PUTNAM COUNTY

MITIGATION PLAN

2020

PUTNAM COUNTY LOCAL MITIGATION STRATEGY / PLAN (LMS)

PUTNAM COUNTY, FLORIDA

Multi-Jurisdictional
Multi-Hazard

2020

PREPARED BY:
THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY TASK FORCE/COMMITTEE

PUTNAM COUNTY LMS PARTICIPATION BY JURISDICTION

Putnam County Board of County Commissioners

City of Palatka

Town of Interlachen

Town of Pomona Park

Town of Welaka

City of Crescent City

PUTNAM COUNTY LMS PARTICIPATION
BY DEPARTMENT/AGENCY & POSITION TITLE

Chair: Putnam County Emergency Services Department, Emergency Management Coordinator
Vice Chair: Putnam County Emergency Services, Emergency Management Director

Putnam County Departments

- Administration Dept.,
  - County Administrator or designee
  - Legislative and Information Coordinator or designee
- Emergency Services Dept.
  - Fire/EMS Chief or designee
  - Fire Marshall
  - Volunteer Fire Service Coordinator
- Information Technology Dept., Director or designee
- Library System Dept. Director or designee
- Planning and Development Dept.,
  - Director or designee
  - Planning Manager or designee
  - Building Official or designee
- Public Works and Engineering Dept.,
  - Director or designee
  - Assistant Director or designee
- Parks and Recreation Dept., Director or designee
- Sanitation Dept., Director or designee
- Human Resources Dept., Director or designee
- Fleet Maintenance Dept., Director or designee
- General Services Dept., Director or designee
- Veterans Services Dept., Director or designee
- Agricultural Services Dept., Director or designee

Municipalities

- City of Palatka, City Manager or designee
- Town of Interlachen, Town Manager or designee
- Town of Pomona Park, Town Manager or designee
- Town of Welaka, Town Manager or designee
- City of Crescent City, City Manager or designee

State, Federal, Private & Other

- Putnam County Clerk of Courts, Clerk of Courts or designee
- Putnam County Property Appraiser, County Property Appraiser or designee
- Putnam County Sheriff's Office, County Sherriff or designee
- Putnam County Supervisor of Elections, Supervisor of Elections or designee
- Putnam County Tax Collector, Tax Collector or designee
- Putnam County School District, Superintendent of Schools or designee
- Georgia Pacific, Emergency Coordinator or designee
- Seminole Electric Cooperative, Emergency Coordinator or designee
- St. Johns River State College, Emergency Coordinator or designee
- Putnam County Community Medical Center, Emergency Coordinator or designee
- Ride Solutions Transportation Provider, Manager
- Heart of Putnam, Manager
- The American Red Cross, Emergency Coordinator or designee
- The Salvation Army, Manager
- North East Florida Community Action Agency, Manager
- Putnam County Chamber of Commerce, County Chamber Director or designee
- Florida Department of Corrections, Director or designee
- Florida Division of Emergency Management, Region 3 Coordinator
- Florida Department of Health, Planner
- St. Johns River Water Management District, Planner
- Florida Forest Service, Mitigation Specialist/Planner
- Florida Highway Patrol, Designee
- United States Department of Agriculture, Designee
- Florida Department of Environmental Protection, Designee
- Alachua County Emergency Management, Emergency Management Director or designee
- St. Johns County Emergency Management, Emergency Management Director or designee
- Clay County Emergency Management, Emergency Management Director or designee
- Interested County/Municipal Residents of no agency affiliation

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SECTION 1: Introduction

A. Local Mitigation Strategy

In the spring of 1998, the Florida Department of Community Affairs (DCA) initiated a program to assist local governments in developing plans to reduce or eliminate risks to people and property from natural and man-made hazards. This program is known as the Local Mitigation Strategy or the LMS.

Over the past years, hazard mitigation has gained increased attention due to the large number of natural hazards that have occurred throughout the U.S. and world, and because of the rapid rise in costs associated with disaster recovery. With costs being a major concern, it has become apparent that money spent prior to an event to help mitigate/protect the community and reduce the impacts of a disaster can result in substantial savings in life and property following the event. With the benefit cost ratios being extremely advantageous, the Disaster Mitigation Act of 2000 was developed as U.S. Federal legislation that reinforces the importance of pre-disaster mitigation planning to reduce disaster losses nationwide by calling for local governments to have mitigation plans. With this being one of the central documents for the activities of the Federal Emergency Management Agency (FEMA), states and local governments have increased funding and support to help implement hazard mitigation efforts.

The advantages of developing a local LMS program are numerous including guidance in developing pre- and post-disaster mitigation plans, identifying priority projects and programs for funding, and increasing the likelihood of Federal and State funding for pre- and post-disaster mitigation projects.

This document was created to act as a well-thought-out guide for Putnam County and its jurisdictions to use in assessing their risks and identifying actions to reduce their vulnerability to hazards. As a community-driven, living breathing document that reflects a variety of mitigation needs, it is our hope that you will join us in assessing and implementing meaningful hazard mitigation strategies for our communities.

B. Planning Process

May 1998 - March 2009
The Planning Process from the Original LMS Document until the 2009 LMS Document Update

The beginning of Putnam County's Local Mitigation Strategies took place in May of 1998, when the Northeast Florida Regional Council (NEFRC) was contracted to facilitate the county's development of the LMS. Through a Memorandum of Agreement, the development of the mitigation strategies was intended to provide one unified

program/document for Putnam County and its five jurisdictions (Crescent City, Interlachen, Palatka, Pomona Park, and Welaka). The primary objective behind the LMS both then and now was to reduce vulnerabilities and to mitigate towards limiting losses due to hazardous events. During this time, Putnam County and its jurisdictions agreed that having the NEFRC as their facilitator allowed each community to provide unrestricted input regarding local mitigation needs without appearing biased.

In August of 1998, a county-wide LMS Task Force was organized with members from a vast array of different representations within the county. This included elected officials, county department heads, county and city staff, representatives of the jurisdictions, local businesses, and other interested citizens. The Task Force was responsible for developing all work products for the LMS including the development of a set of guiding principles; identification of potential hazards affecting the community; identification of people and infrastructure that are vulnerable to hazards; identification of critical facilities that are necessary for maintaining health, safety and welfare of residents before, during, and after a catastrophic event; and the development of a prioritized list of pre- and post- hazard mitigation projects eligible for funding.

The LMS Task Force committee has been meeting quarterly every year since 1999. With the work of the regularly scheduled Task Force meetings continuing after the creation of the original LMS document, this permanent committee is now responsible for reviewing new mitigation projects and LMS document updates, for implementing mitigation strategies, for ranking projects, and for contributing in all other areas of the planning process. These Task Force meetings are open for all interested individuals and their participation is encouraged. (For more information on how the community, private businesses, local government offices, etc. were encouraged to participate, see Section 1C, 1D, & 1E following this subsection.)

FEMA approved the 2004 revision of the Putnam County LMS, and it was adopted by the County and all jurisdictions between 2004 through 2006. See Appendix G.

Between May 1998 and March 2009, the Northeast Florida Regional Council staff, in conjunction with Putnam County Emergency Management, served to facilitate all the Task Force meetings and updating the LMS document. This partnership helped the county to get many projects initiated, funded, and completed through the guidance of the LMS. This teaming also worked to bring the LMS into compliance with FEMA regulations through regular maintenance coupled with updates. The Northeast Florida Regional Council staff performed the data collection, analysis, and revisions to the LMS document with the assistance of the Task Force members. When revisions were made to the document, they were brought forth to the Task Force for review, discussion, and approval.

In March 2009, Putnam County's contract expired with the Northeast Florida Regional Council, giving Putnam County Emergency Management full facilitation of the LMS Task Force meetings and full responsibility to bring the LMS into FEMA regulation compliance with the support of the Task Force members. The public LMS Task Force

meetings are still held quarterly (in the months of March, June, September, and December) with meetings taking place inside the Putnam County Emergency Operations Center. Members are invited to these meetings via Everbridge Notifications.

- **March 2009 –2014**
  The Planning Process for the 2015 LMS Update

Below is a summary of the process followed, or that will be followed, for the 2015 LMS update.

- **March 2009 - December 2014 LMS / Public Meetings**

  2009 LMS meetings were held on the following dates: March 12, 2009, June 11, 2009, and December 10, 2009.

  2010 LMS meetings were held on the following dates: January 14, 2010, March 11, 2010, June 10, 2010, September 9, 2010, and December 9, 2010.

  2011 LMS meetings were held on the following dates: March 31, 2011, June 9, 2011, September 8, 2011 and December 8, 2011.

  2012 LMS meetings were held on the following dates: March 8, 2012, June 7, 2012, September 6, 2012, and December 6, 2012.

  2013 LMS meetings were held on the following dates: March 7, 2013, June 6, 2013, September 5, 2013, and December 5, 2013

  2014 LMS meetings were held on the following dates: March 27, 2014, June 12, 2014, September 18, 2014 and December 4, 2014.

  2015 LMS meetings will be held on the following dates; March 26, 2015 June 11, 2015, September 17, 2015, December 3, 2015. All 2015 meeting minutes are included as attachment K to this plan. Public meeting to specifically address pan updates were conducted on September 17, 2014 and December 3, 2014.

  LMS Meeting dates are agreed upon by LMS participants and a meeting reminder/notification is provided to all LMS Task Force participants and interested individuals prior to the meeting by the LMS Chairperson/Putnam County Emergency Management. Furthermore, public announcements are always made 10 days prior to each meeting in the Palatka Daily News, the local newspaper. All interested individuals were/are welcomed to contribute to any part of the planning stages for the 2015 update.

- **May 2013 – November 2014**: Putnam County Emergency Management gathered data needed to update plan. This was largely done through information obtained from other county plans that have been updated since 2009, agency websites,

local planning/emergency documents, and by making approximately 30 different email correspondences for related information. Some of the information came from agencies within the LMS Task Force.

- **September 17, 2014 & December 3, 2014**: The Putnam County LMS Task Force meeting was advertised as a public announcement in the newspaper 10 days prior to the meeting. One focus of this meeting was explaining the LMS updating procedure and the importance of Task Force/community participation. Putnam County Emergency Management presented reasons why to update the LMS plan, how the update process works, and a schedule of when things would approximately be completed, and explained how important the Task Force assistance/input was in developing the draft plan update.

- **December 3, 2014**: The document review meeting took take place. At this meeting the document will be reviewed by Task Force members and the general public (posted in the newspaper) before submitting it to FEMA. Because their input is so important, Putnam County Emergency Management also be sent the draft electronically, weeks in advance, to all Task Force members and anyone else interested in order to gain insightful input.

- **January 2015**: The draft LMS document will be sent to the State Hazard Mitigation Officer for initial review.

- **February 2015**: It is proposed that after the FDEM/FEMA review, the county and jurisdictions will begin adoption of the update in early 2015. The updated document will also be posted on the Putnam County Emergency Management website.

Putnam County Emergency Management will continue with the method and schedule for monitoring, evaluating, and updating the plan as to what was established in the past between Putnam County Emergency Management and Northeast Florida Regional Council (see Section 1H).

The office responsible for Putnam County land use and comprehensive planning is the Putnam County Planning and Development Services Department. This county department is actively involved in the LMS planning process. This office contributed to integrating floodplain management sections and addressing some of the Community Rating System (CRS) elements/requirements into this plan.

- **2016 –2019**
  The Planning Process for the 2020 LMS Update

Putnam County has a wide variety of representation within the LMS Task Force. An updated list of agencies and organizations who have attended the Task Force meetings in the last few years has been included; see "Putnam County LMS Participation" on the page in the beginning after the title page, as well as the last three LMS Task Force

meeting's minutes and attendance sheets in Appendix K *(To see how agencies, organizations, etc. were involved and participated in the recent 2020 update, go to the following sections, Sections 1C, 1D, 1E).*

Below is a summary of the process followed, or that will be followed, for the 2020 LMS update.

2016 LMS meetings were held on the following dates: March 17, 2016, June 2, 2016, September 22, 2016, and December 8, 20016.

2017 LMS meetings were held on the following dates: March 23, 2017, June 15, 2017, and December 21, 2017. (The September meeting was cancelled due to Hurricane Irma)

2018 LMS meetings were held on the following dates: March 29, 2018, June 28, 2018, October 11, 2018, and December 6, 2018.

2019 LMS meetings were held on the following dates: February 27, 2019, June 20, 2019, September 19, 2019, and December 11, 2019

LMS Meeting dates are agreed upon by LMS participants and a meeting reminder/notification is provided to all LMS Task Force participants and interested individuals prior to the meeting by the LMS Chairperson/Putnam County Emergency Management. Furthermore, public announcements are always made 10 days prior to each meeting in the Palatka Daily News, the local newspaper. All interested individuals were/are welcomed to contribute to any part of the planning stages for the 2020 update.

- **September 2019 – January 2020**: Putnam County Emergency Management gathered data needed to update plan. This was largely done through information obtained from other county plans that have been updated since 2015 and a variety of government websites such as the Census Bureau, BEBR, and the National Climate data center.

- **February 2020:** The Putnam County LMS Task Force meeting was advertised as a public announcement in the newspaper 10 days prior to the meeting. One focus of this meeting was explaining the LMS updating procedure and the importance of Task Force/community participation. Putnam County Emergency Management presented reasons why to update the LMS plan, how the update process works, a schedule of when things would approximately be completed, and explained how important the Task Force assistance/input was in developing the draft plan update.

- **April 2020**: The document review meeting took take place. At this meeting the document will be reviewed by Task Force members and the general public (posted in the newspaper) before submitting it to FEMA. Because their input is so important, Putnam County Emergency Management also be sent the draft

electronically, weeks in advance, to all Task Force members and anyone else interested to gain insightful input

- **July 2020**: The draft LMS document will be sent to the State Hazard Mitigation Officer for initial review.

- **Late 2020**: It is proposed that after the FDEM/FEMA review, the county and jurisdictions will begin adoption of the update in late 2020. The updated document will also be posted on the Putnam County Emergency Management website.

C. Jurisdictional Participation

Within Putnam County, all municipal jurisdictions have participated in the plan development since the original LMS document creation into the 2020 update. Putnam County had no jurisdictional changes so all of the same jurisdictions that were originally part of the LMS since its origin, *(Putnam County, Crescent City, Interlachen, Palatka, Pomona Park, and Welaka)* have continued participation. We define "participation" as the following:

- As of December 2019, all five municipal jurisdictions in Putnam County have attended a LMS Task Force meeting in the 5 years, with most attending multiple meetings. The Task Force meetings are a very important part of how our planning process and mitigation-related functions work. All jurisdictions have been actively attending meetings since the document's creation.
- All jurisdictions have commenced in mitigation efforts and mitigation project decisions within the county in the last few years. This was accomplished through meetings, email, and phone correspondence with Putnam County Emergency Management (the LMS facilitator) and the jurisdictions.
- All jurisdictions have participated in the 2020 LMS update by contributing information to the LMS' "Guiding Principles" as seen in Section 2. The jurisdictions provided updated local documents and policies that dealt with mitigation efforts. Each jurisdiction reviewed the draft 2020 LMS update.
- All jurisdictions were notified in advance of the 2020 draft review meeting, before the plan is scheduled to be submitted to FDEM/FEMA, so they can give input on the document.
- All jurisdictions were part of the original LMS plan development in 2003, 2004, 2009 and 2015. Here they helped establish the LMS goals, potential projects, guiding principles, and adopted project priority evaluations, etc.
- Within the past 10 years, all jurisdictions have had a stake in at least one project on the priority list. This does not necessarily mean that the project is located within the jurisdiction, but that the project serves that jurisdiction's community (i.e. sub-regional drainage efforts, retrofit projects that serve multiple

jurisdictions, etc.). These stakes have encouraged planning participation for the jurisdictions.

- All jurisdictions received information packets that included previous meeting minutes, updated project priority lists, additional information such as grant opportunities, etc., before each LMS Task Force meeting. Therefore, all jurisdictions are continually kept involved in the LMS planning process.

Putnam County Emergency Management *(2014)* concludes that the level of jurisdictional participation has contributed very much to the LMS endeavors. Efforts are currently being sought to encourage more jurisdictional participation in the future.

D. Community Participation

Putnam County and all LMS participating partner agencies will continue to encourage public participation in the plan maintenance process throughout the course of the next 5 year update after approval of the 2020. Specifically, to encourage public involvement, all LMS Task Force Meetings, since their creation, have been advertised in a newspaper of general circulation at least 10 days prior to the date of the meeting. This notice presents the nature of the meeting, the time and date of the meeting, the exact location of the meeting, and stated that all are invited to attend. Announcement of the meeting is also provided in English and Spanish. The community is welcome to submit new projects to be added to the project priority list as long as they project have a sponsoring/managing agency that is associated with the project. These meetings provided a great opportunity for the public to comment on the plan during drafting stages, to contribute in project proposals, and to participate in project prioritization. These newspaper announcements assured that the public was informed of the quarterly scheduled LMS meetings and it gave them a chance to participate if interested. To ensure continued public participation, LMS Task Force meetings will continue to occur four times a year with newspaper postings.

Also posted in the newspaper were one or more public meeting(s)/ workshop(s) that were held to review updated drafts of the LMS document before plan approval. These meetings/workshops were held in order to solicit ideas and comments from the general public and to incorporate other aspects into the final plan before it is sent for review. The next one will be conducted in December 2014 before the document is sent to be reviewed by FDEM and FEMA.

Over the past few years, Putnam County increased efforts to include the public. In 2008 the LMS Task Force created a Wildfire Mitigation Team subcommittee with the help of Florida Forest Service. During 2008 and 2009, this subcommittee increased public participation by providing wildfire mitigation materials and lectures at local fairs, schools, and gas stations, thus increasing public knowledge of LMS efforts. The Wildfire Mitigation Team subcommittee plans to continue conducting regular meetings outside of

the LMS Task Force meetings and develop meaningful mitigation strategies. Currently in the works, there are plans to promote public awareness through a demonstration which will educate the public on "safe burning" practices.

Other public outreach activities included periodic presentations to the Putnam County Commission and to the jurisdiction commission/council meetings that are open to the general public. Putnam County Emergency Management plans to present on the LMS at one of these meetings for each jurisdiction in 2019-2020.

Besides having the LMS document located on Putnam County's Emergency Management website and in the office, discussion has also ensued to also include the 2020 update in a few of the county's public libraries. Usually all meetings held in the Putnam County Emergency Operating Center offer announcements of other meetings that will take place in the EOC. Since the LMS Task Force meetings take place in the EOC, people within other public workshops hear about the open LMS meetings. Putnam County's Emergency will continue this practice.

One other way that continued public participation was achieved was by Putnam County Emergency Management keeping a contact database of everyone who was interested in the LMS. This included email updates on the LMS document and the next meeting date, followed up with a mailed packet that included meeting minutes, updated project priority lists, and other supplemental information. This was discovered to be the most efficient way to ensure continued participation in Putnam County. In 2009, over 70 packets were mailed prior to each meeting to interested participants *(Putnam County Emergency Management, 2009)*. Since then, it has been established an electronic distribution of all meeting materials is more efficient and cost effective. As seen, the public is welcomed and encouraged to participate at all levels and stages, as equally as anyone else. Additionally, if a member of the public as comments about possible changes to the LMS. Their comments are considered by the chair, and if deemed appropriate the changes are then adopted. This process is the same for any member of the task force.

While no public comments were received for the 2020 update, Putnam County maintains procedures to make sure all comments are reviewed and considered for adoption into the LMS document. Any comments from participants, regardless of stature or position, are recorded in the meeting minutes and comments are evaluated by the LMS chair. If deemed appropriate, the comments and revisions are made during the review process.

E. Other Participation

Since the very beginning of the Local Mitigation Strategy program in Putnam County, efforts have been made to ensure participation by the private sector, local and state government agencies, and others. Currently on the LMS contact list, this includes representatives from the private sector (e.g. energy companies, a medical center, insurance firms, a local bank, a construction company, etc.), local agencies (e.g. police, fire department, planning and zoning department, public works, property appraisal, etc.),

state agencies (e.g. FDOF, DEM, etc.), and non-profit agencies (e.g. American Red Cross, Salvation Army, Southern Baptist Disaster Organization, etc.).

Prior to each LMS meeting, these individuals were sent an electronic packet with information from the last meeting as well as materials pertaining to the upcoming meeting. Everyone on the list also received emails to remind them of up-and-coming meetings and emails dealing with their input in the LMS document updates. By sending out this type of information, the representatives from the private sector, local government agencies, state government agencies, non-profits, and others are actively encouraged to participate in the Local Mitigation Strategy planning process.

According to Putnam County Emergency Management *(2009)*, most of the local county employees have at least heard about the Local Mitigation Strategies. For this reason, in Putnam County, the LMS meetings have strong attendance records in the areas of local and state government agencies. In regard to private and non-profit sectors, meetings have been attended sporadically due to conflicts and busy schedules. For this reason, the planning of LMS meetings is starting to consider the private and non-profit schedules. However, with that being said, at least one representative from the private and non-profit sector has usually been in attendance at each of the LMS meetings. Valuable input has been obtained from these participants.

During the 2015 LMS document update, increased Putnam County LMS recognition has been achieved with many academic, professional, local, and state agencies through the gathering of information to be incorporated into the document. To gather this information, contacts were made that first described the process of the LMS. These contacts ranged from local forest rangers to the local farming bureau and from the regional Army Corps of Engineers Emergency Management branch to professors at Florida State University. Many of these local, regional, and state organizations had little to no information on what Local Mitigation Strategies were before correspondence began. This process has encouraged interest and will hopefully result in more organizations wanting to participate in LMS efforts.

The Putnam County LMS Task Force plans to continue holding quarterly meetings and will continue to coordinate and encourage private, public, and non-profit interest and involvement. Efforts to expand the list of participating agencies and organizations include holding an informational workshop in order to provide new members and interested parties with materials regarding the LMS planning process and why their participation is important. Something that was originally done in the initial LMS Task Force development and is being planned again, will be using the Chamber of Commerce as an information source to obtain up-to-date information on businesses and organizations. This will give the opportunity to a wide-variety of businesses and organizations to participate in the planning process.

F. Use and Incorporation of Existing Documents

As part of the planning process for the creation and update of the LMS document, other existing documents were used as references and incorporated into the LMS document. These existing documents include county and municipal comprehensive plans, regional strategic plans, county land development regulations, emergency management plans, and others.

Existing documents were incorporated into the LMS document in several ways. The policies dealing with mitigation goals were incorporated into Section 2's "Guiding Principles" (see Section 2 for more information). As of the 2015 update, jurisdictional review allowed 124 new guiding principles to be added into the LMS document to better serve the communities. These guiding principles came from reviewing the most up-to-date versions of comprehensive plans, and also included some principles incorporated from the Putnam County Land Development Code, which was not included at all in the original LMS document. The Northeast Florida Strategic Regional Policy Plan also played a large role in developing the principles. Below is a list of the documents used to create the guiding principles:

- Putnam County Comprehensive Plan, 2015
- City of Palatka Comprehensive Plan, 2020
- Town of Interlachen Comprehensive Plan, 2012
- Town of Pomona Park Comprehensive Plan, 2013
- City of Crescent City Comprehensive Plan, 2019
- Town of Welaka Comprehensive Plan
- Putnam County Land Development Code, 2003
- Northeast Florida Strategic Regional Policy Plan, 2014

Another way existing documents were incorporated into the 2020 LMS document update was by providing information needed for sections dealing with hazards. These documents provided data from previous hazard occurrences to hazard vulnerability analysis. More information on this process and in-text sourcing are included throughout the LMS document. Below is a list of some existing documents that were incorporated into the 2009 update of the sections dealing with hazards.

- Putnam County Post Disaster Redevelopment Plan (2014)
- Florida Statewide Regional Evacuation Study, NE Florida Region, (2013)
- Putnam County CEMP (2018)
- Emergency Action Plan for Kirkpatrick Dam and Rodman Reservoir (2007)
- Northeast Florida Housing Report (2008)
- Putnam County Hazards Analysis (2007-2008)
- Putnam County Emergency COOP Plan (2007-2008)
- Putnam County CEMP appendix for Hazardous Materials (2007)

Just as with the 2020 update, efforts will be made in future planning activities to review new and previously not reviewed documents in order to cover the wide spectrum of plans within the county and state.

G. Incorporation of LMS into other Documents

By incorporating the LMS into other planning documents and mechanisms, LMS information can help fill-in missing mitigation gaps in existing documents, the LMS can contribute to existing mitigation strategies, and by combining the LMS with other planning mechanisms, the stance of mitigation implementation and awareness will strengthen within the county and its jurisdictions. Some of the mechanisms that the LMS could be incorporated into include local and regional plans (e.g. jurisdiction Comprehensive Plans, Northeast Florida Strategic Regional Policy Plan, Putnam County CEMP, etc.), local codes and regulations (e.g. Putnam County Land Development Code, Putnam County Fire Code, etc.), and programs (e.g. Firewise, Palatka Historic Preservation Board documents, etc.).

In the past 10 years, information from the LMS document has been successfully incorporated into the Putnam County Comprehensive Emergency Management Plan (CEMP). This process has been completed during recent CEMP updates, with the most recent in 2018. Putnam County Emergency Management staff reviewed the two documents side-by-side. The information cross-reviewed in the documents included comparing information on hazard vulnerability assessments, vulnerable locations of hazard incidents, previous occurrences of hazard events, and overall risk assessments. Depending on the hazards, the CEMP or the LMS may have originally included more valuable information. The useful LMS information was transferred into the CEMP sections dealing with hazard vulnerabilities. The CEMP text referenced the Putnam County LMS document for additional information on these sections.

With expanded information included in the 2020 LMS update, Putnam County Emergency Management plans to repeat this process for the next CEMP update since much of the updated LMS information is not in the CEMP and is deemed useful by Putnam County Emergency Management. The LMS was also included in the Putnam County Continuity of Operations (COOP) plan through the same process but on a smaller scale. This process will continue with the COOP also.

In 2020, the LMS Task Force and LMS facilitators wanted to incorporate goals, mitigation strategies, and other worthy information within the LMS into the county's and all jurisdictional Comprehensive Plans. In 2020, small steps were been taken towards this incorporation. These steps include *1)* The jurisdiction's 2020 review and incorporation of the guiding principles into the LMS from their comprehensive plans (see Section 2) and *2)* The establishment of more inclusive and thoughtful mitigation goals for the LMS (see Section 2). Part of the reason for re-establishing the LMS goals were to make them more attractive to become incorporated into other planning mechanisms. By encouraging heavier jurisdiction and departmental participation in the planning process,

and by keeping in mind each jurisdiction's comprehensive plan's mitigation-driven policies (LMS Guiding Principles), the Task Force believes the LMS will attract a desire to be incorporated within comprehensive plans.

The future process towards this desire of incorporating parts of the LMS into comprehensive plans will start at LMS Task Force meetings. The decision on how to present this idea to each jurisdiction will be made, suggestions on how to determine what each jurisdiction may want to incorporate into their comprehensive plans from the LMS, and why, will be determined, and information on when/how to present this incorporation proposition to each jurisdiction will be collected from Task Force members. . Meetings/contacts will then be made with jurisdictional representatives, many of whom are active members in the LMS Task Force, to find out which jurisdictions want to incorporate the LMS into their comprehensive plans. If the jurisdictions are interested, then a schedule of what needs to be done to incorporate parts of the LMS into the jurisdiction's next comprehensive plan update will be made. Because of governmental support and participation with the LMS, the Task Force believes that this is a realistic goal to be completed within the next few years.

H. Plan Maintenance Process

This subsection shows a rough guideline of how the plan maintenance process worked in the past and how it will work in the future 5-year update. For more on the 2020 LMS update process see Section 1B & 1G.

Monitoring

The LMS Chair (Putnam County Emergency Management) is responsible for monitoring any changes throughout the county and making sure that the information gets properly entered into the plan on a quarterly basis. This process includes the following schedule and method:

- The LMS Chair will schedule four Task Force Meetings each year in the months of March, June, September, and December. Each of these meetings will be scheduled usually six months in advance in the Putnam County Emergency Management meeting room signup. These meetings will allow the LMS Chair to monitor advancements or changes in mitigation projects being implemented by Task Force members. At every meeting, the LMS Chair is going to ask for updates on current projects being implemented and suggestions for new projects. Any meeting announcement by agencies and organizations about project changes, problems, and advancements will be itemized by the LMS Chair in the project priority list and included in the minutes of the meeting. This allows the project advancements and changes to be noted on paper on a quarterly basis every year.

    - All LMS Task Force members will usually be given the meeting date and time around 6 months in advance, a reminder at the previous LMS Task Force meeting 3 months in advance, and an email reminder as well as a electronic email packet sent three weeks in advance.
    - Two weeks prior to the meeting, the LMS Chair will ask for a public notice announcement to be posted in the local newspaper, at least 10 days in advance of the LMS meeting.
    - Stakeholder groups/individuals are directly invited to participate by email correspondence and WebEOC correspondence. Meeting packets with information are posted to WebEOC and emailed by request to those stakeholder groups that have not been granted WebEOC access.

- The LMS Chair will call each agency that is working on a LMS project usually two to five weeks before LMS Task Force meetings to monitor progress, hear concerns, give assistance, and answer questions regarding the mitigation projects.

- If any agency or organization that is implementing a project can't attend the LMS Task Force meeting, the LMS Chair will request an overview of their project update so that the Chair can present the information at the meeting.

- All mitigation project changes and advancements will be included in the U.S. Postal mail packet sent by the LMS Chair to all LMS Task Force members approximately three weeks before each of the four Task Force meetings. The packets may include supplemental information about grant programs, etc. as has been done in the past.

- If need be, the LMS Chair will schedule meetings and site visits with the agencies and organizations requesting certain assistance with a mitigation project.

- Yearly, the LMS Chair will look for new ways of incorporating the community into the LMS process.

- Yearly, the LMS Chair will ask the LMS Task Force to review parts of the LMS document that may need to be updated.

- Also, the LMS Chair will prepare an annual report that captures the highlights of the previously mentioned quarterly meetings and the LMS developments.

Evaluating

The LMS Chair (Putnam County Emergency Management) is responsible for evaluating any changes or situations that need to be taken into account for the LMS Task Force goals and for the LMS document. This process includes the following schedule and method:

- Every year during the summer months and after all natural disasters, the Chair will conduct an evaluation on the nature, magnitude, and/or type of risks that may have possibly changed within that timeframe for the county. This will be done by seeking new hazard and hazard vulnerability data, through speaking with experts, and by inquiring input from LMS Task Force members.

- At the end of every year, the LMS Chair will evaluate the attendance and participation of LMS members. If certain agencies or organizations attend one or less meetings in the past year, the Chair will attempt to find the reasons why and try to accommodate them so their participation can increase. Also, the LMS Chair will review Chamber of Commerce information as a source to obtain up-to-date details on new businesses and organizations that could potentially become part of the LMS Task Force.

- Every three years the LMS Chair will conduct a Task Force meeting to determine if the LMS goals and guiding principles are being met and if any of them should be changed or new ones added. This process will be determined entirely by the Task Force members.

- The LMS Chair will call each agency/organization that is working on a LMS project around two to five weeks before the LMS Task Force meetings to monitor

progress, hear concerns, give assistance, and answer questions regarding the mitigation projects. Based on the comments, re-evaluation of project implementation will commence.

Updating

The LMS Chair (Putnam County Emergency Management) is responsible for updating the plan within five years from the date of the last FEMA approval. This process includes the following chronological schedule and method:

- Every year within the 5-year update timeframe, the LMS Chair will make notes in the LMS of items that require changes based on the evaluation process.

- During both the second and third year of the 5-year timeframe, the LMS Chair will begin updating the actual document sections with the most recent data available. This will be done with the help and acknowledgement of the LMS Task Force members. After each of these document updates, the Chair will bring forth the changes to the LMS Task Force members for review.

- Based on the review input from the LMS Task Force, the Chair will make changes where required.

- During the end of the third year and the beginning of the fourth year, the LMS Chair will gather the new FEMA update element requirements so that the updated plan will act in accordance with federal regulations.

- The LMS Chair will then give a presentation about the 5-year update to the LMS Task Force members and describe how they can help and why they should participate.

- The LMS Chair will update all sections of the LMS with the most recent data and processes available.

- This updated document will then be presented to the LMS Task Force members for review.

- After making the revisions from the review, the LMS Chair will send the document to the State Hazard Mitigation Officer for initial review. This will be done approximately 7 months before the plan's expiration date.

- After this review, any changes will be completed with acknowledgement from the Task Force before it is sent to FEMA. This will be accomplished at least 5 months before the plan's expiration date.

- Upon FEMA approval, the county and all jurisdictions will adopt the LMS document within the following year.

I. 2009- 2015 Update

Putnam County's 2009 LMS went through vast expansion from the original document. On the following pages is a listing of why and how every FEMA review requirement was updated in 2009. This includes a listing of where the update is found in Putnam County's LMS plan. For more information see each Putnam County LMS Section Introduction.

Prerequisites

Multi-Jurisdictional Plan ***(Crosswalk Elements 2A, 3A, 3B)***
Section 1C in the Putnam County LMS Plan

How updated- Created a new subsection (1C of the LMS) dedicated to jurisdictional participation; entirely new writing and information dealing with the past 5 years.

What was included in the update- Made a separate subsection dedicated to jurisdictional participation; explained that the same jurisdictions that participated 5 years ago still do now (no changes); gave a newly presented definition of "Putnam County Jurisdictional Participation" that includes 7 bullet-points on how the jurisdictions participated originally in the LMS development and in the past 5 years.

Why- The LMS Task Force felt that we previously didn't define jurisdictional participation well in the LMS.

Planning Process

Current Planning Process ***(Crosswalk Elements 4A, 4B)***
Section 1B in the Putnam County LMS Plan

How updated- Entirely rewrote section 1B in July 2009; includes new information on current planning process within the last 5 years.

What was included in the update- Divided the subsection into two parts: the previous planning process and the 2009 update planning process; included the LMS facilitation change and the 2009 intern program information; newly provided meeting minutes from the most recent two meetings; new list of "current" agencies / organizations participating in the last three or so years; gave newly presented 9 bullet-point timeline on the current planning process from the

start of updating the document until the estimated timeframe when the update will be adopted by each jurisdiction.

Why- The LMS Task Force felt that we previously lacked information on events since 2004 and thought the current planning process timeline was a good idea.

Public Involvement ***(Crosswalk Element 4C)***
Section 1D in the Putnam County LMS Plan

How updated- Entirely rewrote section 1D in July 2009; includes new information on public involvement within the last 5 years.

What was included in the update- Update on how the Task Force meetings are advertised in the newspaper; includes new developments such as having public meetings in the County's Emergency Operating Center announced at the LMS meetings; the LMS Wildfire mitigation team promotion at local fairs, schools, gas stations, etc.

