrequent threat; however, tsunamis have the potential to cause damage far removed from the initial trigger as the energies for these waves can travel along fault lines and become concentrated, traveling vast distances across the open ocean as a tele-tsunami.

There are no recorded cases of tsunamis on the shores of Flagler County after it became a county in 1917, but there are a few that occurred on the shores of north Florida that are worth noting.
In 1755, before substantial colonies were established along the east coast, it is *possible* that a tele-tsunami struck that was generated from a massive earthquake in Portugal. The wave was recorded all around Europe and as far west as Cuba, Hispaniola, and the West Indies. Modeling indicates that the wave may have been as high as 10 feet off of Florida's east coast. There are no historical reports of this wave striking Flagler County specifically though. In 1886, in what is now Jacksonville (specifically the Mayport Naval Station), the Florida Times Union newspaper reported a "tidal wave" that came up the river a short ways, "the earth and houses shook like the leaves on the trees," a local reported. This wave was most likely caused by a large earthquake that occurred on the fault system that lies along the South Carolina coastline. The quake is estimated to have been between magnitudes of 7.3 to 7.6 in today's scale, which could generate a substantial tsunami if it occurred again.

Since incidence rates of tsunamis are so low, and their effects on the area have not been recorded well, a vulnerability analysis would be vague at best. Flagler County coast is vulnerable to tsunamis, but since there are no recorded incidents to draw from, there is no way to tell of the effects it might have on the county, other than the inundation the subsequent wave could result in as it funnels water down the St. Johns River into Crescent Lake. (See the SLOSH model in the storm surge section for the general possible locations.) There is not enough historical data to properly predict an extent, but it's possible that a wave could extend 200 or 300 feet inland,

depending upon the strength of the generating phenomena. However, it is possible that the extent of a tsunami could be magnified by the gentle sloping of the continental shelf that skirts the eastern Atlantic seaboard. When a wave emits from its source, the size when it strikes could be exaggerated because of a lower angle of approach.

Not much is truly known about where and how tsunamis would impact the coastal regions of Florida, or Flagler County itself. There are no established risk percentages or return probabilities for this hazard type, but the Florida Department of Environmental Protection and the 2013 State of Florida Enhanced Hazard Mitigation Plan both state that the probability of a tsunami striking Florida is low.[5]

4.11.2 Saltwater Intrusion

According to the United States Geological Survey (USGS) saltwater intrusion is a generic term referring to an influx of saltwater through various pathways into an aquifer and is a major threat to freshwater resources. Under natural conditions, the seaward movement of freshwater prevents seawater from encroaching coastal aquifers, and the interface between freshwater and seawater is maintained near the coast or far below land surface. Movement can occur both laterally or vertically. Lateral intrusion is the most common and occurs when fresh groundwater is removed from the aquifer at a rate faster than can be replaced; heavier saltwater then moves laterally to fill this void. Due to high demand of water and withdrawal by public supply wells and irrigation wells for agriculture, intrusion of saltwater inland has resulted. Saltwater intrusion can also be worsened by extreme events like hurricane storm surges.

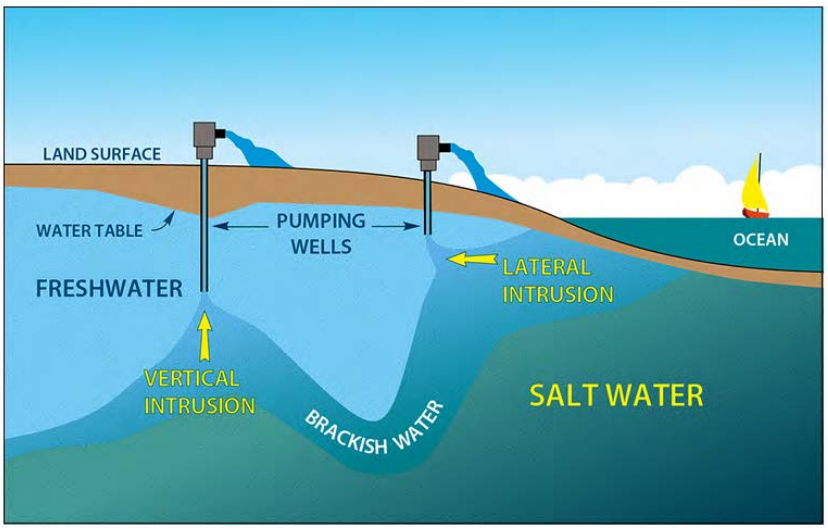

Figure 4.33: Depiction of Lateral and Vertical Saltwater Intrusion Processes
Source: ESSEA, 2015

Aquifers that have potential for saltwater intrusion include the surficial aquifer system, the underlying intermediate confining unit, and the Floridan aquifer. All exist at different depths underneath Flagler County. The map below shows the locations of the aquifer system throughout the state. The construction of canals and drainage networks can lead to saltwater intrusion.

[5] http://www.dep.state.fl.us/geology/geologictopics/hazards/tsunamis htm

Canals provide conduits for saltwater to be carried inland, as does the deepening of existing channels for navigation purposes.

Figure 4.34: Florida's Aquifer Systems (USGS, 2011)

More than 90% of people living in northeast and east central Florida use groundwater that comes from an aquifer. Saltwater intrusion decreases freshwater storage in the aquifers, reduces the water available for human consumption and agricultural use, and in extreme cases can result in the abandonment of supply wells.

There is a large contrast in chloride concentrations between freshwater and seawater. When water has a total dissolved-solids concentration less than 1,000 mg/L, it is classified as 'freshwater', and when that concentration reaches 1,000 mg/L it is deemed 'saltwater'. Seawater has a total dissolved-solids concentration of about 35,000 mg/L, of which dissolved chloride is the largest component (about 19,000 mg/L). As a comparison, the USGS says concentrations of chloride in fresh ground water along the Atlantic coast are typically less than about 20 mg/L.

The Environmental Protection Agency (EPA) sets the secondary maximum contaminant levels (SMCLs) for total dissolved solids and chloride in drinking water. Unlike maximum contaminant levels (MCLs) that have been established to protect the public against drinking-water contaminants that present a risk to human health, the secondary contaminant levels have been established as guidelines to assist operators of public-water systems in managing the aesthetic qualities of the water such as taste, color, and odor. The SMCL set by the USEPA for total dissolved solids and chloride are 500 mg/L and 250 mg/L respectively.

There have been cases of saltwater intrusion within the state and within nearby counties which could indicate vulnerability on the east coast, particularly the shallow surficial aquifer. This

indicates Flagler County may also be at risk. There are no exact known geographic locations that will be at the most risk; the entire county is susceptible.

In recent years, the wells in the nearby counties of Duval and St. Johns have exceeded chloride concentrations of 250 mg/L. At about this concentration, the salty taste of chloride becomes noticeable.

Table 4.44: Historic Occurrences of Saltwater Intrusion in Florida

Areas With Saltwater Intrusion in Florida	
County	**Aquifer Affected**
St. Johns	Surficial
Duval	Surficial
Miami-Dade	Biscayne
Broward	Biscayne
Palm Beach	Biscayne

Prior to 1979, the City of Flagler Beach abandoned 32 shallow wells along the central ridge and initiated its groundwater supply from the Upper Floridian aquifer in the vicinity of Bunnell.[6] The surficial aquifers along the northeast Florida coast have shown signs of seawater intrusion due to pumping. Barrier islands already have limited freshwater aquifers available due to their geography.

The City of Flagler Beach's well field is located south of the Flagler County Airport, and shares it with City of Palm Coast. In 2008, when Flagler Beach built a new Water Treatment Plant, it included the drilling of four new wells, designated Wells 10 through 13. Unfortunately, Well 12 had to be abandoned shortly after completion due to high turbidity. These wells replaced eight existing lower capacity wells, numbered 1 through 9 (No. 4 was abandoned during the drilling process).

Beginning in 2009, quarterly monitoring in each of the wells indicates that average chloride levels have been rising significantly. Well 10 has seen an increase from 64 to 320 mg/L, with a high of 660 mg/L in the dry month of May 2014. Well 11 has had a steady increase from 54 to 340 mg/L, with a high of 380 mg/L in June 2015. Well 13 started out relatively high at 330 mg/L in 2009, and reached 510 in November 2015.

The Water Treatment Plant uses a nanofiltration system that removes the chlorides and pipes this high salt concentrate to the City's Wastewater Treatment Plant for disposal. However, high chloride concentration is still a concern because of the impact it has to the treatment plant membranes, requiring an expensive replacement. The City will begin to replace membranes this year, a project that will take three years to complete due to budget constraints, and will cost a total of approximately $190,000. There are also plans to drill an additional well, Well 12 R (for

[6] http://www.olemiss.edu/sciencenet/saltnet/swica2/Hutchings_ext.pdf

"replacement") in late 2016 at a cost of $250,000, with $150,000 budgeted this fiscal year, and another $100,000 the next fiscal year.

The City's Consumptive Use Permit (CUP), issued by St. Johns River Water Management District in 2006, includes Special Condition 24, which required the drilling of three shallow piezometer wells near the production wells, and quarterly monitoring to track water levels in the surrounding wetlands. The current CUP expires in August 2016. It remains to be seen what, if any, Special Conditions, will be imposed by the District at that time.

The City of Palm has reported salt water intrusion in 3 of the city's 59 active wells. In accordance with Palm Coast's Consumptive Use Permit authorized by the St. Johns River Water Management District, those affected wells, LW-14, LW-30, and LW-32 are currently 'production limited' to specified millions of gallons per day (mgd) withdrawals by condition #40. Another 36 wells are monitored for water level, total dissolved solids, specific conductance, sulfates, and chlorides on a quarterly basis each year in accordance with the Palm Coast Salt Water Monitoring Plan. The city is currently in the process of building 5 new wells. These additional wells will not add to the total amount of water pumped out, thus reducing the production pumping rate (demand) at each individual well in an effort to reduce the vertical intrusion of saltwater at each well.

Although no direct studies have been conducted on the rate at which saltwater intrusion has affected Flagler County, the figure below depicts chloride concentration ranges, in milligrams per liter (mg/L), as tested in 2013. Of note, portions of Flagler County show concentrations in the range of 250 to 1000 mg/L, and small pockets of the county may have exceeded 1000 mg/L. Continued monitoring may then allow for comparisons to historical values to determine historical trends, potential future extents, and the rate at which salt water intrusion is affecting Flagler County.

Figure 4.35: Upper Floridan Aquifer Chloride Concentrations

Source: USGS, 2013

Given the current demands of water, both agriculturally and consumptively, and the growing population within the region, there is higher probability of seawater leaching into the groundwater supply in the coming years. The growing demand coupled with sea level rise may further fuel the intrusion over the next decade.

Salt water intrusion effects are described mainly by the resultant effects of the salt ions present within the water, primarily chloride and sodium. Chloride itself does not have significant impacts on human health, particularly when equal amounts of freshwater are taken in. A normal adult human body naturally contains approximately 81.7 grams of chloride, yet little is known about the effect of prolonged intake of large amounts of chloride in the diet. Sodium though can lead to cardiovascular, kidney, and liver diseases, and has a direct link to high blood pressure.

Sodium in drinking water is not part of the National Primary Drinking Water Regulations, and as such not regulated by the EPA. It is however listed on the Contaminant Candidate List for further review and evaluation. The EPA also has established a drinking-water advisory for sodium. The

advisory recommends reducing sodium concentrations in drinking water to concentrations of 30 to 60 mg/L to avoid adverse effects on taste. Some members of the population are more sensitive to the effects of sodium than others are. The EPA developed a Drinking Water Equivalent Level (DWEL) of 20 mg/L for those individuals restricted to a total sodium intake of 500 mg/day and should not be extrapolated to the entire population. The Dietary Guidelines for Americans recommend limiting sodium to less than 2,300 mg a day — or 1,500 mg for populations aged 51 or older, those of African American descent, or those with high blood pressure, diabetes or chronic kidney disease.[7]

Chlorides conduct electricity and are highly corrosive. These properties can cause ions, such as lead and copper, to leach from metal pipe and contaminate the drinking water. This process is more likely to occur in homes built before 1981.

As such, areas of susceptibility include structures with lead piping, wells near the coastline, and those with health conditions that might put them at higher risk.

4.11.3 Sea Level Rise

Over the last decade there has been a lot of talk about sea level rise. This phenomenon is occurring throughout the world in different ways. The overall sea level change average is increasing but different places within the world are experiencing diverse trends. Florida overall is experiencing a 1-3mm/year increase, whereas Alaska is actually decreasing in portions by 1-6mm/year. As Florida's perimeter is mostly coastline, infrastructure, residences, and our economy are highly sensitive to changes in the sea level.

There are two different types of sea level rise– eustatic and relative. Two factors directly cause the increase in eustatic sea level–thermal expansion of the oceans and melting of land ice such as the Greenland ice sheet, the Antarctic ice sheet, and land glaciers. The change is measured with tidal gauges that record variations in relation to a fixed benchmark. These tidal gauges also measure the relative sea level which refers to local lowering or rising of land through geologic processes such as subsidence and glacial rebound.

Table 4.45: Sea Level Rise Factors

Eustatic Sea Level Rise Factors	
Thermal Expansion	**Melting of Land Ice**
1. Global atmospheric temperatures rise 2. Oceans absorb heat and warm 3. Warming creates a decrease in density 4. Expansion of the ocean occurs 5. A rise in sea level occurs.	1. Rising temperatures cause ice and snowfields to melt. 2. There is an increase in the amount of water in the oceans. 3. A rise in sea level occurs.

Sea level rise has always been a major force in shaping coastlines. Within the 20th century, there has been evidence from tidal gauges of sea levels rising slowly throughout the world. Earth naturally has had periods of time where warning trends have occurred, leading to increases in sea level. The difference for our future is that the rate of sea level rise is occurring faster,

[7] http://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/sodium/art-20045479

exacerbated by both global temperature increase and melting land ice. This accelerated rate may cause damage to many coastal features.

The closest tidal gage to Flagler County exists in Mayport, Florida. The historical sea level rise calculated between 1928 and 2006 is recorded at an average of 2.29 mm/year. Seasonally, these levels change. March holds the lowest average mean sea level from 1928 to 2006, recorded at -0.083 meters below the average; October holds the highest at 0.211 meters above.

The Hurricane and Storm Damage Reduction Project Report conducted by the USACE Jacksonville District in 2014 for Flagler County studied the current sea level rise situation and predicted future levels. The USASCE estimated future sea level using the historic trend and two curves from the National Research Council–Intermediate and High. The table below is based on the current sea level rise trends from historic data received from the study conducted by the U.S. Army Corps of Engineers in 2014.

Table 4.46: Relative Seal Level vs. Year for Flagler County

	Baseline (Historic)			Intermediate (NRC Curve I)			High (NRC Curve III)		
	Year	mm	ft	Year	mm	ft	Year	mm	ft
Base Year	2016	9.16	0.03	2016	13.93	0.05	2016	29.05	0.10
	2021	20.61	0.07	2021	32.56	0.11	2021	70.44	0.23
	2026	32.06	0.11	2026	52.55	0.17	2026	117.49	0.39
	2031	43.51	0.14	2031	73.89	0.24	2031	170.18	0.56
	2036	54.96	0.18	2036	96.59	0.32	2036	228.53	0.75
25 Year	2041	66.41	0.22	2041	120.64	0.40	2041	292.52	0.96
	2046	77.86	0.26	2046	146.04	0.48	2046	362.17	1.19
	2051	89.31	0.29	2051	172.81	0.57	2051	437.46	1.44
	2056	100.76	0.33	2056	200.92	0.66	2056	518.41	1.70
	2061	112.21	0.37	2061	230.39	0.76	2061	605.00	1.98
50 Year	2066	123.66	0.41	2066	261.22	0.86	2066	697.25	2.29

The figure below provides a depiction of what each of the curve lines studied look like in comparison to each other.

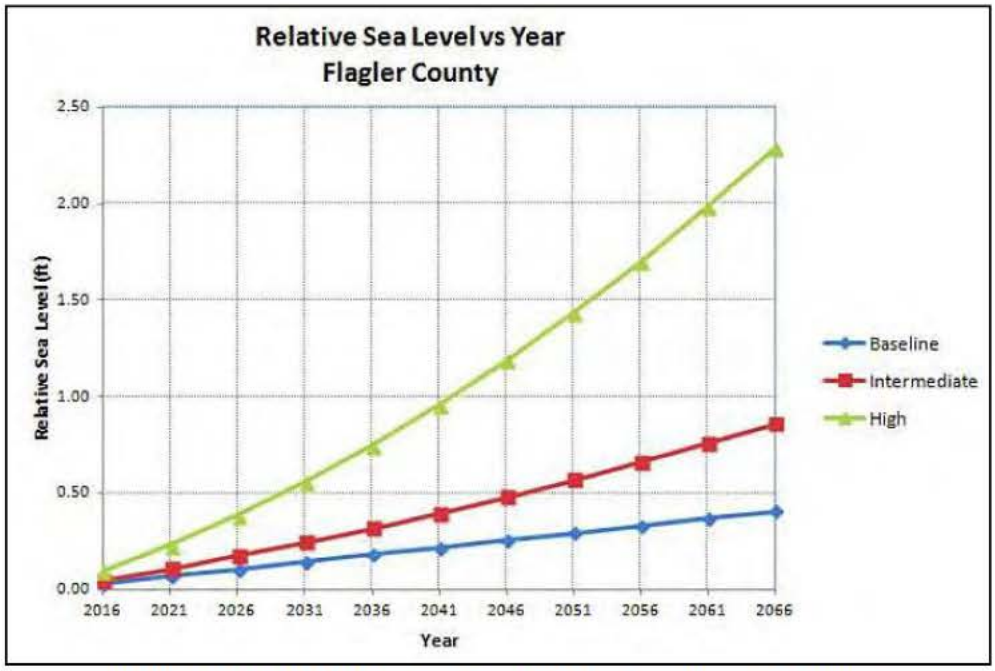

Figure 4.36: Relative Sea Level Rise Trends and Curves

Within the most extreme scenario, the sea level over the 50 year projection will reach 697.25mm (2.29 ft) above what it is today. At the historic baseline, the projection reaches 123.66mm (0.41ft) above today's level. Although it is uncertain what the sea level will reach over the next 50 years, it is probable that at minimum, sea level will follow historic trends and reach at least a 123.66mm rise in the next 50 years.

Using the best data available, the map below depicts where sea level rise of different magnitudes might affect the county. As expected, areas along Crescent Lake and the Intracoastal would be majorly affected, even by a 1 foot increase in sea level.

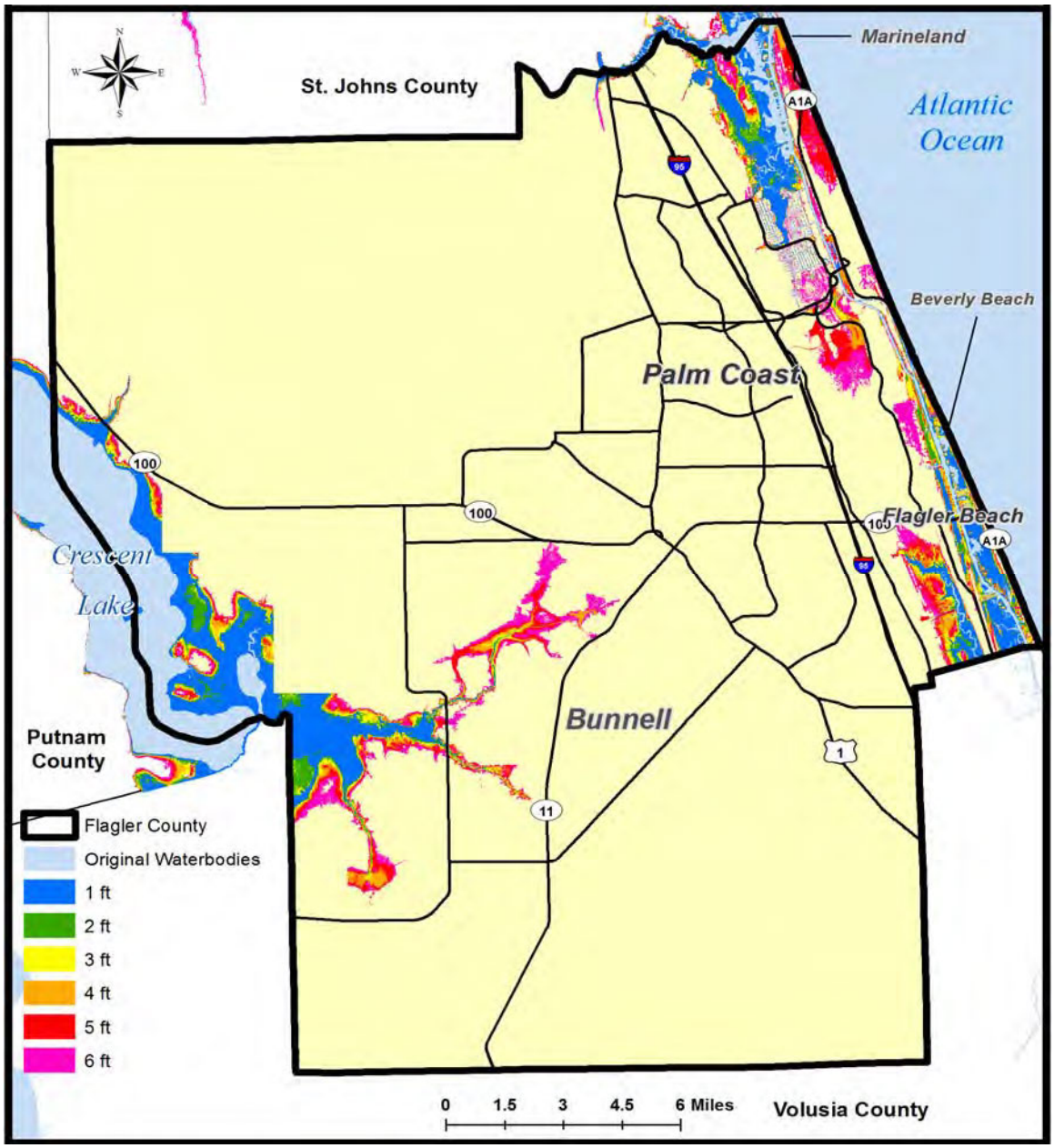

Figure 4.37: Areas Potentially Impacted by Sea Level Rise

Data Source: NOAA Coastal Services Center

Looking at the data for the highest projection, the areas that would be inundated include parts of Marineland, Flagler Beach and Beverly Beach along the Intracoastal Waterway. At the highest possible sea level rise (2.29ft) over the next 50 years, several conditions may be present:

- Property and infrastructure damage
- Increase in storm surge effects
- Species and habitat loss
- Movement/destruction of dune systems
- Population displacement
- Job loss

Nearly half of Flagler County's infrastructure exists within floodplains. These floodplains are highly susceptible to sea level rise. If sea level was to reach the 2.29 foot marker, much of the inundation would occur in areas that are highly residential such as Palm Coast and homes in and around Bulow Plantation Ruins Historic State Park. If damage becomes severe, these populations will have to relocate to a different area. Recreation will be directly affected under these conditions, particularly within the intracoastal waterways. As most of the area will expand and become flooded, many of the public beach access points and boat ramps may be damaged, particularly Bing's Landing, Varn Park, and Herschel King Park. Damage to businesses, depletion of beaches for tourist revenue, and damage to resorts will cause significant economic side effects.

On coastlines, there will be landward migration of the dune systems as the waves and winds continually push the sand. Coastal squeeze may eventually deplete the dune systems altogether if infrastructure is present behind the existing dunes. Lack of sand and dune ecosystems will create a significant loss in habitat for shorebirds, sea turtles, reptiles, and other shoreline species.

The following table was constructed after using ArcGIS to gather the data on the areas inundated from sea level rise. This information is based on the historical sea level rise of 2.4mm found for Flagler County.

Table 4.47: Potential Property at Risk from Sea Level Rise

Rise	Value of Property ($)	Number of Properties	Number of Critical Facilities
1 ft.	1,306,198,188	5,671	0
2 ft.	1,409,238,474	6,269	3
3 ft.	1,500,714,824	7,004	3
4 ft.	1,598,405,892	7,719	3
5 ft.	1,966,237,987	9,869	3
6 ft.	2,513,780,321	12,643	5

This hazard affects a multitude of property types. Of the number of properties listed above, a majority of them include residences up to a two mile radius of the coastline. Although most of the initial inundation will be within the barrier islands and along the Intracoastal Waterway, the canal systems within Palm Coast and the low lying areas south of 100 in Flagler Beach will become inundated at only a 1 foot increase. The Palm Coast residential zone is of very high susceptibility at only a one foot increase in sea level. At this level almost all homes north of Palm Coast Parkway SE and southeast of Matanzas High School will be surrounded with water. Matanzas High School itself has a high enough elevation that this area will not be inundated by sea level past 6ft. Within Flagler Beach, much of the inland inundation will initially consume the residences east of the Matanzas River and some properties adjacent to John Anderson Hwy. Properties north of Bulow Plantation Ruins Historic State Park will be inundated at 1 ft sea level, including around 30 residential homes which would be affected. Sea level rise will impact access to places and may undermine the stability of roads.

Sea Level Rise and its Effects on Storm Surge

A recent study examined the effects of one meter of sea level rise on storm surge in Flagler County using HAZUS. Using Hurricane Floyd (1999) as an example, two storm surge scenarios were created—one with base sea level and one with 1 meter of sea level rise— to examine how storm surge impacts would change given different levels of the sea. While Floyd was projected to brush the Florida east coast and eventually make landfall at or near Flagler County, it eventually curved northward leaving a wake of severe beach erosion and some wind damage along the beaches.

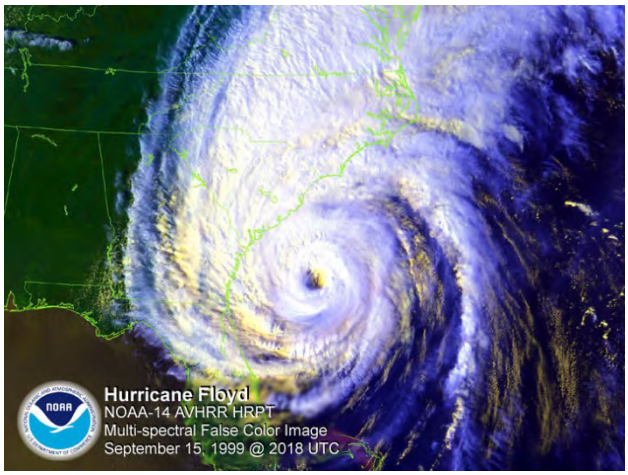

Figure 4.39: Hurricane Floyd east of Savannah, GA (NOAA, 1999)

Method

HAZUS allows the user to select a scenario for creating a storm based upon several input methods. For this particular study, the option to <create your own scenario> was used to select a number of geographic points, wind speeds, and trajectory information based upon one of Hurricane Floyd's early projected paths. This new storm was named "Floyd Prime". The following map is a HAZUS generated prediction of wind speeds based on the proposed "Floyd Prime" track.

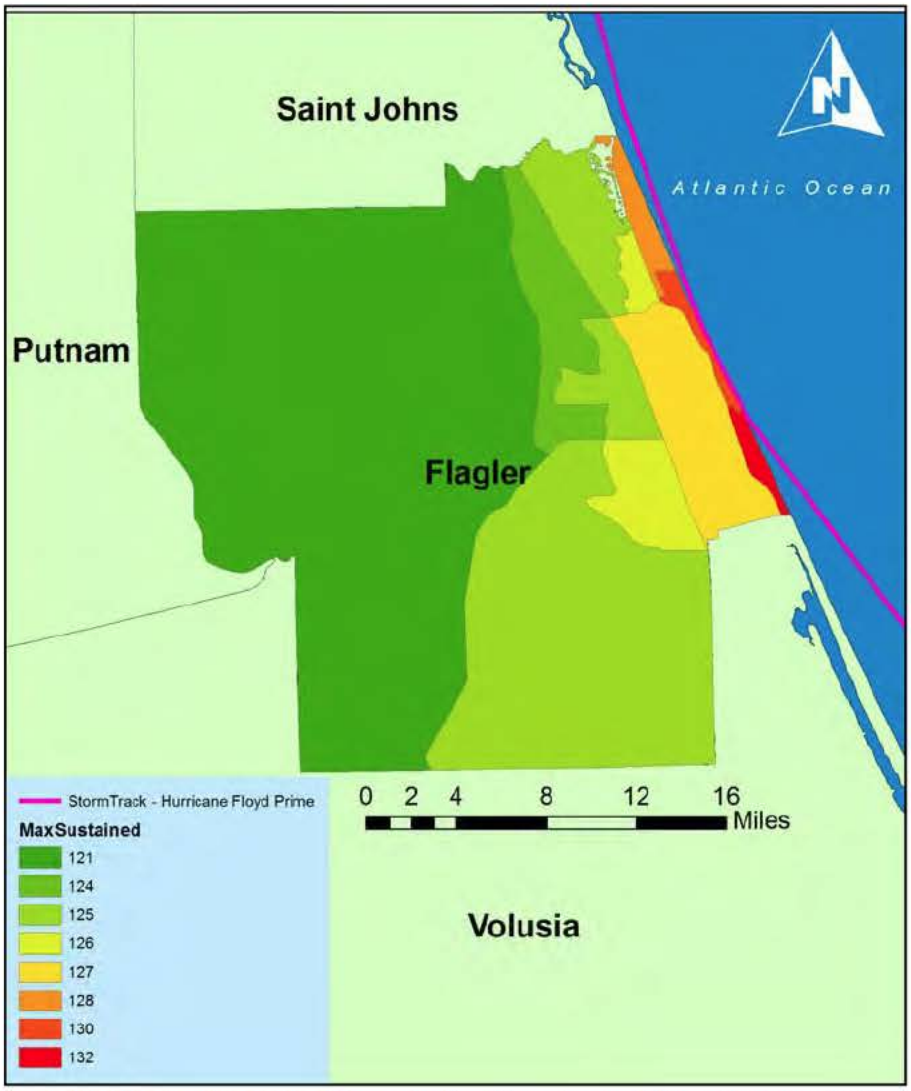

Figure 4.40: Projected Wind Speeds for Hurricane "Floyd Prime" Scenario

Taylor Phillips Capstone Project/HAZUS, 2015

Two models were run: the first without sea level rise, and the next with one meter additional sea level. Both models treated Floyd Prime as a 100 year event, while the model with one meter of sea level rise used 3.208 additional feet of stillwater elevation on top of a 10 foot stillwater depth and a 2 foot wave setup derived from the last FEMA Flood Insurance Study for Flagler County.