Why- More efforts have been made to attract public involvement, especially with the LMS Wildfire Mitigation Team, so the LMS Task Force saw a need to include this information.

Other Participants in the Planning Process ***(Crosswalk Element 4D)***
Section 1E in the Putnam County LMS Plan

How updated- Entirely rewrote section 1E in July 2009; includes new information on gaining more participation in the planning process within the last 5 years.

What was included in the update- Sending information packets to LMS Task Force members; email reminders about what information was sent out; newly added paragraph dealing with how, in 2009, more organizations found out about the planning process through developing a contact system to help update the document; how we plan on working with the Chamber of Commerce again to gain more members.

Why- The LMS Task Force thought details were lacking in the previous plan and they also wanted to describe how others learned what the LMS was about through the gathering of information to compile the updated plan.

Review and Incorporation of Existing Documents ***(Crosswalk Element 4E)***
Sections 4F, 2C, and throughout the Putnam County LMS Plan

How updated- Updated the "Guiding Principles" section with new principles after they were confirmed by the jurisdictions; entirely rewrote the section 4F in July 2009 to explain new developments; used over 5 new existing plans/reports in the hazard sections of the LMS.

What was included in the update- The "Guiding Principles" section had 124 new local mitigation policies added to it from the most recent jurisdictional comprehensive plans, the County Land Development Code (not previously included), and the County Comprehensive Plan; used over 5 new existing plans/reports in the hazard sections of the LMS; made the previous appendix list part of the actual text.

Why- The LMS Task Force felt that the guiding principles weren't compiled well, so they wanted a review of the most recent comprehensive plans, etc. for each jurisdiction to see if any other policies dealt with mitigation. Also, with the vast explanation of the hazard sections, there was a need to locally relate reports/plans to adequately describe the hazard and its vulnerabilities.

Updating the Plan ***(Crosswalk Element 4F)***
Section 1I and throughout the Putnam County LMS Plan

How updated- The plan in its entirety was updated; a new subsection (1I) was created in August 2009 to describe in detail the updates; the introduction of all sections included a 2009 update.

What was included in the update- In-text citations were included in the update, etc. (This section, 1I, describes the updates entirely.)

Why- When reviewing the past LMS, the updaters had no guidance on where information originally came from, thus making it harder to update. The LMS Task Force thought that better organization, in-text citations, and the sections dealing with updates would make it easier for future updaters to review the document.

Risk Assessment

Identifying the Hazards ***(Crosswalk Element 5A)***
Section 4A in the Putnam County LMS Plan

How updated- The hazards "Hurricanes and Other Cyclonic Activity," "Severe Thunderstorms," and "Terrorism" were added to the plan in June 2009. Also, the previous hazard titles called "Floodplain" and "Dam/Levee" were changed to "Flooding" and "Dam/Lock Hazards."

Why- The hazards “Hurricanes and Other Cyclonic Activity” and “Severe Thunderstorms” were added because hazards produced by these events, such as flooding, high winds, tornadoes, and in the case of hurricanes, storm surge, were separately addressed in the LMS, but little information was provided on how these highly probable thunderstorm, hurricane and other cyclonic activities could cause those hazards. In the Putnam County LMS Task Forces' opinion, hurricanes /tropical storms and severe thunderstorms have and will bring some of the most significant impacts to the county, thus making them too important to leave out. “Terrorism" was added because even though it is unlikely, Putnam County started including it in the county’s CEMP and the Task Force thought it was more important for these documents to contain roughly the same hazards. The title “Floodplains” was changed to “Flooding” because floodplains are a location where a hazard could occur. The word “Levee” was changed to “Lock” because Putnam County has a lock and not a levee. The LMS Task Force agreed that these changes would make the plan better.

Hazard Location and Extent ***(Crosswalk Elements 6A, 6B)***
Sections 4B, 4D, Appendix A, and throughout the Putnam County LMS Plan

How updated- All sections/appendices dealing with hazard locations and extents were rewritten for all hazards as part of the update in June 2009; this includes the new three hazard’s locations and extents being researched then written, and the placement of new FEMA FIRM maps for each jurisdiction.

What was included in the update- After reviewing materials dealing with hazards / risks, new jurisdiction-to-hazard descriptions were updated in Section 4 and Appendix A; the creation of the extent and the measurement scale categories were newly added to Appendix A in an effort to easily identified each hazards extent; general locations of possible hazardous material locations were newly provided in the update; the most recent FEMA FIRM maps for each jurisdiction were added to Section 4D; **Note**: Besides the FEMA FIRM maps, the Critical Facilities map, and the Repetitive Loss map, all other maps come from 2004 information.

Why- Locations were updated because the LMS Task Force felt that they weren’t as obviously defined in the text of the original LMS; extents were updated, and presented clearer, because the LMS Task Force had a hard time locating where the extents were located in the plan; FEMA FIRM maps for each jurisdiction were included in the update because flooding is one of the biggest concerns for the county and because previously the LMS only had a small county specific map; **Note**: Besides the maps listed above, the other maps weren’t updated from 2004 because the hazard vulnerability locations haven’t changed and updated information is not available at this time to update the maps. These maps will be updated in the next LMS update cycle.

Hazard Previous Occurrences ***(Crosswalk Element 6C)***

Sections 4B and Appendix A in the Putnam County LMS Plan

How updated- The section and appendix dealing with previous occurrences were rewritten for all hazards as part of the update in June 2009; this took into account all occurrences in the past 5 years and significant occurrences previously skimmed over.

What was included in the update- This update more than tripled its sourcing for previous occurrences to provide a full range of information; all hazards include previous occurrences in the last 5 years; hazards that previously didn't provide many previous occurrences listings in the original document were expanded; better descriptions were provided of the occurrences instead of just listing them.

Why- The LMS Task Force felt that previous occurrences could be presented with more accurate and recent information; the Task Force also believed that gathering data from a wide variety of sources, instead of just a few, would largely contribute to the success of the LMS.

Probability of Future Hazard Events ***(Crosswalk Element 6D)***

Sections 4B, 4C, Appendix A, and Appendix B in the Putnam County LMS Plan

How updated- All sections/appendices were rewritten to include updated probability information in June of 2009; this includes the creation of the new Appendix B and Section 4C's multi-jurisdictional probability chart for each hazard.

What was included in the update- For the first time the LMS includes a chart of multi-jurisdictional probability for each hazard; Appendix A, etc. provides information on how the probabilities were based off of recent expert sources.

Why- Previously the LMS mainly included probabilities for the county as a whole without explaining how the probability conclusions were made. The LMS Task Force wanted to include probabilities for each jurisdiction in an easy to read chart and provide information on how these probabilities were constructed.

Hazard Vulnerability and Impacts ***(Crosswalk Elements 7A, 7B)***

Sections 4B, 4C, 6B, Appendix A, and Appendix B in the Putnam County LMS Plan

How updated- All sections/appendices were rewritten to include updated vulnerability and impact information in June/July 2009; this includes the creation of the new Appendix B, which provides a simple formula on how vulnerability

and impacts were calculated, and Section 4C's multi-jurisdictional probability chart for each hazard; also newly created Section 6 B provides information on the numbers and value of structures at risk.

What was included in the update- For the first time the LMS includes a simple formula to show how levels of impacts and vulnerability were determined for each jurisdiction for each hazard; this is accompanied by descriptions of what impacts could include and how structures could be affected.

Why- The LMS Task Force felt that the previous LMS didn't include well thought-out descriptions of how vulnerabilities and impacts were determined. Also, previously the LMS only included vulnerabilities and impacts for the county as a whole and not for the jurisdictions separately, therefore the Section 4C charts were created.

Repetitive Loss Properties ***(Crosswalk Element 8A)***
Section 5C in the Putnam County LMS Plan

How updated- This section was rewritten to include the most recent, September 2008, repetitive loss property information; this includes the creation of a map showing the new locations and a chart that provides information such as what flood zone each property was located within.
Why- The LMS Task Force wanted the most up-to-date repetitive flood loss information and a clearly identified chart/map to help determine future mitigation projects surrounding this theme.

Vulnerable Number & Value of Structures ***(Crosswalk Elements 9A, 10A, 10B)***
Sections 5B and Section 6 in the Putnam County LMS Plan

How updated- All this new information on vulnerable structures is entirely new and wasn't included in the previous LMS.

What was included in the update- This information that previously didn't exist in the LMS was included for every hazard where possible; newly presented vulnerable critical facilities were considered for each hazard; the LMS gives a new description on how this was completed and what the LMS will include in the future.

Why- The previous LMS stated that the next update would include information on the number and value of vulnerable structures for each hazard; Putnam County was keeping our promise by including this information.

Development Trends **(*Crosswalk Element 11A)***

Section 3 in the Putnam County LMS Plan

How updated- This section was rewritten to include updated development trends and future development trends from the most recent Putnam County Comprehensive Plan; newly created maps and charts were included which weren't in the original LMS.

Why- The LMS Task Force saw a value to putting the most recent County Comprehensive Plan into the LMS; the Task Force also wanted maps to compare existing land uses to future land uses, thus allowing the members to think "big-picture" in mitigation projects.

Multi-Jurisdictional ***(Crosswalk Element 12A)***
Sections 4C, Section 6 and throughout the Putnam County LMS Plan

How updated- Subsection 4C was created to address updated probabilities, risk, impacts, and vulnerabilities in comparison charts for each jurisdiction; Section 6 addresses the number and value of vulnerable structures for each jurisdiction where possible; recent FEMA FIRM maps for created for each jurisdiction; etc.

Why- The LMS Task Force saw a short-fall with the original LMS in that little was included about specific jurisdictional risks/vulnerabilities; the LMS Task Force wanted side-by-side jurisdictional comparisons in a chart form.

Mitigation Strategy

Goals ***(Crosswalk Element 13A)***
Section 2B in the Putnam County LMS Plan

How updated- All of the 5 goals have been updated in July 2009; these goals were established to protect people, property, structures, promote public mitigation education, and protect businesses.

Why- The LMS Task Force and Putnam County Emergency Management believed that the LMS plan needed a more inclusive range of goals. The previous goals created too many boundaries for mitigation strategies, thus taking out much of the creative process needed to develop worthwhile mitigation initiatives.

Mitigation Actions ***(Crosswalk Elements 14A, 14B, 14C)***
Section 7 in the Putnam County LMS Plan

How updated- All mitigation action items have been updated in the past 5 years by the rewriting of Section 7, in July/August of 2009; this includes listing the

identified new/existing building items for each project, which wasn't noticeable in the original LMS; this also includes establishing a new subsection which entirely deals with describing each action item and giving a short update description.

Why- The LMS Task Force saw a need to describe, and provide more information, on the mitigation projects than what was included in the past; the Task Force wanted to make sure the project updates were included.

NFIP Participation ***(Crosswalk Elements 15A, 15B)***
Section 5D in the Putnam County LMS Plan

How updated- This is the first time that the LMS presented this information as a separate subsection; it includes an updated list of jurisdictional participation in NFIP; explains how we are continuing the NFIP goals; explains how Welaka will be a part of NFIP in the very near future; includes prioritized items on how all jurisdictions plan to continue to be compliant.

Why- The jurisdictions and Task Force members wanted more details in the LMS since flooding has been a big problem at points in the past; this information is now required by FEMA to be in the LMS.

Implementation of Mitigation Actions ***(Crosswalk Elements 16A, 16B, 16C, 16D)***
Section 7 in the Putnam County LMS Plan
How updated- This section was entirely rewritten to include developments in the past 5 years and to provide more organized charts/lists; each project includes a 5 year update, a sponsoring agency, potential resources, etc.

Why- The LMS Task Force thought this to be one of the most important sections to update and reorganize; the LMS Task Force thought this was the section that needed to include the most updates; the LMS Task Force thought that reorganizing this section would help keep everyone on the same page in terms of mitigation projects and what's going on.

Multi-Jurisdictional ***(Crosswalk Elements 17A, 17B)***
Section 7E in the Putnam County LMS Plan

How updated- An entirely new subsection (7E in the LMS) was created to address this requirement and provide updates; includes a newly provided list of jurisdictions that benefit from the projects, jurisdictions that support the projects, and actions jurisdictions can take for each project.

Why- The LMS Task Force thought that not enough jurisdictional participation information was provided in the past.

Plan Maintenance Process

Monitoring, Evaluating, and Updating the Plan *(Crosswalk Elements 18A, 18B, 18C)*

Section 1H in the Putnam County LMS Plan

How updated- An entirely new subsection (1H in the LMS) was created to address this and explain how monitoring, evaluating, and updating will take place in the future; it explains why and how the 2009 update differs from the proposed future process; it provides a bullet-point timeline for how the plan will be monitored, evaluated, and updated.

Why- The LMS Task Force saw a need to have a better scheduled/defined planning process as a way to keep all members on the same page and to make sure things are getting done in a timely manner.

Incorporation into Existing Planning Mechanisms *(Crosswalk Elements 19A, 19B, 19C)*

Section 1G in the Putnam County LMS Plan

How updated- This section was expanded three-fold to include the information from the 2009 update; this includes how, in the past five years, the LMS was incorporated into existing planning mechanisms; it gives a process of how the LMS will be included into existing planning mechanisms in the future.

Why- The LMS Task Force saw a need to explain how the LMS was incorporated into the County's CEMP & COOP plan and they wanted an explanation on how this will be done in the future.

Continued Public Involvement *(Crosswalk Element 20A)*

Sections 1D and 1E in the Putnam County LMS Plan

How updated- These updated sections provide a current listing of how the LMS Task Force has and will continue to gain public involvement; this includes putting the LMS in public libraries after the updated version is adopted by the county and how newspaper advertisements will continue; this also includes how the 2009 update helped gather more public involvement.

Why- The LMS Task Force has and will continue to make efforts to gain more public involvement; the Task Force wanted a better explanation of the process in the LMS plan.

J. 2015-2020 Update

Due to the vast expansion of the 2015 LMS document; the update for the 2020 requirement was not as dramatic. In this update Putnam County Emergency Management focused more on the specific data of populations and hazards. This included a complete review of the county's vulnerability to specific hazards. While the updates seem minor in scope, they are the essence of what the LMS plan is supposed to address. Especially, because in 2025 when the next LMS updated will be completed brand new census data will be available for incorporation into plan for the first time since 2010.

SECTION 2: Goals and Guiding Principles

A. Introduction

The purpose for developing a set of Goals and Guiding Principles is to clearly state the community's overall vision for hazard mitigation and to ensure that the community adequately addresses its mitigation needs before and after a disaster. This goes directly in line with the purpose of the LMS, which is to provide guidance to the county in building a safer and more resilient community.

All of Putnam County's goals were updated in July 2009, because of the LMS Task Force and the Putnam County Emergency Management's suggestion for a more inclusive range of goals. Previous LMS goals created too many boundaries for mitigation strategies, thus taking out much of the creative process needed to develop worthwhile mitigation initiatives. There has not been any new goals or guiding principles added or revised since 2009.

The "Guiding Principles" section had 124 new local mitigation policies added to it from the most recent jurisdictional comprehensive plans, the County Land Development Code (not previously included), and the County Comprehensive Plan as part of the 2009 update. These guiding principles were reviewed by every jurisdiction and the LMS Task Force.

B. Goals

Prior to the initial development of the Guiding Principles for Putnam County's LMS, the Task Force identified five main goals they believed should be forefront in the overall development of this document. Activities (projects) recommended as mitigation efforts for the LMS must first meet or further these goals. These goals were provided in a ranked order where the first goal is paramount.

1. Protect the lives and health of citizens from the effects of natural and man-made hazards.

2. Minimize future loss from all hazardous incidents by reducing the vulnerability of public and private property.

3. Emphasize mitigation planning to decrease vulnerability of existing and new construction.

4. Encourage public support and commitment to hazard mitigation, by communicating mitigation benefits.

5. Strive to protect business and industry by reducing their economic vulnerability. These goals are used as part of the project prioritization methodology. Projects recommended to the LMS must first meet one of these goals to be considered. See Section 7F to see which current projects line up with which goals.

C. Guiding Principles

The Guiding Principles for Putnam County were developed and approved by the LMS Task Force as part of the LMS process. It was compiled in 2009 and reviewed in 2015 & 2019 from existing adopted policies and ordinances that address hazard mitigation and long-term recovery.

The sources of Putnam County's Guiding Principles come from the most recent versions of the Putnam County and all of the jurisdiction's Comprehensive Plans, the Strategic Regional Policy Plan developed by the NEFRC, and the Putnam County Land Development Code. All of these principles deal with mitigation goals in some form, from drought mitigation and flood-prone area mitigation to storm surge mitigation and wildfire mitigation.

The Guiding Principles, when viewed as a whole, should represent a community policy statement relating to the future development in terms of mitigation for the county. The Local Mitigation Strategy Guiding Principles are provided to also help encourage local jurisdictions and agencies to undertake a coordinated and effective program that will serve to reduce the vulnerability of its population and infrastructure to future hazard events. The Guiding Principles are provided starting on the following page.

The Guiding Principles for Putnam County outlined in the following document, which was developed and approved by the Working Group as part of the LMS planning process. It was compiled from existing adopted Goals, Objectives, Policies, and Ordinances, which address hazard mitigation and long-term recovery.

The Guiding Principles were compiled by reviewing existing requirements in the adopted Comprehensive Plan of each local government as well as State, Regional and Local planning documents. These documents have already adopted requirements which address hazard mitigation and long-term recovery, and which are already serving as the County's Adopted Guiding Principles. They are shown in the text summary, which identifies in a narrative description how they contribute to a comprehensive mitigation strategy as well as the source of the requirement and if and how it has been implemented. Sources include Florida State Statutes, the County and Municipal Comprehensive Plans; the Strategic Regional Policy Plan developed by the NEFRC; Putnam County Comprehensive Emergency Management Plan, and local ordinances.

A review of these Guiding Principles will quickly reveal several mitigations approaches commonly used in the County and municipal plans. Among these are the policies which, direct growth away from or restrict growth in the hazardous areas. These examples are

given to introduce the concepts that Putnam County and its municipal governments have available to them and the regulatory authority and public support for development of a unified mitigation strategy.

It is not intended that the inclusion of these policies as Guiding Principles in the Local Mitigation Strategy will provide a fixed master plan for the future development or revision of policies, but that they when viewed as a whole represent a community policy statement relating to the future development in Putnam County. As such they are intended to provide the guidelines for revision of development regulations and to focus future policy development on the goals stated above. As plans and policies are rewritten and updated these guidelines will be expanded and improved upon. The LMS also relates to the intent and mandates of the State and Federal governments to encourage local jurisdictions to undertake a coordinated and effective program that will reduce the vulnerability of its population and infrastructure to the effects of disasters. When the use of these Guiding Principles for future policy development is combined with the direct implementation of mitigation projects identified in this Strategy, the County will have a unified mitigation approach.

Putnam County LMS Guiding Principles

City of Palatka Comprehensive Plan- Future Land Use Element
Goals, Objectives and Policies
Adopted by City of Palatka on July 10, 2008

A.1.1.1 *Flood-prone Area Mitigation*
The City of Palatka shall use the latest version of the Flood Insurance Rate Maps promulgated by FEMA to determine the location of the 100-year floodplain and flood prone areas in the City. The City shall, within its Land Development Regulations provide specifications for regulating construction/development within these areas. These specifications will include:

A. Development within the FEMA 100-year flood hazard zone is to be constructed
so that the lowest floor elevation is at least one foot above the base flood elevation as established by the FEMA Flood Insurance Rate Maps;

B. Dredging and filling of lands within floodplains shall be limited to that approved by federal and State agencies having the authority to regulate and police such activities. All proposed development shall be clustered and located on the non- floodplain portions of the site, or, for proposed development areas that lie entirely within the 100-year floodplain, all structures shall be required to be elevated on pilings; and

C. In addition, the following criteria will apply to development in the 100-year floodplain:

1. No hazardous materials or waste shall be stored within the 100-year floodplain;

2. Clearing of native vegetation will be minimized in the 100-year floodplain by establishing the following open space ratios for the land uses identified below:

Residential land use	60% open space
Commercial land use	50% open space
Industrial land use	45% open space

3. Use of septic tanks in flood prone areas will be restricted as specified by the County Health Department. Existing Development shall be required to connect to central sewage systems when system collection lines are within 250 feet of subject property. New development will be required to connect to centralized sewer pursuant to Public Facilities Element Policy D.1.4.1.

4. Any development within a flood prone area will maintain the natural topography and hydrology of the development site.

A.1.1.4 *Stormwater Mitigation*

By June 1, 2009, the City's Subdivision and Zoning Code shall be reviewed and where necessary revised to address drainage and stormwater issues as identified in the Public Facility Element; ….

A.1.3.3 *Flood-prone Area Mitigation*

By June 2008, the Building Official shall review the City's Subdivision Regulation and Zoning Code and where necessary revise these ordinances to ensure that land use categories are regulated in accordance with the Future Land Use Map and that controls are adopted for the regulation of sub-divisions and the use of land in flood prone areas in accordance with applicable FEMA regulations and Policies D.1.1.1 and D.2.2.5.

A.1.4.1 *Flood-prone Area Mitigation*

Development in wetland/floodprone areas will be restricted to low density residential land use at a density no greater than 1 unit per 5 acres with permitted development clustered on the upland portion of the site or in that portion of the site least affected by construction activities. The City shall utilize the "City of Palatka Wetlands Protection Ordinance" contained in Chapter 30 of the Land Development Regulations to ensure that wetlands are adequately protected from development activities.

A.1.4.4 *Flood-prone Area Mitigation*

A 50-foot set back from the waterfront will be required for all new construction along the St. Johns River.

A.1.4.6 *Stormwater Mitigation*

Every two years, the City shall review the City of Palatka and Ravine State Gardens Stormwater Quality Master Plan to ensure that it continues to meet the needs of the City.

A.1.4.9 *Flood-prone Area Mitigation*

The City shall, through available State and federal programs, promote the acquisition of floodplains along the St. Johns River.

City of Palatka Comprehensive Plan- Intergovernmental Coordination Element

Goals, Objectives and Policies
Adopted by City of Palatka on July 10, 2008

G.1.5.3 *Stormwater Mitigation*

The City shall continue to coordinate with the FDOT to seek means of improving maintenance of drainage facilities along State roads.

City of Palatka Comprehensive Plan- Public School Facilities Element

Goals, Objectives and Policies
Adopted by City of Palatka on July 10, 2008

I.1.4.6 *Shelter & Emergency Mitigation*

The City of Palatka, with the School District, shall identify issues relating to public school emergency preparedness, such as:

a. The determination of evacuation zones, evacuation routes, and shelter locations;
b. The design and use of public schools as emergency shelters; and
c. The designation of sites other than public schools as long-term shelters, to allow schools to resume normal operation following emergency events.

City of Palatka Comprehensive Plan- Conservation Element
Goals, Objectives and Policies
Adopted by City of Palatka on July 10, 2008

E.1.2.10 *Drought Mitigation Education*

No occupancy permit shall be issued unless the required water conservation measures are in place. Water conservation information shall be attached to every permit application and will be issued with all plumbing permits. The City will cooperate with the SJRWMD to promote public education and awareness of the benefits of conserving water.

E.1.2.15 *Drought Mitigation Education*

The City shall require that residential developers provide a copy of the St. Johns River Water Management District's "Saving Water Indoors" and "Saving Water Outdoors" pamphlets with each residential and nonresidential unit.

E.1.2.16 *Drought Mitigation Education*

By June 1, 2009, the City will implement a water conservation public awareness campaign for the purpose of communicating clear, concise and consistent messages on water conservation.

E.1.2.17 *Drought Mitigation*

New development shall utilize and/or preserve native vegetation, or use drought-resistant plants for landscaping to the greatest practicable extent. Native or drought tolerant plants include, but are not limited to those in the Florida Native Plant Society's Native Plants for Landscaping in Florida, or comparable guidelines.

E.1.3.1 *Erosion Mitigation*

Developers shall be required to use the Florida Stormwater, Erosion, and Sedimentation Control Inspector's Manual published by the Florida Department of Environmental Protection, Nonpoint Source Management Program, as the guiding Best Management Practices erosion control document, and shall be required to adhere to the requirements therein both during and after construction.

E.1.5.1 *Hazardous Materials Mitigation Education*

The City shall continue to provide in-kind support to Keep Putnam Beautiful in order that City residents, businesses and facilities will be informed through public education of hazardous waste disposal locations and proper methods of disposal.

E.1.5.2 *Hazardous Materials Mitigation*

The City shall continue to cooperate with the DEP to enforce the proper disposal of hazardous waste including used automobile and truck tires and batteries.

E.1.5.3 *Hazardous Materials Mitigation*

The City shall continue to require that Fire Department personnel have proper training in regard to hazardous materials spills and evacuation procedures in the event that hazardous materials are released due to train or truck accidents or other causes.

E.1.5.4 *Hazardous Materials Mitigation Education*

Information currently obtainable from EPA, DEP, and Putnam County regarding hazardous materials, and evacuation procedures shall be made available for distribution to City residents, and shall be available at City Hall and fire stations.

City of Palatka Comprehensive Plan- Public Facilities Element

Goals, Objectives and Policies
Adopted by City of Palatka on July 10, 2008

D.2.2.3 *Stormwater Mitigation*

Upon Plan adoption the City, through its Building Official and Public Works Director shall implement the following programs to contain and/or channel stormwater runoff:

A. The Public Works Director shall implement a routine maintenance program of semi-annual inspection of drainage facilities.

B. The Building Official shall not permit to be removed buffers of native vegetation adjacent to water bodies and wetlands which provide filtration of stormwater pollutants.

C. The Public Works Director shall design its new streets to direct storm
drainage to be filtered through soils and native vegetation before the runoff enters the drainage system.

D. The Building Official shall not issue a building permit until permits from jurisdictional agencies for dredge and fill, stormwater, and drainage are secured.

E. The Public Works Director shall continue to provide monthly drainage status reports to the City Manager.

D.2.2.4 *Stormwater Mitigation*

The City shall continue to coordinate with the FDOT to seek means of improving maintenance of drainage facilities along State roads.

D.2.2.5 *Flood-prone Area Mitigation*

All new development in floodprone areas shall meet the following standards:

A. Development in the FEMA 100-year flood hazard zone shall be constructed so that the lowest floor elevation is at least one (1) foot above the base flood elevation as established by the FEMA Flood Insurance Rate Maps.

B. Dredging and filling of lands within floodplains shall be limited to that approved by federal and State agencies having the authority to regulate and police such activities. All proposed development shall be clustered and located on the non-floodplain portions of the site, or, for proposed development areas that lie entirely within the 100-year floodplain, all structures shall be required to be elevated on pilings.

C. In addition, the following criteria will apply to development in the 100-year floodplain:

1) No hazardous materials or waste shall be stored within the 100-year floodplain;

2) Clearing of native vegetation will be minimized in the 100-year floodplain by establishing the following open space ratios for the land uses identified below:

Residential land use	60% open space
Commercial land use	50% open space
Industrial land use	45% open space

3) Use of septic tanks in flood prone areas will be restricted as specified by the County Department of Health and all such sewage disposal systems shall be required to connect to central sewage systems in accordance with Policy D.1.4.1.

4) Any development within a flood prone area will maintain the natural topography and hydrology of the development site.

D.2.2.6 *Stormwater Mitigation*

The level of stormwater run-off shall be reviewed as part of the requirements of the Land Development Regulations and the level of stormwater run-off from a parcel during and after construction shall not exceed the level of run-

off from the site experienced prior to construction.

D.2.3.2 *Hazardous Materials Mitigation*

Within twelve (12) months, ~~t~~he City shall coordinate with NEFRC and Putnam County to adopt Land Development Regulations that establish procedures for disposal of hazardous waste materials and identify levels of hazardous waste generated.

Business with the potential for generating hazardous waste will be identified. The City Commission will coordinate with Putnam County and the NEFR~~P~~C to establish procedures for the pick-up, transport and disposal of identified hazardous wastes.

D.2.3.3 *Hazardous Materials Mitigation Education*

The City shall coordinate with Keep Putnam Beautiful to distribute federal, State and county generated data regarding the handling and disposal of hazardous waste to all business identified as potential generators of such waste and make such literature available at City Hall for all its residents.

City of Palatka Comprehensive Plan- Capital Improvements Element

Goals, Objectives and Policies
Adopted by City of Palatka on July 10, 2008

H.4.2.7 *Stormwater Mitigation*

Upon plan adoption, the Level of Service Standards to be met for stormwater drainage and treatment shall be as required by the various jurisdictional, State and federal agencies.

H.4.2.8 *Stormwater Mitigation*

The City of Palatka shall not issue a building permit or other development order in any case where the above standards for the stormwater drainage levels of service are not met.

Town of Interlachen Comprehensive Plan- Future Land Use Element

1.2.b.3 *Flood-prone Area Mitigation/Stormwater Mitigation*

Where all of a parcel is contained within a conservation area, single family development shall be allowed at the intensity of use and with the restriction in siting specified in Policy 1.2.b.1. The remainder of the lot shall be left in its natural vegetative state to preserve the natural stormwater drainage system functioning to the greatest extent possible. The dwelling and the septic tank shall be developed or installed in a manner such that they are elevated a minimum of 1 foot above the 100-year floodplain as identified by FIRM and FEMA maps.

1.2.b.4 *Flood-prone Area Mitigation*

No development shall be allowed within the 10-year floodplain as identified by the FIRM and FEMA maps. The developer may, by his/her effort/expense, show the property to be above the 10-year floodplain and then be accorded the option offered in policy 1.2.b.3.

1.2.e.1 *Stormwater Mitigation*

Residential neighborhood developments with lots less than or equal to five acres shall be designed to include an efficient system of paved streets and shall ensure that post-development runoff does not exceed pre-development drainage.

2.1 *Flood-prone Area Mitigation/Sinkhole-Landslide Mitigation*

The Town's land development regulations shall restrict development within unsuitable areas due to flooding, improper drainage, steep slopes, rock formations, and adverse earth formations, unless acceptable methods are formulated by the developer and approved by the Town to solve the problems created by the unsuitable land conditions.

4.1.d *Stormwater Mitigation*

Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management. At a minimum, these regulations shall minimize the disturbance of the natural stormwater-management system by requiring the natural vegetation remain in place to the maximum extent possible. They shall also ensure that post-development runoff does not exceed pre-development runoff through the use of retention ponds, swales, gutters, and other stormwater drainage facilities.

6.4 *Flood-prone Area Mitigation*

The Town shall participate in the National Flood Insurance Program and regulate development and the installation of utilities in flood hazard areas in conformance with the program's requirements.

Town of Interlachen Comprehensive Plan- Sewer & Water Element

3.1.1 *Flood-prone Area Mitigation*

Interlachen land development regulations shall deny permits to develop in wetlands or in floodplains.

3.2.1 *Stormwater Mitigation*

The Town will work with the St. Johns River Water Management District to identify problem areas in relation to drainage issues.

4.1.10 *Hazardous Materials Mitigation*

The Town shall cooperate with the County in the County's establishment of local listing of all producers of greater than 100 KG per month of hazardous water material, as provided by the Water Quality Assurance Act of 1983, Florida Statutes 403.7225 by 1993.

4.1.11 *Hazardous Materials Mitigation*

The Town will, in 1995, cooperate with the County in the preparation of a five year assessment and update the County's hazardous waste plan, as provide by the Water Quality Assurance Act of 1983, Florida Statutes 403.7225, and the County's monitoring of small quantity producers (greater than or equal to 100 KG per month) of hazardous and toxic materials.

Town of Interlachen Comprehensive Plan- Conservation Element

2.7 *Flood-prone Area Mitigation*

The town shall regulate development within 100-year floodplains in order to maintain the flood-carrying and flood storage capacities of the floodplains and reduce the risk of property damage and loss of life. In addition, by June 1, 1992, the town shall adopt flood damage prevention regulations and in the interim shall continue to enforce the provisions of the National Flood Insurance Program.

Town of Interlachen Comprehensive Plan- Capital Improvements Element

1.8 *Infrastructure Mitigation*

The Town will identify facilities that are needed to protect, or that eliminate a hazard to, the public health, welfare, or safety.

Town of Welaka Comprehensive Plan- Future Land Use Element

A.1.1.1 *Flood-prone Area Mitigation*

The Town of Welaka shall use the latest version of the Flood Damage Prevention Ordinance promulgated by FEMA to determine the location of the 100-year floodplain and flood prone areas in the town. The town shall, within its Land Development Regulations provide specifications for regulating construction/development within these areas.

A.1.3.3 *Flood-prone Area Mitigation*

The Town's Subdivision Regulation and Zoning Code shall be reviewed and where necessary revised to ensure that land use categories are regulated in accordance with the Future Land Use map and that controls are adopted for the regulation of subdivisions and the use of land in flood prone areas in accordance with applicable FEMA requirements.

A.1.4.1.a *Flood-prone Area Mitigation*

Development adjacent to the St. Johns River and other designated flood prone areas shall be restricted to low intensity activity that shall be subject to standards provided in Policies A.1.1.1, A.1.4.3, A.1.4.4, and A.1.4.10 which would prevent adverse environmental impacts.

A.1.4.4 *Flood-prone Area Mitigation*

A 25-foot building line set back from wetlands and other surface waters as defined in 62-340 F.A.C. (excluding upland cut ditches) will be required for all new construction adjacent to the St. Johns River.

A.1.4.7 *Stormwater Mitigation*

By 2008, the Town shall review of the Master Drainage Plan to verify the Plan adequately regulates the quality and quantity of stormwater run-off for all new

development pursuant to the following criteria; Rule 17-302.500, Rule 17-25.042, Rule 17-25.040, Rule 17-25.

A.1.4.10 *Flood-prone Area Mitigation*

Riverfront development shall be designed so as not to affect the water quality of adjacent waters. Design standards include: limitation of density, set back of buildings from waterfront, set back of sanitary sewer drain field (septic tank) from water's edge as permitted by the County Department of Health and a 25-foot vegetative buffer required between actual building site and water body.

Town of Welaka Comprehensive Plan- Infrastructure Element

D.1.1.4 *Stormwater Mitigation*

The Town shall prohibit any development that adversely affects the LOS standards established in Policy D.1.1.1 for the potable water and sanitary sewer system, solid waste disposal system, or stormwater management system.

D.1.4.2 *Drought Mitigation*

By 2006, the Town shall ensure that adopted Land Development Regulations encourage the use of water-saving measures that are recommended by the St. Johns River Water Management District. Such regulations may include recommendations for the use of drought-resistant native or natural plant species and low-flow or drip irrigation systems in any required landscape buffering plans.

D.1.5.3 *Stormwater Mitigation*

The Town shall continue to coordinate with Putnam County to seek funding for improving stormwater management facilities along S.S. 309.