After the models in HAZUS were run, the following maps were produced that exemplify the effects of sea level rise on storm surge.

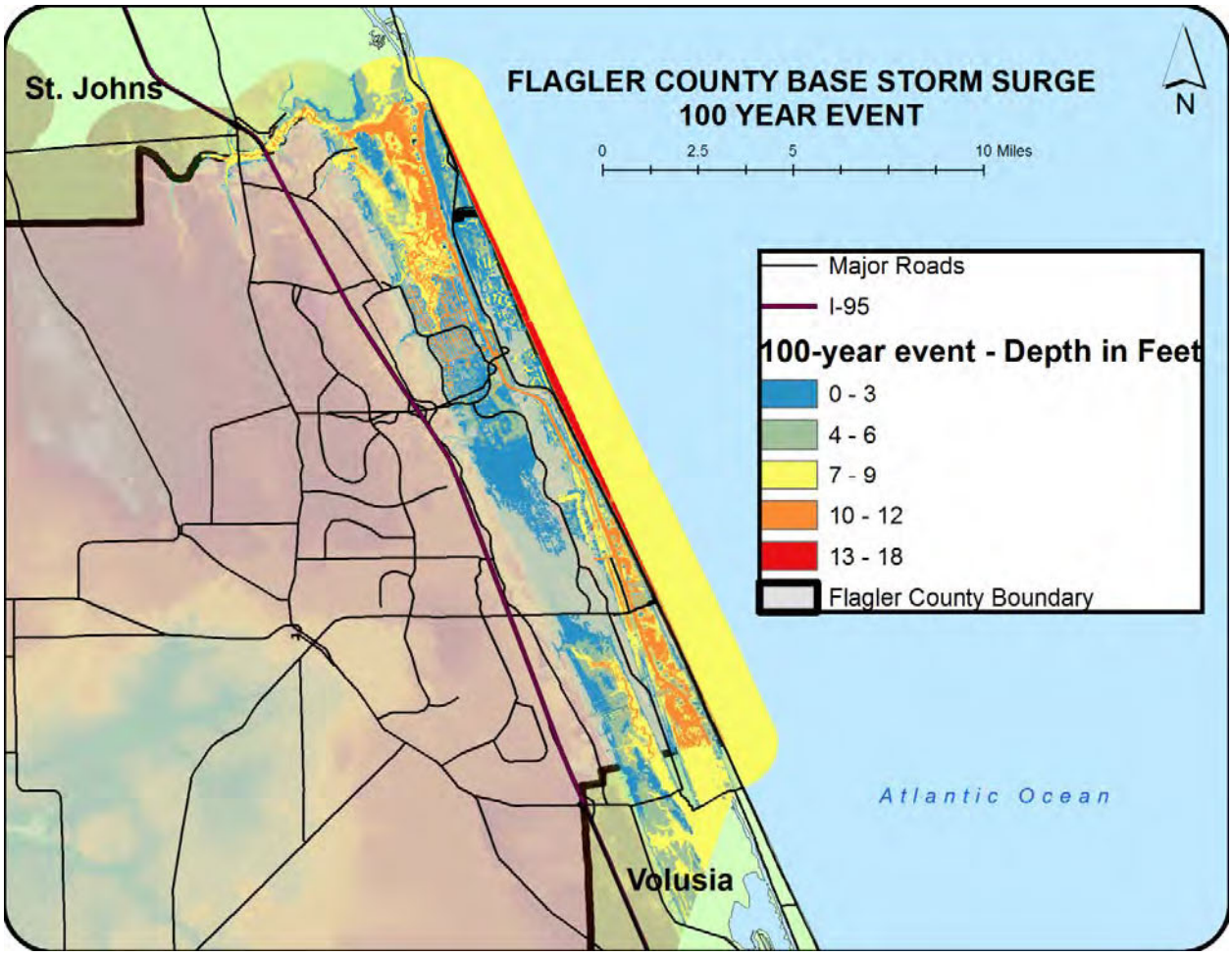

Figure 4.41: Projected Storm Surge for "Floyd Prime" Scenario without Sea Level Rise

Source: Taylor Phillips Capstone Project/HAZUS, 2015

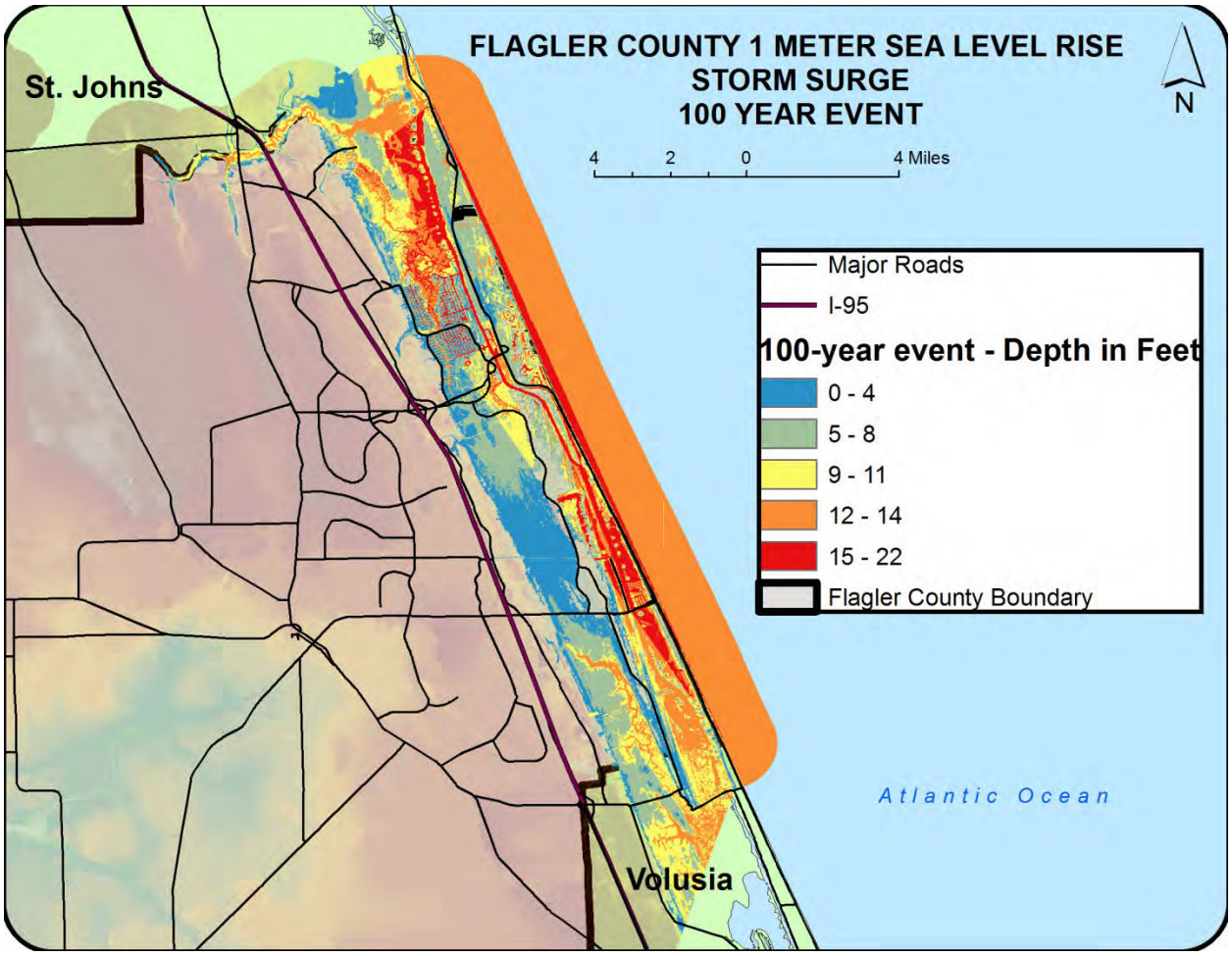

Figure 4.42: Storm Surge Projections for Hurricane "Floyd Prime" Given a 1meter Sea Level Rise

Source: Taylor Phillips Capstone Project/HAZUS, 2015

Results and Analysis

One meter of sea level rise can increase storm surge by over four feet in some cases, up to a total of 22 feet. While this case is extreme, the inundation distance is also considerably farther inland. Palm Coast has several canals that are lined with expensive housing that could be under water in high storm surge events.

The following tables are HAZUS outputs for the first model with no sea level rise for Hurricane "Floyd Prime". Notable results include:

- 3,307 buildings are at least moderately damaged (30% of total in the scenario)
- 397 (10%) completely destroyed
- Almost all buildings that could be affected are residential (76%)
- 100% of manufactured housing would be substantially damaged (180 units)

- $741 million in total damages could be incurred by "Floyd Prime"
- $2.5 million in business interruptions may be incurred.

Building Damage

General Building Stock Damage

Hazus estimates that about 3,307 buildings will be at least moderately damaged. This is over 30% of the total number of buildings in the scenario. There are an estimated 307 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	2	33.33	3	50.00	1	16.67	0	0.00	0	0.00	0	0.00
Education	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	9	0.27	534	16.13	1,110	33.52	479	14.47	872	26.34	307	9.27
Total	12		538		1,111		479		872		307	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0.00	18	18.00	33	33.00	14	14.00	31	31.00	4	4.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	180	100.00
Masonry	7	0.31	383	17.11	787	35.17	352	15.73	616	27.52	93	4.16
Steel	1	25.00	3	75.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	1	0.12	139	17.14	292	36.00	117	14.43	230	28.36	32	3.95

Figure 4.43: HAZUS Damage Outputs for "Floyd Prime" with no Sea Level Rise

Source: Taylor Phillips Capstone Project/HAZUS, 2015

Economic Loss

The total economic loss estimated for the flood is 744.04 million dollars, which represents 21.18 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 741.56 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 76.85% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	348.81	34.80	7.36	3.63	394.60
	Content	221.91	82.81	14.67	24.44	343.84
	Inventory	0.00	0.88	2.03	0.21	3.13
	Subtotal	**570.72**	**118.49**	**24.07**	**28.29**	**741.56**
Business Interruption						
	Income	0.04	0.49	0.00	0.08	0.61
	Relocation	0.64	0.09	0.00	0.03	0.76
	Rental Income	0.26	0.05	0.00	0.00	0.31
	Wage	0.11	0.39	0.00	0.31	0.81
	Subtotal	**1.05**	**1.01**	**0.00**	**0.42**	**2.48**
ALL	**Total**	**571.77**	**119.50**	**24.07**	**28.70**	**744.04**

Figure 4.44: HAZUS Outputs for "Floyd Prime" with no Sea Level Rise

Source: Taylor Phillips Capstone Project/HAZUS, 2015

The following tables are HAZUS generated outputs for Hurricane "Floyd Prime" storm surge with 1 meter of sea level rise and a 2 foot wave setup during normal astronomical tides.

Building Damage By General Occupancy

November 09, 2015

All values are in thousands of square feet

		Square Footage Distribution by Damage Percent Range						
	Total Square Footage	None	1-10	11-20	21-30	31-40	41-50	Substantial
Florida								
Flagler								
Agriculture	24.00	0.00	0.00	9.00	7.00	1.00	5.00	2.00
Government	25.00	3.00	0.00	14.00	6.00	2.00	0.00	0.00
Residential	19,572.00	2,410.00	33.00	1,004.00	4,471.00	2,665.00	7,258.00	1,731.00
Religion	138.00	8.00	7.00	96.00	13.00	3.00	6.00	5.00
Education	129.00	10.00	4.00	44.00	64.00	2.00	5.00	0.00
Commercial	1,580.00	63.00	24.00	377.00	342.00	289.00	261.00	224.00
Industrial	390.00	39.00	0.00	18.00	66.00	126.00	53.00	88.00
Total	21,858.00	2,533.00	68.00	1,562.00	4,969.00	3,088.00	7,588.00	2,050.00
Total	21,858.00	2,533.00	68.00	1,562.00	4,969.00	3,088.00	7,588.00	2,050.00
Scenario Total	21,858.00	2,533.00	68.00	1,562.00	4,969.00	3,088.00	7,588.00	2,050.00

Figure 4.45: HAZUS Damage Outputs for "Floyd Prime" given 1 meter of Sea Level Rise

Source: Taylor Phillips Capstone Project/HAZUS, 2015

Building Damage

General Building Stock Damage

Hazus estimates that about 7,956 buildings will be at least moderately damaged. This is over 31% of the total number of buildings in the scenario. There are an estimated 822 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	18	62.07	7	24.14	4	13.79	0	0.00	0	0.00
Education	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
Religion	0	0.00	3	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	481	6.07	2,237	28.24	1,182	14.92	3,200	40.40	821	10.36
Total	0		503		2,245		1,186		3,200		822	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0.00	17	5.69	99	33.11	46	15.38	126	42.14	11	3.68
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	345	100.00
Masonry	0	0.00	344	6.43	1,571	29.39	842	15.75	2,247	42.03	342	6.40
Steel	0	0.00	11	61.11	3	16.67	3	16.67	0	0.00	1	5.56
Wood	0	0.00	129	6.51	585	29.50	298	15.03	849	42.81	122	6.15

Figure 4.46: HAZUS Building Stock Loss Output for "Floyd Prime" with 1 meter of Sea Level Rise

Source: Taylor Phillips Capstone Project/HAZUS, 2015

Key findings for 1 meter of sea level rise include:

- 7,956 buildings likely to be at least moderated damaged, over twice as many than scenarios with no sea level rise
- 822 buildings will be substantially damaged, nearly all of them residential
- Again, 100% of manufactured housing will be substantially damaged; this time over 300 units are inundated with the additional sea level rise
- Over 2 million square feet of building space will be inundated, 1.7 million of which are residential

4.11.4 Infectious Disease Outbreak

An infectious disease outbreak includes any cluster of disease cases caused by a single bacteria, virus, fungi, or parasite that will cause side-effects and possible mortality to the individual. This hazard, as profiled, is not inclusive of intentional infectious disease outbreaks, which is profiled separately under the Human-Caused hazard, terrorism.

An outbreak can be quite difficult to predict. Some disease outbreaks may be able to be handled under routine operating conditions, and are not expected to require even the partial activation of emergency management. Within this section are the infectious diseases that Flagler County has at least a moderate probability of both incidence and of prompting some level of EOC activation. Potential consequences of an infectious disease outbreak include both economic and social implications: significant casualty counts, overwhelmed providers, limited/no mutual aid assistance, degraded critical services, increased worker absenteeism, and closure of public and/or private facilities for long periods.