D.1.5.4 *Flood-prone Area Mitigation*

All new development shall be constructed above based flood elevations in accordance with FEMA regulations and policies to protect property from water damage and to permit unobstructed flow of water and drainage.

D.1.6.3 *Hazardous Materials Mitigation Education*

The Town shall distribute Federal, State, and County-generated data regarding the handling and disposal of hazardous waste to all businesses identified as potential generators of such waste and make such literature available at Town Hall for all Town residents.

Town of Welaka Comprehensive Plan- Conservation Element

E.1.2.8 *Flood-prone Area Mitigation*

A 25-foot vegetated upland buffer shall be required for any waterfront development.

E.1.2.12 *Drought Mitigation*

The Town shall utilize its police powers to enforce SJRWMD rules for emergency conservation of water during periods of drought.

E.1.5.1 *Hazardous Materials Mitigation Education*

Town residents shall be informed through education of hazardous waste disposal locations proper methods of disposal.

E.1.5.2 *Hazardous Materials Mitigation*

The Town shall develop an ordinance, which will require the proper disposal of hazardous waste including used automobile and truck tires and batteries.

E.1.5.3 *Hazardous Materials Mitigation*

The Town shall continue to require that fire department personnel have proper training in regard to hazardous materials spills and evacuation procedures in the event that hazardous materials are released due to train or truck accidents or other causes.

E.1.5.4 *Hazardous Materials Mitigation Education*

Information currently obtainable from EPA, DEP, and Putnam County regarding hazardous materials, and evacuation procedures hall be made available to Town residents through the Town Hall and fire stations.

Town of Welaka Comprehensive Plan- Capital Improvements Element

H.4.2.7 *Stormwater Mitigation*

The level of service standards to be met for storm water drainage and treatment shall be as required by various jurisdictional state and federal agencies.

H.4.2.8 *Stormwater Mitigation*

The Town of Welaka shall not issue a building permit or other development order in any case where the above standards for stormwater drainage levels or service are not met.

H.4.2.9 *Stormwater Mitigation*

A Town wide study shall be prepared to develop a storm water evaluation strategy including runoff quality and quantity considerations by January 1, 2008.

Town of Pomona Park Comprehensive Plan- Land Use Element

A.1.1.1 *Flood-prone Area Mitigation*

The Town of Pomona Park shall use the latest version of the Flood Damage Prevention Map promulgated by FEMA to determine the location of the 100-year floodplain and flood prone areas in the Town. The Town shall, within its Land Development Regulations provide specifications for regulating construction/development within these areas.

A.1.1.4 *Stormwater Mitigation*

The Town's Subdivision and Zoning Code shall be reviewed and where necessary revised to address drainage and stormwater issues as identified in the Public Facility Element;….

A.1.1.6 *Stormwater Mitigation*

The Town building Official nor Town Council shall issue a building permit or other development order until the minimum requirements of concurrency as established by Rule 9J-5.0055(2)a (potable water, sanitary sewer, solid waste and drainage);….

A.1.3.3 *Flood-prone Area Mitigation*

The Town's Subdivision Regulation and Zoning Code shall be reviewed and where necessary revised to ensure that land use categories are regulated in accordance with the Future Land Use Map and that controls are adopted for the regulation of sub-divisions and the use of land in flood prone areas. All development in flood prone areas hall be controlled by the standards specified in Policies A.1.1.1, A.1.4.4 and A.1.4.10 with use of septic tanks limited to that permitted by FEMA and County Health Department Regulations.

A.1.4.1 *Flood-prone Area Mitigation*

Figures A-5 (100-year floodplain) and A-6 (wetlands) identify two environmentally sensitive areas of the Town in which development must be controlled. To protect these natural resources from the impact of development the following development standards shall apply:

a) Development adjacent to Lake Broward and other designated flood prone areas shall be restricted to low intensity activity that shall be subject to standards provided in Policies A.1.1.1, A.1.4.4 and A.1.4.10 which would prevent adverse environmental impacts.

A.1.4.3 *Erosion Mitigation*

Land development regulations shall specify acceptable erosion control practices to be implemented and inspected by the Town Building Official during construction (such as temporary covering of straw, hay-bale obstruction in drainage swales, etc.) in order to reduce soil erosion from wind and water during the construction phase of development to a maximum of 600 milligrams of sediment per liter of run-off.

A.1.4.4 *Flood-prone Area Mitigation*

A 25-foot set back from the actual building site to the lakefront will be required for all new construction adjacent to Lake Broward and other surface water bodies with the Town.

A.1.4.5 *Flood-prone Area Mitigation*

A 25-foot buffer of vegetation, native to the site, shall be required for developments located adjacent to wetlands in Figure A-6.

A.1.4.7 *Stormwater Mitigation*

By June 1992, the Town shall adopt an interim storm water management ordinance which will regulate the quality and quantity of stormwater run-off for all new development pending development and adoption of a Town Master Drainage Plan.

Town of Pomona Park Comprehensive Plan- Public Facilities Element

D.1.2.1 *Stormwater Mitigation*

Land Development Regulations shall be adopted which require that the Town Building Official issue a "Certificate of Concurrency" guaranteeing that roads, recreation and open space, sanitary sewer, drainage, and solid waste are available to serve new development in amounts prescribed by the Town's adopted Levels of Service for these components of infrastructure and in accordance with the requirements of Chapter 9J-5.0055(2)(a),(b), and (c).

D.1.2.2 *Stormwater Mitigation*

The Town shall prohibit any development that adversely affects the LOS standards established for the potable water and sanitary sewer system, solid waste disposal, or drainage.

D.1.5.2 *Drought Mitigation*

By June 1992, Land Development Regulations shall require providing for the use of water-saving measures, such as, limit landscape watering to certain hours during droughts, provide for the use of drought resistant native/natural plants and, in general, promote public education and awareness of the benefits of conserving water.

D.2.1.2 *Stormwater Mitigation*

By 1995 the Town shall complete a Town-wide drainage study which will 1) determine the volume, rate, timing, and pollutant load of runoffs 2) identify areas which have recurring drainage problems and evaluate the extent to which receiving surface water bodies are being impacted by the Town's stormwater discharges; 3) determine where additional improvements are needed; and 4) prioritize improvements in accordance with Policies D.1.3.1 and H.1.3.1.

D.2.1.3 *Stormwater Mitigation*

By 1996, the Town shall adopt a Stormwater Master Drainage Plan which identifies current drainage problems and sets short and long term priorities for correcting deficiencies and anticipating projected costs.

D.2.1.5 *Stormwater Mitigation*

The Town shall continue to coordinate with the FDOT to seek means of improving maintenance of drainage facilities along Highway 17.

D.2.1.6 *Flood-prone Area Mitigation*

All new development shall be constructed above based flood elevations in accordance with FEMA regulations and policies.

D.2.2.2 *Hazardous Materials Mitigation*

By June 1992, the Town shall incorporate and adopt within its Land Development Regulations procedures for disposal of hazardous waste materials and identify levels of hazardous waste generated.

D.2.2.3 *Hazardous Materials Mitigation Education*

The Town shall distribute federal, state and county generated data regarding the handling and disposal of hazardous waste to all business identified as potential generators of such waste and make such literature available at Town Hall for all its residents.

Town of Pomona Park Comprehensive Plan- Conservation Element

E.1.2.6 *Flood-prone Area Mitigation*

A 25-foot upland vegetated buffer shall be required for any waterfront development.

E.1.3.1 *Erosion Mitigation*

Land development regulations shall specify acceptable erosion control practices during construction (such as temporary covering of straw, hay-bale obstruction in drainage swales, etc.) to reduce soil erosion from wind and water.

E.1.5.1 *Hazardous Materials Mitigation Education*

Town residents shall be informed through public education of hazardous waste disposal locations and proper methods of disposal.

E.1.5.2 *Hazardous Materials Education*

The Town shall develop an ordinance which will require the proper disposal of hazardous waste including used automobile and truck tires and batteries.

E.1.5.3 *Hazardous Materials Mitigation/Evacuation Mitigation*

Information currently obtainable from EPA, DER, and Putnam County regarding hazardous materials, and evacuation procedures shall be made available to Town residents through the Town Hall and fire stations.

Town of Pomona Park Comprehensive Plan- Capital Improvements Element

H.1.7.8 *Stormwater Mitigation*

The Town of Pomona Park shall not issue a building permit or other development order in any case where the above standards for the storm water drainage levels of service are not met.

H.1.7.17 *Stormwater Mitigation*

A town wide study shall be prepared to develop a storm water evaluation strategy including runoff quality and quantity considerations by January 1, 1995.

Crescent City Comprehensive Plan- Future Land Use Element

A.1.1.1 *Flood-prone Area Mitigation*

The City of Crescent City shall use the latest version of the Flood Damage Prevention Ordinance promulgated by FEMA to determine the location of the 100-flood floodplain and flood prone areas in the City. The City shall, within its Land Development Regulations provide specifications for regulating construction/development with these areas.

A.1.1.2 *General Mitigation*

The City shall require that any required permits from the appropriate agency such as the Water Management District, Department of Environmental Regulations, and Corps of Engineers be secured prior to the issuance of a building permit.

A.1.1.4 *Stormwater Mitigation*

The City's Land Development Regulations and Zoning Code shall be periodically reviewed and where necessary revised to address drainage and stormwater issues as identified in the Public Facility Element;….

A.1.4.3 *Erosion Mitigation*

Land development regulations shall specify acceptable erosion control practices to be implemented during construction (such as temporary covering of straw, hay-bale obstruction in drainage swales, etc.) in order to reduce soil erosion from wind and water during the construction phase of development. These erosion control measures shall include "Best Management Practices" for erosion control as identified by Saint John's Water Management District and or the Florida Department of Environmental Protection.

A.1.4.4 *Flood-prone Area Mitigation*

A 25-foot set back from the lakefront will be required for all new construction adjacent to the four lake water bodies situated within or adjacent to the City limits. This buffer, for the most part, will locate construction back beyond the 100-year flood plain impact. Where a 25-foot setback is not adequate to remove construction from the 100-year floodplain area, construction will be placed on that portion of the site least impacted by the 100-year floodplain and will follow the criteria stated in Policy A.1.3.3.

A.1.4.5 *Flood-prone Area Mitigation*

A 25-foot buffer of vegetation, native to the site, shall be required between the construction site and the upland edge of the wetlands for new-developments located adjacent to wetlands as defined in 40C-4.021(11), F.A.C.

A.1.4.7 *Stormwater Mitigation*

The City's Land Development regulations shall prescribe stormwater and drainage requirements for all new development and redevelopment, these requirements shall include the criteria defined in Policies D.1.1.1, D.1 through 6; D.2.1.4 and A.1.3.3.

A.1.4.8 *Stormwater Mitigation*

By 2009 the City shall initiate the development of a Master Stormwater Management Plan with the intent of producing a plan for adoption by 2011.

A.1.8.1 *Stormwater Mitigation*

2) Development that is adapted to natural features in the landscape and which avoids the disruption of natural drainage patterns.

5) Planned Unit Developments may be used to protect environmentally sensitive areas but also may be used to increase the potential for developing water/sewer systems and more effective drainage systems.

A.1.9.3 *Flood-prone Area Mitigation*

(A.1) Residential development within the 100-year floodplain will be required to meet FEMA regulations regarding the height of floor level above the flood plain level.

(A.3) Industrial development of parcels that include flood prone areas shall occur only on the upland portion of the parcel using the flood prone area as part of the required 10 percent set-aside of previous land surface.

(A.4) Agriculture shall be permitted where designated in flood prone/wetland areas so long as best management practices are employed which do not change the topography of the land or hydroperiods or flow capacities of stormwater runoff

Crescent City Comprehensive Plan- Public Facilities Element

D.1.1.1 *Stormwater Mitigation*

The following level of service standards shall be used as the basis for determining the availability of facility capacity against the demand generated by development.

(B.D.2 &3) Wetland Stormwater Discharge: Permits for wetland stormwater discharge shall follow FAC 17-25.042. Stormwater Discharge Facilities: Permits for construction of new stormwater discharge facilities shall follow F.A.C. 17-25.040.

D.1.2.2 *Stormwater Mitigation*

The City shall prohibit any development that reduces the City's ability to meet the LOS standards adopted for the potable water and sanitary sewer system, solid waste disposal, or drainage.

D.1.3.3 *Project Mitigation*

Projects needed to correct existing deficiencies, particularly where the public's health and safety would be jeopardized, shall be ranked and completed as a priority level one in the schedule of programs in the Capital Improvements element.

D.1.3.B.1 *Drought Mitigation*

The City Public Works Director or other designee shall continue to implement the City program for identifying and correcting water losses in the distribution system.

D.1.5.1 *Drought Mitigation Education*

The City shall conduct a public information program alerting water customers of wasteful water usage practices and promoting responsible and practical use of the water system with the goal of maintaining a potable water level of service requirement of 116 gcd.

D.1.5.2 *Drought Mitigation*

Land Development Regulations shall be adopted and implemented that provide for the use of water-saving measures, such as, limit watering to certain hours during droughts, provide for the use of drought resistant native/natural plants in new construction and promote public education and awareness of the benefits of conserving water through making available at City Hall literature on the subject which is produced by DNR, DER, and the SJRWMD.

D.2.1.2 *Stormwater Mitigation*

By 2009 the City shall initiate a City-wide drainage study which will 1) determine the volume, rate, timing, and pollutant load of runoffs where improvements have been made; 2) identify areas which have recurring drainage problems and evaluate the extent to which water bodies are being impacted by the City's Stormwater discharges; 3) determine where additional improvements are needed; and 4) prioritize improvements.

D.2.1.3 *Stormwater Mitigation*

By 2011 the City shall adopt a Stormwater Master Drainage Plan which identifies current drainage problems and sets short and long term priorities for correcting deficiencies and anticipating projected needs. Upon adoption by the City Commission, the Master Drainage Plan will be made part of the Drainage Sub Element to the City's Comprehensive Plan.

D.2.1.4 *Stormwater Mitigation*

In order to enforce measures that will protect the City from property destruction and environmental degradation prior to adoption of a City Master Drainage Plan, the City shall maintain Land Development Regulations as an interim Stormwater Management Plan which embody the following requirements: ….

D.2.1.5 *Stormwater Mitigation*

The City shall continue to coordinate with FDOT to seek means of improving maintenance of drainage facilities along Highway 17.

D.2.1.6 *Flood-prone Area Mitigation*

All new development shall be constructed above based flood elevations in accordance with FEMA regulations and policies.

D.2.2.2 *Hazardous Materials Mitigation*

The City shall maintain Land Development Regulations and coordinate with Putnam County to establish procedures for disposal of hazardous waste materials and identify levels of hazardous waste generated.

D.2.2.3 *Hazardous Materials Mitigation Education*

The City shall distribute federal, state, and county generated data regarding the handling and disposal of hazardous waste to all business identified as potential generators of such waste and make such literature available at City Hall for all its residents.

Crescent City Comprehensive Plan- Conservation Element

E.1.5.1 *Hazardous Materials Mitigation Education*

City residents shall be informed through public education of hazardous waste disposal locations and proper methods of disposal.

E.1.5.2 *Hazardous Materials Mitigation*

The City shall develop an ordinance, which will require the proper disposal of hazardous waste including used automobile, truck tires, and batteries.

E.1.5.3 *Hazardous Materials Mitigation*

The City shall continue to require that fire department personnel have proper training in regard to hazardous material spills and evacuation procedures in the event that hazardous materials are released due to train or truck accidents or other causes.

E.1.5.4 *Hazardous Materials Mitigation Education*

Information currently obtainable from EPA, DEP, and Putnam County regarding hazardous materials, and evacuation procedures shall be made available through the City Hall and fire stations.

Crescent City Comprehensive Plan- Capital Improvements Element

H.5.1.2 *Stormwater Mitigation*

The City's Concurrency Management System shall require that all development orders and permits are to be evaluated for concurrency consistent with the adopted levels of service as identified in Policies H.5.2.1- Sanitary Sewer, H.5.2.4- Solid Waste, H.5.2.7- Storm Water,

H.5.2.11- Potable Water, H.5.2.13- Recreational Facilities, and H.5.2.15- Transportation Facilities. If the adopted LOS standards are not maintained, then the City must deny additional development permits or may require additional steps to limit additional development.

H.5.2.8 *Stormwater Mitigation*

The City of Crescent City shall ensure all development approvals are consistent with the Stormwater adopted levels of service and Concurrency Management system as outlined in Policy H.5.1.3.

H.5.2.9 *Stormwater Mitigation*

A citywide Master Drainage Plan shall, by 2011, be developed and adopted; including a storm water evaluation strategy containing runoff quality and quantity considerations.

H.5.2.10 *Stormwater Mitigation*

Upon adoption by the City Commission a citywide storm water evaluation strategy shall be reviewed for inclusion as an LOS standard.

Putnam County Comprehensive Plan- Future Land Use Element

A.1.1.1 *Flood-prone Area Mitigation*

Putnam County shall use the latest version of the Flood Insurance Rate Maps provided by FEMA to determine the location of areas of special flood hazard, which include the 100-year floodplain and floodways within the 100-year floodplain. The County shall provide specifications for regulating development and land use activities within these areas in its Land Development Code.

A.1.1.4 *Stormwater Mitigation*

The County Land Development Code shall address drainage and stormwater issues as identified in the Infrastructure Element; ….

A.1.2.4 *Post-Hurricane Fixes*

Capital expenditures for public infrastructure and supporting facilities and services will be concentrated so as to upgrade the quality of existing neighborhoods and hurricane damages areas.

A.1.3.3 *Flood-prone Area Mitigation*

The County's Land Development Code shall be the mechanism that ensures that land use categories are regulated in accordance with the Future Land Use Map and that controls subdivisions and the use of land in areas of special flood hazard consistent with the requirements of Policy A.1.1.1.

A.1.4.6 *Erosion Mitigation*

The County shall implement the resource protection and design standards of the adopted Land Development Code that specify on-site erosion control practices during new construction, which will reduce soil erosion from wind and water. Controls shall include such techniques as spreading hay or other mulch materials over potential erosion areas, lining drainage swales with sod, burlap or other appropriate material, spraying non-polluting binding materials over the site, etc.

A.1.4.10 *Flood-prone Area Mitigation*

Development in and adjacent to wetland and water bodies shall be subject to the following:

A. All applicable state and federal regulations for permitting and mitigation must be met prior to the County issuing any construction permits. This will be enforced through the site plan review process as provided in the adopted Land Development Code.

B. The County through implementation of its subdivision regulations shall require all new lots to have adequate area to meet a minimum 25 foot upland buffer of native vegetation between development and jurisdictional wetlands and the water body buffer requirements of the Land Development Code….

A.1.4.11 *Stormwater Mitigation*

The County shall continue to regulate the quality and quantity of stormwater run-off for all development through the natural resources and design standards of the adopted Land Development Code and the adopted stormwater management system level of service standards.

A.1.4.12 *Stormwater Mitigation*

The County shall continue to pursue the development of a Master Stormwater Management Plan.

A.1.4.14 *Flood-prone Area Mitigation*

The County shall, through available state and federal programs, promote the acquisition of floodplains along the St. Johns and Ocklawaha Rivers.

A.1.9.3 *Stormwater Mitigation*

Land development regulations adopted to implement this Plan shall be based on the intent of the following future land use category descriptions, guidelines and standards:

(12.b.v) The proposed development provides for a unique and innovative development plan that avoids any impact to wetlands, areas of special flood

hazard or other environmentally sensitive lands, and incorporates best practices for low impact design for irrigation and stormwater management.

A.1.12.1 *Emergency Shelter Mitigation*

Putnam County shall coordinate with counties and local governments to its east, which are along the coast, to assess future shelter needs and seek funds or donations of shelters to correct the shelter deficiency documented in the "Florida Statewide Emergency Shelter Plan."

A.1.12.2 *Storm Surge Mitigation*

Putnam County shall investigate augmenting its public facilities with storm surge resistant equipment along the St. Johns River and strongly and encourage private utilities and entities likewise to protect against storm surge damage along the River as a result of hurricanes.

Putnam County Comprehensive Plan- Infrastructure Element

D.1.2.3 *Stormwater Mitigation*

The following level of service standards for stormwater management facilities shall be used as the basis for determining the availability of facility capacity and the demand generated by a development.

Stormwater management facilities shall be designed to accommodate the 25-year frequency, 24-hour duration design storm to meet the standards….

D.1.4.1 *Drought Mitigation Education*

The County shall request the assistance of the Suwannee River Water Management District, St. Johns River Water Management District and other agencies to facilitate and conduct a public information program alerting residents of wasteful water practices, and encouraging responsible and practical use of potable and water resources. Through this program the County shall maintain a public awareness of the diminishing supply of potable water in the State of Florida and be prepared to explore alternative sources of water if the situation becomes exacerbated. The Planning, Zoning and Building Department shall continue to display brochures provided by SJRWMD and SRWMD concerning water conservation techniques and where the county has control of public utilities supplying water, public information brochures shall be distributed with residents' water bills.

D.1.6.1 *Stormwater Mitigation*

The County shall maintain the level of service standards for stormwater management adopted in this element, the Capital Improvement Element and the Land Development Code. One year after the adoption of the stormwater master plan by the Board of County Commissioners, relevant provisions of

the stormwater master plan shall be incorporated into this element and the Capital Improvements Element.

D.1.6.2 *Stormwater Mitigation*

The County shall implement a routine maintenance program of County-maintained drainage ditches, the cost of which is incorporated into the County's operating budget.

D.1.6.3 *Stormwater Mitigation*

The County shall continue to coordinate with the Department of Transportation (FDOT), on a routine basis, for FDOT's fulfillment of its responsibility to implement a maintenance program for drainage ditches along state maintained roads.

D.1.6.4 *Flood-prone Area Mitigation*

The County shall require new development to establish a minimum 25 foot buffer of native vegetation adjacent to wetlands and a minimum 50-foot buffer adjacent to water bodies.

D.1.6.5 *Erosion Mitigation*

The County shall require and implement through its Land Development Code that new construction be engineered to reduce erosion due to stormwater runoff both during and after construction. Erosion controls shall include and consist of the recommended best management practices found in Chapter 4: "Best Management Practices for Erosion and Sedimentation Control" of the Florida Erosion and Sediment Control Inspector's Manual published by FDEP.

D.1.6.6 *Stormwater Mitigation*

The County shall require and implement through its Land Development Code that surface water runoff from new construction sites not be greater than the runoff from the site prior to construction activities. Exempted from this policy are subdivisions with an approved stormwater master plan and construction associated with a DRI.

Putnam County Comprehensive Plan- Conservation Element

E.1.1.2 *Wildfire Mitigation*

The County will encourage alternatives such as composting and chipping facilities to the open burning of debris from land clearing.

E.1.2.4 *Stormwater Mitigation*

New waterfront development shall be designed so that stormwater runoff and erosion are retained on-site or are channeled so as to not degrade ambient water quality of adjacent waters.

E.1.2.5 *Flood-prone Area Mitigation*

The County shall adopt and enforce regulations that required the preservation or restoration of a vegetated upland buffer or filter for any waterfront development….

E.1.2.9 *Stormwater Mitigation*

The County shall adopt and enforce regulations that require that new development and redevelopment be designed so that stormwater runoff is retained on-site or is channeled so as to control erosion and maintain ambient water quality in accordance with the requirements of Rule 62-302, FAC, which otherwise can adversely affect adjacent surface water bodies and wetlands.

E.1.2.12 *Drought Mitigation Education*

Water conservation measures shall be promoted for all water users including domestic, public, institutional, industrial, and agricultural. The County shall make available at County offices water conservation materials published by the FDEP, SJRWMD and SRWMD.

Water conservation measures endorsed by the County include the plugging of unused flowing artesian wells, landscape watering restrictions during periods of drought, the use of drought resistant vegetation (xeriscaping) and building code criteria including the use of water-saving devices required when upgrading residential, commercial or industrial plumbing systems.

E.1.2.17 *Flood-prone Area Mitigation*

Putnam County shall use the latest version of the Flood Insurance Rate Maps provided by FEMA to determine the location of areas of special flood hazard which include the 100-year floodplain and floodways within the 100-year floodplain. The County shall provide specifications for regulating development and land use activities with these areas in its Land Development Code….

E.1.3.4 *Erosion Mitigation*

Developers shall be required to apply erosion control practices to reduce soil erosion from wind and water during and after construction activities. Controls shall be implemented as specified in Land Development Code and shall include such techniques as spreading hay or other mulch materials over potential erosion areas, lining drainage swales with sod, burlap or other appropriate material, spraying non-polluting binding materials over the site, etc.

E.1.4.9 *Stormwater Mitigation*

The County shall ask the St Johns River Management District and Florida Department of Environmental Protection to identify the stormwater drainage from County maintained roads and facilities that is causing degradation of the St Johns River and its tributaries. Upon identification, the County shall apply for State and federal funds to improve stormwater management and restore degraded aquatic ecosystems caused by stormwater runoff.

E.1.5.1 *Hazardous Materials Mitigation*

Commercial generators of hazardous waste (as defined by the Department of Environmental Protection) shall have on-site facilities to contain and store hazardous waste in a safe manner prior to disposal by a certified handler.

E.1.5.2 *Hazardous Materials Mitigation Education*

County residents and small quantity generators of hazardous waste shall be informed in accordance with Sections 403.7234 and 703.7225(16), FS, and through distribution of public education materials of hazardous waste disposal locations and proper methods of disposal.

E.1.5.3 *Hazardous Materials Mitigation*

Landfills shall be monitored by the County to eliminate the illegal disposal of hazardous waste.

E.1.5.4 *Hazardous Materials Mitigation*

The County shall develop an ordinance which would support F.A.C. Rule 62-701 and State issued Landfill Operating Permit No. SC54-270643 prohibiting landfilling of waste tires and batteries which will require the proper disposal of

hazardous waste including used automobile and truck tires and batteries as well as household hazardous waste so as to halt illegal dumping or other disposal, and protect the natural resources of the county.

E.1.5.5 *Hazardous Materials Mitigation Education*

The County shall coordinate and participate with DEP and/or EPA in any available public educational programs or grants which will help to educate County residents and businesses regarding hazardous waste, and their proper disposal.

Putnam County Comprehensive Plan- Intergovernmental Coordination Element

G.1.4.6 *Drought & Hazardous Materials Mitigation Education*

Putnam County shall coordinate with state agencies and County municipalities in providing information to its respective residents regarding the conservation of water resources and the disposal of hazardous waste.

G.1.6.1 *Emergency Shelter Mitigation*

Review annually the interlocal agreement with the School District of Putnam County to ensure inclusion of: ….; the use of schools by the public, including use as emergency shelter; ….

Putnam County Comprehensive Plan- Capital Improvements Element

H.5.1.3 *Stormwater Mitigation*

The following level of service standards for drainage facilities shall be used as the basis for determining the availability of facility capacity and the demand generated by a development.

Stormwater management facilities shall be designed to accommodate the 25-year frequency, 24-hour duration design storm to meet the standards….

H.5.1.4 *Stormwater Mitigation*

Putnam County shall not issue a building or other development order in any case where the above standards for drainage facility levels of service are not met.

Putnam County Land Development Code: Article 3- Supplementary Use Regulations

3.02.26 (b.9) *Stormwater Mitigation*

A drainage plan for the manufactured home park which meets the requirements of Article 7 of this Code must be submitted to the Public Works Department. Approval of the design and implementation of the plan must be obtained from Public Works.

3.02.26 (b.10) *Emergency Shelter Mitigation*

Emergency storm shelters shall be provided as required by Article 10 of this Code.

3.02.36 (b.11.a) *Wildfire Mitigation*

Fires shall be permitted only in stoves, fireplaces, and other equipment intended for such purposes

6.05. *Flood-prone Area Mitigation*

Floodplain Management Ordinance of Putnam County, Florida, The provisions of this section (of the Putnam County Land Development Code) shall apply to all development that is wholly within or partially within any flood hazard area, including but not limited to the subdivision of land; filling, grading, and other site improvements and utility installations; construction, alteration, remodeling, enlargement,

improvement, replacement, repair, relocation or demolition of buildings, structures, and facilities that are exempt from the Florida Building Code; placement, installation, or replacement of manufactured homes and manufactured buildings; installation or replacement of tanks; placement of recreational vehicles; installation of swimming pools; and any other development…

Northeast Florida Strategic Regional Policy Plan- Emergency Preparedness and Resiliency

General Mitigation

Policy 11: The Region supports "all hazards" as the complete list of hazards as identified in all Local Mitigation Strategies in the Region.

Policy 13: The Region completes emergency-related, post disaster redevelopment and economic recovery as quickly as possible while mitigation future risk.

Policy 20: The vulnerability maps should be consulted when reviewing plans for redevelopment to ensure that reconstructed buildings are located in suitable areas and built to safe standards.

Policy 24: The Region supports directing development away from areas anticipated to be most vulnerable to hazards. Where growth within vulnerable areas occur, the Region encourages concurrent mitigation for those impacts. NEFRC will work with local government on mitigation strategies to the extent they plan to add residential units in the Costal High Hazards Area to ensure the mitigation addresses vulnerably.

Climate Change Mitigation

Policy 27: The Region will work with the communities, leaders and experiences to determine what assets (people and built environment) are vulnerable, establish a plan to know what actions to take to address the impacts of climate change, if any, and mitigation the impacts whenever possible.

SECTION 3: County Development Trends

A. Introduction

This section addresses existing and future land use development trends within Putnam County.

2020 Update

The development Putnam has experienced from 2015-2020 can be attributed to a number of industry leaders in the pulp and paper, steel manufacturing, concrete pipe and ship building sectors that have a presence in Putnam, including Georgia Pacific and Veritas Steel. Georgia Pacific, a manufacturer of tissue, pulp, paper, packaging, building products and related chemicals, announced that its Palatka mill has been selected for the company's $400 million expansion in its GP Consumer (retail) tissue and towel business. In addition, Veritas Steel, a leader in the steel bridge fabrication industry, expanded operations in Putnam County. Additional details about development Putnam County experienced from 2015-2020 can be found in this section. Additional development trends will be provided after the update to the 2020 Putnam County Comprehensive plan that is currently in development. Hazard vulnerability as result of development trends remains unchanged in the unincorporated area of Putnam County and in Putnam County's five (5) municipalities.

2015 Update

For the 2015 Update, Putnam County's most recent Comprehensive Plan Future Use Land Element, EAR-based Amendment dated 10/26/10 was reviewed as well as the Putnam County Post Disaster Redevelopment plan to gather the most current trend data.

B. Land Use and Development Trends

Putnam County is located in northeast Florida. Putnam County contains a total area of 533,702 acres, including the incorporated municipalities of Crescent City, Interlachen, Pomona Park, and Welaka. The unincorporated area of the County is approximately 514,037 acres, or 98% of the County. This figure has been revised since the 2006 Comprehensive Plan to reflect approximately 1,298 acres of municipal annexations. The County contains many lakes, wetlands, and other water bodies, which account for approximately 63,740.7 surficial acres, or 12.4% of the County's total area. The St. Johns River runs through the eastern portion of the County with the City of Palatka serving as an effective head of navigation. The County has about 100 miles of river frontage. Land elevations range from 16.4 feet along the St. Johns River to 180.45 feet in the highlands west of Interlachen.

Most of the land within unincorporated Putnam County is forested with a scattering of vacation and retirement homes clustered around the lakes. The majority of these homes are located in the southeast portion of the County on the peninsula formed by the St. Johns River and Crescent Lake and in the northwest portion of the County near Melrose and Interlachen.

Primary residential development is projected to be strongest in the east and northwest sectors of the County. Both areas are influenced by growth in adjacent counties, are receiving improved infrastructure, and are historically popular recreational areas. Commercial and industrial establishments are generally concentrated in the east central area around Palatka, though there are local retail and commercial land uses within all of the municipalities. Putnam County's economy depends on agriculture, silver culture, and manufacturing, including lumber, wood products, and paper and allied commodities (Putnam County Comprehensive Plan, 2010.)

Putnam County contains an area of 533,702 acres with 98% of the total county land being unincorporated. With the county being known by many as the "bass" capital of the world," it comprises over 100 miles of river frontage and approximately 1,500 lakes. Water features, especially the St. Johns River and its tributaries, determine the current and future development trends within the county.

The resident labor force of Putnam County has grown from 18,166 (35.9%) employees in 1980 to 27,877 in 2019 *(Putnam Chamber of Commerce, 2019))*. The proportion of the total population in the labor force is lower when compared to the region as a whole. By contrast, the national average labor force participation rate was 63.9% in 2000 *(Putnam County Comprehensive Plan, 2008)*.

The lower labor force participation in Putnam County is typical of a population that has many retiree households *(Putnam County Comprehensive Plan, 2008)*. The county has long been a haven for retirees relocating from other areas. Older age groups have contributed to a continually expanding proportion of the recent resident population growth. Table 1 shows the county's population estimates for the future.

The population data, as shown in Table 1 below, includes estimates for unincorporated Putnam County and its jurisdictions. Updates to the 2010 numbers were made using the best available data from the U.S. Census Bureau. Putnam County's population is projected to grow at 0.5 percent per year or an estimated 14 percent by the year 2030. For the purpose of disaster mitigation, the County will need to address the needs of 74,364 residents. By 2030, the population will increase to 80,400 residents.

Table 1
Population Projections

Putnam County

	2020	2025	2030
Putnam	77,300	78,900	80,400
Palatka	10,969	11,184	11,382

Crescent City	1,318	1,204	1,091
Pomona Park	1,25	1,082	1,134
Interlachen	1,366	1,337	1,303
Welaka	791	834	876
Unincorporated	61,831	63,259	64,614

Source: 2019 BEBR and Florida Housing Data Clearinghouse

Two factors usually cause a change in the size of an area's population. One is natural increase or decrease, which is the relationship of births to deaths. The other is net migration, which is in-migration, or the number of people moving into the area less out-migration, or people moving out.

Natural increase was not a major factor in the growth of Putnam County between 1990 and 2000, and is not expected to become a major factor due to the comparatively small proportion of females in child-bearing age groups and the relatively high amount of the population age 65 and over (Putnam County Comprehensive Plan, 2010).

As shown in the table below, in-migration was the major factor creating state and regional growth between 2000 and 2008. In Putnam County, 89.1 percent of the growth is through in-migration bringing new residents and households (Putnam County Comprehensive Plan, 2010). Putnam County is eager to learn if this percentage will grow or decline once the 2020 United States Census data has been compiled.

Table 2
COMPONENTS OF POPULATION GROWTH, 1990- 2008

2000	2008	Percent Growth	Natural Increase	% of Growth	Net Migration	% Growth
70,423	74,989	6%	498	10.90%	4,068	89.1%

Source: US Census 2000; Florida County Perspectives, Bureau of Economic and Business Research. Prepared by: NEFRC, 2010.