Novel or Pandemic Influenza

A novel influenza (flu) virus is an influenza virus that has caused human infection and is different from current seasonal influenza viruses spreading among people. Novel influenza viruses can be viruses that originate in animals that gain the ability to infect and spread among humans or human viruses that change significantly so as to be different from current human seasonal influenza viruses. Most novel influenza viruses do not spread easily from one person to another. A pandemic influenza occurs when a novel influenza virus does spread from person to person and affects a very large number of people around the world. This may happen if the novel virus can spread efficiently from person to person, especially if most people do not have immunity to the new virus. People can have some immunity to novel or pandemic flu viruses that are similar to flu viruses they've been infected by it in the past.[8]

During the 2009-2010 flu season, a new and very different novel virus emerged. Previously called Novel H1N1, the 2009 H1N1 influenza, began circulating in the population much earlier in the year than the typical 'season', peaking first in June and then again, and with greater incidence, in late October. This virus caused the first influenza pandemic in more than 40 years, and has now replaced the H1N1 virus that was previously circulating in humans.[9] Flagler County saw one confirmed case and several other 'probable cases' that were not confirmed.

Historically, influenza pandemics have occurred every 11-39 years. The last three influenza pandemics (1957-58, 1968-69, and 2009-2010) were comparatively mild, but the pandemic of 1918 killed 20 to 50 million people worldwide, including more than 500,000 in the United States. Many experts consider influenza pandemic to be inevitable, yet no one knows when the next one will actually occur. It is expected that effective preventive and therapeutic measures - including vaccines and antiviral agents - will be in short supply, as may some antibiotics used for treatment of secondary infections. Existing medical facilities may be quickly overwhelmed, requiring the use of non-traditional medical settings. Healthcare workers and other first

[8] http://www.cdc.gov/flu/glossary/index.htm
[9] http://www.cdc.gov/flu/pastseasons/0910season htm

responders will likely be at even higher risk of exposure and illness than the general population, further impeding the care of victims.[10]

Florida State Surgeon General and Secretary of Health Dr. John H. Armstrong recommends getting the flu vaccine each year, and early in the season, as it is "the single best way to protect yourself and your family against influenza".[11]

Meningococcal Disease

Meningococcal disease can refer to any illness that is caused by the type of bacteria called Neisseria meningitidis, also known as meningococcus. These illnesses are often severe and include infections of the lining of the brain and spinal cord (meningitis) and bloodstream infections (bacteremia or septicemia).

Meningococcus bacteria are spread through the exchange of respiratory and throat secretions. Keeping up to date with recommended vaccines is the best defense against meningococcal disease, as four of the five most common types of these bacteria are preventable by vaccines. The disease is most common in infants and people with certain medical conditions, such as people without a spleen or with blood disorders. People at risk also include adolescents, in particular youth aged 16-23 years old and those living in close quarters, as well as the elderly and travelers to countries where meningococcal disease is common. [12]

Rates of meningococcal disease have been declining in the United States since the late 1990s. In 2013, there were about 550 total cases of meningococcal disease reported nationally. Meningococcal disease is also seasonal– the number of cases generally peaks each year in January and February.[13] In 2015, there were 50 meningococcal disease cases in Florida reported to the CDC.[14]

Outbreaks of meningococcal disease, when there are multiple cases of the same bacterial serogroup in a specific population over a short period of time, are rare in the United States. However, the onset of an outbreak is unpredictable and the outcomes can be emotionally devastating to affected communities and organizations.[15]

Measles

Measles, also called rubeola, is a respiratory disease caused by a virus. It is highly contagious, so much so that if one person has the virus, 90 percent of the people close to that person who are not vaccinated will also become infected with the measles virus. Measles is a disease of humans and is not spread by any other animal species. It is transmitted by direct contact with infectious droplets and by airborne spread when an infected person breathes, coughs, or sneezes. [16]

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[10] http://www floridahealth.gov/diseases-and-conditions/influenza/pandemic-influenza.html
[11] http://newsroom.doh.state.fl.us/wp-content/uploads/newsroom/2014/05/092614-Flu-Vaccine.pdf
[12]http://www.floridahealth.gov/diseases-and-conditions/vaccine-preventable-disease/meningococcal-disease/index html
[13] http://www.cdc.gov/meningococcal/surveillance/index html
[14] https://data.cdc.gov/NNDSS/NNDSS-Table-II-Lyme-disease-to-Meningococcal/7pb7-w9us
[15] http://www.cdc.gov/meningococcal/outbreaks/
[16] http://www.floridahealth.gov/diseases-and-conditions/vaccine-preventable-disease/measles/index html

People at high risk for severe illness and complications from measles include infants and children under 5 years of age, adults over 20 years of age, pregnant women, and people with compromised immune systems. About 30 percent of measles cases develop one or more complications, including pneumonia, encephalitis, and ear infections. Even in previously healthy children, measles can be a serious illness requiring hospitalization. As many as 1 out of every 20 children who contract measles will develop pneumonia, and 1 to 2 children in every 1,000 who get measles will die as a result of complications. Measles also can make a pregnant woman have a miscarriage, give birth prematurely, or have a low-birth-weight baby.[17]

Measles is very rare in the United States as a result of vaccination efforts. Measles can be prevented with the MMR (measles, mumps, and rubella) vaccine. One dose of MMR vaccine is about 93% effective at preventing measles if exposed to the virus, and two doses are about 97% effective. In the United States, widespread use of measles vaccine has led to a greater than 99% reduction in measles cases compared with the pre-vaccine era. It was declared 'eliminated' from the United States in 2000, however there are still sporadic cases reported as visitors from other countries or U.S. citizens traveling abroad can become infected before or during travel and spread the infection to unvaccinated or unprotected persons[18].

Outbreaks in countries to which Americans often travel can directly contribute to an increase in measles cases in the U.S. Recent outbreaks in the U.S., as reported by the Centers for Disease Control, include[19]:

- 2013: The U.S. experienced 11 outbreaks in 2013, three of which had more than 20 cases, including an outbreak with 58 cases. One such outbreak was in Florida, where 9 cases were reported.[20]
- 2014: The U.S. experienced 23 measles outbreaks in 2014, including one large outbreak of 383 cases, occurring primarily among unvaccinated Amish communities in Ohio. Many of the cases in the U.S. in 2014 were associated with cases brought in from the Philippines.
- 2015: The United States experienced a large, multi-state measles outbreak linked to a traveler who became infected overseas with measles, then visited the amusement park while infectious. No source was officially identified; however analysis by CDC scientists showed that the measles virus type in this outbreak (B3) was identical to the virus type that caused the large measles outbreak in the Philippines in 2014.

4.12 Man-Made Hazards

Man-made hazards are difficult to predict and rarely have warnings before the incident occurs. Past experiences do not generally indicate the probability or severity of future occurrences as there is rarely a scientific warning beforehand; events vary in kind and magnitude. There have been minimal past incidences within the county which would also make any chance of future occurrences unpredictable at best.

[17] http://www.cdc.gov/measles/about/complications html
[18] http://www.cdc.gov/measles/vaccination html
[19] http://www.cdc.gov/measles/cases-outbreaks.html
[20] http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6236a2.htm#fig2

4.12.1 Technological Hazards

Hazards that are classified under technological disasters include any unpredictable, hazardous material incident or exposure of toxins in either of the solid, liquid, or gaseous form. Hazardous materials are substances that are flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, an irritant or radioactive. These may include spilling, leaking, discharging, dumping, emitting, or disposing of any hazardous material into the environment. A hazardous material spill or release can pose a risk to life, health or property. An incident can result in the evacuation of a few people, a section of a facility or an entire neighborhood. Most hazmat incidents occur at fixed sites, but incidents involving transported hazardous materials are often more dangerous, since they occur in less controlled environments. This section will cover transportation incidents as well as incidents from commercial and residential areas.

4.12.1a Hazardous Materials Incidents

Flagler County has 14 facilities classified as having extremely hazardous substances. These are sites are designated '302 facilities' and their locations can be seen on the following map. Although the details of their containments are not specified, a technological or human error can lead to a potentially harmful spill. 302 facilities must possess at least the planned threshold designated in 40 CFR 355 in which an emergency response coordinator is appointed. These areas have the highest probability of a hazardous material spill as they are known to store, manage, or supply chemicals directly.

Table 4.48 Hazardous Material Sites in Flagler County

Designated '302' Facilities within the County
Palm Coast Waste Water Treatment Facility
Palm Coast Water Treatment Plant 1
Palm Coast Water Treatment Plant 2
Palm Coast Water Treatment Plant 3
Beverly Beach Water Treatment Plant
Bunnell Water Treatment Plant
Flagler Beach Wastewater Treatment Plant
Flagler Beach Water Treatment Plant
Dunes Community Development
Home Depot
Kanthal-Palm Coast
Matanzas Shores Waste
Palm Coast Wastewater Treatment Plant
T Brand Fertilizer

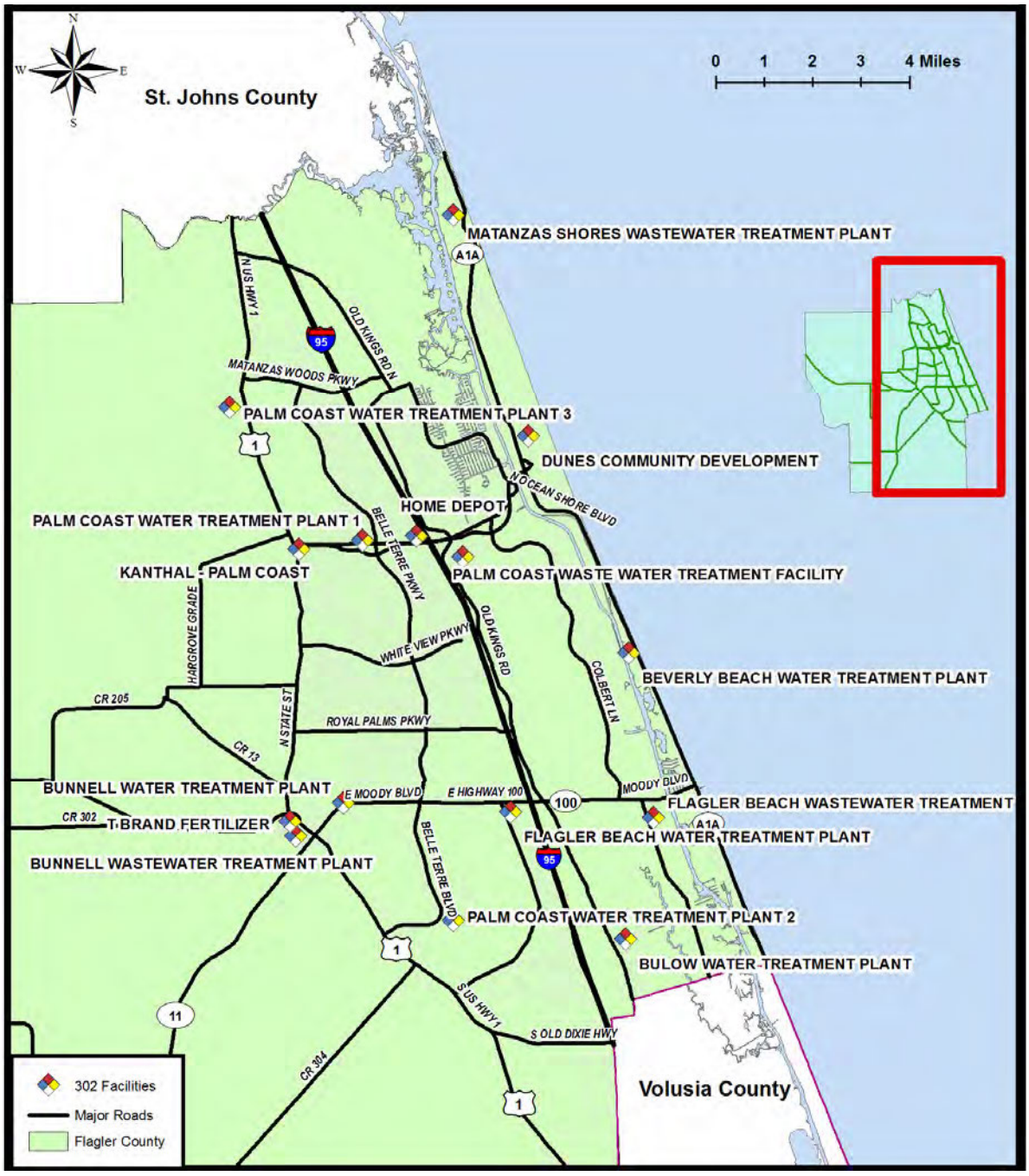


Figure 4.47: 302 Hazmat Facilities in Flagler County

Finding the exact descriptions of all the historical occurrences within the past ten years was unable to be accomplished by the planning team. By utilizing information from various sources including Fire Rescue, Emergency Management, and the LMS Strategy Subgroup, a list was compiled based on the quantity and type of hazardous materials events that have occurred within the last ten years. A total of 575 hazardous condition incidents have occurred since 2005, making up 0.6% of the responses for Fire Rescue. Most incidents do not have any associated details or dates but the verifiable incidents will be listed in further detail following this table.

Table 4.49: Total Categorized Hazardous Material Incidents in Flagler County

Hazardous Materials Incidents from 2005-2015	
Hazard Incident Type	**Number of Occurrences**
Hazardous Condition	88
Gas or other Flammable Liquid Spill	48
Gas Leak	22
Combustible Liquid Spill	7
Electrical (short circuit, power line, or other equipment problem)	265
Accident	74
Chemical Hazard, Spill or Leak	13
Radioactive Condition	2
Explosive/Bomb Removals	4
Overheated Motor	14

Discernible events include:

- **11/28/2005-** A chlorine leak in Hammock Dunes required a securing of an area near 16th Road and Hammock Dunes Parkway. No homes were evacuated and no injuries were reported. This incident was resolved in 3 hours.
- **01/04/2010-** An Advanced Auto Parts had a vehicle leaking sulfuric acid from the battery. This caused 7 individuals to become ill with nausea and discomfort.

There has also been at least one transportation related incident that has caused spilling of hazardous materials. Since the Florida East Coast Railway and various large interstates run through Flagler County it is important to profile the possibility of a hazardous material by transportation incident. The probability of this incident occurring is very low as there has only been one known occurrence.

Discernible events include:

- **05/09/2009-** Florida East Coast Railway had a train derailment that involved hazardous materials in one tank car. Smoke and fumes were emitted, but the wind blew them away from populated areas.

4.12.2 Human-Caused Hazards

While the risks presented by natural hazards may be increased or decreased as a result of human activity, hazards that are classified as human-caused are distinct from natural hazards primarily in that they originate from human induced activity. The human-caused hazards that may potentially impact Flagler County include terrorism and civil disturbance. Depending on the nature of the incident, the impacts of a human-caused hazard can be localized— even limited to a single building—or they can be widespread, encompassing large parts of the county or even extending into the surrounding counties. Additionally, the extent of the physical damages generated by an incident can be surpassed by its associated economic impacts, as demonstrated by the national-level economic effects of the September 11th terrorism attacks.

4.12.2a Terrorism

There is no single, universally accepted definition of terrorism, and it can be interpreted in many ways. Terrorism, as defined by FEMA, is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom[21]. This definition is further expounded on to include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons. The effects of terrorism can vary as much as the methods themselves—from loss of life and injuries, to property and infrastructure damage and disruption, and whether actual or threatened attack, can elicit fear and panic.