An indicator of new residents or households can be measured by building permits for new dwelling units. During the period of 2000 through 2005, the Putnam County Building Department issued permits for 2,046 dwelling units. During the period of 2006 through 2010, the Putnam County Building Department issued permits for 2,156 dwelling units. From 2010 through 2014 the Building Department issued 535 dwelling unit permits. The largest expansion however, came from 2015-2019, during this span the Building Department issued 1,080 permits.

County development trends can also be measured by infrastructure development, such as roadway improvements. Currently, it is estimated that of the 1,635.35 miles of county-maintained roads,538.17 miles or 32.91% have been paved (Putnam County Public Works, 2014).

County development trends can also be seen in Putnam County as it pertains to non-residential growth. Commercial and industrial establishments are generally concentrated

in the east central area around Palatka, although there is local retail commercial and service land uses within the other municipalities.

Table 2, below from the Putnam County Comprehensive Plan is an update of the existing land use in the plan's inventory and analysis section.

Table 3
Land Use in Unincorporated Putnam County

Table A-1: Unincorporated Putnam County, Existing Land Use 2009[1]

Land Use	2009 Percent	2009 Acreage
General Agricultural	13.6	69,909.0
Commercial	0.4	2,056.1
Industrial	0.5	2,570.2
Institutional[2]	0.9	4,626.3
Mining	0.6	3,084.2
Recreation/Open Space	19.5	100,237.3
Residential	7.1	36,496.6
Silviculture	39.4	202,530.6
Vacant[3]	3.8	19,533.4
SUBTOTAL	**85.8**	**441,043.7**
Waterbodies	12.4	63,740.7
Roads, Railroads, Utilities, Canals	1.8	9,252.6
TOTAL	**100.00**	**514,037.00**

Sources: Putnam County, 2009
Notes:
1. The existing land use information is for unincorporated Putnam County only.
2. Institutional is comprised of Institutional, Public Grounds and Buildings, and Public Facilities.
3. Vacant lands occur in all Future Land Use categories.

Source: Putnam County Comprehensive Plan, 2010

Primary residential development is projected to be strongest in the east and northwest corners of the county. Both of these areas are influenced by growth of adjacent counties, are receiving improved accessibility, and are historically strong recreational use areas.

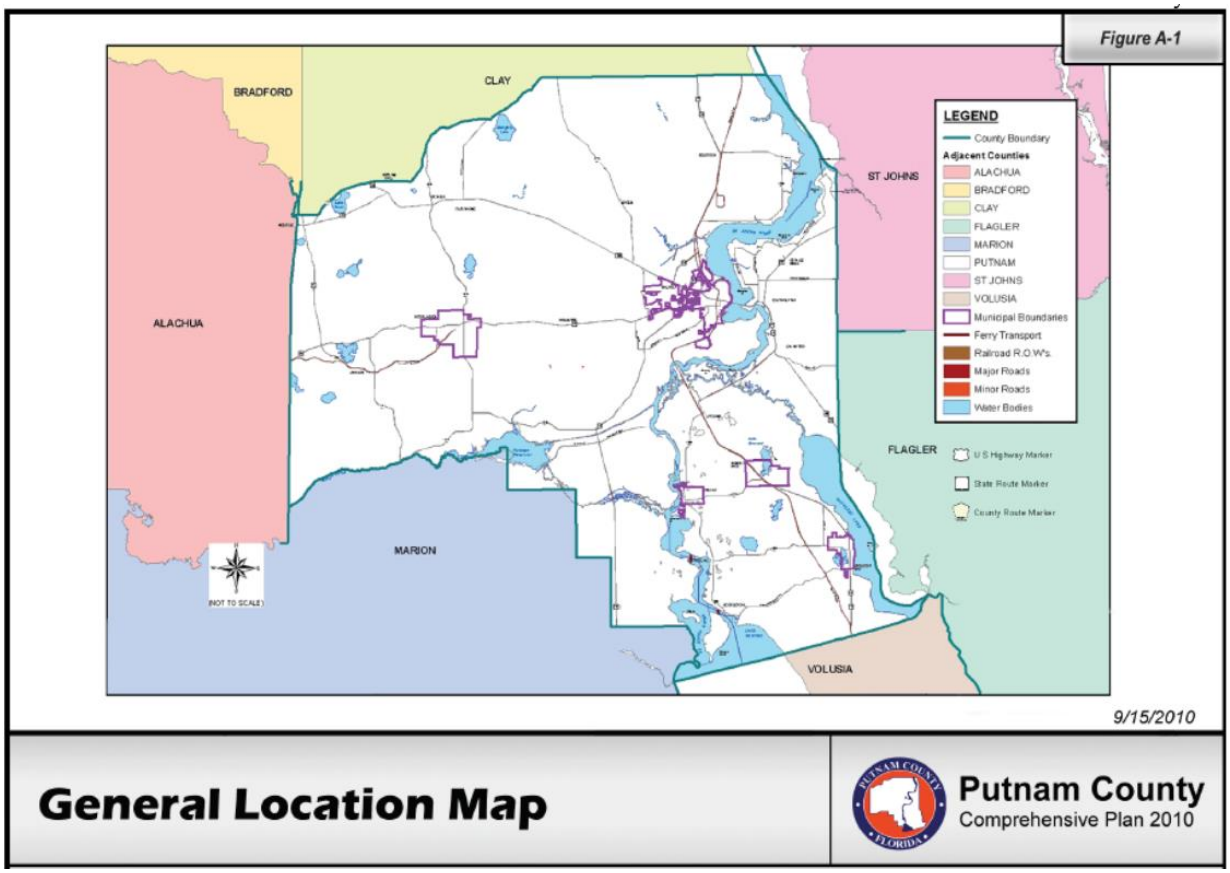
Table 4 below gives future land use information for the county. The following maps provide layouts of existing and future land uses. For larger versions of the maps, please contact Putnam County Emergency Management.

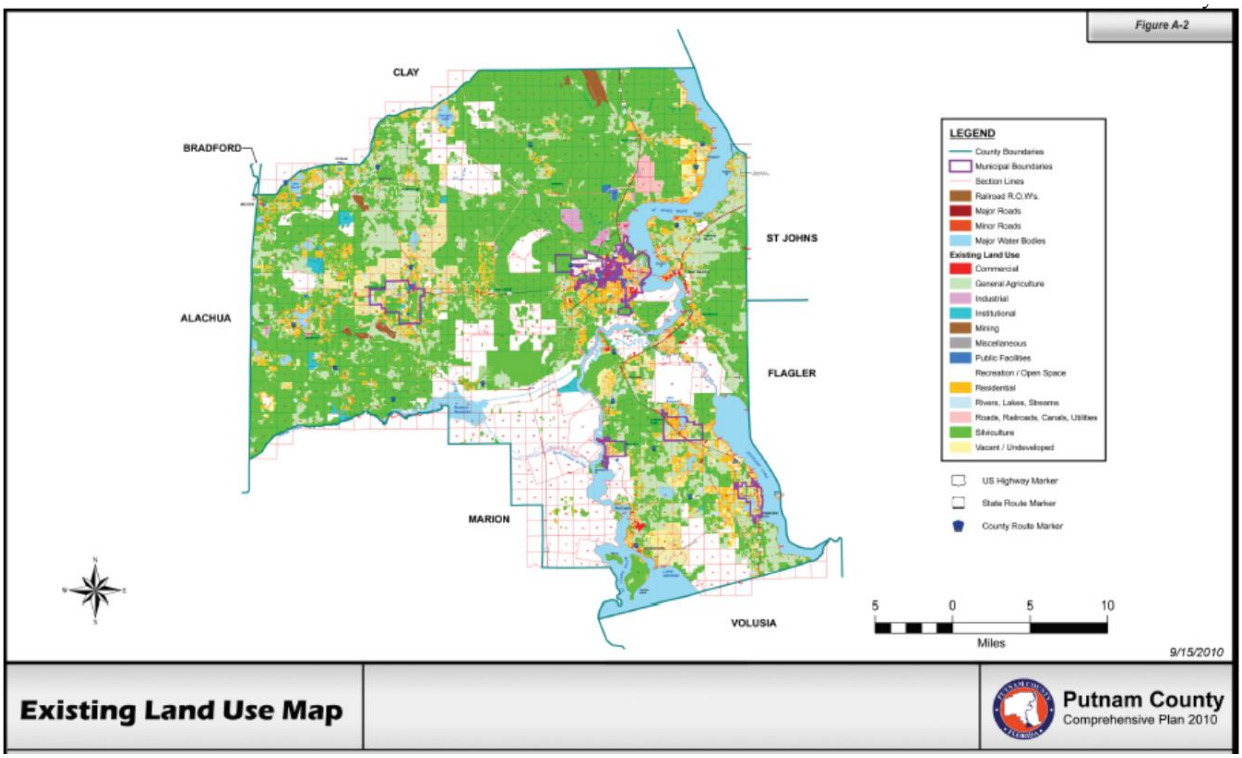
Table 4
Future Land Use in Unincorporated Putnam County

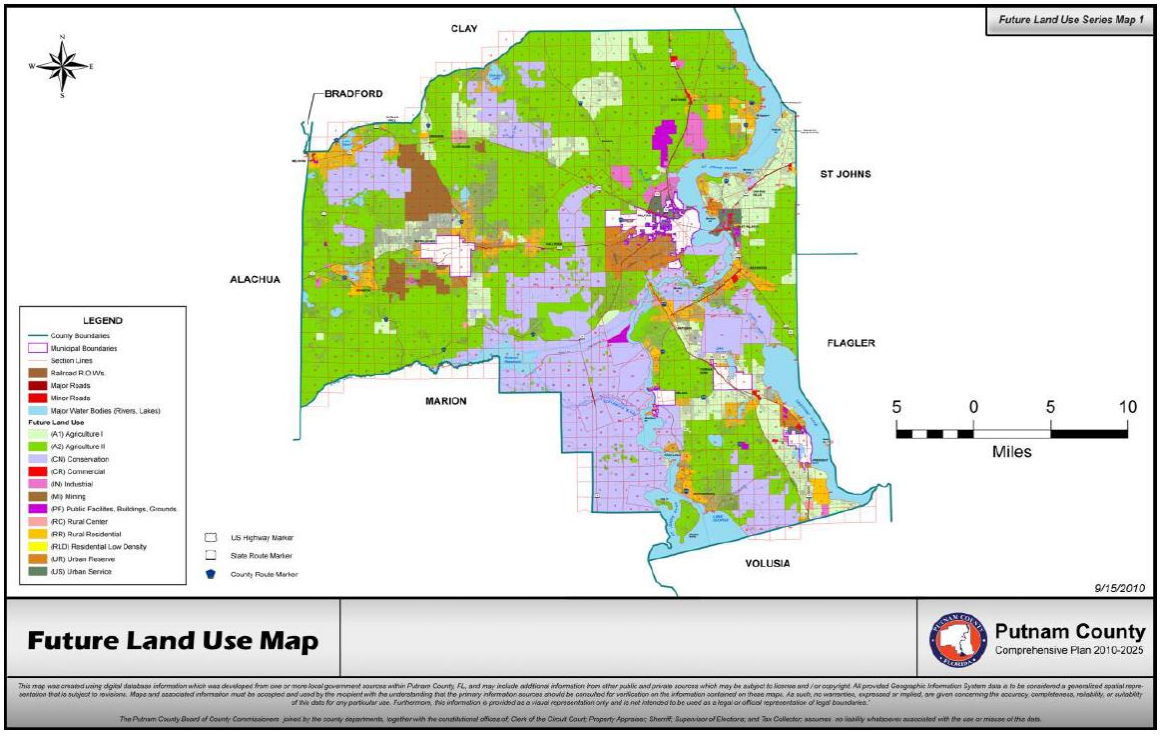
Table A-4: Future Land Uses – Unincorporated Putnam County, 2010

Future Land Use Categories	Maximum Density/Intensity	FLUM Acreage	Percent of Uninc. Lands
Agriculture 1	1 du/10 ac – 1du/5 ac & 35% ISR; 85% ISR non-residential	50,425.00	10.7
Agriculture 2	1 du/20 ac – 1 du/10 ac & 35% ISR; 85% ISR non-residential	236,207.00	50.0
Conservation	1 du/30 ac & 10% ISR	126,789.00	26.8
Commercial	1:1 FAR & 85% ISR	1,286.00	0.3
Industrial	1:1 FAR & 85% ISR	5,808.00	1.8
Mining	None	8,279.00	1.8
Public Facilities	0.5:1 FAR & 70% ISR	2,666.00	0.6
Rural Center	1 du/ac & 0.5 FAR; 0.7:1 FAR non-residential	968.00	0.2
Rural Residential	1 du/5 ac & 0.4 FAR; 0.4:1 FAR non-residential	27,949.00	5.9
Urban Reserve	1 du/1 ac & 0.5 FAR; 0.85:1 FAR non-residential	9,045.00	1.9
Urban Service	1 du/1 ac & 0.5 FAR; 0.85:1 FAR non-residential	2,932.00	0.6
GRAND UNINC.TOTAL		**472,354.00**	**100.0**

Source: Putnam County Comprehensive Plan, 2010







Source: Putnam County Comprehensive Plan, 2018

Of particular concern in Putnam County from a preparedness and mitigation standpoint, are those persons with special needs or limited resources such as the elderly, disabled, low income or language-isolated residents. During the response and recovery phases of a disaster the special needs population in the County is addressed by County Emergency Management partners and sheltering process. The demographics provided in the table below provide a trend that may assist in the decision making process for mitigation.

Female-headed households may have fewer resources for childcare or in a post disaster situation have fewer opportunities for work and financial resources. During the post disaster phase, functioning schools provides normalcy throughout the community and allows working parents the ability to begin work. The elderly also represent a vulnerable population (18.9 percent), whether living at home or in a nursing home, assisted living facility, or medical facility.

Table 5 below identifies persons that potentially require special consideration post disaster in Putnam County. Disability as defined by the U.S. Census Bureau are the persons with a work disability, individuals 15 years and over with functional limitations and Activities and Instrumental in Daily Living (ADLs and IADLs), mental retardation and developmental disabilities, care limitations status, mobility limitations status of current population. Speak another language other than English is defined by the Census as persons aged 5 and over who spoke a language other than English at home and includes those that spoke English very well to not at all (Putnam County Post Disaster Redevelopment Plan, 2014)

Table 5

Putnam County Persons with Special Considerations

SOCIAL VULNERABILITY CATEGORY	NO. OF PERSONS	PERCENT OF POPULATION
Under 5 years	4,248	5.7%
Under 18 years old	15,798	21.2%
65 years and over	17,661	23.7%
Speak another language other than English	7,005	9.4%
With a disability under age 65	9,762	13.1%

Source: US Census Bureau, 2019 estimates

The economy plays a significant role in recovery and mitigation activities. Larger businesses may have additional resources and a wider pool of contacts and revenue to rely on including preparedness and business continuity plans and long term funding goals.

The labor force is a critical asset to disaster mitigation and plays an important role in post disaster redevelopment. As of 2020, the labor force in Putnam County was 26,563. Table 6 below lists the major employers in Putnam County.

Table 6
Major Employers in Putnam County

EMPLOYER	SECTOR	NUMBER OF EMPLOYEES
Putnam County School Board	Education System	1,680
Georgia Pacific Corporation, Palatka	Pulp and Paper Mill	1,000
Putnam County Medical Center	Hospital	520
St. Johns River Management	Water Preservation & Management	550
Wal-Mart	Retail Stores	480
Putnam County Government	County Government	600
Palatka Healthcare Center	Medical Services	300
St. Johns River State College	College	280
St. Johns Ship Builders	Maritime Manufacturing	120
Veritas Steel	Manufacturing	120

Source: Putnam County Chamber of Commerce, 2020

SECTION 4: HAZARDS

A. Introduction

The identification of hazards that have the ability to threaten Putnam County's communities, and the determination of what populations, properties, and environments are most vulnerable to these hazards is a very crucial step in the LMS process.

For purposes of this plan, the LMS Task Force has identified the hazards that could affect the county are: hurricanes and other cyclonic activity, storm surge, severe thunderstorms, high winds, flooding, tornadoes, wildfires, droughts/heat waves, freezes/winter storms, earthquakes, tsunamis, sinkholes/landslides, dam/lock hazards, hazardous material incidents, and terrorism. The identification of these hazards was achieved through discussions with the LMS Task Force members (who have valuable knowledge of their local community), through review of existing hazard-related documents (such as Putnam County's CEMP and Florida's State Hazard Mitigation Plan), and through expert knowledge from an array of federal, state, and local agencies. The identified and discussed hazards in this LMS are all required to be included per federal regulations even though all are not considered as significant threats to the county. It should also be noted that some of these hazards, such as "hurricanes and other cyclonic activities" and "severe thunderstorms," can cause other hazards that are identified in the LMS, such as "high winds," "flooding," "tornadoes," etc. This correlation was taken into account and these connections are noted throughout the section.

An overview of vulnerabilities and impacts are included in this section. For more information about vulnerabilities in terms of critical facilities, properties at risk, value of structures at risks, etc., see Section 5 & 6. Appendix A provides a quick glance information table of the details provided in this section for each hazard. Appendix B provides a comprehensive vulnerability assessment for each jurisdiction that is summarized in part C of this section.

Each hazard has separate subsections, such as "*previous occurrences*" and "*vulnerabilities, probability, risk*" to make certain information easier to find. In 2009 the "*hurricane & other cyclonic activities*" and "*severe thunderstorms "were added* to the list of hazards. These sections were added because hazards produced by these events, such as flooding, high winds, tornadoes, and in the case of hurricanes, storm surge, were separately addressed in the LMS but little information was provided on how these highly probable thunderstorm and hurricane & other cyclonic activities events could cause those hazards. For Putnam County, the events of hurricanes/tropical storms and severe thunderstorms have and will bring some of the most significant impacts to the county, thus making them too important to leave out. Also, "*terrorism*" was added to the hazard

list in 2009 because the Putnam County's CEMP and the Mitigation Task Force thought it was important for planning documents to be uniform and address the same hazards.

All the information provided in this written section has been updated to reinsure the facts with up-to-date information. This information was attempted to be updated as close to the present time as available and was accomplished by working with a variety of experts to gain valuable information. To better display expert/academic information, in-text sourcing was included throughout this section as part of the update as well as the creation of tables throughout the section.

In cooperation with the hazard section, Appendix A was updated to provide an easy way to find an overview of specific details. Also, new to the LMS in 2009 was the creation of Appendix B "Vulnerability Assessment." This was sparked by the need to better determine vulnerabilities for each jurisdiction using an array of differing components, thus helping the LMS Task Force to develop more meaningful mitigation strategies.

B. Hazards

1. Hurricanes & other cyclonic activity

One of the most destructive natural forces seen to cause considerable amounts of damages and losses in Florida are hurricanes. Hurricanes are characterized by high velocity wind circulation around a moving low-pressure center and are developed over warm water due to atmospheric instability. Having the potential to impact entire regions and affect thousands of people lives, mitigating for hurricane associated hazards is an extremely important endeavor for the state of Florida.

To understand successful mitigation techniques toward hurricane hazards, one has to understand that the impact effects of a hurricane depend on its direction, the geography of the area being impacted, the community's preparedness level, the strength and scale of the area's infrastructure, and the force of the storm itself. The Saffir-Simpson Hurricane Scale is a way of categorizing the power of a hurricane on a scale of one through five, with categories 1 and 2 being considered "minor" hurricanes and categories 3, 4, and 5 considered "major" hurricanes. (See table 1) No matter what category a hurricane is, all can cause significant amounts of damage and loss.

Table 1
Saffir-Simpson Scale for Hurricane Categories

Storm Category	Wind Velocity (mph)	Central Pressure (millibars)	Storm Surge (ft)
1	74-95	>980	3-5
2	96-110	965-979	6-8
3	111-130	945-964	9-12
4	131-155	920-944	13-18
5	>155	<920	>18

Source: NOAA National Hurricane Center, June 2009

With a focus on hurricane hazards, it is important to briefly note that other cyclone storms exist and have/will affect Putnam County. Tropical cyclones with enough power form hurricanes, but their lesser extents can be categorized as a tropical depression (which have maximum sustained surface winds of less than 39 mph) or a tropical storm (winds of 39 mph to 73 mph). Also, Putnam County has experienced subtropical depressions (winds less than 39 mph) and subtropical storms (winds greater than 39 mph). A subtropical storm is a non-frontal low pressure system that has characteristics of both tropical and extratropical cyclones *(NOAA NHC, 2007).* These particular storms can't turn into hurricanes while being subtropical and they are usually characterized as having less rainfall than tropical storms.

With this being said, hurricanes and some other cyclonic activities have the potential of producing four major associated hazards: *storm surge, high winds, flooding, and tornadoes*. These will be separately addressed within this hazard identification section.

1a. Previous Occurrences

Tropical Storm Debby impacted Putnam County. Tropical Storm Debby moved across the State of Florida from the
Northeast Gulf of Mexico, St. Johns County began feeling the rain and some wind effects from Debby on Monday, June 25th, 2012. Debby moved across the State very slowly and finally exited into the Atlantic Ocean on Wednesday, June 27th. During this 3 day time frame Debby produced 12-15 inches of rain in the northern portion and 5-8 inches in the southern portion of Putnam County. Significant road flooding was reported throughout the County along with sporadic power outages and tree damage. With regard to jurisdictional impacts and effects of this incident, the City of Palatka damages totaled $13,832 and Putnam County damages totaled $1,882,205 and were comprised primarily of road and drainage related damages.

By reviewing NOAA Coastal Services Center records (2014), it is noted that 43 hurricanes, "eyes," or tracks have traveled through or within a 100 mile radius around Putnam County between 1842-2014. The most recent hurricane system affecting Putnam County was Hurricane Jeanne, Charley and Frances. These storms were also declared a federal disaster in Putnam County in 2004. An additional 75 tropical storms or subtropical storms have traveled through or within a 100 mile radius around Putnam County between 1842-2014.

The center of a "hurricane" (category 1-5) has come within 100 miles of Putnam County 34 times. Table 2 states historical hurricane event details related to Putnam County and Table 3 shows the number of hurricane centers that directly hit coastal counties in near Putnam County. The counties listed on this table are based on the counties that hurricanes passed through that caused the highest impacts to Putnam County, although any hurricane direction and movement through any number of counties could affect Putnam County.

Table 2

Number of Hurricane Centers by their Highest Category within a 100 mile Radius of Putnam County, FL (1842-2014)

Category 1 (74-95 mph)	*Category 2 (96-110 mph)*	*Category 3 (111-130 mph)*	*Category 4 (131-155 mph)*	*Category 5 (155+ mph)*
25	9	8	1	0

Source: NOAA Coastal Services Center, November 2014

Table 3

Number of Direct Hurricane Hits to Selected Coastal Counties Situated in a Possible Prime Impact Zone for Putnam County, FL (1900-2014)

	County	Number of Hurricane Hits
Northeast Florida Coastal Counties	Volusia	8
	Flagler	6
	St. Johns	4
	Duval	4

Source: NOAA National Hurricane Center, April 2014

In terms of other cyclonic activity, Table 4 describes the approximate number of non-hurricane cyclonic storm centers to pass within a 75-mile radius of Putnam County between 2000-2013.

Table 4

Approximate Number of Non-Hurricane Cyclonic Centers within a 75-mile Radius of Putnam County (2000-2013)

Strom Name	Year	Intensity
Gordon	2000	TS
Edouard	2002	TD
Charley	2004	H1
Frances	2004	H1
Jeanne	2004	H2
Tammy	2005	TS
Barry	2007	TD
Fay	2008	TS
Debby	2012	TD
Beryl	2012	TS

Andrea 2013 TS

Source: NOAA Coastal Services Center, April 2014

A review of records from NOAA's Coastal Services Center Historical Hurricane Tracks from 1958 to 2012 shows that Putnam County and Northeast Florida have had several close calls with hurricane impacts (within 75 miles). The County has also been impacted by significant Tropical Storms, Tropical Storms Beryl and Debby in 2012. The last hurricane to directly impact Northeast Florida was Hurricane Gladys in 1968 which made landfall as a Category 1 Hurricane from the Gulf Coast through Marion County and passed directly through Putnam County as a Category 1 Hurricane onto St. Johns County. The table below lists cyclonic storms that have threatened or impacted Putnam County since 1960.

Table 5

Hurricane History for Northeast Florida since 1960

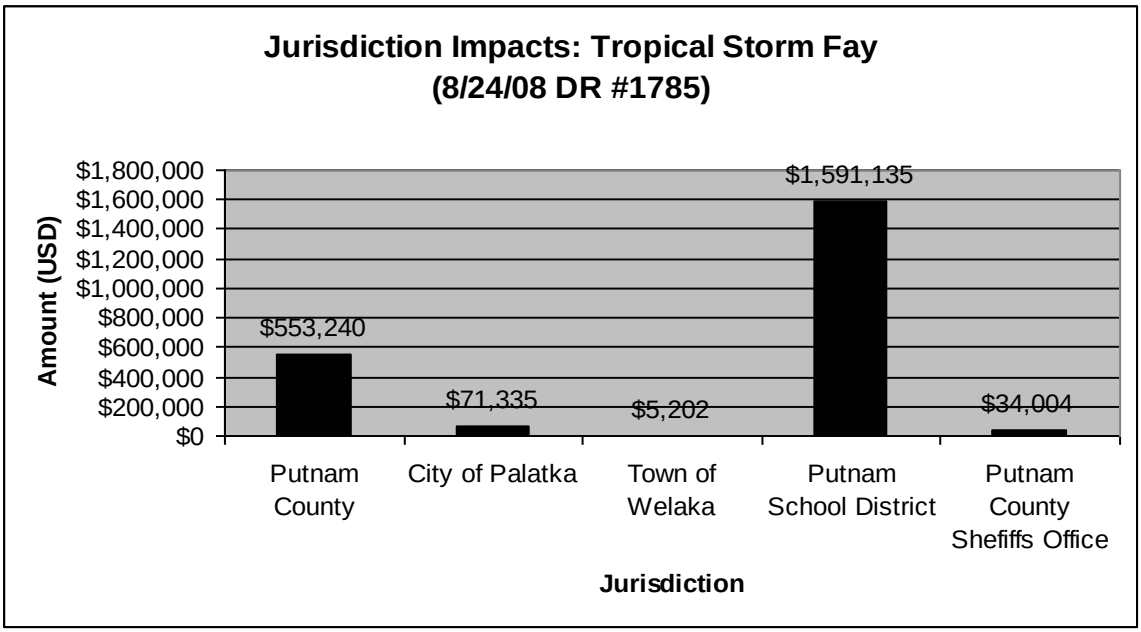
STORM NAME	DATE (MONTH AND YEAR)	CATEGORY
Hurricane Donna	September 1960	H3
Tropical Storm Cleo	August 1964	TS
Hurricane Dora	September 1964	H3
Tropical Storm Abby	June 1968	TS
Hurricane Gladys	October 1968	H1
Hurricane David	September 1979	H2
Tropical Storm Dennis	August 1981	TS
Tropical Storm Isidore	September 1984	TS
Tropical Storm Isabel	October 1985	TS
Tropical Storm Chris	August 1988	TS
Tropical Storm Jerry	August 1995	TS
Tropical Storm Josephine	October 1996	TS
Hurricane Floyd	September 1999	H3
Tropical Storm Gordon	September 2000	TS
Tropical Storm Gabrielle	September 2001	TS
Tropical Storm Edouard	September 2002	TS
Tropical Storm Kyle	October 2002	TS
Hurricane Charley	August 2004	H1
Hurricane Frances	September 2004	H2
Tropical Storm Jeanne	September 2004	TS
Tropical Storm Tammy	October 2005	TS
Tropical Storm Alberto	June 2006	TS
Tropical Storm Ernesto	August 2006	TS
Tropical Storm Barry	June 2007	TS
Tropical Storm Fay	August 2008	TS
Tropical Storm Beryl	May 2012	TS
Tropical Storm Debby	June 2012	TS
Hurricane Matthew	October 2016	H5

STORM NAME	DATE (MONTH AND YEAR)	CATEGORY
Hurricane Irma	September 2017	H5
Hurricane Dorian	September 2019	H5

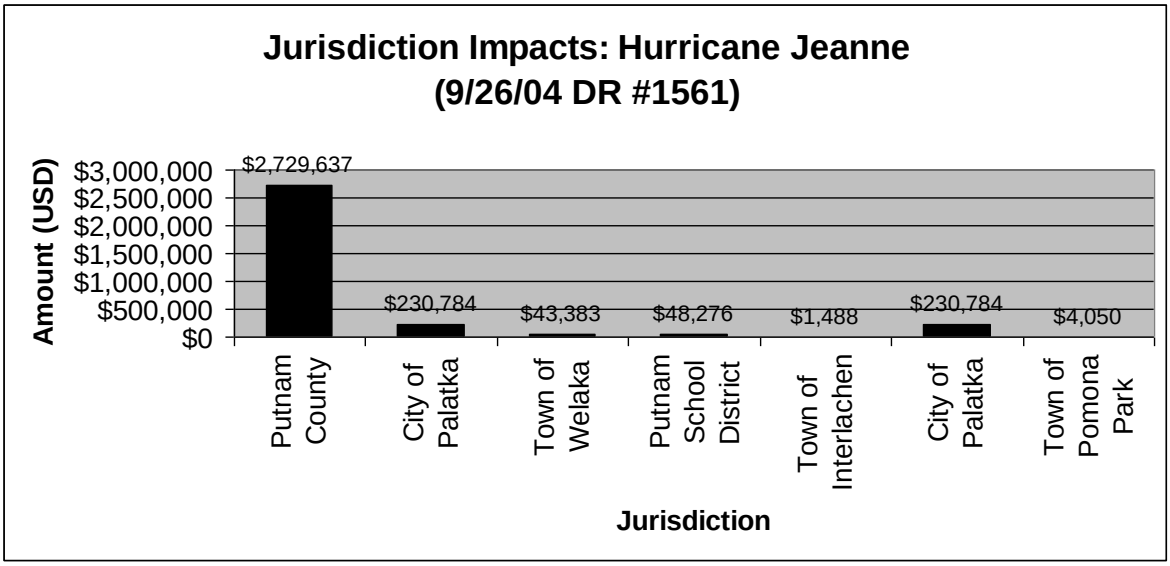
Source: NOAA's Coastal Services Center

The below information provides additional detail regarding the impact that hurricanes and other cyclone has had on various "jurisdictions" within Putnam County. Previous hurricanes and other cyclone hazard impacts can be measured in regard to dollar-based damage estimates from the event. To address dollar-based impacts to individual jurisdictions in Putnam County, Putnam County Emergency Management has researched FEMA/FDEM Public Assistance information and submits the following information chart that may attempt to identify the impact of flooding on individual jurisdictions. The impact is measured in the amount of United States dollars of FEMA Public Assistance obligated to each eligible jurisdiction that was eligible and applied to receive Public Assistance.

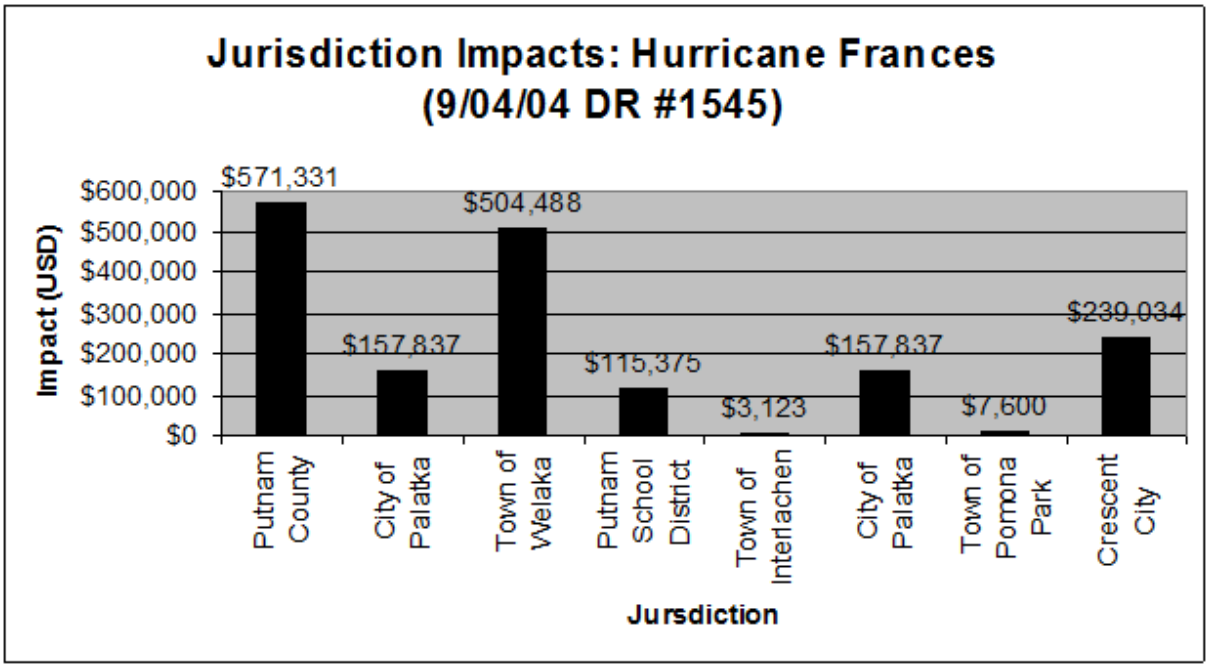
Graph 1
Jurisdictional Impacts from Tropical Strom Fay 2008



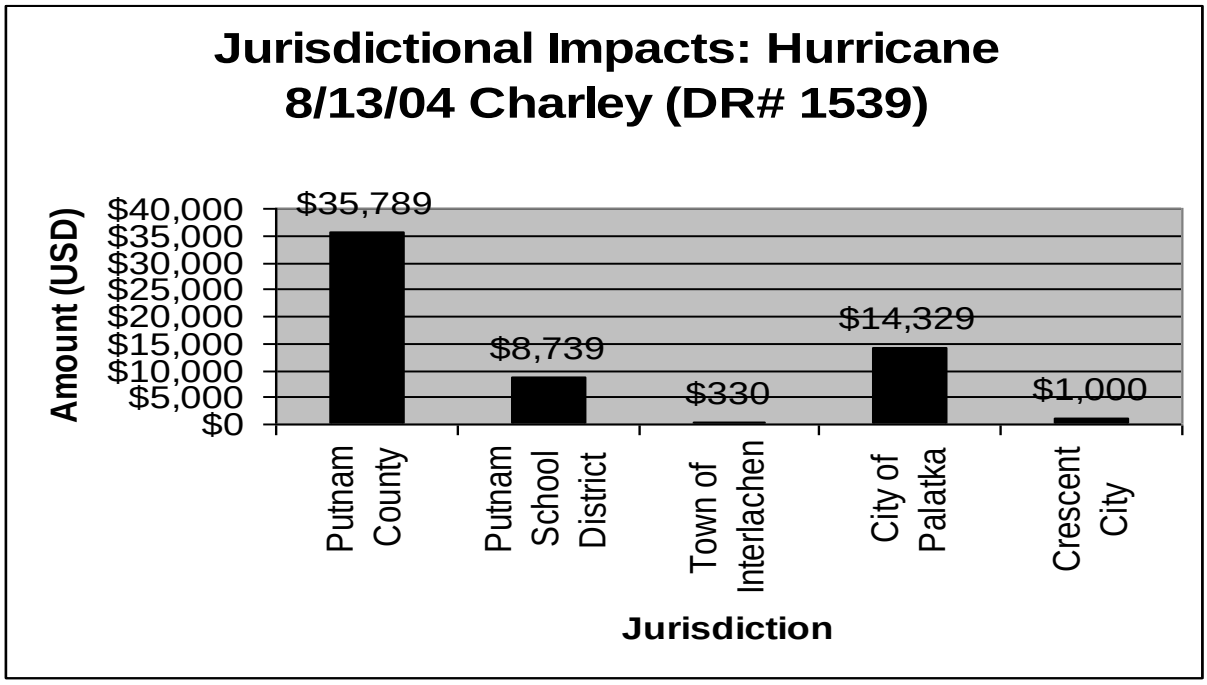
Graph 2
Jurisdictional Impacts from Hurricane Jeanne 2004



Graph 3
Jurisdictional Impacts from Hurricane Frances 2004



Graph 4
Jurisdictional Impacts from Hurricane Charley 2004



1b. Vulnerability, Probability, Risk

With hurricane and other cyclonic associated hazards being separately addressed in Putnam County's LMS hazard identification section (e.g. storm surge, high winds, flooding, tornadoes), all of the county and its jurisdictions are vulnerable to hurricane and other cyclonic activity hazards as a whole.

While Putnam County has a large population vulnerable to hurricanes. Impacts from these storms can include tree and natural environment destruction, infrastructure and house damage or collapse, downed power lines, blocked roads, flooding, and massive amounts of storm-generated debris. All structures are susceptible to impacts of hurricanes, especially buildings in floodplains and unsound housing or mobile homes. Below is a chart that indicates Putnam County's vulnerable population from hurricane by evacuation level:

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E	Evacuation Zone F
Putnam County*/**						
Site-built Homes	5,373	1,418	687	863		
Mobile/Manuf. Homes	3,342	1,293	564	477		N/A
TOTAL	**8,715**	**2,710**	**1,251**	**1,340**		

Source: Volume 6-4 Northeast Florida Statewide Regional Evacuation Study Program

Through data collected from the NOAA National Hurricane Center, probabilities were created for the estimated return periods of hurricanes to coastal regions by their categories. Table 5 gives the probability of hurricanes hitting the Northeast Florida coastal region (Volusia, Flagler, St. Johns, and Duval County). Since Putnam County is located inland from this coast, it can be assumed that each category that hits the coast may not have the same wind and surge effect on the cost as it will in Putnam County, thus possibly making the estimated return periods slightly higher for Putnam itself. Within this probability, the vast majority of Atlantic Ocean hurricanes and other cyclonic activity take place during hurricane season, June 1 through November 30. Risks of hurricanes and other cyclonic activities will be discussed more within the separate hazard sections associated with hurricanes.

Table 6

Estimated Return Periods in Years for Northeast Florida Coastal Region by Hurricane Categories (created in 1999)

	Estimated Return Period
Category 1	10-11 years
Category 2	22-28 years
Category 3	39-53 years
Category 4	85-120 years
Category 5	220-340 years

Source: NOAA National Hurricane Center, June 2009

2. Storm Surge

Storm surge is an abnormal rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge should not be confused with storm tide, which is defined as the water level rise due to the combination of storm surge and the astronomical tide. This rise in water level can cause extreme flooding in coastal areas particularly when storm surge coincides with normal high tide, resulting in storm tides reaching up to 14.4 feet in Putnam County, National Hurricane Center, Florida Statewide Regional Evacuation Study, 2013).

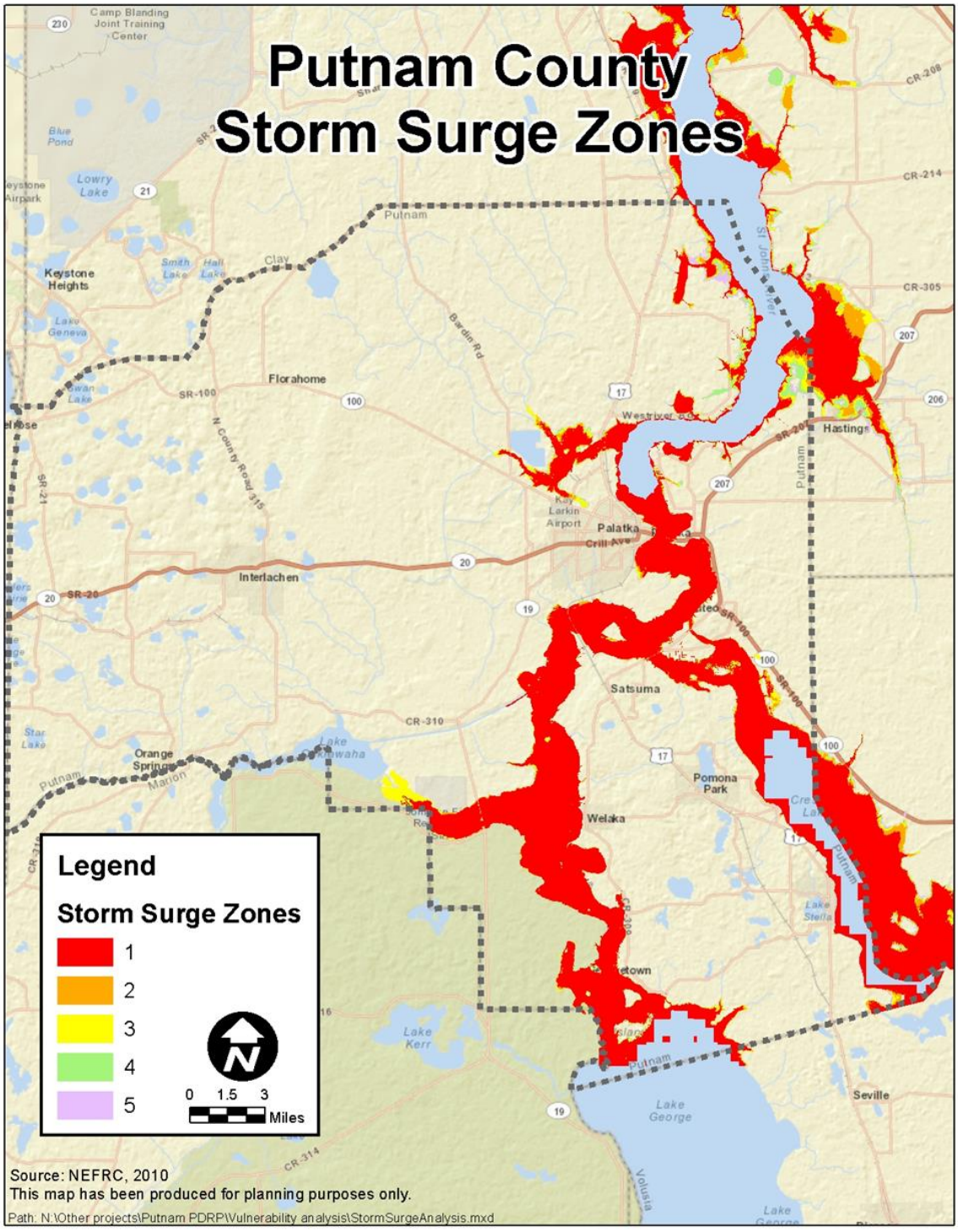
> Although Putnam County is an inland county and doesn't have as high of risk as a coastal county, it does have storm surge possibilities associated with the St. Johns River. Storm surge can penetrate well inland from the coastline. During Hurricane Ike, the surge moved inland nearly 30 miles in some locations in southeastern Texas and southwestern Louisiana. (National Hurricane Center)

Along the lower basin, from Putnam County to the mouth of the Atlantic Ocean in Duval County, the St. Johns River functions less as a river and more like a lagoon that is strongly influenced by tides from the Atlantic Ocean.

In an attempt to further understand building vulnerability to storm surge, a GIS analysis of Putnam County's parcel database and storm surge zones was completed. Only parcels that have a building value were used in this analysis, as they are inferred as being 'improved' parcels.

The storm surge zones were produced as part of the Statewide Regional Evacuation Study Program for Northeast Florida that was created in 2010. The exhibit below is from 2010 Regional Evacuation Study and illustrates the County's Storm Surge Zones.

Map 1
Putnam County Storm Surge Zones



According to the 2013 Northeast Florida Regional Evacuation Study, the County could receive up to a 14.4 foot storm tide from a Category 5 Hurricane. These surge heights represent the maximum values from the SLOSH model Maximum of Maximums (MOM)

Map 1-Chart
Putnam County Strom Surge Zones – Potential Storm Tide Height

**Storm Strength	Clay	Duval	Flagler	Nassau	Putnam	St. Johns
Category 1	Up to 3.6′	Up to 6.6′	Up to 6.3′	Up to 6.8′	Up to 4.3′	Up to 6.5′
Category 2	Up to 5.6′	Up to 11.0′	Up to 12.6′	Up to 12.2′	Up to 6.7′	Up to 11.9′
Category 3	Up to 9.5′	Up to 19.9′	Up to 18.8′	Up to 16.7′	Up to 9.3′	Up to 19.9′
Category 4	Up to 13.5′	Up to 22.2′	Up to 24.2′	Up to 21.2′	Up to 12.4′	Up to 24.9′
Category 5	Up to 16.3′	Up to 28.2′	Up to 27.3′	Up to 27.7′	Up to 14.4′	Up to 29.6′

**Surge heights represent the maximum values from selected SLOSH MEOWs*
***Based on the category of storm on the Saffir-Simpson Hurricane Wind Scale*

Source: Volume One: Technical Data Report, Chapter IV Regional Vulnerability and Population Analysis, Table IV-1

The tables below show the number of improved parcels in Unincorporated Putnam County as well as the municipalities located in storm surge zones. The tables also provide the associated building value of the improved parcels at risk. The Towns of Interlachen and Pomona Park are not included as, based on the model, they are not vulnerable to Storm Surge.

Table 71 –Building Vulnerability to Surge
Putnam County Unincorporated

STORM SURGE	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK IN EACH SURGE ZONE	BUILDING VALUE OF AT-RISK PARCELS	% AT RISK TOTAL IMPROVED PARCELS
Category 1	**33,409**	2137	$139,143,425	6.4%
Category 2		1919	$129,642,905	5.7%
Category 3		1989	$138,348,481	6.0%
Category 4		1842	$130,999,654	5.5%
Category 5		1657	$122,908,548	5%
CUMULATIVE TOTAL	**33,409**	**9,544**	**$661,043,013**	**28.6%**

Source: GIS analysis based on Putnam County Property Appraiser data and the Northeast Florida Regional Council's 2010 Storm Surge data.

Table 8 – Building Vulnerability to Surge
City of Crescent City

STORM SURGE	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK IN EACH SURGE ZONE	BUILDING VALUE OF AT-RISK PARCELS	% AT RISK TOTAL IMPROVED PARCELS
Category 1	**161**	25	$868,017	15%
Category 2		26	$908,278	16%
Category 3		25	$868,017	15%
Category 4		26	$908,278	16%
Category 5		26	$908,278	16%
CUMULATIVE TOTAL	**161**	**128**	**$4,460,868**	**78%**

Source: GIS analysis based on Putnam County Property Appraiser data and the Northeast Florida Regional Council's 2010 Storm Surge data.

Table 9 – Building Vulnerability to Surge
City of Palatka

STORM SURGE	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK IN EACH SURGE ZONE	BUILDING VALUE OF AT-RISK PARCELS	% AT RISK TOTAL IMPROVED PARCELS
Category 1	**1,323**	32	$2,180,163	2.4%
Category 2		31	$2,213,880	2.3%
Category 3		31	$2,213,880	2.3%
Category 4		34	$2,389,506	2.6%
Category 5		36	$2,582,400	2.7%
CUMULATIVE TOTAL	**1,323**	**164**	**$11,579,829**	**12.3%**

Source: GIS analysis based on Putnam County Property Appraiser data and the Northeast Florida Regional Council's 2010 Storm Surge data.

Table 10 – Building Vulnerability to Surge
Town of Welaka

STORM SURGE	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK IN EACH SURGE ZONE	BUILDING VALUE OF AT-RISK PARCELS	% AT RISK TOTAL IMPROVED PARCELS
Category 1	454	55	$2,331,647	12%
Category 2		28	$1580674	6%
Category 3		27	$1,762,127	5.9%
Category 4		27	$1,762,127	5.9%
Category 5		27	$1,762,127	5.9%
CUMULATIVE TOTAL	**454**	**164**	**$9,198,702**	**36%**

Source: GIS analysis based on Putnam County Property Appraiser data and the Northeast Florida Regional Council's 2010 Storm Surge data.

Tables above show almost 30 percent of improved parcels vulnerable to storm surge. This analysis indicates where best to concentrate mitigation projects and for post disaster redevelopment.

2a. Previous Occurrences

There has been no previous occurrence of storm surge resulting from tropical activity since the last plan update.

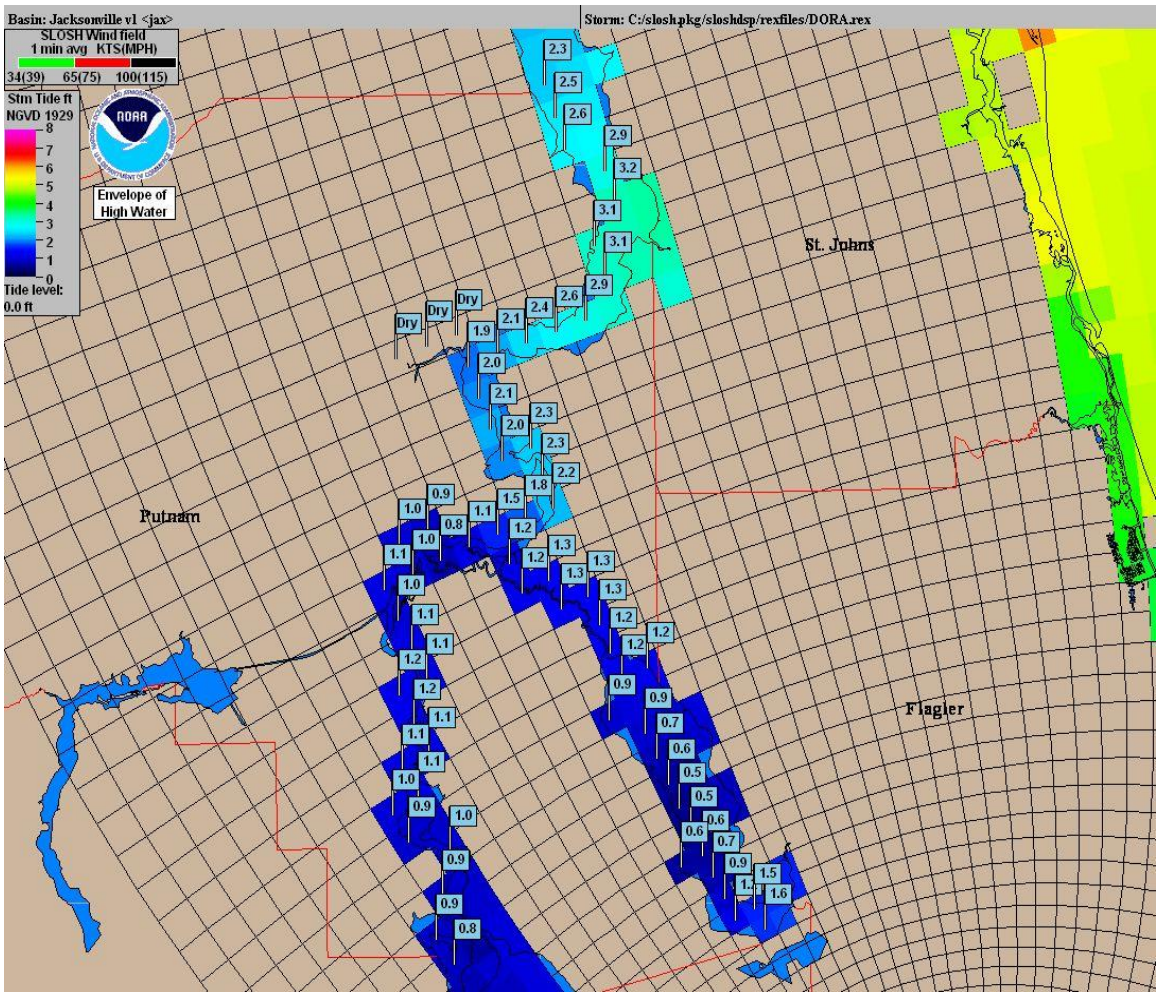
According to NOAA's National Weather Service of Jacksonville *(2009)*, Putnam County has seen 0.5' to 3.2' of storm surge along the St. Johns River as a result of Tropical Storm Fay in 2008 and Hurricane Dora in 1964. Map 1 shows storm surge impacted areas along the St. Johns River in Putnam County by Hurricane Dora.

2b. Vulnerability, Probability, Risk

In Putnam County, areas of particular vulnerability to storm surge are the adjacent shorelines to the St. Johns River and its tributaries, especially in northeastern Putnam County. Palatka, Welaka, and Crescent City will be much more vulnerable than Interlachen and Pomona Park since the former three jurisdictions are located adjacent to the tidally influenced waters of the St. Johns River. Out of these Palatka is more vulnerable than Welaka and Crescent City because of its closer vicinity towards the ocean mouth, its general location/river depth, and since it is not located on a tributary. While it is possible for storm surge to raise over 5 feet in the St. Johns River from a high category hurricane, it is very unlikely based on past trends of mainly receiving between 0.5 – 3.5 feet.

These three jurisdictions associated risks are lower than on coastal counties. Impacts in Putnam County could include damaged piers/boats and possibly some effects to buildings built in close proximity to the St. Johns River, especially in the northern section of the county around the river. The probability of future occurrences that could cause noticeable damages is low because of the historical small-scale storm surge measurements received in Putnam County associated with being over 40 miles away from the river's Atlantic Ocean mouth and from the historical lower probability of strong hurricanes to directly impact the northeast Florida region. If a storm surge were to occur, it would probably happen within hurricane season, between June 1 and November 30.

Map 1
Hurricane Dora Storm Surge Heights in Putnam County



Source: NOAA National Weather Service in Jacksonville, 2009

3. Severe Thunderstorms

When it comes to thunderstorms experienced in the United States, Florida is ranked number one. Out of those thunderstorms experienced, around 10% are considered severe *(NOAA, 2006)*. The National Weather Service *(2007)* said to consider a thunderstorm severe it must encompass one of three traits: produce winds greater than 58 miles per hour, produce hail ¾ of an inch or greater in diameter, or produce tornadoes.

These thunderstorms are created by warm moist air rising into cooler air and have the potential of producing some major associated hazards: *hail, lightning, high winds, flooding, and tornadoes*. High winds, flooding, and tornadoes will be separately addressed within this hazard identification section.

3a. Previous Occurrences

The NOAA National Climatic Data Center was used to query previous occurrences of "Thunderstorm Wind." Between January 1, 1950 and December 31, 2014 there were 185 days reported with "Thunderstorm Wind." On July 20, 2002 one fatality of a 51 year old male occurred while boating during Thunderstorm Wind (and rainfall). According to the event narrative in the database:

> "Bass boat would not start as thunderstorm approached and was taken under tow by a pontoon boat. Bass boat filled with water and sank. Victim could not be located due to low visibility, wind and waves. Victim was not wearing a life jacket."

Since the last LMS update in the last five (5) years, the NCDC data based has recorded 50 incidents of thunderstorms in Putnam County. These thunderstorms have been comprised of thunderstorm wind between 45kts and 60kts. While these thunderstorms have not been documented to cause injury or death, collectively these thunderstorms have been reported to have attributed to at least $15006 in damages. Below are the database details from these events:

Begin Location	Date	Begin Time	Event Type	Magnitude (Kts)
MELROSE	4/19/2015	14:22	Thunderstorm Wind	50
SAN MATEO	4/19/2015	15:45	Thunderstorm Wind	50
HOLLISTER	4/20/2015	14:30	Thunderstorm Wind	50
FLORAHOME	6/12/2015	16:49	Thunderstorm Wind	50
FLORAHOME	6/18/2015	17:10	Thunderstorm Wind	50

CARRAWAY	6/18/2015	17:20	Thunderstorm Wind	50
GRANDIN	6/22/2015	22:00	Thunderstorm Wind	50
MANNVILLE	7/5/2015	15:30	Thunderstorm Wind	50
JOHNSON	7/5/2015	15:40	Thunderstorm Wind	50
MC MEEKIN	7/11/2015	15:00	Thunderstorm Wind	50
GEORGETOWN	7/12/2015	14:35	Thunderstorm Wind	50
FRUITLAND	7/12/2015	14:40	Thunderstorm Wind	50
GEORGETOWN	7/12/2015	14:40	Thunderstorm Wind	50
EAST PALATKA	8/18/2015	17:50	Thunderstorm Wind	45
MC MEEKIN	5/13/2016	17:30	Thunderstorm Wind	50
PALATKA KAY ARKIN AR	5/20/2016	11:54	Thunderstorm Wind	50
PALATKA	5/20/2016	11:54	Thunderstorm Wind	50
FEDERAL PT	5/31/2016	17:30	Thunderstorm Wind	45
CARRAWAY	5/31/2016	17:53	Thunderstorm Wind	50
WELAKA	7/7/2016	16:40	Thunderstorm Wind	60
NASHUA	7/7/2016	16:40	Thunderstorm Wind	50
SAN MATEO	8/1/2016	17:40	Thunderstorm Wind	45
FLORAHOME	1/22/2017	19:00	Thunderstorm Wind	50
PENIEL	6/15/2017	17:05	Thunderstorm Wind	50
PALATKA KAY ARKIN AR	7/10/2017	16:45	Thunderstorm Wind	50
GEORGETOWN	9/1/2017	15:12	Thunderstorm Wind	50
EDGAR	6/4/2018	15:15	Thunderstorm Wind	50

MELROSE	7/22/2018	10:50	Thunderstorm Wind	50
PALATKA KAY ARKIN AR	7/22/2018	11:10	Thunderstorm Wind	50
EAST PALATKA	7/22/2018	11:15	Thunderstorm Wind	50
LUNDY	7/22/2018	11:15	Thunderstorm Wind	50
EAST PALATKA	7/22/2018	11:30	Thunderstorm Wind	50
PENIEL	7/22/2018	11:40	Thunderstorm Wind	50
GEORGETOWN	7/22/2018	11:45	Thunderstorm Wind	50
JOHNSON	7/22/2018	12:35	Thunderstorm Wind	50
FRUITLAND	7/22/2018	12:50	Thunderstorm Wind	50
LAKE COMO	7/22/2018	13:10	Thunderstorm Wind	50
CRESCENT CITY	7/22/2018	13:10	Thunderstorm Wind	50
INTERLACHEN	1/4/2019	14:56	Thunderstorm Wind	40
INTERLACHEN	1/4/2019	14:56	Thunderstorm Wind	40
GRANDIN	4/19/2019	11:30	Thunderstorm Wind	50
FLORAHOME	4/19/2019	11:48	Thunderstorm Wind	50
CRESCENT CITY	4/19/2019	12:00	Thunderstorm Wind	50
HUNTER	5/5/2019	11:13	Thunderstorm Wind	50
SPRINGSIDE	6/4/2019	15:15	Thunderstorm Wind	50
INTERLACHEN	12/14/2019	4:10	Thunderstorm Wind	60
PALATKA KAY ARKIN AR	12/14/2019	4:30	Thunderstorm Wind	50
MANNVILLE	12/14/2019	4:35	Thunderstorm Wind	60
JOHNSON	2/6/2020	22:27	Thunderstorm Wind	55

MANNVILLE	4/14/2020	11:55	Thunderstorm Wind	50

As a result of thunderstorms, Putnam County has faced a number of hail and lightning hazards. Between 1974 and 2014, Putnam County had over 80 reports of hail ¾ of an inch or greater, with the occurrence of diameters being over 2 inches in 1974 *(NOAA NCDC, 200)*. Hail may not cause much damage alone, but it usually occurs in conjunction with other hazards and thus has the possibility of intensifying effects.

Between 1994 and 2007, Putnam County has reported over 15 significant lightning events *(NOAA NCDC, 2009)*. Out of these there were approximately 7 reports of lightning causing building fires, some of which completely destroyed homes and caused injuries. In 1995, boating fatality occurred as a result of a lightning strike in the St. Johns River.

In total over 419 thousand dollars of property damage has been documented by the National Climatic Data Center as result of severe thunderstorm damage in Putnam County.

3b. Vulnerability, Probability, Risk

With severe thunderstorm associated hazards largely being separately addressed in Putnam County's LMS hazard identification section (e.g. high winds, flooding, tornadoes), all of the county and its jurisdictions are vulnerable to severe thunderstorm hazards as a whole. The risk of impacts from hail is relatively low, with the possibility of hail causing damage to car or building windows and small dents on mobile home roofs. The risk of lightning impacts are higher because of the possibility of causing building or forest fires, especially due to the large concentration of the county's residents living in rural wooded areas.

Past records show that thunderstorms have occurred in every month of the year for Putnam County *(NOAA NCDC, 2009)* and that the probability for future occurrences is high. These storms have the potential of causing power outages, localized flooding, destruction or damage to buildings, and can result in loss of life. While severe thunderstorms in Putnam County could have winds over 80 mph, hail bigger than 3 inches, and create numerous tornadoes, it would be very unlikely for thunderstorms to reach this extent based on past trends. Minor damages have occurred from thunderstorms each year within the county *(Putnam County CEMP, 2009)*. All structures are

susceptible to impacts of severe thunderstorms, especially buildings in floodplains and manufactured or mobile homes.

4. High Winds

High winds are strong damaging winds associated with powerful storms such as severe thunderstorms, tropical storms, and hurricanes. In the past, these high velocity winds have caused considerable damage to Putnam County through tree and natural environment destruction, infrastructure and house damage or collapse, downed power lines, and massive amounts of storm generated debris. Table 6 gives part of an estimated wind damage index based on the Saffir-Simpson Scale from the University of Florida as seen through Putnam County's CEMP.

Table 11
Estimated Wind Damage Index

Wind Speed	Damage Description
39-73 mph	No real damage to building structures. Damage to shrubbery and trees.
74-95 mph	Minor damage to building structures. Damage primarily to unanchored mobile homes, shrubbery and trees.
96-110 mph	Roofing material, door and window damage. Considerable damage to vegetation, mobile homes and piers.
111-130 mph	Structural damage to residences and utility buildings with some curtain wall failures. Mobile homes are destroyed.
131-155 mph	Extensive curtain wall failures with some complete roof failure on residences.
above 155 mph	Complete roof failure on residences and many industrial buildings. Some complete building failures with small utility buildings blown away.

Source: Putnam County CEMP, June 2009

To further understand building vulnerability to wind in Putnam County GIS analysis can be applied. The GIS analysis of Putnam County parcels and critical facilities with hazards information yielding numerous results are presented in the discussion below. It is important in mitigation planning to have an assessment of the County's building inventory and its exposure to hazards. This inventory will allow the County to plan for temporary housing needs, assist residents with post disaster repairs and rebuilding, and allow for policy decisions that foster a more sustainable and disaster-resistant community.

Using HAZUS-MH, a scenario was run simulating the damage and loss from the 1968 Hurricane Gladys that made landfall in Northeast Florida as if it were to happen today. Calculated losses include losses from buildings, contents damage and monetary losses resulting from loss of function. The below map shows the storm path of Hurricane Gladys.

Based on the HAZUS-MH default data, which includes Census 2000 tract data and R.S.

Means 2005 building valuations, there are an estimated 33,985 buildings in the County exposed to Hurricane Winds with an estimated dollar exposure of over $8 million dollars. The table below breaks down the figures by occupancy type.

Map 3
HAZUS-MH Scenario – Putnam County Building Stock

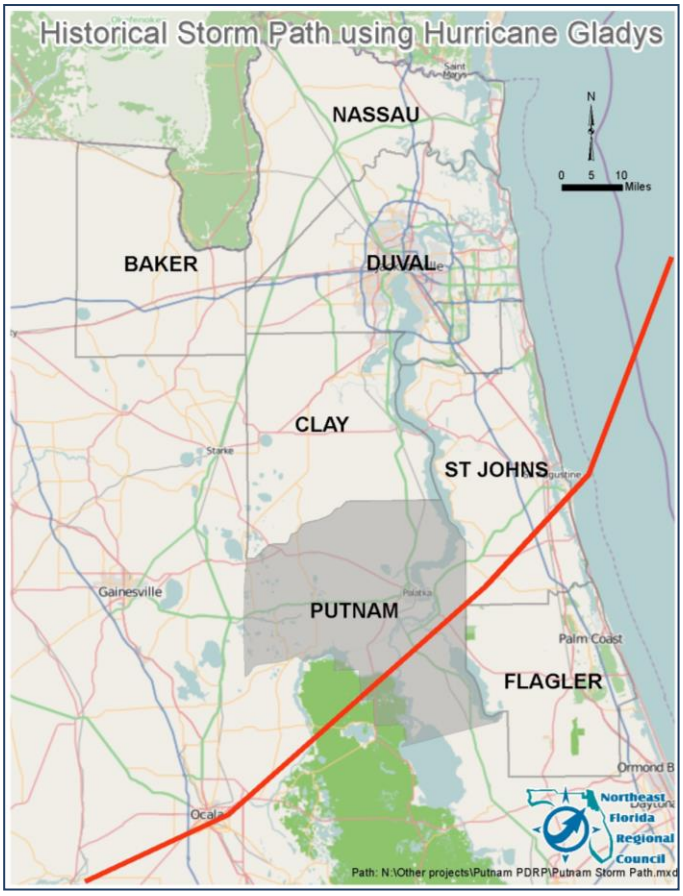


Table 12
Exposed to Hurricane Winds

OCCUPANCY	BUILDING COUNT	DOLLAR EXPOSURE
Agricultural	45	$15,825
Commercial	1001	$748,761
Education	42	$338,745
Government	203	$388,919
Industrial	141	$395,243
Religious	254	$264,383
Residential	32299	$5,895,188
TOTAL	**33985**	**$8,047,064**

Source: HAZUS-MH MR3 data

Table below summarizes the expected building damage in Putnam County by occupancy if the same hurricane was to occur today.

Table 13
Expected Building Damage by Occupancy

	LEVEL OF DESTRUCTION					
OCCUPANCY CLASS	NO DAMAGE	MINOR	MODERATE	SEVERE	DESTROYED	TOTAL
Agriculture	43	2	0	0	0	45
Commercial	947	48	6	0	0	1001
Education	40	2	0	0	0	42
Government	194	8	1	0	0	203
Industrial	134	6	1	0	0	141
Religion	243	10	1	0	0	254
Residential	31316	921	61	1	0	32299
TOTAL	**32917**	**997**	**70**	**1**	**0**	**33985**

Source: HAZUS-MH MR3 data

Table below details the expected economic loss from the Hurricane Gladys if it occurred today. Economic Loss is divided into two categories Capital Stock Losses and Income Losses. Capital Stock Losses include building damage, contents damage, and inventory loss. Income Losses include relocation losses, capital related losses, wage losses, and rental income losses.

Table 14
Direct Economic Losses for Buildings

CAPITAL STOCK LOSSES			INCOME LOSSES				
BUILDING DAMAGE	CONTENTS DAMAGE	WAGE LOSSES	INVENTORY LOSS	RELOCATION LOSS	CAPITAL-RELATED LOSS	RENTAL INCOME LOSSES	TOTAL
$49,541.210	$10,319,510	$37,160	$82,010	$2,027,320	$52,920	$1,285,730	$63,345,860

Source: HAZUS-MH MR3 data

4a. Previous Occurrences

Between the period of 1950 and 2020, Putnam County reported having over 212 thunderstorm/high wind events with winds clocked as high as 65 knots, around 75 mph *(NOAA NCDC, 2009)*. These thunderstorm winds have caused roof damage to mobile homes, sheds, barns, and to an old church in Palatka (including instances where some of these roofs were completely blown off). In 1993, thunderstorm winds damaged 15 homes along SR-315 making this one of the higher reported property damaged caused by thunderstorm winds at $50,000 *(NOAA NCDC, 2009)*. Most damage created by

thunderstorms are from tree branches falling onto power lines and homes/buildings. Only one death and a few injuries in Putnam County have been knowingly caused by thunderstorm high winds, including an injury received in 2008 from a tree falling on a mobile home *(NOAA NCDC, 2009)*. Thunderstorms can also produce the risk of down bursts in Putnam County, which can be as intense as a tornado. Down bursts are short and intense localized downdrafts that can occur along the leading edge of thunderstorms.

Regarding hurricane winds between 1885 and 2020, Putnam County has had over seven events with winds over 74 mph, including winds between 96-110 mph *(NOAA Coastal Services Center, 2009)*. All of these wind events caused damages within the county. In 2001, Tropical Storm Gabrielle downed many trees and power lines in Putnam County resulting in more than 11,000 businesses and homes without power *(NOAA NCDC, 2009).*

4b. Vulnerability, Probability, Risk

With high wind hazards, all of the county and its jurisdictions are vulnerable. Areas of higher topography, areas adjacent to large bodies of water, and areas of certain land use patterns, such as large clear-cuts within the forest, are the most susceptible. Within the county, Interlachen would be the least vulnerable, with Palatka and all shoreline development located adjacent to the St. Johns River being the most vulnerable. Hurricane/tropical storm winds will usually be seen during hurricane season and thunderstorm winds can occur in any month for the county. This timeframe plus past historical events leads Putnam County to have a high probability of future occurrences. Impacts from high winds that have occurred in the county and will occur again are tree and natural environment destruction, infrastructure and house damage or collapse, pier and boat damage, downed power lines, and massive amounts of storm generated debris. While it is possible for the county to receive winds that could destroy mobile homes and cause complete roof failure (category 4 or 5 hurricane winds), it is very unlikely according to past storm trends which have created only minimal building damage with wind speeds less than 110 mph. This hazard overall poses a high associated risk level with the most susceptible structures in the county being manufactured and mobile homes. According to the Northeast Florida Statewide Regional Evacuation Study Program, Putnam County in 2015 has county had 11,413 mobile homes and approximately 32,857 people living in them, making up approximately 47% of the county population in 2015.