Statistically, most terrorism incidents are carried out by a single perpetrator in a single location, and enclosed public spaces such as schools are frequent targets of such attacks. Of note, between 2008 and February 2016, among the Flagler County schools locations there was one bomb threat, one hazardous materials incident, one shooting incident, and one shots-fired incident. There were also 101 'threats' that weren't otherwise described, 187 suspicious incidents, and 64 weapons complaints. The Flagler County Sheriff's Office (FCSO) was able to provide county-wide information on call types received between 2009 and February 2016. Of the 20,575 'Calls for Service' FCSO received, 9 were for bomb threats, 98 for suspicious packages, 4 for cyber crimes, 26 for hazardous materials incidents, 85 for shootings and shots-fired, 1,646 for threats, 15,758 for suspicious incidents, and 2,907 for weapons complaints. *An important note on this data:* These numbers are aggregate data on call types, and do not mean that each incident was correctly labeled or that any above incident was an actual or threatened terrorism incident. The data does however reflect the need for continued monitoring and further evaluation of this hazard in the future.

Because there are no 'high-risk targets' for acts of terrorism in Flagler County, such as military facilities, international airports, or high-profile landmarks or tourist attractions, there is little likelihood that the religious, political, or ideologically motivated terrorism events most associated with domestic and international terrorism attacks would occur in Flagler County (as compared to the Oklahoma City Murrah Federal Building bombing or 9/11 attacks in New York). This condition makes the probability of terrorism related events less likely in Flagler County than elsewhere in the surrounding region, such as Daytona Beach, St. Augustine, Orlando, or Jacksonville areas.

Although the probability of terrorism incidents is extremely low, any event would be the most harmful within areas of the greatest population density. Palm Coast would have the most highly susceptible residential area, as well as the majority of critical facilities. Numerous 302 facilities (facilities that have reported an amount equal to or greater than the Threshold Planning Quantity (TPQ) of any "Extremely Hazardous Substance" covered by EPCRA, also known as Title III of the Superfund Amendments and Reauthorization Act of 1986) are spread out within the county, with government, hospital, law enforcement, school, and shelter buildings located quite near. While not the 'high-risk targets' of state or national significance, these critical facilities would be considered Flagler County's higher risk targets. If a terrorism incident were to occur it would be

[21] http://www fema.gov/media-library-data/20130726-1549-20490-0802/terrorism.pdf

very difficult to predict when or where it would happen, and depending on the method of attack, could potentially harm a large portion of the community.

4.12.2b Civil Disturbance

Civil disturbance is a broad term used to describe any action by a person or group of people that disrupts a community and requires intervention to maintain public safety, such as riots, sabotage, sit-ins, illegal demonstrations, and other forms of public or governmental obstruction, excluding those acts classified as terrorism. Civil disturbances can cause extensive social disruption, lead to fatalities and injuries, and result in property damage. The loss and damages may result from those involved in the action or initiated by authorities in response to the perception of a potential threat. It can similarly damage the county's or city's reputation, which in turn may dampen future economic growth and result in negative psychological effects for residents and visitors. Furthermore, the response to large disturbances often require an enormous expenditure of money, resources and time to reestablish control and recover from property damage, business losses and revenue collections.

While Flagler County is home to many ethnic populations originating from countries with divergent political, religious, and social systems, there have not been significant civil disturbance incidents arising from such thus far. Calls for service about civil disturbance incidents are difficult to track, as the calls are coded differently, depending on the situation. For instance, the incident may be coded using one of the disturbance headings (Verbal, Physical, or with Weapon) or as a description of the action, such as trespassing, depending on how the complaint is made. Because of the considerable variability in coding theses calls and the inherent inclusion of events other than civil disturbance events, 'Call for Service' aggregate data is not a valid indicator of civil disturbances in Flagler County. However, the possibility of local civil disturbance is not unnoticed, and will continue to be monitored and evaluated for future hazard profiling.

5.0- Mitigation Strategy

The mitigation strategy section is the piece of the plan that lays the groundwork for the foreseeable future. The goals and objectives, prioritization process and the plan maintenance sub-sections make up the primary components of the mitigation strategy section and were the main responsibility of the Strategy Sub-group. Additionally, the strategy section contains information on common mitigation funding programs and the plan integration process.

5.1 Goals and Objectives

Developing goals is important to the mitigation planning process. Goals and objectives help focus the efforts that the LMS Working Group would like to see take place. The LMS goals are broad statements of action while the objectives provide more specific guidance, and when undertaken and supported by mitigation initiatives, protect Flagler County's assets. LMS goals, objectives, and guiding principles are used to provide direction in developing and prioritizing the list of hazard mitigation initiatives. Goals are tied to the proposed mitigation projects in the plan in an effort to ensure projects are consistent with the strategic direction the Working Group agrees upon. By matching up the goals and objectives with projects, LMS Working Group members can also identify if there are any gaps that need to be addressed.

After evaluating the 2011 goals and objectives, it was determined that they were in need of a complete overhaul. It was unanimously agreed upon by the LMS Working Group, Planning Sub-group and Strategy Sub-group that the goals should be re-written and to be more directly geared toward mitigation. Several state, county and municipal plans were reviewed to ensure proposed goals were consistent with existing planning mechanisms. Some examples of plans reviewed are the State Hazard Mitigation Plan, county Strategic Plan, State Continuity of Operations Plan, Comprehensive Emergency Management Plan, and Comprehensive Plan and other Florida county LMS plans.

The hazard mitigation goals and objectives were created through a series of Strategy Sub-group meetings and LMS Working Group meetings. After proposing some goals to the LMS Working Group, the Planning Sub-group finalized the list and then developed draft objectives. The objectives were flushed out with input from the Strategy Sub-group and the LMS Working Group. The final draft of the goals and objectives was reviewed for one final edit by the Strategy Sub-group before being included within this document. Both the goals and objectives were established and approved by consensus from the Strategy Sub-group.

The final list represents an overall mitigation mission of promoting and preserving the quality of life within Flagler County. The individual goals identified by the LMS Working Group are directed by the desire to protect the people and property of Flagler County from the effects of hazardous events. Goals will be reviewed annually and can be modified based on a consensus vote of the LMS Working Group. The goals are as follows:

Goal 1: Minimize impacts from hazards to infrastructure, critical facilities, and property.

- Objective 1.1- Reassess and identify all critical and mission critical facilities.

- Objective 1.2- Identify actionable mitigation projects that minimize vulnerabilities.
- Objective 1.3- Reduce repetitive loss properties.
- Objective 1.4- Promote Firewise techniques and principles in all current and future developments.
- Objective 1.5- Improve the resiliency of transportation infrastructure.
- Objective 1.6- Improve the resiliency of water and sewer facilities within the community.
- Objective 1.7- Retrofit structures to withstand maximum physical impact from disasters.
- Objective 1.8- Reduce or eliminate development in hazard prone areas.
- Objective 1.9- Promote resilient structures for all future developments.

Goal 2: Minimize the impact to natural resources (including water resources, wetlands, and coastal habitats).

- Objective 2.1- Preserve open space.
- Objective 2.2- Promote land acquisition in high hazard areas.
- Objective 2.3- Promote environmentally sustainable prescribed burning.
- Objective 2.4- Enhance coastal ecosystems that act as natural mitigation tools (including but not limited to dunes, wetlands, mangroves, and upland forests).
- Objective 2.5- Identify efficient long-term solutions for erosion control.

Goal 3: Promote community awareness of vulnerability and mitigation options.

- Objective 3.1- Provide opportunities for public education about areas of high risk and personal susceptibility.
- Objective 3.2- Inform the public of available residential and commercial mitigation grants.
- Objective 3.3- Create user friendly mitigation tools.
- Objective 3.4- Create outreach opportunities targeted to local contractors and homeowners for education on residential mitigation options.

Goal 4: Reduce potential hazard related economic losses to businesses.

- Objective 4.1- Create programs between businesses and local government for pre and post-disaster mitigation.
- Objective 4.2- Raise awareness about local hazards, their vulnerability, and technical assistance available.
- Objective 4.3- Encourage hazard mitigation retrofitting of local business buildings.

Goal 5: Strengthen regional relationships in regards to mitigation among municipalities, agencies, and other organizations.

- Objective 5.1- Identify areas where day-to-day programmatic activities have an effect on mitigation efforts.
- Objective 5.2- Promote information sharing among groups through easily accessible sources.
- Objective 5.3- Facilitate conversations to promote mitigation projects with regional impacts.
- Objective 5.4- Maximize the use of available resources to further the implementation of CRS in the county and surrounding areas.

Goal 6: Promote methods of funding mitigation projects, including innovative methods.

- Objective 6.1- Promote public/private partnerships for mutually beneficial mitigation funding.
- Objective 6.2- Utilize existing and upcoming grants from state and/or federal agencies.
- Objective 6.3- Encourage local governments to explore all opportunities to maximize project match funding.

Goals and objectives are matched to prioritized projects in order to ensure projects are in line with the direction the LMS Working Group has set for the next five years. However, goals and objectives can be revised or added by the request of someone in the Working Group with approval from the Strategy Sub-group and consent from the overall Working Group to accommodate for the ongoing and evolving mitigation efforts. Goals and objectives will be evaluated annually as a part of the plan monitoring process.

5.2 Project Prioritization

Prioritizing projects in a consistent manner is important to determining which projects should receive funding first, as they will have major impacts in the community. Prioritizing projects identified during the risk assessment process and frontloading grant applications will help the county be able to more quickly obtain post-disaster funding for projects that are "shelf-ready". The evaluation of a project using the prioritization process provides each project a score. Projects that receive higher scores will be the first to receive funding during a presidential declaration or when other funding methods become available.

The previous project ranking procedure was reviewed by the county's mitigation planner and it was recommended to the Strategy Sub-group that some fields be added to the project information sheet and that the ranking process be revised to better evaluate projects. The Strategy Sub-group concurred and a new process was thoroughly discussed. The outline of the previous LMS project sheet was used as a foundation for the current project scoring sheet. All elements of the project description page are required to be completed by the project sponsor/point of contact to ensure the prioritization process can be completed without needing any further information. It was important to the sub-group to make the prioritization process as easy and objective as possible.

As an initial step of the project development process, project sponsors are asked to identify alternative projects and consider only ones that they believe will receive a Benefit Cost Analysis (BCA) score of 1.0 or higher. Project sponsors can work with technical specialists at the Florida Division of Emergency Management's Bureau of Mitigation to run initial BCAs using the FEMA BCA toolkit if they are unsure as to whether or not a project would have a high return on investment. All information collected on the project information sheet plays a role in the overall benefit cost review of a given project.

The process for creating the prioritization method included loosely following FEMA's 'STAPLEE' method to encompass all aspects of reviewing mitigation actions. In filling out the project evaluation sheets, the following questions are answered:

- Is the project consistent with the LMS goals?
- Does the project address mission essential or mission critical facilities?

- Are the financial benefits expected to be greater than the project costs?
- Does the project benefit or harm the environment?
- Is the project "shelf-ready"?
- Is there legal opposition?
- Is the project socially equitable?
- Are funding sources available?
- Would there be acceptance from the community?

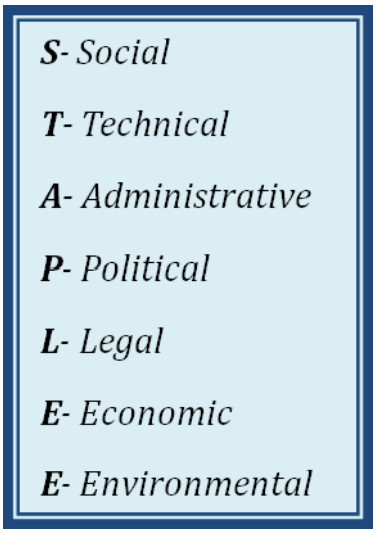


Figure 5.1: Categories to Evaluate using FEMA's STAPLEE Method

Each of the 9 criterion were then weighted based on what the Strategy Sub-group deemed as the 'most important to consider' or the 'least important to consider'. Criteria were given a weight of 1-4, with 4 being the most important.

Each criterion was then split into three or five levels to which a score of 0-4 could be assigned. A score of 4 translates to positive characteristics of the project and a score of 0 means the project may have significant room for improvement. In order to avoid bias when scoring, the Strategy Sub-group assigned descriptions for each score under the criterion. All scores (0-4) are then multiplied by the 'weight' (1-4) and totaled to give the project a final priority score. The highest score a project can receive is 80 points.

After the prioritization process was finalized, the Planning Sub-group presented the Strategy Sub-group with a project information sheet and project scoring matrix. To test the objectivity and usefulness of the prioritization method, the Planning Sub-group selected a project scored by the previous method, and then used the new prioritization project matrix to have determine its new score. All group members were able to agree on the final project score based on the defined category descriptions, thereby validating the new scoring criteria and process.

Individuals or organizations sponsoring projects are encouraged to score their own projects before turning in the sheets. Projects will be presented to the LMS Strategy Sub-group for evaluation and discussion by the sponsoring person/organization. It will be the Strategy Sub-group's responsibility to determine whether or not they feel the project is scored appropriately. For instance, projects may be eligible for more points than the sponsoring organization realizes or they may be too generous with the scoring process in order to get more points and rise in the priority list. Project sponsors will be allowed to justify the scoring of their projects but will not be allowed to partake in the overall consensus voting of their project. Once consensus is achieved, the project will move on for final approval from the overall LMS Working Group. As of 2016, this is a trial process and if warranted, a new process may be proposed for support by the greater Working Group.

The Strategy Sub-group is open to all individuals who participate in the LMS Working Group. When possible, the Strategy Sub-group will meet directly before the quarterly LMS meeting. All meetings will be publicly advertised. Items discussed in the Strategy Sub-group meetings will be summarized in the LMS Working Group meetings and may be discussed at the regular working group meetings, if desired.

A copy of the project information sheet and scoring sheet along with instructions can be found in **Appendix E.** Individuals or organizations looking to submit projects can have a one-stop-shop for everything needed to fill in and submit a project information sheet. A copy of the project information sheet can also be found below along with an example scoring sheet.