5. Flooding

Flooding is a natural occurrence, and only becomes a hazard when the natural floodplains have been altered through urbanization and development. As urbanization increases in the

low-lying areas, property damage and loss of life increase due to flooding. Flooding is a problem in several areas of Putnam County where development has occurred within floodplains. Periodic flooding has been documented in numerous locations in Putnam County. Multiple areas of flooding concern have been identified in the 2006 Putnam County Master Stormwater Plan prepared by Ayers and Associates.

Floodplains are those areas generally associated with small natural streams or other drainage systems that naturally flood following large amounts of runoff generated by short episodes of extremely heavy rainfall, thunderstorm, or during and after a tropical cyclone event. Low lying areas and/or poorly drained land can also accumulate rainfall through ponding on the surface. Major flooding due to tropical cyclones occurs primarily during Hurricane Season. Thunderstorms or other heavy rain events, on the other hand, can cause minor-to-moderate flooding to occur in almost any month of the year. Putnam County's flooding sources include streams, lakes, and wetlands. Flood elevations have not been determined for many of the wetland systems not associated with major streams or lakes. Major streams include the St. Johns River, Ocklawaha River with Rice Creek, Etonia Creek, Dunns Creek, Deep Creek, Trout Creek and their tributaries. Major lakes in the eastern areas of the County include Crescent Lake, Georges Lake, and Lake George.

Putnam County has experienced many minor and major flooding events after continual rainfall, thunderstorms, tropical storms, and hurricanes. On average, Putnam County receives 52 inches of rainfall per year, with a large amount occurring between May and September. According to Florida Division of Emergency Management, as of September 30, 2014, Putnam County has 1,378 NFIP policies that generate $820,322 in annual premiums, resulting in a total insurance coverage of $258,598,000. There are 27 minus-rated policies, which are all located in zone A. There has been $ 1,541,675 in closed paid losses from 127 claims.

Floods in Putnam County are usually caused by rainfall *(Also see the separate section for storm surge information).* These flooding events can occur when excess water from rivers and other bodies of water overflow onto riverbanks and adjacent floodplains. In addition lower lying regions can collect water, as would a bucket, from rainfall and flat, poorly drained land can also accumulate rainfall through sheet flow or ponding on the surface. In many communities flooding can cause severe impacts, thus reinforcing the importance of carrying flood insurance.

In Putnam County some areas are more flood-prone than others. One of the ways of identifying these flood-prone areas is through determining the county's 100- and 500-year floodplains. 100-year floods are calculated to be the level of flood water expected to be equaled or exceeded every 100 years on average, meaning a flood that has a 1% chance of being equaled or exceeded in magnitude in any single year. A 500-year floodplain has a 0.2% chance. A 100-year floodplain would include the areas adjoining a stream, river, or watercourse that would be covered by water in the event of a 100-year flood. Putnam County has 529,383 total acres county-wide and 220,841 acres or 41.7% of acreage in the County is in a floodplain (Census 2000 SF3 (Land & Water Acreage); FEMA (Digital Inventory of Flood Plain Acreage), 2012.

5a. Previous Occurrences

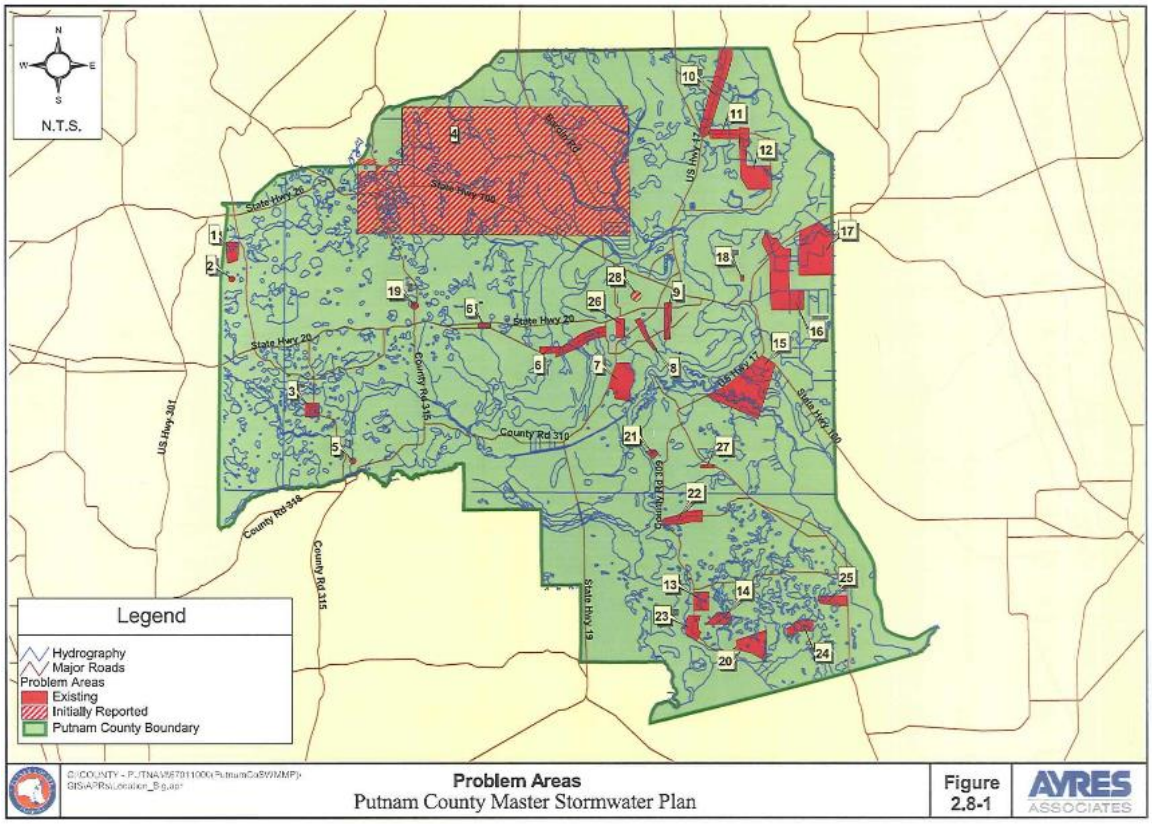
Putnam County has had many minor and major flooding occurrences after continual rainfall, thunderstorms, tropical storms, and hurricanes. Chronic flooding areas on publicly owned infrastructure (roads) have been identified by Putnam County Public Works Department. The Putnam County Master Storm water Plan identifies twenty-eight problem areas have been identified (some already being addressed by the County). Areas of previous flooding occurrence are listed below.

Table 15
Previous Occurrences of Flooding in Putnam County, Fl.

FLOODING AND SEDIMENTATION AREAS

Location # and Name	Description
1. Bellamy Woods Road	(From Price Road 0.3 miles north on Bellamy Road) Flooding problem
1, 2. Price Road	(From Perry Road east to culvert on Price Road) Road floods in these areas
3. Roops Ditch	Overflow for lakes
4. Florahome Drainage [Maintenance performed in 2005 may have addressed this problem]	(Fulton Road at Keystone Road, 309D at Keystone Road, John's Road, Bannerville (dirt) culvert at Coral Farms Road, Bardin drainage included)
5. Orange Springs Shortcut [County is addressing]	Bridge goes under water during moderate rains
6. Old Gainesville Hwy/Hunter Road	Drainage from timber woods
7. Mondex	(Pinellas Road, Park Avenue, Royal Palm Road) roads go under water with medium rainfall
8. Devall Branch	Maintenance problems, water volume increasing steadily, water backs up during moderate rain
9. Twomile Creek	Volume overload, water backs up during moderate rains
10 West Tocoi [will be out for bid soon]	Floods in several places
11. Palmetto Bluff	Water volume problem, road floods
12. Millican Road	Very slow drainage, flooding
13. River Park Subdivision	Road floods during moderate rain
14. Lakeway Drive Drainage	Lakeway Drive drainage
15. San Mateo Road Dunns Creek	Flooding and erosions
16. East Palatka Drainage District	Slow drainage, roads tend to flood
17. Hastings Drainage District (Rector Road) [Culvert has collapsed – Road Closed]	Drains a large area of farm land
18. East River Road (at Camp Road)	Flooding during moderate rain backs up water to Public Works Department
19. County Road 315 at 64th Street	Road under water during moderate rain
20. Whispering Pines	Low area floods during rain
21. Saratoga Harbor [County is currently addressing]	Drains through small lakes and dams
22. County Road 308 B	Area floods during moderate rain
23. County Road 309	Area floods during moderate rain
24. Harris Fish Camp Road	Flat land area
25. Junction Road	Floods during moderate rain
26. Mud Lake/Monroe Creek [County is currently working in this area]	Concern with additional water from SR 20
27. Sisco Road	Road floods during rain, road is lower than surrounding property.
28. Foxwood Outfall [County is currently addressing]	Drains property south of St. Johns Avenue area floods during rain

Map 4
Flood Problem areas in Putnam County



Source: Putnam County Master Stormwater Plan, September 2006

Between April 1, 2015 and June 30, 2020, the NCDC has 6 recorded "flash flood" or "flood" incidents. According to the National Centers for Environmental Information, these events have not resulted in property damage. These incidents are below

Begin Location	Begin Date	Begin Time
Melrose	8/20/2017	1740
Palatka Kay Arkin AR	9/10/2017	2249
San Mateo	10/1/2017	2000
Carraway	10/2/2017	0010
Bostwick	12/14/2018	2051
Kenwood	6/19/2019	1713

Since 1996 Putnam County has had a numerous recorded flooding events and over 10 events where severe road flooding occurred, including closing down parts of the county's major roads: US-17, SR-20, and SR-100 *(NOAA NCDC, 2009)*. Between this time span, local flooding damages have been noted to range from $1,000 to over $10,000 and Florida northeast regional flooding damages have totaled over $500,000. From past flooding events,

As it pertains to number of feet of flood waters possible in the last five years Putnam County Emergency Management has witnessed 1-2 feet of standing water on County roadways from non-cyclone events. Given historical observations and surge data provided by LIDAR models the extent of flooding in Putnam County may be anywhere up to 14.4 feet if a storm surge effect is present.

Palmetto Bluff Road and Millican Road have periodically flooding. Palmetto Bluff Road floods in three locations between its intersection with Millican Road and the Town of Bostwick. Millican Road floods beginning one-half mile south of the Millican/Palmetto Bluff Road intersection and extends south for approximately one-half mile. There is also an erosion problem at the Millican/Palmetto Bluff Road intersection (Putnam County Comprehensive Plan, 2010).

Specifically in Putnam County frequent flooding has been documented to occur in the River Park subdivision of Putnam County when Lake Laverne, Lake Maxine and a third un-named lake stage up and flow west through an undersized ditch and culvert crossing at Lake Drive. Another area that experiences periodic flooding is around Mud Lake. Flooding occurred on Red Fox Trail immediately north of S.R. 19, Karen Place and Karen Court south of S.R. 19. Karen Place and Karen Court are in the Fox Trail Subdivision. At least one home in the Fox Trail subdivision flooded during the hurricanes of 2004, and numerous other homes experienced yard flooding. There were more than six inches of standing water over the road. Local flooding has been reported in the Whispering Pines subdivision. Roads and occasional yard flooding occurs even during moderate rainfall events. The cause is predominantly from erosion of dirt roads. CR 315 floods near the intersection with 64th Street. There is a drop in elevation where the road curves to the right around Mariner Lake. Dirt roads draining to CR 315 cause sediment to clog roadside swales along CR 315, which is a major cause of flooding at this location. Another area with flooding problems is known locally as the Mondex Subdivision, which is located south of Palatka and north of the Barge Canal between S.R. 19 and Stokes Landing Road. This area consists of low-density residential development with numerous privately owned dirt roads and flooding is a recurring problem here. Roads, yards, and structure flooding has occurred in the subdivision on an annual basis (Putnam County Comprehensive Plan, 2010).

Flooding in East Palatka occurs where SR 207 crosses Dog Branch. Large deposits of sediment accumulate at this location, which causes severe loss of conveyance capacity, and the water has been seen at the edge of the highway pavement. Flooding at the County Public Works Facilities on Putnam County Boulevard and various low areas have been reported by the County. The parking lots, the clay and limerock stockpile area and the maintenance garage are flooded on average twice per year. Flooding occurs due to a relatively large watershed discharging through an undersized outlet under East River Road. (Putnam County Comprehensive Plan, 2010).

In 1996, flooding submerged a mobile home on a creek off of SR-207 near Orange Mills where four people had to evacuate. In 1997, some areas of Putnam County reported water

being as deep as 20 feet in low-lying spots. In 2002 a fatality occurred when a man's bass boat flooded with rainwater and sank *(NOAA NCDC, 2009)*.

Recently, in May 2009, after receiving between 10 to 20 inches of rain in less than a week, flooding caused extensive crop damages in Putnam County with many fields under water in the middle of the harvest season. Putnam County was included in a three-county area, along with Volusia and Flagler, where flooding was estimated to cause $45 million dollars in crop damage *(Orlando Sentinel and Gainesville Sun, May 2009)*. Also, according to Putnam County Emergency Management *(2009)*, out of the approximate 250 linear miles of dirt roads in the county, this flood caused damage to an estimated 60-80%

With regard to residential development in the floodplain, Article 6, Section 6.05 of the Putnam County Land Development Code, establishes standards for construction in areas of special flood hazard. The areas of special flood hazard are those areas identified as category A, AO, AH, A1 through A30, AE, and A-99 of the on the latest available Flood Insurance Rate Map (Putnam County Comprehensive Plan, 2010).

To determine the vulnerability of the County's building stock to freshwater flooding, a GIS analysis was performed utilizing the recently updated FEMA Flood zone data and the consistently utilized parcel database, which was provided by the County. FEMA defines four types of risk areas in their flood zone designations: moderate to low risk areas, high risk areas, high-risk coastal areas and undetermined risk areas. For purposes of the National Flood Insurance Program (NFIP), which Putnam County participates in, only the high-risk areas and high risk coastal areas have mandatory flood insurance purchase requirements. As such, the high-risk areas are utilized in the analysis. This high-risk area, which includes the A, AE, and AE Floodway zones, is also known as the 100 Year Flood zones.

The table below shows the number of improved parcels in Unincorporated Putnam County and its municipalities that are located in the flood zone high-risk areas. Unincorporated Putnam County has the greatest building value at risk to the 100 Year Flood Zones, with 21,597 parcels in the high-risk flood zones and 26 percent of the improved parcels impacted at a total value of $548,585,910.

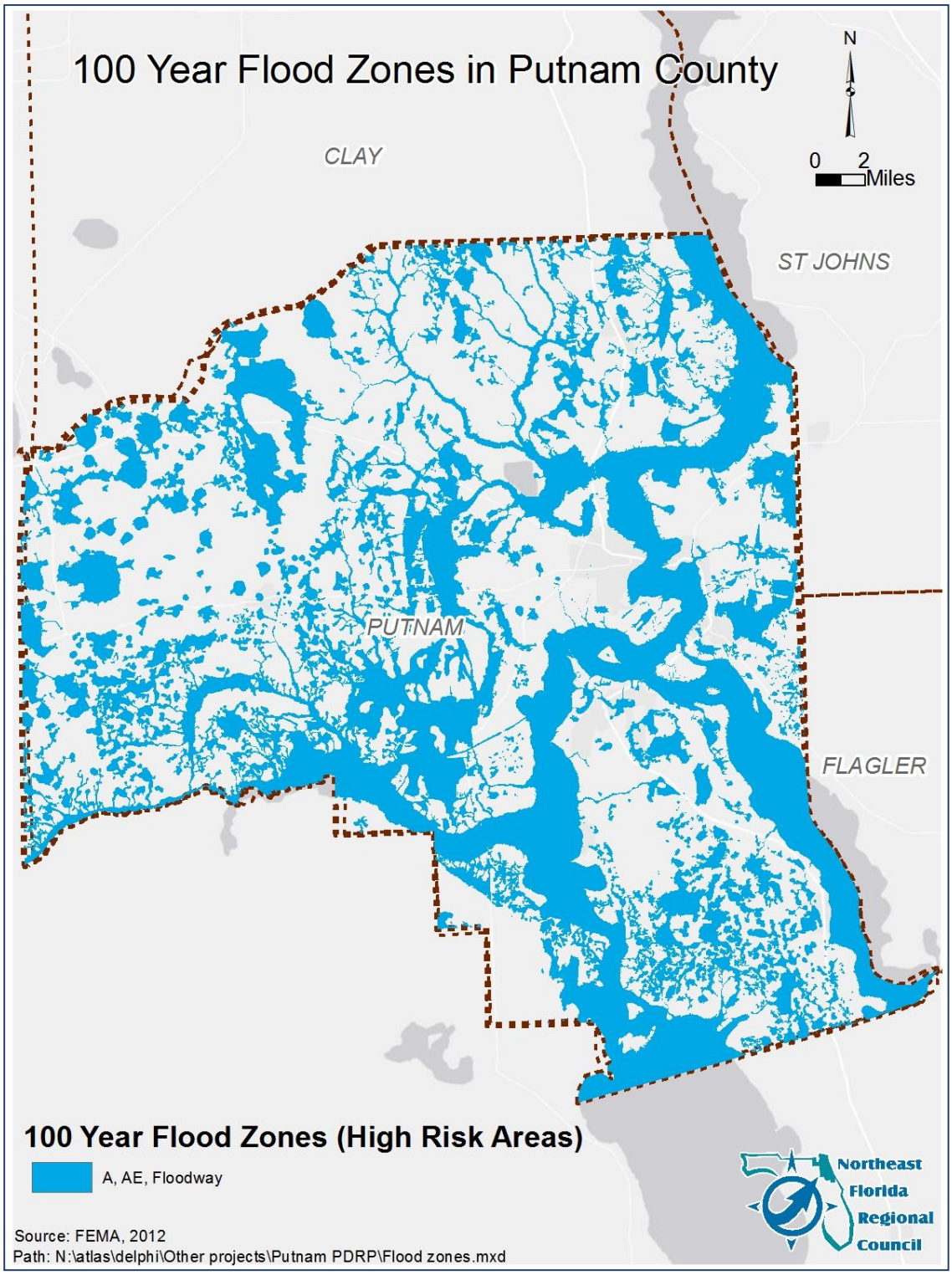
Table 14
Direct Economic Losses for Buildings

HIGH RISK FLOOD ZONES				
	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK	PERCENTAGE OF IMPROVED PARCELS	BUILDING VALUE OF AT-RISK PARCELS
Unincorporated Putnam County	33,409	8,606	26%	$548,585,910
Crescent City	161	106	66%	$4,137,287

Interlachen	1187	247	21%	$8,814,808
Palatka	1323	43	3%	$2,645,226
Pomona Park	411	74	18%	$3,753,402
Welaka	454	111	24%	$3,814,927

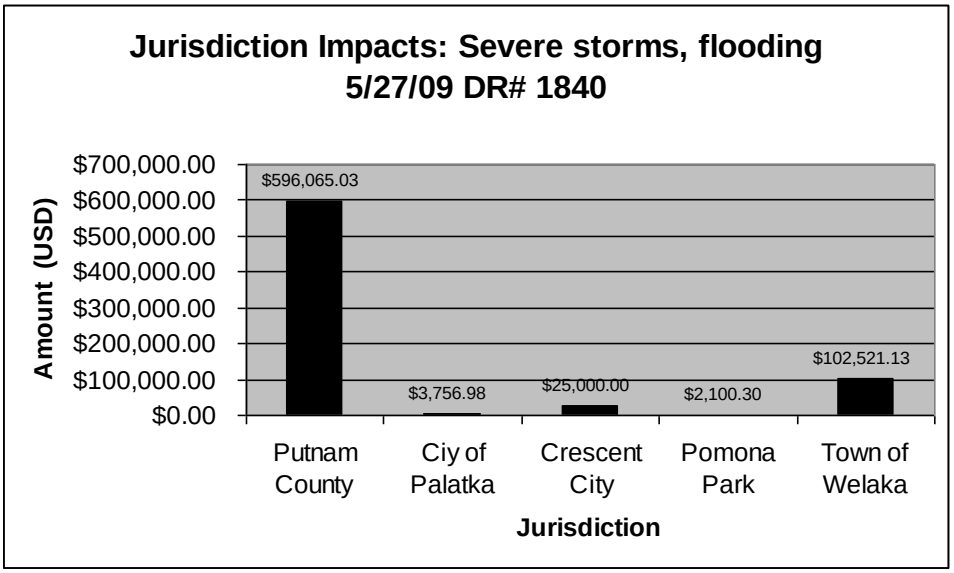
Map – 100-Year Flood Zones in Putnam County

Map 5
FEMA 100 Year Flood Zones Putnam County, Fl.



Graph 5 below provides additional detail regarding the impact that flooding has had on various "jurisdictions" within Putnam County. Previous flood hazard impacts can be measured in regard to dollar-based damage estimates from the previous hazard event. To address dollar-based impacts to individual jurisdictions in Putnam County, Putnam County Emergency Management has researched FEMA/FDEM Public Assistance information and submits the following information chart that may attempt to identify the impact of flooding on individual jurisdictions. The impact is measure in the amount of United States dollars of FEMA Public Assistance obligated to each eligible jurisdiction that applied to receive Public Assistance.

Graph 5
Jurisdictional Impacts from Severe Flooding Event in Putnam County 2009



5b. Vulnerability, Probability, Risk

In Putnam County, flooding is an issue because approximately 1/3 of the county and around 20% of the county's population are within the 100-year floodplain *(Putnam County CEMP, 2009)*. Parts of the county and parts of every jurisdiction are vulnerable to flooding, especially parts of Palatka, lands adjacent to the St. Johns River and its tributaries, land adjacent to some lakes, and some low lying areas. Putnam County Planning and Development Services Department reports that between August 17, 2015 and August 21, 2014 there has been 483 structures permitted in the SFHA area. Also, all jurisdictions have some acreage located in the 100-year flood zone. Within the county, bank overflowing and pooling are the most common types of flooding due to the number of small lakes and swampy areas along the waterways *(Putnam County CEMP, 2009)*. This is important to know since, according to the Putnam County Building and Zoning Department *(May 2009)*, the county has approximately 10,732 homes in the 100-year floodplain (zones A & AE), 645 homes in the 500-year floodplain (zone X500), 4,416 mobile homes in the 100-year floodplain, and 255 mobile homes in the 500-year

floodplain. These residences, especially the mobile homes, could potentially feel the impacts of flooding.

In addition to the impact on structures, flooding can cause impacts to agriculture, utilities, can spread hazardous chemicals, and disrupt transportation networks. The Putnam County Farm Bureau *(2009)* states that out of natural threats like freezes and droughts, flooding has caused the most agricultural damage to the county. Also, according to Putnam County Emergency Management (2009), floods disrupt traffic and cause damage to the roads, thus putting travelers at risk by disrupting the flow of traffic. This is one of the county's main concerns when it comes to flooding because of past trends from road washouts.

As previously stated, flooding from hurricanes/tropical storms are most likely to occur during hurricane season, and thunderstorm and rain related flooding can occur in any month. Typically at least minor flooding has occurred almost every year in the county. This presents the probability of future occurrences to be higher. Table 7 itemizes the Areas and Roads of Flooding Concern for Putnam County as deemed by the CEMP and past trends. See Appendix C for a more detailed analysis of flooded roadways. While it is possible for the county to receive 500-year floods that cause vast structure damage due to water accumulation from extremely strong storms and continuing precipitation events, it would be less common.

Table 16
Areas and Roads of Flooding Concern for Putnam County (2009)

Community of Putnam Hall	State Road 100
Community of Grandin	US 17
Community of Welaka	Crill Avenue
Community of Florahome	Manning Grade Road
Rice Creek Flood Area	Paradise Point Road
St. Johns River Area	Payne Road subdivision
City of Palatka, notably Reid St.	Elsie Drive
State Road 26	Port Comfort Road

Source: Putnam County CEMP & Emergency Management, 2009

6. Tornadoes

Out of all the natural hazards, tornadoes have been known to cause some of the greatest losses of life as well as millions of dollars in property damage annually. These violently rotating columns of air have historically caused a large number of deaths in the state of Florida. For Putnam County, the majority of tornadoes are most likely to occur as a result of thunderstorms and hurricanes/other cyclonic activity. According to NOAA NHC *(2009)*, studies show that more than half of landfall hurricanes produce at least one tornado. These typically occur in the right-front quadrant of the hurricane. Tornado production can also occur for days after hurricane landfall due to remnants of low-pressure circulation.

According to the State of Florida Hazard Mitigation Plan, Florida has two tornado seasons. The summer tornado season runs from June until September and has the highest frequencies of storm generation, with usual intensities of EF0 or EF1 on the Enhanced Fujita Scale. This includes those tornadoes associated with land-falling tropical cyclones.

The deadly spring season, from February through April, is characterized by more powerful tornadoes because of the presence of the jet stream. When the jet stream digs south into Florida and is accompanied by a strong cold front and a strong squall line of thunderstorms, the jet stream's high-level winds of 100 to 200 mph often strengthen a thunderstorm into what meteorologists call a "supercell" or "mesocyclone." These powerful storms can move at speeds of 30 to 50 mph, produce dangerous downburst winds, large hail, and usually the most deadly tornadoes.

Unlike hurricanes, which produce wind speeds of similar values over relatively widespread areas (when compared to tornadoes), the maximum winds in tornadoes are often confined to extremely small areas and vary tremendously over very short distances, even within the funnel itself.

The Enhanced Fujita Tornado Scale, (or the "EF Scale"), is the definitive scale for estimating wind speeds within tornadoes based upon the damage done to buildings and structures since 2007. Prior to 2007, the Fujita Scale for tornado was used for measurement.

According to NOAA's Storm Prediction Center, the original F-Scale revealed the following weaknesses:

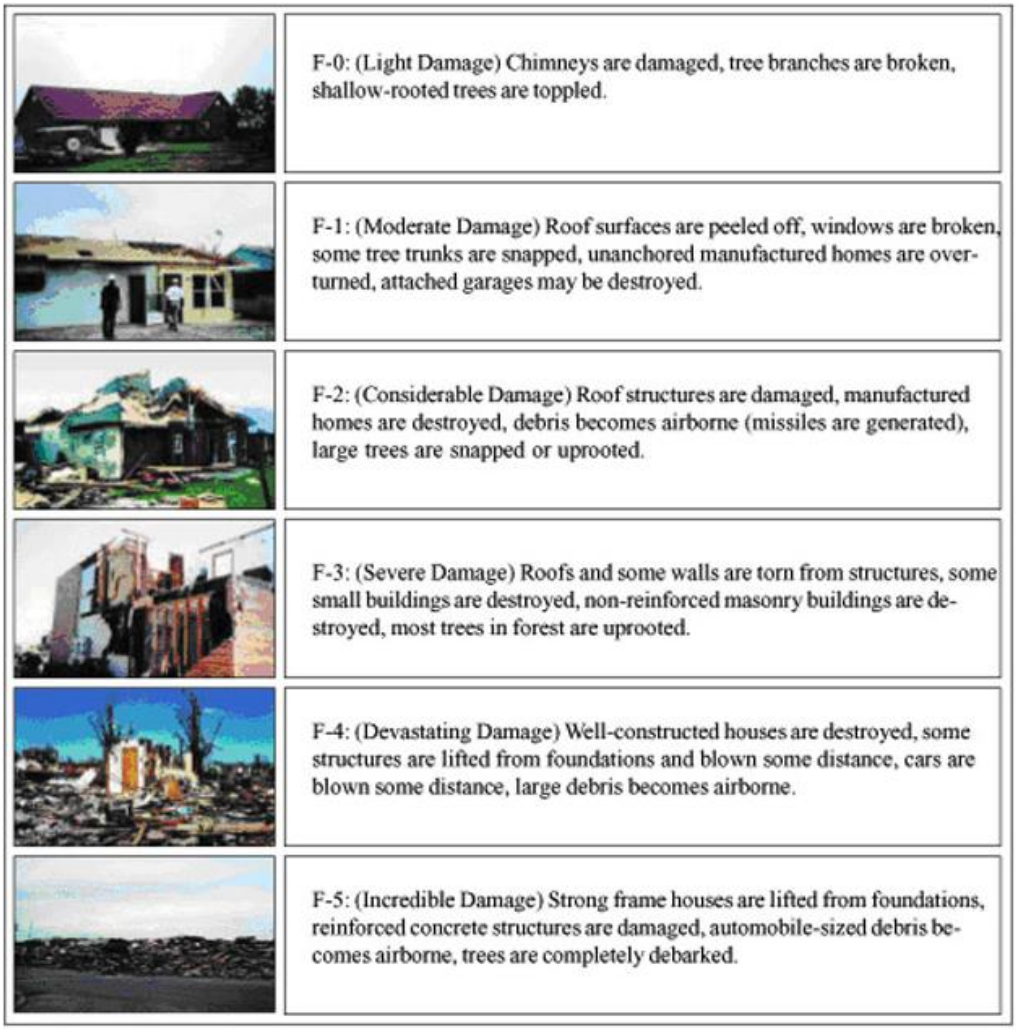
- It is *subjective* based solely on the damage caused by a tornado
- No recognition in difference in construction
- Difficult to apply with no damage indicators
    - If the 3/4-mile wide tornado does not hit any structures, what F-scale should be assigned?
- Subject to bias
- Based on the worst damage (even if it is one building or house)
- Overestimates wind speeds greater than F3

Given the weakness above presently, the Enhanced Fujita Tornado Scale (EF Scale) is used extensively by the NWS in investigating tornadoes (all tornadoes are now assigned an EF Scale number), and by engineers in correlating damage to buildings and techniques with different wind speeds caused by tornadoes. Table 16 outlines the Fujita Scale, the derived EF Scale and the operational EF Scale. Though the Enhanced Fujita scale itself ranges up to EF28 for the damage indicators, the strongest tornadoes max out in the EF5 range (262 to 317 mph). The chart below identifies the comparison between the Fujita Scale and the Ehanced Fujta Scale that has been in use since 2007.

Table 16
Fujita Scale vs. Enhanced Fujita Scale for Tornadoes.

Fujita Scale		Enhanced Fujita Scale* * In use since 2007	
F–0	40–72 mph winds	EF–0	65–85 mph winds
F–1	73–112 mph	EF–1	86–110 mph
F–2	113–157 mph	EF–2	111–135 mph
F–3	158–206 mph	EF–3	136–165 mph
F–4	207–260 mph	EF–4	166–200 mph
F–5	261–318 mph	EF–5	>200 mph

Enhanced Fujita Scale



Source: NOAA, http://celebrating200years.noaa.gov/magazine/tornado_forecasting/figure7.html

6a. Previous Occurrences

According to data provided by NOAA NCDC *(2014)*, Putnam County has had 41 recorded tornadoes incidents between August 1, 1950 and June, 2020. There has not been a confirmed tornado in Putnam County since June, 2010. Total property damage estimates since 1950 from tornado have been estimated at $3,602,000. However, according to NOAA's NCDC Putnam County has not experienced a tornado touchdown since 2010. Over this period there have been multiple occasions where a tornado watch or warning has been issued but no confirmed tornado, The magnitude of tornados in Putnam County have ranged from F0-F2. According to the Tornado History Project the longest tornado path in Putnam County resulting from a tornado was 39 miles and the widest path was 350 yards. Below is a chart that lists all NCDC reports of previous occurrences of tornados in Putnam County:

BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	TOR_F_SCALE	DAMAGE_PROPERTY_NUM
6/8/1957	1455	Tornado		30
10/4/1966	1735	Tornado	F1	0
10/4/1966	1900	Tornado		0
5/22/1967	1315	Tornado	F2	25000
4/4/1973	515	Tornado	F2	250000
4/11/1975	830	Tornado	F1	25000
5/15/1976	730	Tornado	F0	25000
8/10/1976	1651	Tornado	F0	0
6/15/1977	1445	Tornado	F0	2500
6/17/1977	1830	Tornado	F1	25000
12/5/1977	1230	Tornado	F2	250000
5/1/1978	1730	Tornado	F0	250
5/1/1978	1730	Tornado	F0	2500
5/4/1978	1155	Tornado	F0	2500
6/3/1978	1424	Tornado	F0	250
9/29/1979	1415	Tornado	F0	0
2/24/1980	1400	Tornado	F1	25000
6/22/1980	1100	Tornado	F1	250000
7/14/1980	1755	Tornado	F0	0
6/16/1982	1400	Tornado	F0	25000
4/9/1983	1400	Tornado	F1	25000
8/11/1987	1630	Tornado	F0	0
12/15/1987	1300	Tornado	F0	2500
6/15/1989	1834	Tornado	F0	25000
8/6/1990	1835	Tornado	F0	2500
3/3/1991	923	Tornado	F1	2500000
6/9/1994	1815	Tornado	F0	5000
7/2/1994	1500	Tornado		50000
8/14/1994	200	Tornado	F0	0
8/3/1995	1115	Tornado	F0	1000
2/2/1996	1815	Tornado	F0	20000
6/14/1996	1600	Tornado	F0	10000
10/7/1996	1614	Tornado	F0	65000
2/22/1998	1545	Tornado	F0	4000
1/2/1999	2315	Tornado	F0	35000
3/29/2001	1117	Tornado	F0	0
9/14/2001	1621	Tornado	F0	0
9/5/2004	1413	Tornado	F0	0
9/5/2004	1750	Tornado	F0	0
9/7/2004	945	Tornado	F0	0

6/21/2005	1526	Tornado	F0	0
7/26/2006	1818	Tornado	F1	0
8/23/2008	1653	Tornado	EF0	0
6/20/2010	1655	Tornado	EF0	0

According to the NCDC, two direct deaths and sixteen direct injuries have resulted from Tornados in Putnam County. One fatality was documented by NOAA NCDC in Bostwick on February 2, 1996 when a F0 tornado traveled 6.5 miles and caused a tree that fell on a resident's porch killing a 63 year old male. The other tornado fatality documented by the NCDC was in 1977. The NCDC narrative pertaining to this F2 tornado that traveled 9.4 miles and was 40 yards wide included the following:

> *"A large tornado first touched down about 4 miles west of Palatka and moved east northeast through Palatka, across the St. Johns River and moved into the town of East Palatka, where the last damage was reported. A commercial fisherman in a small boat was drowned and there were a number of minor injuries. Once man was seriously hurt when a boating marina collapsed on him. A total of 60 homes and a number of businesses had roof damage. A historic boat and marina was destroyed along with a number of homes. The Palatka High School football stadium had extensive damage. Total damage was estimated at nearly $500,000."*

Table 9 provides a summary of their Fujita Scale sizes. During this time frame, a number of injuries were reported and two fatalities from tornado effects occurred, including a tree branch that crashed through a porch in 1996 (NOAA NCDC, 2009). In Putnam County, the majority of tornadoes have been seen to move from southwest to northeast and that the bulk of them usually occur on the county side west of the St. Johns River *(Tornado History Project & Putnam County CEMP, 2009).*

Table 18
Tornado Occurrences in Putnam County (August 1950-December2019)

F0	*F1*	*F2*	*F3*	*F4*	*F5*
30	8	3	0	0	0

Source: Tornado History Project & NOAA NCDC, 2014

6b. Vulnerability, Probability, Risk

All of Putnam County and its jurisdictions are vulnerable to tornado hazard, with the western central portion of the county and its jurisdictions of Interlachen and Palatka, possibly being more vulnerable. This hazard could occur during any time of the year but

is more prevalent during time periods with stronger thunderstorms and during the hurricane season. The most common, usually less destructive, tornadoes are warm weather tornadoes that occur between May and August. Cool season tornadoes are usually the more destructive, occurring between December and April *(Putnam County CEMP, 2009)*. Impacts of tornadoes can include roof damage, power outages, blown down signage, massive amounts of debris, uprooting trees, debris missile launching, and in very bad tornadoes, well-constructed buildings can be completely destroyed.

The biggest threats of tornado impacts to Putnam County are hits to critical facilities, densely populated areas, and the county's vast amount of mobile homes. With this being said, a tornado or a series of tornadoes could affect 20% of the county's population if it occurred in a heavily populated area like Palatka *(Putnam County CEMP, 2009)*. Overall, this hazard poses a high associated risk level to the most susceptible structures of manufactured and mobile homes. According to the Northeast Florida Housing Report (Fall, 2008), in 2000 the county had 14,935 mobile homes with approximately 32,857 people living in them, making up approximately 47% of the county population in 2000.

7.Wildfires

Putnam County is an urbanizing rural county with a large percentage of its land area still covered in forest. The presence of these uncontrollable fires that spread by consumption of vegetative fuels and any other flammable materials in its path is common, making many areas of Putnam County susceptible to wildfires. These wildfires, which occur many times in drought periods, can start from items such as lightning strikes, arson, and escaped yard debris burns. One way of measuring the potential for wildfires is for the county to keep their eyes on the Keetch-Byram Fire Drought Index for wildfires likelihood. This index is a scale between 0 *(no drought)* and 800 *(severe drought)*.

To better understand building vulnerability to wildfire in Putnam County GIS analysis was used to review total number of improved parcels that intersect with risk data/classifications identified by the Division of Forestry.

Tables below show the total number of parcels with building values ('improved parcels') that intersect with 'High' or 'Very High' wildfire risk areas. Also included in the tables are the building values associated with those at-risk parcels. The data includes unincorporated Putnam County as well as the four municipalities.

Table 19
Wildfire Risk - Unincorporated Putnam County

	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK	PERCENTAGE OF IMPROVED PARCELS	BUILDING VALUE OF AT-RISK PARCELS
High	33,409	13,192	39%	$889,842,787
Very High		16,624	50%	$961,652,505
TOTAL		**29,816**	**89%**	**$1,851,495,292**

Table 20
Wildfire Risk- City of Crescent City

	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK	BUILDING VALUE OF AT-RISK PARCELS	% OF TOTAL IMPROVED PARCELS
High	161	31	$1,432,112	19%
Very High		130	$6,004,456	81%
TOTAL		**161**	**$7,436,568**	**100%**

Table 21
Wildfire Risk - Town of Interlachen

	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK	BUILDING VALUE OF AT-RISK PARCELS	% OF TOTAL IMPROVED PARCELS
High	1,187	409	$16,639,974	34%
Very High		368	$15,358,354	31%
TOTAL		**777**	**$31,998,328**	**65%**

Table 22
Wildfire Risk- City of Palatka

	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK	BUILDING VALUE OF AT-RISK PARCELS	% OF TOTAL IMPROVED PARCELS
High	1,323	165	$6,680,485	12%
Very High		550	$30,021,851	42%
TOTAL		**715**	**$36,702,336**	**54%**

Table 23
Wildfire Risk- Town of Pomona Park

	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK	BUILDING VALUE OF AT-RISK PARCELS	% OF TOTAL IMPROVED PARCELS
High	411	170	$8,509,753	41%
Very High		241	$27,281,629	59%
TOTAL		**411**	**$35,791,382**	**100%**

Table 24
Wildfire Risk- Town of Welaka

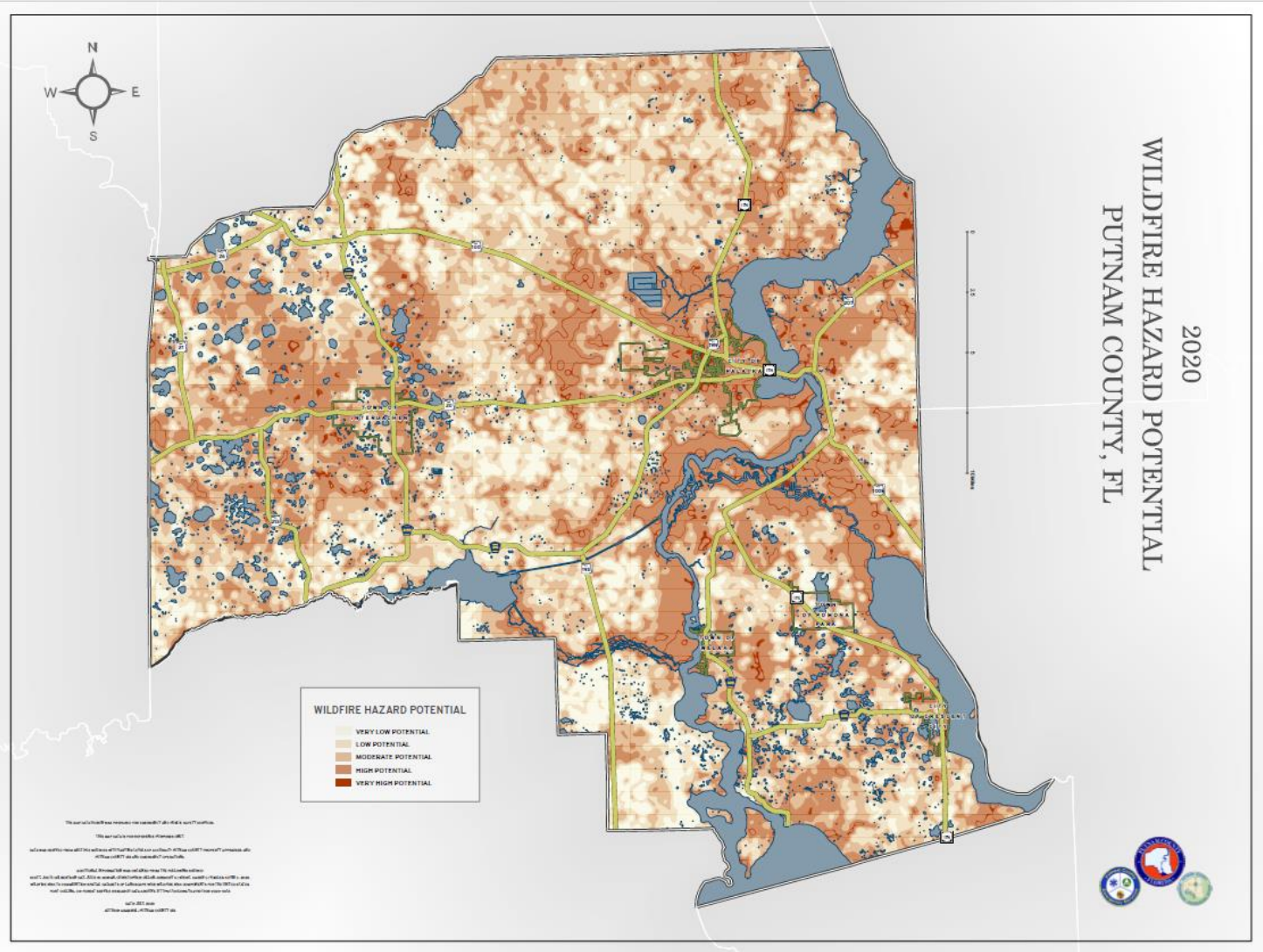
	TOTAL NUMBER OF IMPROVED PARCELS	IMPROVED PARCELS AT RISK	BUILDING VALUE OF AT-RISK PARCELS	% OF TOTAL IMPROVED PARCELS
High	454	94	$6,942,413	21%
Very High		360	$18,637,933	79%
TOTAL		**454**	**$25,580,346**	**100%**

Source (all tables 14-19): GIS analysis based on Putnam County Property Appraiser data and the Division of Forestry Wildfire Risk Data.

In summary, the entire county is very vulnerable to wildfires, with close to 90% of unincorporated Putnam County with some level of high or very high fire risk. There is a high value associated with the structures at risk as well. In Putnam County, there is an almost $1.9 billion dollars of building value is at risk. Overall, wildfire is one of the greatest vulnerabilities in Putnam County.

The high-risk areas are located in residential districts located in the wild land/urban interface, or where structures and other human development meet or intermingle with undeveloped wild land or vegetative fuels. It is where wild land vegetation and urban encroachment co-exist, but neither one dominates. Fires that start in these areas can be dangerous because they can easily spread through developed areas.

Map 6
Wildfire Risk in Putnam County



7a. Previous Occurrences

According to the Florida Forest Management Information System *(June 2020)*, between July, 2014 and June 2020, Putnam County has had 447 wildfires and 3,672.9.acres burned. During this span there has been no recorded property damage.*).* The below chart lists previous occurrence of wildfire fires as reported by the Florida Department of Forestry from7/2014- 6/2020:

FIRE START DATE	Acreage
7/2/2014	1.5
7/3/2014	0.5
7/3/2014	2.0
7/3/2014	0.1
7/3/2014	0.1
7/25/2014	0.5
8/9/2014	0.8
8/21/2014	3.0
8/24/2014	0.5
9/21/2014	1.0
9/28/2014	0.1
10/10/2014	0.1
10/11/2014	0.5
10/18/2014	15.0
10/22/2014	0.1
10/25/2014	5.0
10/30/2014	2.0
11/1/2014	5.0
12/9/2014	0.5
12/14/2014	4.0
1/30/2015	0.8
2/13/2015	0.1
2/14/2015	0.5
2/16/2015	0.5
2/21/2015	2.0
3/13/2015	2.0
3/17/2015	5.0
3/22/2015	0.1
3/30/2015	2.0
3/30/2015	0.3
4/3/2015	0.1
5/4/2015	15.0
5/5/2015	0.5

5/7/2015	0.1
5/8/2015	0.5
5/12/2015	10.0
5/12/2015	1.5
5/13/2015	0.5
5/19/2015	0.1
5/23/2015	1.0
5/23/2015	2.0
5/27/2015	1.0
5/29/2015	0.1
6/1/2015	6.0
6/1/2015	0.1
6/1/2015	20.0
6/1/2015	15.0
6/1/2015	6.0
6/3/2015	6.0
6/4/2015	12.0
6/4/2015	0.1
6/5/2015	0.1
6/6/2015	0.5
6/8/2015	1.7
6/10/2015	0.1
6/12/2015	51.0
6/14/2015	10.0
6/14/2015	25.0
6/17/2015	0.5
6/18/2015	1.0
6/19/2015	0.1
6/19/2015	0.5
6/19/2015	2.0
6/20/2015	2.0
6/20/2015	1.0
6/21/2015	0.1
6/21/2015	0.5
6/22/2015	0.5
6/22/2015	2.0
6/22/2015	3.4
6/22/2015	2.3
6/22/2015	0.1
6/23/2015	2.0
6/23/2015	0.1
6/23/2015	0.1

6/24/2015	3.0
6/24/2015	0.3
6/24/2015	0.3
6/25/2015	0.1
6/27/2015	0.1
6/29/2015	0.1
7/6/2015	9.9
7/6/2015	0.5
7/7/2015	6.0
7/9/2015	3.0
7/10/2015	2.0
7/11/2015	4.0
7/11/2015	0.3
7/11/2015	55.0
7/11/2015	5.0
7/11/2015	3.0
7/13/2015	0.1
7/17/2015	0.1
7/21/2015	7.0
7/24/2015	0.1
8/13/2015	0.1
8/21/2015	0.3
10/16/2015	0.1
11/14/2015	0.1
11/14/2015	0.1
12/8/2015	0.1
1/19/2016	0.5
2/6/2016	2.0
2/9/2016	0.5
2/9/2016	4.0
2/9/2016	8.0
2/10/2016	1.0
2/12/2016	30.0
2/12/2016	2.0
2/22/2016	0.3
2/27/2016	0.1
2/27/2016	0.5
2/28/2016	2.3
2/28/2016	0.5
2/28/2016	1.0
2/28/2016	1.0
2/29/2016	0.6

3/1/2016	250.0
3/2/2016	5.0
3/3/2016	0.3
3/3/2016	0.5
3/3/2016	0.1
3/5/2016	1.0
3/5/2016	1.0
3/6/2016	5.0
3/6/2016	3.0
3/6/2016	2.0
3/6/2016	3.0
3/7/2016	5.0
3/9/2016	4.0
3/10/2016	15.0
3/12/2016	13.0
3/15/2016	2.0
3/15/2016	3.0
3/15/2016	0.3
3/15/2016	0.5
3/16/2016	75.0
3/23/2016	11.0
3/31/2016	0.5
4/6/2016	2.0
4/9/2016	6.0
4/9/2016	0.5
4/10/2016	3.0
4/17/2016	0.1
4/20/2016	0.5
4/23/2016	25.0
4/24/2016	5.0
4/26/2016	0.1
5/2/2016	250.0
5/2/2016	2.0
5/2/2016	1.5
5/2/2016	0.5
5/5/2016	2.0
5/14/2016	0.3
5/25/2016	0.5
5/26/2016	5.0
5/30/2016	4.0
5/30/2016	3.0
5/31/2016	0.3

6/5/2016	2.0
6/5/2016	4.0
6/5/2016	3.0
6/5/2016	2.5
6/10/2016	0.3
6/13/2016	5.0
6/15/2016	0.1
6/19/2016	2.0
6/20/2016	0.3
6/27/2016	5.0
7/7/2016	0.8
7/7/2016	6.0
7/11/2016	0.1
7/12/2016	0.1
7/12/2016	0.3
7/13/2016	5.0
7/14/2016	2.7
7/14/2016	0.1
7/16/2016	0.1
7/17/2016	3.0
7/17/2016	10.0
7/18/2016	0.8
7/18/2016	0.1
7/19/2016	23.0
7/23/2016	0.1
7/25/2016	1.0
7/27/2016	16.5
7/27/2016	3.0
7/27/2016	3.5
7/30/2016	2.0
7/30/2016	2.5
7/30/2016	0.3
7/31/2016	2.0
8/1/2016	0.1
8/2/2016	1.5
8/3/2016	0.1
8/8/2016	0.3
8/13/2016	0.3
8/22/2016	0.1
8/24/2016	10.5
8/29/2016	5.0
8/29/2016	12.0

9/16/2016	0.3
9/17/2016	49.0
10/2/2016	0.3
10/9/2016	0.1
10/14/2016	5.0
10/29/2016	1.0
11/11/2016	0.3
11/16/2016	0.8
11/17/2016	0.3
11/20/2016	0.3
11/23/2016	0.1
11/24/2016	1.5
11/24/2016	0.2
11/27/2016	1.0
11/29/2016	1.0
11/29/2016	0.1
11/29/2016	0.8
12/29/2016	1.0
1/3/2017	0.3
1/9/2017	0.3
1/19/2017	0.5
1/25/2017	3.0
1/27/2017	3.0
1/29/2017	0.3
2/1/2017	0.1
2/3/2017	0.3
2/7/2017	0.3
2/9/2017	2.0
2/16/2017	0.1
2/16/2017	0.1
2/17/2017	0.3
2/21/2017	0.5
2/28/2017	0.3
3/4/2017	110.0
3/4/2017	10.0
3/16/2017	1.0
3/18/2017	993.0
3/19/2017	1.5
3/19/2017	0.3
3/22/2017	1.0
3/24/2017	0.1
3/24/2017	3.0

3/25/2017	1.5
3/28/2017	1.3
3/31/2017	1.0
4/2/2017	100.0
4/2/2017	3.0
4/3/2017	0.3
4/3/2017	0.5
4/6/2017	1.0
4/12/2017	0.5
4/20/2017	3.0
4/21/2017	5.0
4/22/2017	3.0
4/25/2017	8.0
4/30/2017	0.3
5/3/2017	0.1
5/10/2017	0.5
5/10/2017	210.0
5/10/2017	1.0
5/12/2017	6.0
5/12/2017	0.3
5/16/2017	220.0
5/16/2017	2.5
5/17/2017	1.0
5/18/2017	1.0
5/19/2017	0.3
5/19/2017	1.0
5/19/2017	0.3
5/19/2017	0.3
5/19/2017	0.3
5/19/2017	0.3
5/19/2017	0.3
5/20/2017	0.5
5/20/2017	3.0
5/23/2017	0.3
5/23/2017	0.1
5/26/2017	14.0
5/30/2017	80.0
5/30/2017	3.0
5/30/2017	0.3
5/30/2017	0.5
6/14/2017	0.1
7/1/2017	0.1

7/8/2017	10.0
7/19/2017	1.0
7/28/2017	0.1
9/19/2017	0.3
9/19/2017	0.1
9/27/2017	0.3
10/21/2017	0.5
10/28/2017	2.0
11/7/2017	0.1
11/18/2017	1.0
12/12/2017	0.3
12/13/2017	3.0
12/27/2017	5.0
1/2/2018	1.0
1/28/2018	0.5
1/31/2018	2.0
2/1/2018	0.3
2/4/2018	0.1
2/6/2018	5.0
2/6/2018	3.0
2/10/2018	3.0
2/10/2018	3.0
2/20/2018	1.0
2/21/2018	0.3
2/23/2018	2.0
2/24/2018	3.0
2/28/2018	1.0
3/3/2018	0.3
3/4/2018	3.0
3/4/2018	0.5
3/9/2018	0.3
3/12/2018	3.0
3/12/2018	2.0
3/13/2018	0.3
3/14/2018	3.0
3/14/2018	0.1
3/15/2018	0.3
3/17/2018	3.0
3/17/2018	2.0
3/18/2018	0.1
3/21/2018	3.0
3/23/2018	0.3

3/29/2018	0.3
4/6/2018	0.1
4/7/2018	0.5
4/30/2018	3.5
4/30/2018	0.3
5/2/2018	0.1
5/8/2018	0.3
5/10/2018	0.5
5/11/2018	0.2
5/12/2018	0.1
7/15/2018	0.5
8/9/2018	0.3
8/12/2018	2.0
8/18/2018	0.8
9/28/2018	1.0
9/30/2018	0.8
11/12/2018	2.3
11/21/2018	0.3
12/5/2018	0.1
1/3/2019	0.1
1/18/2019	0.3
1/19/2019	0.1
2/12/2019	0.3
2/23/2019	1.0
3/8/2019	0.5
3/20/2019	0.8
3/20/2019	0.5
3/21/2019	0.3
3/21/2019	1.0
3/24/2019	2.0
3/26/2019	0.5
3/26/2019	0.5
3/27/2019	0.1
3/30/2019	4.0
4/4/2019	0.3
4/4/2019	10.0
5/17/2019	0.1
5/26/2019	2.0
5/26/2019	0.5
5/28/2019	2.0
5/29/2019	18.0
6/3/2019	2.0

6/4/2019	0.5
6/4/2019	2.0
6/5/2019	3.0
6/28/2019	6.0
7/2/2019	2.5
7/3/2019	0.1
7/4/2019	5.0
7/11/2019	6.0
7/19/2019	0.1
7/19/2019	2.0
7/21/2019	63.0
9/17/2019	0.3
9/30/2019	0.3
10/3/2019	1.0
10/3/2019	0.3
10/14/2019	0.3
11/11/2019	1.5
11/23/2019	0.5
11/28/2019	2.0
11/30/2019	2.0
12/1/2019	0.5
12/3/2019	3.0
1/28/2020	5.0
2/9/2020	3.0
3/2/2020	0.3
3/5/2020	0.5
3/13/2020	1.3
3/15/2020	1.5
3/15/2020	10.0
3/17/2020	0.8
3/17/2020	2.0
3/21/2020	0.3
3/22/2020	1.5
3/22/2020	0.8
3/24/2020	1.5
3/28/2020	3.0
3/28/2020	0.2
3/29/2020	1.0
3/30/2020	0.3
4/2/2020	0.1
4/7/2020	0.5
4/9/2020	0.3

4/10/2020	1.0
4/13/2020	0.3
4/19/2020	58.0
4/20/2020	0.2
4/21/2020	2.0
4/22/2020	3.0
4/23/2020	0.8
4/25/2020	12.6
4/26/2020	18.0
4/26/2020	47.0
4/28/2020	18.0
4/29/2020	10.0
4/29/2020	20.0
5/1/2020	0.3
5/3/2020	15.0
5/3/2020	4.0
5/3/2020	0.3
5/8/2020	4.5
5/8/2020	1.0
5/8/2020	0.8
5/11/2020	0.1
5/12/2020	3.0
5/15/2020	4.0
5/17/2020	0.3
5/18/2020	1.0
5/23/2020	1.5
5/23/2020	2.0
5/23/2020	0.3
5/23/2020	0.3
5/24/2020	11.0
5/24/2020	12.0
5/27/2020	1.0
5/31/2020	4.0
6/16/2020	12.0
6/25/2020	2.5
6/28/2020	1.0

The primary cause of wildfires in Putnam County is incendiary, lightning, and debris burns. Escaped debris burns (both authorized and unauthorized) are the second leading cause, followed by lightning. Natural lightning-caused wildfires account for 20% while incendiary area approximately 23%. According to Florida's Division of Forestry, the

areas of concern for Putnam County are the communities of Bostwick, Georgetown, Grandin, Mondex, Putnam Hall, Rice Creek, Satsuma, and Springside.

Table 10 gives the details for Putnam County wildfire events between 1990 and 2012. Table 11 gives the average percentage of what sources caused forest fires in the state of Florida between 2000 and 2007.

Table 10

Putnam County Wildfire Statistics
01/01/1990 to 12/31/2019

YEAR	NUMBER OF FIRES	ACRES BURNED
1990	148	298
1991	95	5322.5
1992	91	565.6
1993	147	2744.2
1994	78	287.7
1995	52	261.7
1996	76	545.3
1997	71	453.1
1998	152	4883.9
1999	152	2095.8
2000	166	1318.8
2001	97	598.8
2002	91	574.5
2003	55	204.6
2004	88	418.3
2005	64	270.2
2006	144	2052.9
2007	121	1315.6
2008	94	1647.3
2009	87	1104.1
2010	160	351.4
2011	195	3772.3
2012	107	757.5
2013	63	424.9
2014	45	99.6
2015	81	318.2
2016	118	966
2017	79	1,830.5
2018	48	60.4
2019	45	148.8
TOTAL	**3,010**	**35,692.5**

Source: Florida Division of Forestry June2020

7b. Vulnerability, Probability, Risk

Fire occurrence data shows that when La Niña weather patterns are in place, as was in 2011. 2016-2017, fire activity in Florida increases. From 1990 to 2020, there have been 3,010 reported fires in Putnam County, with a total of nearly 36,000acres burned. Table 4 lists only fire incidences recorded by the Division of Forestry as of 2011. Putnam County since then has responded to wildfire incidences, which are not reported to the Division of Forestry. Therefore, it can be assumed that Table 4 underreports the number of incidences of wildfire. It can be inferred that the total number of acres is much higher than is included in the wildfire statistics on Table 10 (Putnam County Post Disaster Redevelopment Plan, 2014).

Many areas in Putnam County and parts within all jurisdictions are vulnerable to wildfire hazard, particularly the dense forest areas located in the northern section of the county stretching down southwest and along the Marion County border. The majority of forest land acreage is privately owned by timber companies.

Putnam County has more than 75% of the land acreage in the county as forest land and a large concentration of residents live in these rural wooded areas *(Putnam County CEMP, 2009).* Generally, areas located at the urban/rural interface, like the placement of homes that occur adjacent to large undeveloped areas of forestland or land owned by timber companies, are the most susceptible for risks. Examples of this urban/rural interface occur in all jurisdictions, especially in Interlachen which is surrounded by wooded areas. Therefore structures located near the urban/rural interface are most likely to receive potential wildfire impacts.

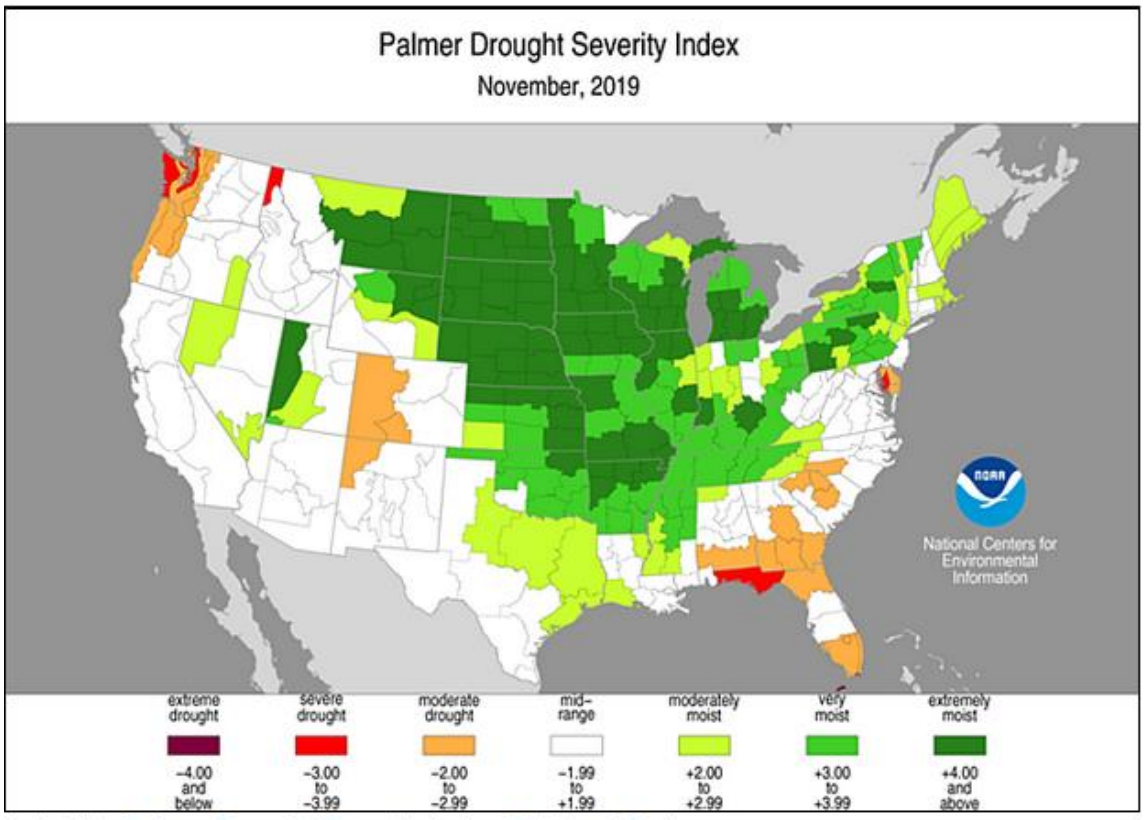
According to Florida's Division of Forestry *(2009)*, the Areas of Concern for Putnam County are the communities of Bostwick, Georgetown, Grandin, Mondex, Putnam Hall, Rice Creek, Satsuma, and Springside. Most years, the spring months (March, April, and May) are Florida's driest times and when the number of wildfires and acreage burned are the highest *(DOF, 2009)*, but some years are drier than others and extended drought periods can occur for several years. While wildfires in Putnam County have the potential to burn over 4,000 acres in a year, this is less likely to occur because of geographical patterns, precipitation events, and fire services designed to fight the fires. From the occurrences of wildfires in almost every year for the county, the probability for wildfires is high. Historically, a major forest fire has occurred at least once every five years in the county *(Putnam County CEMP, 2009).* Impacts of wildfires include and are not limited to losses to agriculture, wildlife, the timber industry, closed down roads, and destruction or damage to building/housing structures.

8. Droughts/Heat Waves

Droughts are a normal climatic occurrence that takes place in the majority of inhabited areas of the planet, although its characteristics vary throughout different regions. They are recognized as a persistent and abnormal moisture deficiency with the potential of causing adverse impacts on vegetation, animals, and people. Heat waves are different from droughts in that these waves occur when temperatures are abnormally and uncomfortably hot for an extended period of time. Heat waves are often accompanied by high humidity and can have a great impact on lives.

Droughts can be scaled using an array of measurements such as the Palmer Drought Severity Index *(e.g. -4 or less = extreme drought, +4 or above = extreme moisture, -1.99-+1.99= Mid-range)* or the Keetch-Byram Drought Index for wildfires likelihood *(e.g. 0 = no drought, 800 = severe drought)*. A good way of looking at drought occurrences over time and their severity is by using the U.S. Palmer Drought Severity Index, that categorizes them by levels of drought conditions. Table 12 provides a nationwide example of the categories used in the U.S. Palmer Drought Severity Index

Table 12
U.S. Palmer Drought Severity Index (November, 2019)



Data File: Palmer Drought Severity Index Divisional Data

Source: U.S. Palmer Drought Severity Index (November, 2019)

8a. Previous Occurrences

Putnam County has experienced a multitude of drought periods and heat waves over the years. Putnam County had the most severe drought conditions in February 2001, November, 2010, December 2010 January 2011, February 2011, March 2011 May 2012, and February-May 2017. Table 13a gives an overview ofof the Palmer Drought Severity Index from January, 2016-December, 2019.

The county has also experienced times of abnormally dry conditions, not drought, in the middle of August 2001 through the middle of June 2002, September 2007 through the beginning of October 2007, the middle of January 2008 through April 2008, June through September 2016, November 2016 through January 2017 and September 2019 through November 2019.In terms of heat waves, Putnam County's summer temperatures can reach the mid to high 90's with heat index ranges of 105-115 degrees Fahrenheit. Table 13b. Identifies the highest maximum temperature by day for Palatka Florida from November 21, 1922 through December 31, 2004. The highest temperature ever recorded in Putnam County's history was on June 25, 1950 where the temperature reached 105 degrees Fahrenheit.

Table 13a.
U.S. Palmer Drought Severity Index for Putnam County (January, 2016-December, 2019)

U.S. Palmer Drought Severity Index (January, 2016-December, 2019)							
	Drought Conditions						
Date	**Extreme Drought - 4.00 and Below**	**Severe Drought - 3.00 to - 3.99**	**Moderate Drought - 2.00 to - 2.99**	**Mid-Range -1.99 to +1.99**	**Moderately Moist +2.00 to +2.99**	**Very Moist +3.00 to +3.99**	**Extremely Moist +4.00 and above**
January, 2016				X			
February, 2016				X			
March, 2016				X			
April, 2016				X			
May, 2016				X			
June, 2016				X			
July, 2016			X				
August, 2016			X				
September, 2016			X				
October, 2016				X			
November, 2016			X				
December, 2016			X				
January, 2017			X				
February, 2017		X					
March, 2017		X					
April, 2017		X					
May, 2017		X					
June, 2017				X			
July, 2017				X			
August, 2017				X			
September, 2017					X		
October, 2017					X		
November, 2017					X		
December, 2017				X			
January, 2018					X		
February, 2018				X			
March, 2018				X			
April, 2018				X			
May, 2018					X		
June, 2018					X		
July, 2018					X		
August, 2018					X		
September, 2018				X			
October, 2018				X			
November, 2018				X			
December, 2018						X	

January, 2019						X	
February, 2019					X		
March, 2019				X			
April, 2019				X			
May, 2019				X			
June, 2019				X			
July, 2019				X			
August, 2019				X			
September, 2019			X				
October, 2019			X				
November, 2019			X				
December, 2019				X			

Table 13b.
Highest Maximum Temperature by day, Putnam, Fl.
(1922 – 2004)

Highest Max Temperature by Day for PALATKA, FL

Click column heading to sort ascending, click again to sort descending.