Flagler County Local Mitigation Strategy
Project Information Sheet

Contact Name and Title:			**Address:**		
Phone/Email:				**File #:**	
Department:		**Jurisdiction:**		**Date Prepared:**	
Project Name:	**Project Title**			**Date Approved:**	
				Date Revised:	
Description:					
Hazard(s) Mitigated:		**New or Existing?**		**Goals and Objectives Met:**	
Explain Possible Alternatives and Why Not Selected:				**Explain Any Expected Opposition:**	
Timeframe to Implement:		**Estimated Cost:**		**Expected Cost Benefit Review:**	
Mission Critical or Mission Essential Facilities Mitigated:		**Shelf Ready?**		**Potential Funding Sources and Match:**	
Describe any Historic, Environmental, and Social Community Benefits or Potential Negative Impacts:					

Figure 5.2: Project Information Sheet

Project Title						File #	0	
Criteria Category	**4**	**3**	**2**	**1**	**0**	**Score**	**Weight**	**Total**
Consistency with LMS Goals	Consistent with multiple goals or objectives		Consistent with one goal or objective		Not consistent with any goals or objectives	4	4	16
Addresses Mission Essential or Mission Critical Facilities	Addresses more than one mission critical facility	Addresses one mission critical facility	Addresses more than 1 mission essential facility	Addresses 1 mission essential facility	Does not address any essential or critical facilities	2	4	8
Cost-Benefit Review	Benefits expected to greatly exceed estimated project costs		Benefit expected to be equal to estimated project costs		Project costs expected to be greater than benefits	4	2	8
Environmental Impacts	Largely benefits the surrounding ecosystems, natural resources, air quality, or water quality long-term (over 50 years)	Benefits the surrounding ecosystems, natural resources, air quality, or water quality short-term (10-49 years)	No environmental impact is made	Minimal, low-impact damage to ecosystems, natural resources, air quality, or water quality	Causes damage to surrounding ecosystems, natural resources, air quality, or water quality	4	3	12
Shelf-readiness	Application materials are filled out and ready to be submitted		Project plans are partially complete and will take some time to submit when funding becomes available		Project plans have not begun	0	2	0
Social Equity	Does not displace or negatively affect any people		Negatively impacts very few people		Negatively impacts many people	4	1	4
Accessibility to Funds	Matching funds are identified and are available		Matching funds can be made available in a short timeframe		Matching funds are not available	2	1	2
Political or Legal Opposition	There will probably be no political or legal opposition		There is limited political or legal opposition		There is likely to be political or legal opposition	4	2	4
Community Support	Community is in full support and is asking for a solution to the problem		Community would easily understand how this project benefits them		There would be limited support by the community for this project	2	1	2
					Priority Score:	**56/80**		

Figure 5.3: Sample Project Scoring Sheet

5.3 Funding

Funding for mitigation projects is essential to success. Not all mitigation projects require large amounts of money to implement. Some projects can be relatively inexpensive to those that implement them, such as ordinances, outreach, and planning. Using creativity when looking for funding may also be advantageous. Other municipalities throughout the U.S. have had success partnering with private sector, using revenue from fees or taxes, getting homeowners to pay portions of projects, and pairing up multiple grants to minimize cost-share. Other cost share or funding options commonly used in Florida include:

- Half-cent sales tax
- Ad valorem tax
- Stormwater tax assessment
- Housing and rehabilitation fund
- In-kind services
- Impact fees/ Development exaction
- Tourist tax local option
- Revenue bonds
- Permit fees
- State revenue sharing

Funding programs are constantly changing; therefore, it is important to remain attentive to all funding resources and review best practices for new ideas on funding projects. A few of the common mitigation project funding sources have been described below and on the following pages.

5.3.1 Federal Funding

Many of the federal grants described below are administered by the Florida Division of Emergency Management (FDEM) on behalf of FEMA. More information can be found online and by contacting FDEM or the county emergency management office.

5.3.1a Hazard Mitigation Grant Program (HMGP)

The HMGP becomes available following a Presidential major disaster declaration in Florida. Counties that are declared as part of the disaster receive a set amount of money proportional to the amount of the funds expended under the disaster under the Individual Assistance (IA), Public Assistance (PA) and Small Business Administration (SBA) programs. Counties not declared as a part of the disaster may apply for any leftover funds on a first-come-first-serve basis. HMGP projects commonly include, but are not limited to, structure elevations, generators at critical facilities, drainage projects, structural retrofits (shutters, impact resistant windows and doors, etc.), acquisitions, and safe rooms. Projects are funded 75% by FEMA and 25% by a local cost share.

5.3.1b Flood Mitigation Assistance Program (FMA)

Typically funded yearly in the spring/summer, the FMA program helps states, local, and tribal governments reduce or eliminate long-term risks of flood damage to repetitively flooded structures insured under the National Flood Insurance Program (NFIP). This nationally competitive program prioritizes projects based on the greatest savings to the NFIP fund.

Common projects include acquisition, relocation, demolition reconstruction, elevation, drainage projects and floodplain planning. Projects are funded 75% by FEMA and 25% by a local cost share. Planning projects have a federal cost share cap of $25,000. If projects address Severe Repetitive Loss (SRL) properties the project may be eligible for 100% federal funding. If a project addresses Repetitive Loss (RL) properties, it may be eligible for a 90% federal share with a 10% local cost share.

5.3.1c Pre-Disaster Mitigation Grant Program (PDM)

This nationally competitive program is designed to assist states, tribal governments and local communities in implementing a sustained pre-disaster natural hazard mitigation program. The program aims to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on federal funding for future disasters. It is typically made available annually in the spring/summer. Projects commonly funded include, but are not limited to, structure elevations, generators at critical facilities, drainage projects, structural retrofits (shutters, impact resistant windows and doors, etc.), acquisitions, safe rooms, and local mitigation planning efforts. Projects are funded 75% by FEMA and 25% by a local cost share.

5.3.2 State Funding

The State of Florida offers a variety of funding options to assist communities, organizations and homeowners with mitigation efforts. Some of the most common mitigation-centric funding sources have been described below.

5.3.2a Hurricane Shelter Retrofit Program

In Florida a small fee is collected on each homeowner's insurance policy to fund the Florida Hurricane Catastrophe Fund (FHCF). The purpose of the FHCF is to protect and advance the state's interest in maintaining insurance capacity in Florida by providing reimbursements to insurers for a portion of their catastrophic hurricane losses. Each fiscal year, $10 million of the FHCF must go toward hurricane mitigation purposes through FDEM for the Hurricane Loss Mitigation Program which includes the Residential Construction Mitigation Program (RCMP) and the Hurricane Shelter Retrofit Program.

The Shelter Retrofit Program makes grants available to retrofit schools to serve as hurricane evacuation shelters. Eligible applicants include local governments and school boards. Money is made available each year and must be spent in the following two years. Projects must be included in the county's annual shelter report and are prioritized for funding by the state based upon the regional shelter space deficit. Grants are for a maximum of $300,000 and can be used to replace windows and doors, install shutters, retrofit roofs, and more. There is no cost share to applicants who are awarded grant funds.

5.3.2b Residential Construction Mitigation Program (RCMP)

The RCMP is a state-funded program administered by FDEM and available annually to local governments, non-profits and for-profit businesses to retrofit residential structures to better withstand hurricane-force winds. Once applicants are awarded, structures are then selected by the sub-grantee to be retrofitted. Under this program homes that are eligible to be retrofitted must be single family, site-built homes built before 2002 with no unpermitted work, no outstanding liens or judgments, and must be the owner's primary residence. Preference is given to homeowners

who qualify as low to moderate income under the federal Department of Housing and Urban Development (HUD) limits. Projects are completely funded by the RCMP; there is no cost share to homeowners.

5.3.2c Florida Communities Trust (FCT) Fund

This program works through the Florida Forever Grant Program to assist communities in protecting important natural resources, providing recreational opportunities, and preserving Florida's traditional working waterfronts. These local land acquisition grant programs provide funding to local governments and eligible non-profit organizations to acquire land for parks, open space, greenways and projects supporting Florida's seafood harvesting and aquaculture industries.

5.3.2d Coastal Partnership Initiative Grant Program

This program works to make federal funds available to Florida's coastal counties to promote the protection and effective management of Florida's coastal resources. This is aimed specifically at four priority areas including; creating resilient communities and helping mitigate against the effects of climate change and natural disasters, coastal resource stewardship, access to coastal resources, and working waterfronts. Local governments can apply and partner with Florida's public colleges, universities, regional planning councils, national estuary programs, and nonprofit groups.

5.3.2e Small Cities Community Development Block Grant Program (CDBG)

This program provides funding for housing and community development activities including mitigation measures such as water and sewer improvements, rehabilitation of substandard housing, drainage and stormwater improvements, and community centers. Each activity must meet one of the following national objectives for the program: benefit low- and moderate-income persons, prevention or elimination of slums or blight, or address community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community for which other funding is not available. Local governments are eligible to apply for the Small Cities CDBG if they have fewer than 50,000 residents, counties with fewer than 200,000 residents, or cities that have opted out of the urban entitlement program.

5.3.2f Community Development Block Grant-Disaster Recovery (CDBG-DR)

In response to presidentially declared disasters, Congress may appropriate additional funding for the CDBG program as Disaster Recovery grants to rebuild the affected areas and provide crucial seed money to start the recovery process. Since CDBG-DR assistance may fund a broad range of recovery activities, HUD can help communities and neighborhoods that otherwise might not recover due to limited resources. Disaster Recovery grants often supplement disaster programs of FEMA, the Small Business Administration, and the U.S. Army Corps of Engineers.

CDBG-DR funds have similar requirements to the CDBG Small Cities program in that they must also meet the national objectives of the program. CDBG-DR funds can assist with mitigation projects such as buying damaged homes in the floodplain and relocating residents to a safer area, rehabilitation of homes and buildings damaged by the disaster, or buying, constructing, or rehabilitating public facilities such as streets, neighborhood centers, and water, sewer and drainage systems.

5.3.2g Weatherization Assistance Program (WAP)

The WAP annually provides grant funds to community action agencies, local governments, Indian tribes and non-profit agencies to provide specific program services for low-income families of Florida. The U.S. Department of Energy Weatherization Assistance Program provides grants to states, territories, and Indian tribes to improve the energy efficiency of the homes of low-income families. Funding goes towards home energy upgrades that create a safe, efficient, and durable home. The program is funded each year by the United States Department of Energy and receives supplemental funding from the United States Department of Health and Human Services. The extent of services to be provided depends on available funding. The Northeast Florida Community Action Agency is responsible for administering funds in Flagler County.

5.3.2h St. Johns River Water Management District Cost-Share Funding Program

The St. Johns River Water Management District Cost-share Funding program allows local governments and other entities to share costs for projects that assist in creating sustainable water resources, provide flood protection and enhance conservation efforts. The District will select projects that it determines provide the most beneficial water resource results.

5.3.2i Recreation Development Assistance Program (FRDAP)

The Florida Recreation Development Assistance Program is a grant program administered by the Florida Department of Environmental Protection that provides financial assistance to local governments for development or acquisition of land for public outdoor recreational purposes. FRDAP could be a potential source of funding used to acquire lands in the floodplain and turn them into a recreational area; thus, preventing future loss to structures. All county governments and municipalities in Florida and other legally constituted local governmental entities with the legal responsibility for the provision of outdoor recreational sites and facilities for the use and benefit of the public are eligible to apply.

Applicants must submit a completed FRDAP Grant Application during an announced submission period. Applicants may submit up to two applications during the submission period. Applications must involve only one project site except for acquisition or development of sandy beach access. The maximum grant amount is $200,000 and the amount of matching funds required is dependent upon the total project cost, but ranges from 0% cost share up to 50% cost share.

5.3.3 Other Funding

Many other funding programs exist that can be applicable to mitigation efforts. Though most usually sought after, grants, taxes and government-collect fees are not the only way to fund projects.

5.3.3a Florida Property-Assessed Clean Energy (PACE)

The Florida PACE Funding Agency is a way for qualified property owners in subscribed communities to finance energy efficiency, renewable energy and wind-hardening improvements through a long-term property assessment. In other words, a PACE loan is paid back through the property tax bill. PACE differs from a grant in that it is a resource to help fund projects with a low interest rate over an agreed upon timeframe, which can be many years long. There is no penalty for paying off the loan early. Previous applicants have saved more money each month on their energy costs than their monthly loan re-payment amount. Applicants can be non-profits,

for-profit businesses and individual homeowners. Applications are made to E-Vest Florida at https://evestflorida.com/apply-now. More information on PACE can be found at https://www.floridapace.gov. Flagler County is one of Florida's 14 counties participating in the program.

5.4 Plan Integration

Mitigation has the potential to easily integrate into many day-to-day functions and existing plans throughout the county, such as the Comprehensive Plan and the Comprehensive Emergency Management Plan (CEMP). Other 'planning mechanisms' that the mitigation plan can be integrated into include policies and procedures. For instance, mitigation can be incorporated during the recovery process of Presidentially declared disasters by simply including it when filling out a Public Assistance Project Worksheet to repair public facilities or infrastructure. Another process for incorporating mitigation would be to provide a policy or procedure for homeowner's associations to incorporate wildfire mitigation activities into their bi-laws.

One of the strongest ties that exists between two mitigation-related planning mechanisms is the one between the LMS and the CEMP. The CEMP must be updated every four years and relies heavily on the LMS—the county's all-hazards risk assessment. As the LMS's risk assessment is updated, it is integrated into the CEMP. On years when the CEMP must be updated prior to the 5-year update of the LMS, the risk assessment section will be reviewed and updated as necessary to meet the needs of the CEMP. The CEMP is adopted by resolution at the county while the other participating municipalities adopt it by promulgation; therefore, all municipalities provide their consent on this integration.

Communities participating in the CRS may use the LMS as their official Floodplain Management Plan and/or as part of their Flood Warning and Response Plan. Communities that utilize the LMS for CRS purposes will have to ensure that the LMS is turned into their ISO CRS representative for review and scoring once it is adopted. If requirements change under the CRS, the LMS may need to be updated. As such, the LMS will be evaluated each time a new CRS manual is released in order to ensure participating jurisdictions are integrating the LMS appropriately to maximize points. Flagler County, Palm Coast and Flagler Beach use the LMS to support their CRS activities.

When it is time for plans to be updated, each municipality will take the lead in ensuring the LMS gets integrated appropriately into the revised plan. At a minimum, the plans being updated will be reviewed to ensure they are consistent with the LMS and places will be identified where mitigation can play a bigger role. That information will be relayed back to the LMS Coordinator so that it can be tracked in the LMS. As a part of the 2016 update, a review was conducted of each municipality's Comprehensive Plan (Comp Plan). Policies related to mitigation were extracted and placed in a table in **Appendix H- Policy Evaluation**. It was discovered that there is ample room for in each of the Comp Plans to integrate mitigation concepts in the future. Between Comp Plan updates, mitigation will continue to be promoted at the local level through other policies, goals and objectives, both new and existing.

Potential plans and planning mechanisms that the LMS can be integrated with include:

- Municipal Comprehensive Plans
- Floodplain Management Plans
- Flood Warning and Response Plans (CRS Section 610)
- Community Wildfire Protection Plans
- CEMPs
- Post-Disaster Redevelopment Plans (PDRPs)
- Municipal ordinances
- Land development regulations
- Floodplain ordinances
- Strategic Plans
- Capital Improvement Plans
- Hazard Specific Plans

Previously, the LMS was integrated with the CEMP via the risk assessment section. A summary table from the LMS was included into the CEMP and it was stated in the CEMP that the county's complete risk assessment can be found in the LMS. Also, the cities of Palm Coast and Flagler Beach used the LMS to gain points under section 510 of the CRS program. Flagler County and the City of Flagler Beach used the LMS to help get points with section 610 of the CRS program. Palm Coast will be using the 2016 LMS to assist them with obtaining points in section 610 at their next ISO review.

5.5 Plan Implementation and Maintenance

The implementation and monitoring process was discussed at length and agreed upon by the Strategy Sub-group. All decisions were agreed upon in consensus and documented for implementation into the LMS. The plan will be formally evaluated annually by the LMS Working Group in order to assess goals and objectives, if the magnitude of any risks has changed, if there are any updates on current resources appropriate for implementing the plan and projects, and it will be checked to see if any technical, political, or legal issues may have arisen that could affect implementation. If anything major occurs throughout the year, the Flagler County Mitigation Planner will be responsible for updating the plan, as necessary, and informing the LMS Working Group.

Quarterly meetings will take place to continually share information regarding projects status, plan implementation and new or revised relevant mitigation information. These meetings will include updates from each jurisdiction and will allow for the LMS to continue as a living document. All information will continue to be posted on the Flagler County mitigation website and meetings will be publicly noticed on the county website and posted in the lobby of the Government Services Building. Any member of the LMS Working Group can request to have a meeting outside of the regularly scheduled quarterly meetings if he or she desires.

Each participating jurisdiction is responsible for implementing the mitigation actions within this plan. The Flagler County Emergency Management Division will continue to seek out funding opportunities to implement identified mitigation projects. In an event that there is a presidential disaster declaration, a LMS meeting will be scheduled shortly thereafter to discuss which

project(s) should be submitted to the state for funding. The project(s) will be chosen based on the priority rank score but will be dependent upon the amount of money available.

In order to maximize the potential of the LMS it is important for the plan to remain fluid. As such, the plan must be reviewed periodically and updated to reflect changing needs and conditions within the county. According to F.A.C 27P-22, each county must submit annually, by the last working day in January, an updated project list, proof that the LMS Working Group met at least once during the year, a copy of the LMS Working Group roster along with contact information for the Chair/Coordinator and Vice Chair, as well as any major revisions to the list of critical facilities, risk assessment, or repetitive loss list.

For the purposes of the Community Rating System (CRS), an annual progress report will be prepared each September by each of the participating communities. The report must include a review of each action item, an explanation of what was implemented or not, recommended changes to the action plan, copies of committee meeting minutes and a description of how the report was submitted to the governing body, released to the media and made available to the public. The progress report must also be sent to the state National Flood Insurance Plan (NFIP) office and the CRS ISO point of contact by October 1st. Each community's CRS Coordinator is responsible for coordinating the annual progress report which will be shared with the LMS Working Group before finalized.

The plan will be comprehensively updated every five years, as directed by FEMA and the state of Florida. The five-year update will consist of a full review of the current document and will involve all participating jurisdictions, interested parties and members of the public. This review will involve a comprehensive assessment of all portions of the plan and the success of addressing all current problems. The Planning Sub-group will conduct an initial assessment before gaining input and approval by the Strategy Sub-group and the entire Working Group. During the update process, the LMS Working Group shall meet as often as necessary to ensure all entities and interested parties have an opportunity to provide input.

The update will begin approximately 18-months prior to expiration. All meetings will continue to be publicly posted on the web and on the county bulletin board. LMS Working Group members will receive email notifications and will be asked to contribute to portions of the plan that directly affect their jurisdiction. In addition, they will be asked to review and contribute to portions of the plan that affect all participating jurisdictions. The plan will be submitted to the state mitigation planning unit approximately six months prior to expiration so that the review and adoption processes can be conducted before the plan is set to expire. The plan will be posted online for public comment at all times. The Flagler County Emergency Management's Mitigation Planner will be responsible for ensuring the five-year update is completed in a timely fashion.

Bike MS Cycle to the Shore March 30,2021
Bike ride fundraiser for Multiple Sclerosis $500 fee pd CC#
National MS Society
Oct 23-24, 2021 5AM-5PM

Preston Steblein Promoter Line, Inc
Colleyville Texas

817.909.0549

preston@promoterline.com

amplified music/PA system

route/event signs to direct attendants

several tents

light towers and tent lights

portolets/handicap accessible

parking attendants/FCSO/EMS/trained 1st responders
no vendors, but food & merchandise/alcohol served – possible beer garden?
Site plan attached safety plan attached no property letter needed
Does this affect the Salt Air Farmers Market on Sunday 10/24/21? Located in the southwest corner of the property/ SA FM is in the northeast corner

All food and drink will be free to participants, staff, and volunteers. Due to covid these meals and drinks will likely be pre packaged to limit any concerns for staff or participants.

The beer will be free to participants as well and will be managed by my team along with the brewery that donates the beer. Their licensed staff will manage the two beers per person policy and the ID checking.

Town of Marineland Special Event Permit Application

Please read the following policies carefully as you/your party are responsible for adhering to these policies upon approval of your permit application and throughout the permitted event.

1. Any organized activity involving the use of, or having impact upon, public property, public facilities, parks, sidewalks, or street areas, or temporary use of private property in a manner that varies from its current land use, requires a special event permit. Permit applications will be reviewed by the Town Commission with special consideration for: (i) availability of location/facility, (ii) compliance with Town ordinances, (iii) necessity of special/additional permits (e.g., County or DOT permits), (iv) charges to be incurred if special assistance/services are required, and (v) security requirements.

2. All applications will be reviewed by the Town of Marineland Commission at a regularly scheduled meeting. A complete permit application (including site maps, proof of insurance, and other supporting documents) must be received by the Town of Marineland no later than 60 days prior to the actual date of your event and may be submitted as early as 365 days before your event. Applications will not be considered by the commission for review until all components are received.

3. Your application will not be considered complete until you have submitted proper payment in addition to supporting documents. The application fee is non-refundable, even in the event that your permit application is denied.

4. Any event drawing more than 100 vehicles (cumulatively) shall require a letter from the Flagler County Sheriff's Department providing a traffic control plan or stating that the event does not require police officers for traffic control.

5. Tents larger than 101 SF must be inspected by a certified Florida Building Official or licensed contractor; proof of inspection (or planned inspection date) must be submitted with this application.

6. Any activities occurring in the right-of-way along State Road A1A will require permit approval from the Florida Department of Transportation. An approved DOT permit must be submitted with this application.

7. Any event involving running, surfing, biking, or other exercise shall provide a written safety plan including a plan for rendering first aid and written evidence of coordination with Flagler County Emergency Services Department. Please note that dedicated emergency/first aid personnel must remain onsite throughout the duration of the event. Events involving exercise must furnish the Town of Marineland with an original certificate of liability insurance in the amount of one million dollars ($1,000,000), naming the Town of Marineland and the Flagler County Board of County Commissioners as additionally insured.

8. Any event involving the sale and/or consumption of alcohol must provide a copy of the state alcohol license and specify on the site plan the areas where alcohol consumption will be allowed and how these areas will be identified (e.g., through the use of fencing, signage, or volunteers). Events involving the sale/consumption of alcohol must furnish the Town of Marineland with an original certificate of liability insurance in the amount of one million dollars ($1,000,000), naming the Town of Marineland and the Flagler County Board of County Commissioners as additionally insured.

9. All event sites must be cleaned up immediately after completion of the event. The applicant is responsible for removal of all trash/litter during/after the event.

10. An approved permit does not grant you exclusive access to the public areas in the Town of Marineland. You may not, at any time, restrict public access to the River to Sea Preserve including the beach, trails, and parking areas.

11. If granted approval, you are required to adhere to the specifications in the submitted application (including the details of the site plan, safety plan, etc). Deviations from the approved activities must be reviewed/approved by the Town Commission at a regularly scheduled meeting before the event.

12. Failure to comply with these policies can result in denial of a future permit applications and/or applicants may be assessed a fine.

13. Any event(s) that will use the identical footprint, site map, safety protocol, etc may considered for approval as a group. Please submit one application with all dates listed; those dates must occur within the same calendar year. Failure to comply with these policies for any single event in the grouping will result in revocation of permit for other approved events.

Please fill out this form as completely as possible. Any additional files you may need to submit please email to: marineland.townmanager@gmail.com

Email address *

preston@promoterline.com

Waiver of Liability Relating to Coronavirus/COVID-19

The novel coronavirus, COVID-19, has been declared a worldwide pandemic by the World Health Organization. COVID-19 is reported to be extremely contagious. The state of medical knowledge is evolving, but the virus is believed to spread from person-to-person contact and/or by contact with contaminated surfaces and objects, and even possibly in the air. People reportedly can be infected and show no symptoms and therefore spread the disease. The exact methods of spread and contraction are unknown, and there is no known treatment, cure, or vaccine for COVID-19. Evidence has shown that COVID-19 can cause serious and potentially life threatening illness and even death.
THE TOWN OF MARINELAND (“THE TOWN”) cannot prevent you [or your child(ren) from becoming

exposed to, contracting, or spreading COVID-19 while utilizing THE TOWN'S services or premises. It is not possible to prevent against the presence of the disease. Therefore, if you choose to utilize THE TOWN'S services and/or enter onto THE TOWN'S premises you may be exposing yourself to and/or increasing your risk of contracting or spreading COVID-19.
ASSUMPTION OF RISK: I have read and understood the above warning concerning COVID-19. I hereby choose to accept the risk of contracting COVID-19 for myself and/or my children in order to utilize THE TOWN'S services and enter THE TOWN'S premises. These services are of such value to me [and /or to my children and other guests, that I accept the risk of being exposed to, contracting, and/or spreading COVID-19 in order to utilize THE TOWN'S services and premises in person.
WAIVER OF LAWSUIT/LIABILITY: I hereby forever release and waive my right to bring suit against THE TOWN OF MARINELAND and its officers, directors, managers, officials, agents, employees, or other representatives in connection with exposure, infection, and/or spread of COVID-19 related to utilizing THE TOWN'S services and premises. I understand that this waiver means I give up my right to bring any claims including for personal injuries, death, disease or property losses, or any other loss, including but not limited to claims of negligence and give up any claim I may have to seek damages, whether known or unknown, foreseen or unforeseen.
CHOICE OF LAW: I understand and agree that the law of the State of Florida will apply to this contract.

I HAVE CAREFULLY READ AND FULLY UNDERSTAND ALL PROVISIONS OF THIS RELEASE,AND FREELY AND KNOWINGLY ASSUME THE RISK AND WAIVE MY RIGHTS CONCERNING LIABILITY AS DESCRIBED ABOVE: *

Yes

General Event Information

Event Name *

Bike MS Cycle to the Shore

Describe your event: *

Bike ride fundraiser for Multiple Sclerosis

Location(s) requested: *

- [ ] River to Sea Preserve (East side A1A) Beach
- [ ] River to Sea Preserve (West side of A1A)
- [ ] River to Sea Preserve (East side A1A) Parking Lot
- [ ] River to Sea Preserve (West side A1A) Parking Lot
- [ ] River to Sea Preserve (West Side) Trails
- [x] Other: see attached map

Start Date of Event *

MM DD YYYY

10 / 23 / 2021

Finish Date of Event *

MM DD YYYY

10 / 24 / 2021

If you are requesting approval for multiple identical events, please list those dates here.

Organization Name

National MS Society

Contact Name *

Preston Steblein

Contact/Organization Address *

Promoter Line, Inc

City *

Colleyville

State *

Texas

Zip Code *

76034

Contact Phone *

18179090549

Contact Email *

preston@promoterline.com

Event Specific Information

On site contact(s) must be present at all times during the event

On Site Contact Name *

Preston Steblein

On Site Contact Phone Number including area code *

18179090549

On Site Contact Email *

preston@promoterline.com

Event Production Company Name (If other than applicant)

Promoter Line, Inc

Event Production Company Phone Number including area code

18179090549

Start Time of Event *

Time

05 : 00 AM

Finish Time of Event *

Time

05 : 00 PM

Estimated Daily Attendance (Per Day) *

1000 + People (Permit Fee $500)

Has this event been held in the past? *

Yes

If this event has been held in the past, please list the dates and locations it has been held

every year for the past 30+ years (except 2020 due to covid)

Is this event open to the general public? *

No

Will you charge admission? If so, how much? *

no fee, just fundraising

Event Power & Water

The Town of Marineland cannot provide power or water for special events.
Additional fees/permits may be required for portable generators used in protected areas.

Describe the power requirements for your event and how power will be provided (e.g., portable generator, etc). Write N/A if no power is required. *

We will be self contained with generators

Describe the water requirements for your event and how water will be provided (e.g., water truck, bottled water service, etc). Write N/A if no water is required. *

N/A

Event Sound, Lighting and Signage

Sea Turtle nesting season extends from May 1- October 31. Requests for additional lighting and sound will meet with special consideration during this time and additional permits may be required. Placement of signs/banners shall be limited to a period of not more than two weeks prior to the event and must be taken down within 24h of the end of the event. Signs left in place may be confiscated/destroyed and applications may be assessed a fee for their removal. The Town will not be held responsible for lost, stolen, or weathered signs. Signs placed in the DOT right-of-way are subject to removal and fines from the DOT. Location of signs must be indicated on the site plan.

What type of non-natural noise will your event produce? *

Amplified Music/PA System

Please describe in detail your non-natural noise plan, including time of day noise will be produced. If none, write N/A. *

quite house music and announcements for the morning start and then music during the day since Marineland is a rest stop along the route

Describe your signage plan for the duration of the event, including the number, size, and types of signs you will use during your event. If none, write N/A. *

plenty of route/event signs to direct attendants

Describe your lighting plan for the duration of the event. If none, write N/A. *

light towers and tent lights

Event Safety Information

The Town of Marineland may deem necessary for your event to have Flagler County EMS/Fire/Sheriff or Ocean Rescue at the event during times of operation. The applicant will be responsible for the cost of those services according to Flagler County policies and procedures.

Will you have on site any of the following safety personnel?: *

- [x] EMS
- [x] Trained First Responders
- [ ] Ocean Rescue
- [x] Flagler County Sheriff's Officer/Sworn Law Officials
- [ ] None of the above
- [ ] Other:

Please list all names and contact information for onsite safety personnel. If none, write N/A. *

TBD

Event Tent Information

All tents must be weighted down, not staked. Any tent larger than 10x10 or over 101 square feet may require an additional building/fire inspection with additional fees. Any tent to be placed on the beach during sea turtle nesting season must be placed after the beach has been cleared by the Sea Turtle Patrol. All beach tents must be removed before sunset each day, even for multiple-day events.

Describe the tent plan (number and sizes) for your event. Include contact information for the rental company providing tents, if applicable. If none, write N/A. *

See site map

Vendors

Vendors are required to furnish:
*Local Business Tax Receipt for the Town of Marineland
*Annual Resale Certificate for Sales Tax
Food/beverage vendors must also furnish:
*State Food/Beverage License
*Alcohol & Tobacco License

One fire extinguisher is required for each vendor/booth where food will be cooked onsite. If a propane tank will be used as a fuel source, it must be secured on the outside of the food booth. A fire inspector is required to inspect all food booths. If inspection is required after working hours or on weekends, an additional fee may be charged.

Will there be Vendors? *

- ○ Yes
- ◉ No

How Many Vendors will there be?

0

What kind of vendors will there be?

- [x] Food (Please note a fire extinguisher is required for each booth cooking or heating food at the event. If a propane tank is used as a fuel source, it must be secured outside the food Booth.
- [x] Merchandise
- [ ] Display (No Selling)
- [ ] Other:

Please list all vendors

Restrooms

Attach a detailed site plan including the number/location of additional restroom facilities, the number of ADA compliant facilities, and the number/location of hand washing stations. A copy of the contract for portable restrooms must be submitted to the Town of Marineland at least one week prior to the delivery. Events operating on parcels that do not have restrooms and/or events involving >100 participants may require additional restroom facilities. If food is being served or sold at the event, you will need to provide hand washing stations.

How many additional restrooms will be provided. If none, write N/A.

TBD about 10

How many will be ADA/Handicap accessible?

2

How many hand washing stations will be provided? If none, write N/A.

2

Contact information for the company providing units:

TBD

Traffic Flow & Parking Details

No event shall restrict public access to public areas(e.g., beach, park, or parking lots. Events requesting permission to allow foot traffic to cross State Road A1a will meet with special consideration regarding safety of the event participants and may be subject to additional permits/fees.

Describe your traffic/parking plan, including the number and location of traffic/parking management officials. If none, write N/A. *

TBD but we hire 3-5 staff to help participants park

Provide contact information for traffic management officials. If none, write N/A. *

TBD

Alcohol

If alcohol is to be sold/served at the event, you are required to procure liability insurance naming the Town of Marineland and the Flagler County Board of County Commissioners as additionally insured. The liquor liability special event rider

must be submitted at least 30 days prior to the event. The Town of Marineland may require you to hire Flagler County Sheriff's Deputies to be present throughout the event, at your expense.

Will alcohol be sold or served at this event? *

- ○ Sold
- ◉ Served
- ○ Neither

Describe your plan for responsible alcohol use, including the location of the alcohol consumption area, how this area will be clearly identified, and a plan for enforcement of legal drinking age for those who enter this area. If none, write N/A. *

Beer garden with licensed servers if they decide to have beer this year due to covid

Recycle, Trash, and Litter Mitigation

Describe your recycle, trash, and litter plan: *

plenty of trash/recycle containers with dumpsters

Site and Safety Plans

Site Plan
Please attach a detailed site plan. We suggest the use of an overall site map (google earth aerial photo) and additional smaller maps to show detail where necessary. Hand drawn site maps will not be accepted by the Town of Marineland. Please include all of the following on your site plant, if applicable:

1. Overall layout of your event including parking/traffic flow
2. Location/types of signs
3. Location/sizes of tents
4. Location of trash/recycle receptacles
5. Location of medical/fire/police/water safety services
6. Location/types of lighting/sound equipment
7. Location/types of power/water sources
6. Location/types of restroom and hand washing facilities

7. Location of alcohol consumption area with marked boundaries

Safety Plan
Please attach a signed letter (addressed to the Town of Marineland) detailing your plan for ensuring the safety of event participants. Include the name and contact information for the onsite safety coordinator(s) who shall be present throughout the duration of the event.

Attach your documents here. Please note only PDF (preferred method), documents (Office Suite, Google Suite) and Images (.JPEG, .PNG, .GIF, .TIFF, .BMP) may be uploaded. You may upload up to 10 files. *

Day 1 - Rest Stop...

Agreement

I declare under penalty of perjury, that to the best of my knowledge and belief, the responses made herein are true and correct. If this application is approved, I understand that I must furnish an original certificate of General Liability Insurance in the amount of $1,000,000 per occurrence and $2,000,000 aggregate naming the Town of Marineland and the Flagler County BOCC as additionally insured. I certify that the information in the foregoing application is true and correct to the best of my knowledge and belief that I have read, understand, and agree to abide by the rules and regulations governing the proposed special event under the Town of Marineland, and I understand that this application is made subject to the rules and regulations established by the Town Council. Applicant agrees to comply with all other requirements of the City, County, State, Federal Government, and any other applicable entity which may pertain to the use of the event venue, the payment of any and all taxes, and the conduct of the event. The City shall not be liable for the payment of any taxes. I further agree that the payment of such taxes shall not reduce any consideration paid to the City pursuant to this permit. I agree to abide by these rules and further certify that I, on behalf of the Host Organization, am also authorized to commit that organization and therefore agree to be financially responsible for any costs and fees that may be incurred by or on behalf of the event to the Town of Marineland.

In consideration of permission to use the property, facilities, staff, equipment and services of any facility owned, leased, rented and/or used by the Town, the BUSINESS, ORGANIZATION and/or INDIVIDUAL (the “Permittee”) that is applicant for this Special Event Permit (the “Permit”) hereby agrees as follows:

The Permittee agrees to Indemnify and Hold Harmless the Town of Marineland, Florida and its officers, employees, agents, and attorneys (the “Town”) from any and all liability, damages, injuries, actions, suits, procedures, claims, demands, disputes, expenses, judgments, fees and costs of whatever kind or character arising from, by reason of, or in connection with the Permit by the Permittee and its members, guests, visitors, spectators, and participants. It is the intention of the Permittee that the Town shall not be liable or in any way responsible for injury, damage, liability, loss or expense resulting, directly or indirectly to the Permittee and those it brings onto the premises due to accidents, mishaps, misconduct, negligence or injuries either in person or property. The Permittee agrees to pay the Town for all damages caused to the facilities resulting from the Permittee’s activities here-under. Further, the Permittee expressly agrees to reimburse the Town for any and all costs, attorney’s fees, and paralegal fees including pre-litigation and appellate costs, attorney’s fees, and paralegal fees incurred by the Town. This indemnification provision shall survive the termination of the Special Use Permit and shall be in full force and effect beyond the term or termination of the Permit. This indemnification provision includes claims made by the entitlement, if any, to immunity under Section 440.11, Florida Statutes. Nothing contained herein shall be construed as a waiver of any immunity or limitation of liability the Town may have under the doctrine of sovereign immunity of Section 768.28, Florida Statues.

The Permittee expressly assumes and does hereby release, waive, covenant not to sue, and discharge the Town, its

elected and appointed officials, and its officers, employees, volunteers, representatives, attorneys and agents from any and all claims arising from all liability, responsibility, actions, damage, costs and claims for personal injury, accidents, illnesses, death, and property damage and loss, arising from, related to, or any way connected to the use and/or participation in any of the facilities pursuant to this Agreement.

The Permittee represents that the activities pursuant to this Agreement will be supervised by adequately trained personnel, and that user will observe, and cause the participants in the activity to observe, all safety rules for the facility and the activity. The Permittee acknowledges that the Town has no duty to and will not provide supervision during the activity.

THIS RELEASE IS GIVEN AND SIGNED OF MY OWN FREE ACT AND WILL, AND I DO UNDERSTAND AND AGREE TO THE POLICIES OF THE TOWN OF MARINELAND FOR SPECIAL EVENTS. FURTHERMORE, I HEREBY REPRESENT AND WARRANT THAT I HAVE THE AUTHORITY TO BIND.

First and Last Name that agrees with above *

Preston Steblein

Date of agreement above *

MM DD YYYY

03 / 30 / 2021

Title *

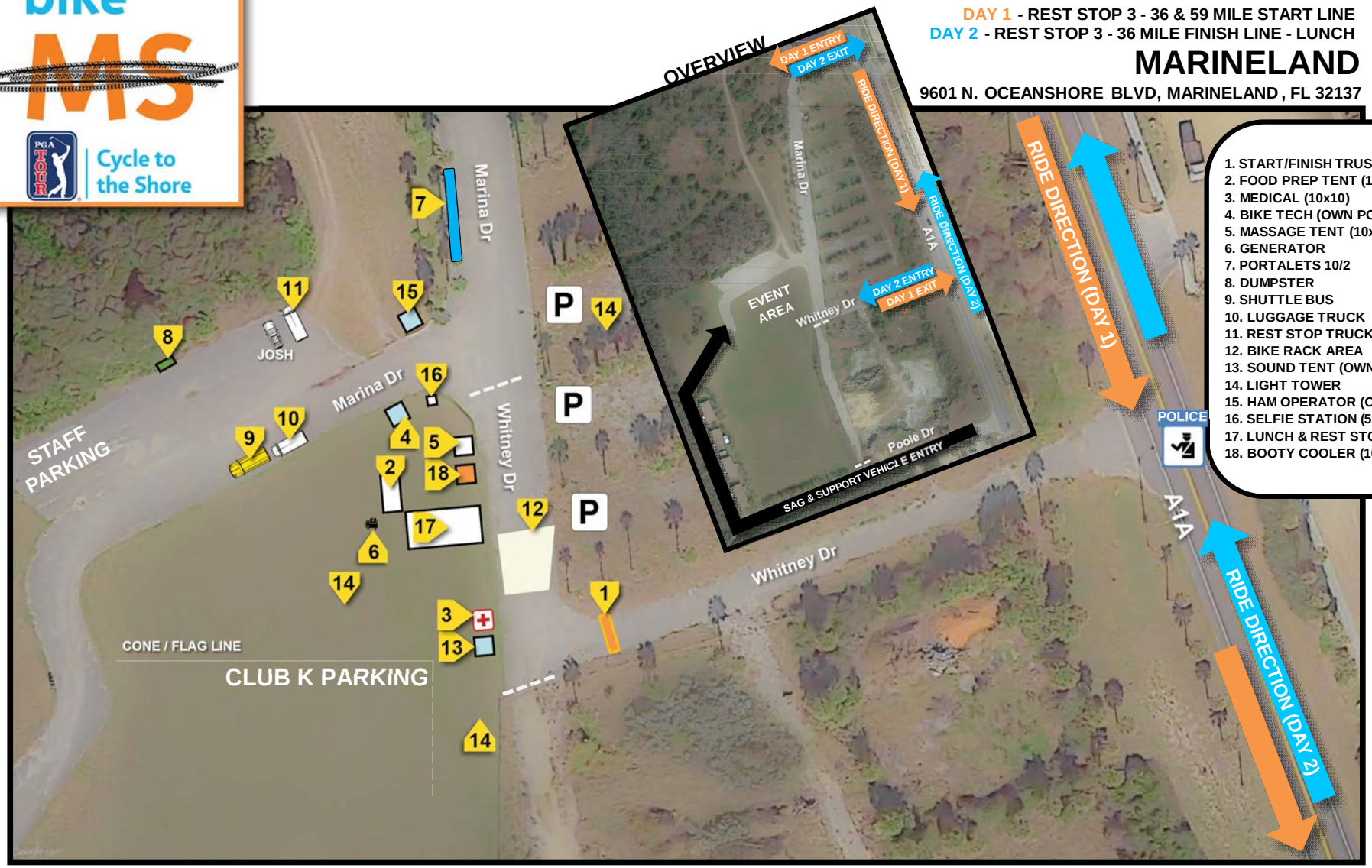
Event Manager- Promoter Line

bike MS Cycle to the Shore

DAY 1 - REST STOP 3 - 36 & 59 MILE START LINE
DAY 2 - REST STOP 3 - 36 MILE FINISH LINE - LUNCH

MARINELAND

9601 N. OCEANSHORE BLVD, MARINELAND, FL 32137



1. START/FINISH TRUSS
2. FOOD PREP TENT (10x20)
3. MEDICAL (10x10)
4. BIKE TECH (OWN POP UP)
5. MASSAGE TENT (10x10)
6. GENERATOR
7. PORTALETS 10/2
8. DUMPSTER
9. SHUTTLE BUS
10. LUGGAGE TRUCK
11. REST STOP TRUCK
12. BIKE RACK AREA
13. SOUND TENT (OWN POP UP)
14. LIGHT TOWER
15. HAM OPERATOR (OWN POP UP)
16. SELFIE STATION (5x5)
17. LUNCH & REST STOP TENT (20x40)
18. BOOTY COOLER (10x10 MS TENT)

LAST EDITED 11-6-19

PROMOTER LINE INCORPORATED

2021 Marineland Safety Plan

Day 1: Rest Stop 4, 36 and 59 Mile Start Line

Day 2: Rest Stop 3, 36 Mile Finish Line

Parking Safety: To get our participants parked and placed in a controlled and safe manner the National MS Society plans to hire professional parking staff. We will have personnel at the entrance to Whitney Dr and Marina Dr as well as throughout the grass area where they are parking.

Route Safety: All along the route, the National MS Society is dedicated to safety. We have local city police as well as county and state officers placed at important areas to ensure the safety of our participants. These officers are also instructed to help with vehicle traffic to minimize the traffic impact from our event. We will have an officer on site at Marineland to make sure they get started safely (on day 1), can enter/exit throughout both day(s), and are able to finish safely (day 2).

Medical Safety: We will have an ambulance on site and on the route for the duration of each day for emergencies and transport as well as a medical tent staffed with trained personnel to assist participants with any medical concerns.

See attached site map for reference.

Preston Steblein – Promoter Line, Inc.

Event Manager / on-site contact

817-909-0549 / preston@promoterline.com

Michelle Arnold **Sun & Sea Beach Weddings**

35 Durbin Station Ct Unit 101 St. Johns FL 32259 904-201-9193

michelle@sunandseabeachweddings.com

Marineland Wedding Request **March 16, 2021**

Perret/Lund River to Sea East/South Beach
7/14/21 5-7PM 21-99 ppl $100 pd CC# on 3.25.21
acoustic music/violinist
no: signs/restrooms/traffic/ alcohol/tent
normal parking
site plan attached Approved

Edwards/Randolph River to Sea East/North Beach March 23, 2021 revised
5/1/21 5:01-6:01PM 21-99 ppl $100 *pd approved 2/18/21 notified*
amplified music/PA system - speaker near seating total $252.12 paid
10x15 tent (not indicated on site plan)*contacted 2/1/21
called 2/9/21 within the circle on the beach tent is the cake cutting.
plan b is table with cake on boardwalk
no: restrooms/traffic/ alcohol
1 hand wash station
site plan attached
100 ppl/shuttle-traffic/portolet?
$150 additional fee ($100 ck applied/$52.12 pd cc# 3.31)
Flagler Co. spec event permit/additionally insured approved

Vernotzy/Denney River to Sea East March 22, 2021
7/17/21 5-7PM 21-99 ppl $100 *should be $50 for small wedding
pd $100 ck#3296 on 3/30/21
Only 15 guests, will use normal parking lot
Small arbor/15 chairs
no: signs/restrooms/traffic/ alcohol/tent
normal parking
site plan attached approved

Turner-Cop River to Sea East March 30, 2021
9/10/21 4-6:30PM 1-20 ppl $50 not pd *should be $50 for small wedding
Only 8 guests, will use normal parking lot
no: signs/restrooms/traffic/ alcohol/tent
normal parking
site plan attached approved

Bronson – Weaver River to Sea East March 31, 2021
12/18/21 4-6PM 21-99 ppl $100 not pd
Small arbor/50 chairs
Acoustic music/guitarist
no: signs/restrooms/traffic/ alcohol/tent
normal parking
site plan attached approved

Winders – Hunter River to Sea East April 5, 2021
8/12/21 4:30-7PM 1-20 ppl $50 not pd
will use normal parking lot
no: signs/restrooms/traffic/ alcohol? /tent
no site plan attached approved

Chavies – Smith River to Sea East April 6, 2021
4/20/21 3:30-5PM 1-20 ppl $50 not pd
will use normal parking lot
no: signs/restrooms/traffic/ alcohol? /tent
no site plan attached approved

9507 N. Oceanshore Blvd.,
St. Augustine, FL 32080

Phone: (386) 232-8060
mayor.marineland@gmail.com

2020-2021
Town Meeting Schedule

Thursday October 15, 2020
Thursday November 19, 2020
Thursday December 17, 2020
Thursday January 21, 2021
Thursday February 18, 2021
Thursday March 18, 2021
Special Meeting 5:30pm Wednesday March 24, 2021
Thursday April 15, 2021
Thursday May 20, 2021
Thursday June 17, 2021
Thursday July 15, 2021
Thursday August 19, 2021
Thursday September 16, 2021

Coastal Policy Center located at 9601 N Ocean Shore Blvd, Marineland, Fl 32080
All meetings take place at 6pm in the main conference room at the Town of Marineland