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	82 1985	84 2002	90 2001	93 1974	96 1962	101 1953	100 1978	101 1999	98 1958	95 1959	90 2003	86 1927
2	82 1973	89 1950	90 1953	91 1945	95 1962	100 1927	100 1927	101 1999	97 1970	95 1959	88 1972	84 1927
3	85 1947	86 1939	90 1953	93 1974	97 1953	101 1927	100 1931	100 1999	98 1944	95 1923	88 1972	82 2001
4	84 1973	85 1957	91 2001	93 1945	97 2002	101 2002	100 1954	100 1953	100 1951	94 1937	90 1929	84 1942
5	90 1982	87 1943	88 1976	90 1945	98 2002	103 1927	101 1931	100 1954	99 1944	95 1951	88 2003	84 1933
6	90 1982	85 1924	89 1961	92 1956	98 1955	102 1927	102 1969	99 1956	98 1943	94 1951	90 1948	85 1942
7	86 1947	83 2004	90 1956	92 1947	95 1950	101 1927	100 2000	102 1956	98 1943	94 1951	88 1935	85 1951
8	82 1947	86 1932	87 1951	91 1957	95 1955	99 1943	102 1931	99 1963	96 1962	94 1941	88 1975	85 1951
9	85 1974	86 1932	88 1974	92 1943	99 1962	99 1954	101 1931	99 1951	96 1939	98 1941	86 2000	85 1943
10	86 1954	87 1939	89 1974	92 1963	97 1936	101 1954	99 1962	99 1980	98 1954	95 1941	89 1942	84 1947
11	83 1974	87 1939	91 1974	96 1962	96 2003	100 1941	99 2001	99 1951	97 1939	92 1973	90 1946	84 1971
12	83 1972	88 1932	90 1967	93 1962	96 1973	101 1952	99 1942	100 1980	98 1933	91 1973	88 2002	83 1976
13	83 1972	87 1932	91 1954	92 1965	99 1955	99 1977	99 1951	101 1954	98 1933	91 2002	86 1972	84 1948
14	83 1937	86 1924	91 1956	90 2001	97 1956	100 1977	100 1951	98 1953	95 1947	92 1972	86 1951	85 1931
15	87 1947	87 1949	91 1956	92 1954	95 1956	98 2000	101 1951	97 1968	96 1972	92 1959	88 1951	85 1971
16	87 1950	86 1932	92 1942	91 1999	97 1948	100 1977	101 1932	98 1980	96 1972	91 1936	88 1929	85 1971
17	87 1943	86 2001	90 2002	91 1967	95 1963	102 1950	99 1943	100 1954	98 2002	90 1928	86 1957	86 1922
18	86 1937	90 1924	90 2002	92 1967	98 1960	101 1943	99 1986	99 1980	96 1934	91 1928	88 1948	83 1967
19	86 1925	87 1944	92 1943	91 1971	96 1944	99 1950	102 1942	99 1954	95 1970	92 1928	89 1930	85 1967
20	85 1937	88 1954	90 1943	93 1968	99 1962	99 2000	103 1942	98 1972	99 1931	89 1946	88 1930	84 1931
21	85 1954	89 1953	92 1952	94 1968	102 1962	100 2000	102 1942	101 1969	97 1954	90 1962	87 1973	85 1931
22	84 1937	88 1962	92 1935	95 1968	100 1962	100 1943	100 1942	98 1955	96 1951	90 1943	89 1948	83 1970
23	85 1974	88 1924	93 1952	94 1968	99 1960	100 1944	100 1957	99 1955	95 1946	90 1950	87 1948	83 1956
24	85 1974	90 1962	92 1949	95 1958	101 1953	102 1944	101 1952	97 1958	96 1946	90 1943	85 1973	86 1931
25	89 1943	89 1924	94 1954	96 1958	103 1953	105 1950	99 1952	99 1968	94 1946	90 1943	85 1973	84 1931
26	85 1950	89 1977	91 1936	95 1958	103 1953	105 1950	98 1951	99 1936	97 1931	90 2001	87 1946	82 1941
27	85 1952	89 2001	92 1949	94 1968	103 1962	103 1952	99 1943	99 1959	96 1931	90 1939	89 1948	84 1942
28	84 1974	90 1962	94 1949	93 1975	99 1962	104 1954	99 1943	101 1943	95 1946	90 1963	89 1948	82 1942
29	84 1972	86 1924	90 1961	96 1943	99 2000	99 1959	101 1949	98 1951	95 1946	90 1959	84 1968	82 1946
30	85 1950	- -	92 1961	94 1962	98 2000	102 1931	99 1961	98 1954	96 1959	90 2002	87 1931	82 1974
31	86 1950	- -	92 1935	- -	98 1953	- -	103 1961	99 1943	- -	89 1951	- -	85 1946

Period of record: 1922-11-21 to 2004-12-31

Source: Northeast RCC CLIMOD II http://climodtest.nrcc.cornell.edu/

8b. Vulnerability, Probability, Risk

All of Putnam County and its jurisdictions are vulnerable to drought conditions and the effects associated with them. Impacts of droughts can affect crops, water supply, and can lead to increased hazards from wildfires that could impact structures. Putnam County has had some crop damage because of droughts *(Putnam County Farm Bureau, 2009)* and usually sees their most destructive wildfires during drought periods *(DOF, 2009)*. Most years, the spring months (March, April, and May), are Florida's driest months, but some years have been drier than others. While Putnam County can receive D3 and D4 drought conditions, it is more likely they will receive D0-D2 conditions. The probability of a drought occurring is high and the risk associated with it is medium.

Also, all of Putnam County and its jurisdictions are vulnerable to heat wave conditions with a higher probability in summer months. Impacts from heat waves can put lives at risk with the possibility of heat strokes and heat exhaustion. Urban areas in Putnam County, especially Palatka, may be more susceptible to the effects of a heat wave due to the Urban Heat Island effect from urban development. It is thus important for the citizens of the county to stay hydrated and take breaks from outside activities. Therefore it is possible to experience heat index ranges over 110 degrees F in some places.

9. Freeze/Winter Storm

Freezing occurs when temperatures are below freezing over a wide spread area for a period of time. These temperatures can damage agricultural crops and burst water pipes. Frost, a layer of ice crystals that is produced by the deposition of water from the air onto a surface that is at or below freezing, is often associated with freezes and can increase damaging effects.

Winter storms are storms that can range from a few hours of moderate snow to blizzard-like circumstances that can affect driving conditions due to a lack of visibility and can have an impact on communications, electricity, and other services. Putnam County is not generally susceptible to winter storms because temperatures rarely, if ever, reach snow-producing levels making these storms unlikely. But temperatures in Putnam County can reach levels low enough to cause damage to crops and possibly water lines.

9a. Previous Occurrences

The last known "disaster" resulting from severe freezing weather was FEMA DR# 1359. This incident period was between December 1, 2000-January 25, 2001. This disaster was authorized for 49 counties in Florida by President Bush for people in Florida communities left jobless because of the effects of that winter freezes on farm crops and fisheries in Florida. These County individuals were entitled to unemployment compensation or Disaster Unemployment Assistance (DUA) benefits.

Between 1998 and May 2009, Putnam County had 63 recorded days with freezing temperatures (equal to or below 32 degrees F) as seen between two weather recording stations in Crescent City and Federal Point *(Southeast Regional Climate Center, 2009)*.

All of these events occurred during the months of December, January, and February except for one account in late November. In this 10-year span, the lowest recorded temperature was 21 degrees F on January 24, 2003 *(Southeast Regional Climate Center, 2009)*. Events colder than this have occurred in years past, including a few in the "teen" degrees. Putnam County has no seen report of significant winter storm conditions.

Between 2009 and 2015, Putnam County had 33 record days with freezing temperatures (equal to or below 32 degrees F) as seen at weather recording station in on Federal Point *(Southeast Regional Climate Center, 2014)*.

According to the "North East RCC Climod II data query system powered by ACIS NOAA Regional Climate Center," the coldest day in Putnam County between November 22, 1922 and December 31, 2004 was on December 12, 1962 where freezing temperatures dropped to 16 degrees Fahrenheit. The below chart depicts the lowest record temperatures in Putnam County.

Lowest Min Temperature by Day for PALATKA, FL

Click column heading to sort ascending, click again to sort descending.

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	26 2001	25 1936	28 2002	35 2003	50 1945	57 1971	66 1970	68 1966	65 1939	54 2001	37 1930	31 2002
2	27 1928	26 1980	28 2002	35 2003	50 1971	61 1933	66 1974	70 2003	64 1999	50 2001	41 1930	28 1999
3	20 1928	27 1980	21 1980	40 1962	47 1940	55 1933	66 2000	67 1981	64 1999	50 2001	30 1954	30 1999
4	24 1979	25 1970	24 1980	41 1975	47 1971	60 1933	66 2000	68 1938	61 1972	50 1974	38 1999	29 1999
5	24 2001	27 1947	30 2002	41 1975	44 1940	58 1933	67 1947	70 2002	66 1972	54 1938	38 1970	31 1968
6	24 2001	27 1947	30 2002	35 1944	46 1940	62 1972	65 1938	69 1938	67 1952	53 1932	37 1976	31 2000
7	26 1999	28 2000	30 2002	38 1950	50 1940	61 1946	66 1947	67 1950	68 1979	48 1932	40 1967	22 1937
8	22 1970	31 1951	35 2001	37 1950	49 1944	62 1970	68 1964	66 2002	65 1972	50 1932	36 1951	24 1937
9	22 1970	29 1947	35 2001	41 2000	48 1928	63 2000	69 2004	66 2002	64 1932	50 1978	32 1976	30 1968
10	23 1970	28 1978	29 1932	39 2000	45 1923	58 1930	67 1936	67 2002	63 1972	50 2000	37 1956	31 1955
11	26 2001	27 1947	32 1932	39 2000	43 1923	58 1960	68 1944	67 2002	66 2003	51 2000	34 1943	29 1937
12	21 1982	28 1979	34 1969	45 1982	50 1960	58 1974	60 2004	66 1931	63 2003	51 2000	35 1923	22 1957
13	14 1981	27 1955	37 1932	36 1940	48 1940	63 1960	69 1944	69 1962	63 2003	51 1977	32 1968	16 1962
14	18 1981	27 1958	29 1932	36 1940	51 1941	64 1960	67 1974	69 1976	62 1968	43 1977	35 1968	24 1962
15	23 1948	21 1943	35 1932	41 1950	50 1932	63 1980	66 1974	68 1967	62 1956	44 1977	30 1969	25 1944
16	28 1982	28 1943	36 1999	40 1943	53 1951	59 1933	69 2003	68 1938	61 2001	46 1978	24 1940	24 1968
17	25 1977	27 1943	35 1937	38 1962	54 1973	61 1974	69 2004	65 1933	59 2001	41 1943	26 1940	27 1968
18	24 1977	24 1958	37 1962	42 1923	54 1940	60 1933	69 1929	68 2000	60 2003	41 1943	33 1970	29 2003
19	22 1977	25 1923	36 1985	39 2001	47 1982	62 1961	70 2003	66 1981	60 2003	42 1977	33 1951	24 1975
20	22 1977	28 1958	39 1956	39 2001	54 1976	62 1965	69 1946	64 2004	64 2003	47 1967	34 1968	23 2000
21	11 1985	28 1958	36 1971	45 1953	55 1981	63 1965	67 1929	63 1930	55 1981	43 1964	27 1932	22 2000
22	12 1985	29 1978	34 1960	42 1934	53 1954	65 1965	68 1944	64 1930	58 1938	45 1964	30 1937	26 1960
23	19 1985	28 1978	40 1970	48 1950	54 2002	66 1944	64 1965	63 1930	59 1938	45 1937	31 2000	28 1960
24	21 2003	30 1939	32 1968	49 2000	56 1954	64 2003	69 1970	62 1930	59 1938	37 1937	26 1970	26 1930
25	21 2003	32 1968	36 1968	48 1969	58 2001	63 1946	70 2003	62 1930	60 1967	39 1937	23 1970	27 1963
26	21 2003	24 1967	36 1956	45 1974	50 1979	63 1940	68 1964	64 1930	61 1975	40 1923	26 1950	30 1999
27	19 1940	31 1974	35 1955	45 1974	50 1979	62 1936	69 2003	64 1930	55 1956	42 1962	32 1930	24 1935
28	18 1940	27 1935	38 1955	46 1926	51 1979	63 1928	68 1978	66 1984	57 1931	38 1943	28 1936	28 1977
29	22 1940	36 1984	34 1955	45 1928	54 1979	65 1974	65 1924	65 1984	57 1962	41 1943	29 1936	30 1977
30	23 1966	- -	40 1955	48 1928	57 1971	65 1938	68 1969	66 1984	56 1967	41 1968	31 2002	26 1961
31	21 1966	- -	35 1964	- -	57 1971	- -	68 1981	67 1939	- -	41 1976	- -	24 2000

Period of record: 1922-11-22 to 2004-12-31

Below are dates of occurrence and the episode narrative and event narrative from the NCDC Storm Events Database:

1/9/2010 Sleet Occurrence
https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=203565

Property Damage	**0.00K**
Crop Damage	**0.00K**

Episode Narrative	**A cold front was well south of the forecast area with an arctic airmass funneling over the area. Surface temperatures were in the 30s. Mid level moisture and a mid level trough combined to support scattered sleet and snow flurries across the area during the morning.**
Event Narrative	**Sleet and light snow dusted grassy areas and cars from San Mateo to Crescent City and Bostwick. The EMA stated it sleeted for 30 minutes in Crescent City.**

2/12/2012 Sleet Occurrence
https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=208173

Episode Narrative	**A surface low tracked eastward from the Gulf of Mexico with a surface warm front extending toward the southern Florida peninsula. Cold air was in place across the area as well as deep moisture. As an upper level short wave trough approached the area from the west, reports of sleet began across portions of north and central Florida after midnight and continued through the late morning hours.**
Event Narrative	**Light sleet was mixed with rain across northern Palatka and portions of northern Putnam county. No accumulation of sleet was reported.**

1/29/2014 Sleet Occurrence
https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=486296

Episode Narrative	**A anomolous winter weather event including sleet, freezing rain and snow flurries occurred on Jan 29th when an area of low pressure deepened offshore of the Fl/Ga Atlantic coast and cold and moist air funneled southward on the west side of the low over southeast Georgia and northeast Florida. An upper level disturbance passed over the shallow cold and moist airmass, with triggered rain mixed with a wintry mix at times during the day on the 29th through the pre-dawn hours of the 30th. Icing on bridges occurred, and many schools across the area closed on the 29th and on the 30th due to the potential for ice freezing on bridges.**
Event Narrative	**Light sleet mixed with rain was reported in Interlachen at State Road 20 and Keuka Road.**

9b. Vulnerability, Probability, Risk

Putnam County and its jurisdictions are all vulnerable to freezing conditions. With that being said, the county is not favorable to winter storms due to their climatic conditions. Most counties in North Central Florida experience hard freezes every year, especially within the months of December, January, and February, thus leading to a higher level of future occurrences *(DOF, 2009).* If temperatures reach freezing levels for extended periods of time and are combined with other climatic factors, crop damage will and has occurred *(Putnam County Farm Bureau, 2009)*. Given historic accounts of temperatures in the teens, it is possible for future low temperatures to again drop to 16 degrees in the future. Injuries and death to people in structures are very low in Putnam County freezes, but indirectly through fire caused by incorrect or careless use of space heaters could occur within the buildings *(Putnam County CEMP, 2009).* Additionally, consumer demand of electricity during these periods of extreme cold weather may require the electric utility to implement rolling blackouts to selected areas in order to avert a total electrical grid overload. These blackouts can have a significant impact on electrical dependent critical facilities and persons *(Putnam County CEMP, 2009).*

10. Earthquakes

Earthquakes are rapid movements of the earth causing the shifting of rock beneath the surface. The event of an earthquake occurring in Putnam County is rare although past events have been recorded in the state. Florida is very geologically stable and the geology does not contain any incontestable fault lines or volcanoes, which are generally associated with earthquakes. Florida is different than earthquake-prone California, which is located on an active margin (bounded by faults). Florida is situated on a passive (trailing) margin of the North American Plate *(FDEP FGS, 2007).*

10a. Previous Occurrences

While no known occurrences of earthquakes events have occurred in Putnam County, according to FDEP FGS *(20019)*, Florida has reportedly "felt" around twenty-four "seismic events," with six being felt between 1950-1991. Determining seismic events since 1991 in Florida through data sourcing is a little more complicated. USGS shows two earthquakes in Alabama in 2003 and 2004 that may have possibly been felt in the western "panhandle" of Florida. USGS supposedly recorded an earthquake 2 km south of Tampa in March 2005 (but the FAA said it was a sonic boom from fighter jets). In September 2006 in the Gulf 405 km (250 miles) south-southwest of Apalachicola, an earthquake of a magnitude of 5.8 was said to be felt by some Floridians. According to the State of Florida Enhanced Hazard Mitigation Plan, a severe quake measuring VI on the Mercalli Intensity scale was reported in St. Augustine on October 1727. In October of 1900, a Mercalli Intensity V was recorded by U.S. Coast and by Geodetic Survey

The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced at that place. The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above. The following list is the description of the Modified Mercalli Intensity Scale:

I. Not felt except by a very few under especially favorable conditions.

II. Felt only by a few persons at rest, especially on upper floors of buildings.

III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.

IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.

V. Felt by nearly everyone, many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.

VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.

IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.

XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

According to FDEP FGS *(2009)*, the actual number of earthquakes that originated under Florida is few, with most originating in adjoining states or offshore. Even though earthquakes are not a major hazard concern in the state of Florida, in 1879 an earthquake felt around the northern half of the state was said to shake down plaster and cause articles to be thrown from shelves in St. Augustine, which is approximately 30 miles east of Putnam County *(FDEP FGS, 2007)*. This earthquake was, assumed to be the largest recorded in Florida. It only caused minimal damages.

10b. Vulnerability, Probability, Risk

There has been no known occurrences of earthquake events that have have occurred in Putnam County. Putnam County and its jurisdiction are vulnerable to lesser significant earthquake hazards, and the probability and risk levels are extremely low. While there is very low probability an earthquake would occur in Putnam, the entire building stock would be vulnerable to the negligible impacts of an earthquake in Putnam County. For additional information as to Putnam's vulnerability to an earthquake, reference Section 6 of this plan.

11. Tsunamis

Tsunamis are giant waves generated in a body of water that can be caused as a result of an earthquake, volcano, landslide, or explosions. These giant waves can greatly affect low-lying coastal areas by inundating mass areas of land.

11a. Previous Occurrences

There is no specific occurrence of tsunami impact in Putnam County Florida.

According to FSU's Center for Ocean-Atmospheric Prediction Studies *(May 2009)*, NOAA's NGDC Tsunami Runup database shows 9 incidences of slight tsunami effects having been recorded in Florida. These natural hazards have happened in the Pacific Ocean in past decades but are not common in the Atlantic Ocean. However, scientists in England have been studying the effects of a potential tsunami in the Atlantic Ocean caused by the possible eruption of a volcano in the Canary Islands, off of Northwest Africa, that would lead to a portion of the mountain falling into the ocean. The probability of this creating a "mega-tsunami" is widely debated.

On July 3, 1992, Daytona Beach, southeast of Putnam County, experienced a rogue wave, which is different than a tsunami but has similar end results *(NOAA NWS, 2009)*. The water rose 10 feet at the beach and caused the majority of its damage to be felt within 5 miles of the shore. Little is known about the formation of a rogue wave but many assume it has to do with an ocean swell being magnified by currents or the atmosphere.

11b. Vulnerability, Probability, Risk

There has been no known occurrences of Tsunamis events that have occurred in Putnam County. Putnam County's most eastern border being over 20 miles away from the coast, it has no coastal lands that are vulnerable to the effects of a tsunami. According to the FSU Center for Ocean-Atmospheric Prediction Studies *(2009)*, the probably of a tsunami hitting the northeast coast of Florida is extremely low. However, if one did occur, some of the more tidal sections of the St. Johns River could feel slight effects. In the instance of a 1:500 year tsunami (which is very unlikely), areas in the jurisdictions of Palatka and possibly Welaka could be vulnerable with a lower level of associated risk. Impacts could include damaged piers/boats and possibly some effects to structures built in close proximity to the St. Johns River. For additional information as to the possible effects from tsunamis in Putnam County please reference "Storm Surge" or "Flooding" portion of this plan.

12. Sinkholes (Subsidence) /Landslides

Florida has more sinkholes than any other state in the nation due to the state's karst topography. Sinkholes originate beneath the surface as groundwater passes through limestone and erodes large cavities, or holes, in the bedrock. If the water table drops, while water was supporting the walls and ceiling of the cavity, the cavity will eventually collapse causing a surface indenture, or sinkhole (*UF Center for Aquatic & Invasive Plants, 2003*). When sinkholes like this form, some can suddenly or slowly cause damage to homes, roads, and other infrastructure.

As for landslides, it is very rare to see landslides within Florida because of how flat the majority of the state is. Landslides occur in areas where there are steep slopes and unconsolidated soils and sediments. Florida only has one documented "true" landslide which occurred in Gadsden County in 1948 (*FDEP FGS, May 2009*). The scale of a landslide event can vary considerably, therefore, it's possible that hilly areas of Florida could have had small, unreported slumping or mudflows after heavy rains.

12a. Previous Occurrences

According to the Florida Geological Survey and Putnam County Emergency Management, as of May 2009, Putnam County has had 2 significant sinkholes since the 1960's and a number of smaller ones. One significant sinkhole occurred in 1970, on State Road 21, northwest of Interlachen. This sinkhole measured eight foot in length and width, and 10 foot deep. The other major one occurred in 1985, in Interlachen near Morris Lake. It was measured as 50 feet in length and width, and 30 feet deep *(FDEP FGS, 2009)*. This sinkhole was caused by drilling a water well. These sinkholes were generally located in western Putnam County in an area spotted by lakes created from pre-historic sinkholes *(FDEP FGS, 2009)*. Between the time period of 2009-2014 Putnam County Emergency Management has documented five subsidence events in the County. Documented incidents of sink hole/subsidence in Putnam County have not included estimated property damages resulting from this hazard. Putnam County has no reported landslides, but some unrecorded events may have occurred after heavy rains. Below is a chart of DEP recorded subsidence incidents in Putnam County:

EVENT_DATE	LONGDD	LATDD	SINLNGTH	SINWIDTH	SINDEPTH	SLOPE
8/16/1985	-81.975	29.61167	50	50	30	45
12/21/1985	-82.0402	29.79249	66	63	40	90
8/1/2012	-81.8816	29.6342	25	50	3	60
8/1/2012	-81.6526	29.66287	5	3	3	0
	-82.0347	29.68194	8	8	10	90
6/27/2012	-81.9766	29.73079	4	4	0	0

9/3/2014	-81.8378	29.65134	30	15	4	N/A
7/27/2017	-81.6425	29.64708	3	3	1	N/A
9/11/2017	-81.6396	29.77419	15	15	19	N/A
9/18/2017	-81.9033	29.64249	15	15	30	N/A
9/21/2017	-81.9558	29.64282	3	5	3	90
10/17/2017	-81.6357	29.71575	6	6	3	N/A
2/13/2018	-81.6607	29.62800	12	6	4	N/A
4/26/2018	-81.5781	29.73949	1.5	1.5	1	N/A

12b. Vulnerability, Probability, Risk

All of the county and its jurisdictions are vulnerable to sinkholes, but the vulnerability is overall lower due to a somewhat unfavorable topography for sinkholes. The western and southeastern parts of the county have a slightly higher vulnerability to sinkholes *(NFRPC, 2004)* and based on previous occurrences, the jurisdiction of Interlachen may be more susceptible than other jurisdictions. In Putnam County, most sinkholes are small (less than a few feet wide and deep) and have occurred after an increase in rain or fluctuation in river levels *(Putnam County CEMP, 2009)*. Since July 1, 2011 Putnam County Emergency Management has responded to five subsidence reports that were received by County residents. FDEP subsidence report data also reflects five different reports of subsidence in Putnam County. While this data may include some true sinkholes, the majority of the incidents have not been field-checked and the cause of subsidence is not verified by a geologist.

Impacts that sinkholes could cause in the county include road damages, building/housing damages, utility damages, natural damages, and possibly the total destruction of certain infrastructure. A sinkhole would be even more disruptive if it struck a densely populated area, critical facility, or major road. While it is possible for a sinkhole in the county to be over 100 feet in length/width and over 50 feet deep, it is very unlikely since only smaller sinkholes have developed in the area. The probability of future sinkholes occurring is somewhere between low and remotely common, with the majority of these probably being very small and not imposing any drastic risks.

Landslides are uncommon due to the lack of large slopes of land that cause them and since Florida has only one “true” landslide report in a different Florida region *(FDEP FGS, 2009)*. In the county, an area that has steep slopes and unconsolidated soils and sediments is vulnerable. This includes parts within Palatka. Impacts could include damage to infrastructure and buildings that are located on or below topographical slopes. The probability of a landslide is low, but there could be a possibility after heavy rains.

13. Dam/Lock Hazard

Dam failures, unlike some hazards are not routine; two factors influence the potential severity of full or partial dam failure: (1) The amount of water impounded, and (2) the density, type, and value of development downstream (Statewide Hazard Mitigation Plan, 2013).

In Putnam County, the largest dam/lock of significance, is the Kirkpatrick (Rodman) Dam (NIDID- FL00156) and spillway formed on the Ocklawaha River for the impoundment of the Rodman Reservoir. The Henry H. Buckman dam/Buckman Lock (NIDID – FL00159) is another "dam" identified by the US Army Corps of Engineers (2009). The Buckman Lock is used to lift boats and barges from the water level of the St. Johns River to the level of the Rodman Reservoir. This dam and lock were originally designed by the U.S. Army Corps of Engineers for the proposed, and now deceased, Cross-Florida Barge Canal, and a waterway connecting the Atlantic Ocean to the Gulf of Mexico. Currently the Rodman Reservoir is a popular place for bass fishing. The dam/lock is owned and operated by FDEP.

Also in Putnam County, meeting the definition of a dam as defined by Florida Statue 373.403, is the Ketter Causeway/Dam and Gibbs Rd dams. These two dams are in residential subdivisions and are owned by Putnam County.

Dam or lock failures have the potential to cause damage to properties downstream. Failure to these structures, or mis-operation, could be caused by a number of situations, such as structural/electrical/mechanical problems, seismic conditions, flooding induced high water spillover, and sabotage.

13a. Previous Occurrences

There are no known previous occurrences of significant dam or lock failure *(Putnam County Emergency Management, 2009)*.

13b. Vulnerability, Probability, Risk

Currently, only sparse development has occurred downstream of the rodman dam and spill and Henry H. Buchman lock. Structures, but areas including part of State Road 19, the jurisdiction of Welaka, and the community of Satsuma are still vulnerable. For this reason, the Kirkpatrick Dam and Rodman Reservoir have an Emergency Action Plan *(2007)* prepared for the FDEP by URS Engineering, which gives detailed information on vulnerabilities, probability, and risk of structure failure or mis-operation.

According to the National Inventory of Dams *(2009)*, Kirkpatrick Dam is currently listed as a low hazard facility, meaning failure or mis-operation would result in low estimates of economic, environmental, and human losses. This was seconded by the Army Corps

of Engineers who said both the dam and lock have a low potential for being a hazard to areas downstream *(2003)*.

The "dam hazard" is a term indicating the potential hazard to the downstream area resulting from failure or mis-operation of the dam or facilities. According to the USGS National Inventory of Dams, there are 149 major dams in the state of Florida that have been identified by their hazard risk of low, significant or high. Below is additional detail pertaining to these three risk classifications.

> Low: A dam where failure or operational error results in no probable loss of human life and low economic and/or environmental loss. Losses are principally limited to the owner's property.
>
> Significant: A dam where failure or operational error results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or affect other concerns. These dams are often located in predominantly rural or agricultural areas but could be located in areas with more dense populations and significant infrastructure.
>
> High: A dam where failure or operational error will probably cause loss of human life. (Statewide Hazard Mitigation Plan, 2013)

Even though these studies give an overall low categorization of vulnerability, probability, and risk, the Kirkpatrick Dam Emergency Action Plan *(2007)* gives impacts for a worst case scenario of complete failure for Kirkpatrick Dam. According to this plan, there are an estimated 378 structures at risk from complete dam failure, with the vast majority in the jurisdiction of Welaka. The estimated time required to achieve this maximum flood elevation to damage these structures range from 10 to 33 hours, with the immense majority of structures having at least 27 hours' notice before the flood wave arrives. Catastrophic damage to the dam would result in 2.6-13.5" increase in water surface elevation. Lesser dam failures, such as slight dam gate malfunctions, would result in little to no structural damage downstream.

14. Hazardous Material Incidents

Hazardous material incidents are the accidental or purposefully release or spill of hazardous chemicals into the environment where human, plant, and animal life could be endangered. If a hazardous material incident was to occur in Putnam County, it would probably be an accidental spill, such as a surface transportation spill, a spill at a facility that works with hazardous materials, or a non-commercial spill from residents using hazardous products.

14a. Previous Occurrences

According to the Putnam County Emergency Services Department *(2014)*, there have only been a few incidents regarding hazardous material accidents, with just about all of them being spills of oil and gasoline. Since 2011 43 petroleum spills have been documented. This is seconded by the county's CEMP *(2018)* that states several minor incidents, mostly fuel spills, occur in the county each year. Putnam County Emergency Management (2009) has some records of hazmat incidents called in (not including natural gas or propane leaks) with 13 calls in 2005, 14 in 2006, 26 in 2007, and 11 in 2008. 21 calls between 2011 and 2014. There are no known previous occurrences of major hazardous material incidents.

14b. Vulnerability, Probability, Risk

In Putnam County and its jurisdictions, areas along major transportation routes where hazardous materials are transported and areas adjacent to facilities that store hazardous materials are the most vulnerable. Specifically, this includes Palatka because of the heavily populated areas located next to these routes and facilities.

According to FDOT and Putnam County's Planning Department *(2009)*, most of the county's highways are classified as part of the SIS (Strategic Inter-modal System) including the county's major routes of SR 100, SR 20, SR 19, and US 17. These roads carry the most hazardous materials in the county, therefore drivers and areas around these routes are more vulnerable to surface transportation spills from traffic accidents, especially in the busier areas in the jurisdiction of Palatka. Even though other collector roads in the county will experience some local traffic carrying hazardous materials, these are the main routes. Among the hazardous materials transported are gasoline, propane, chlorine, and ammonia *(Putnam County CEMP, 2009)*. Also, other routes included in the SIS are the St. Johns River and the CSX Rail Line.

Hazardous waste information is contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, storage facilities, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. When identifying facilities of hazardous waste handlers, the EPA Envirofacts Date Warehouse provides a list of EPA-regulated facilities.

Locations around these facilities have a higher vulnerability to hazardous waste incidents. Table 15 provides the number of these facilities in the communities of Putnam County as of June 2014. Communities in "bold lettering" indicate the county's jurisdictions.

Table 15
Putnam County's Number of Hazardous Waste Handlers Per Community (June 2014)

Community	# of Hazardous Waste Handlers
Bostwick	1
Crescent City	**1**
East Palatka	23
Edgar	0
Florahome	0
Georgetown	1
Grandin	0
Hollister	2
Interlachen	**9**
Lake Como	0
Melrose	6
Palatka	**123**
Pomona Park	**4**
Putnam Hall	0
San Mateo	1
Satsuma	3
Welaka	**1**

Source: EPA Envirofacts Data Warehouse online (2014)

One other source of hazardous material incidents, that is harder to determine spatially, is non-commercial hazardous materials. With much of the county being rural residential or agricultural, many properties have sheds, barns, and storage buildings that may contain a mixture of chemicals. These chemicals could include paints, insecticides, fertilizers, petroleum products, lubricants and other common household or agricultural products *(Putnam County CEMP, 2009)*. It can be assumed that the majority of these residents may not be in full compliance with the law when storing and/or disposing of these items. Since most materials are in such small quantities, concern of a full "hazmat" incident is minimal.

Another way of identifying facilities that could be significant in terms of hazardous material incidents is through reviewing the State Emergency Response Commission's E-Plan database. This database is used by fixed facilities to report annual inventories of reportable chemicals. This database highlights EPCRA Section 302 facilities containing Extremely Hazardous Substances (EHS) that are at or above Threshold Planning Quantities (TPQ). The US EPA determines the Extremely Hazardous Substances based on their potential to cause significant health effects in a single exposure. Identifying these facilities allows the county to develop chemical emergency preparedness and response capabilities through better coordination/planning with local businesses. Putnam County Emergency Services keeps a list of these facilities with thirteen (13) Section 302 facilities

currently reporting EHS chemical inventories. This includes six (6) facilities in Palatka, three (3) in East Palatka, one (1) in Crescent City, one (1) in Interlachen, one (1) in Hawthorne, and one (1) in Melrose.

15. Terrorism

Terrorism is a term that is somewhat hard to define, but for our purposes, we will define terrorism as a criminal act that influences an audience beyond the immediate victim *(www.terrorism-research.com, 2009)*. Terrorism incidents span over an array of different forms including chemical weapons, biological weapons, explosives, nuclear weapons, incendiary weapons, eco-terrorism and cyber-terrorism. All counties in Florida are vulnerable to all types of terrorist attacks. Even though rural Putnam County doesn't have the high levels of vulnerability, as do other larger urban areas in Florida, local and regional incidents could still occur.

15a. Previous Occurrences

Putnam County hasn't had any significant terrorism events per-se, but the county had a few of what some could call "scares." According to Putnam County Sheriff Dispatch *(2009)*, between 2005-2008 the county received "bomb threat" calls every year. In most cases the "bomb threat" calls weren't a threat; they were usually someone calling in to report that they had seen a suspicious looking package that resembled an explosive. Even though these types of calls rarely, if ever, turned up to be valid assumptions, it is still extremely important for authorities to take all precautions and act accordingly. The most recent "scare" incident took place on July 7, 2009 when a survey crew in a patch of woods near Bostwick found a military training ammunition known as an Mk-26. This training device typically isn't explosive but it could have had a small explosive charge on it for certain training exercises *(Putnam County Emergency Management, 2009).*

15b. Vulnerability, Probability, Risk

All of Putnam County and its jurisdictions are vulnerable to terrorism events, but the probability associated with them is lower since it's a more rural county. Areas thought to be particularly vulnerable within the county are schools *(see "Critical Facilities" in Section 5),* special events and festivals, government complexes *(see "Critical Facilities" in Section 5),* facilities holding hazardous waste *(see "Hazardous Material Incidents" in Section 4 and 6),* and the Kirkpatrick Dam *(see "Dam/Lock Hazard" in Section 4 and 6)*. Also related to terrorism, if an incident occurred at the nuclear research reactor located at the University of Florida in Gainesville, Putnam County could serve as a massive care site for evacuees from areas around the reactor *(Putnam County CEMP, 2009).* Shelter and public health issues pertaining to contamination and exposure of evacuees could become a relevant issue for the county. Because of the possibility of terrorism occurring within the county, a Terrorism Response Annex has been created as an appendix to the

Putnam County CEMP to provide the county with a continuing assessment of the community's vulnerability and capability to respond to a terrorism incident.

This hazard has just recently been added to the LMS, as of July 2009, because of the need shown by Putnam County Emergency Management and the LMS Task Force. In addition, the Terrorism Response Annex has also been recently added to the county's CEMP. Currently Putnam County Emergency Management is developing and retrieving more information dealing with terrorism that will be added in future LMS and Terrorism Response Annex updates.

16. Sea Level Rise

Florida is vulnerable to sea level rise given its extensive shoreline and low elevation. Should sea levels rise, a number of consequences including the salination of fresh water sources, land loss, and increases in storms and flooding, could be observed. Sea Level Rise is addressed in the Statewide Hazard Mitigation Plan in 2013.

Sea level rise increases the vulnerability of coastal areas to flooding during storms. During a tropical storm or hurricane storm surge builds up on top of a higher base of water resulting in more significant damages. Given that storm surge from a hurricane or nor'easter builds on top of a higher base of water, a Report to Congress by FEMA (1991) estimated that existing development in the U.S. Coastal Zone would experience a 36–58 percent increase in annual damages for a 1-foot rise in sea level, and a 102–200 percent increase for a 3-foot rise.

Additionally, shore erosion increases storm vulnerability by removing the dunes and beaches that otherwise provide a buffer between coastal property and storm waves and surge. Lastly, sea level rise can result in an increase in coastal flooding from rainstorms because low areas drain more slowly as sea levels rise (Statewide Hazard Mitigation Plan, 2013, Florida Statewide Regional Evacuation Study Technical Data Report, Volume 1-4).

While sea level rise has been identified as a hazard for purposes of further mitigation efforts, this hazard has not been identified for further analysis in this plan.

C. Multi-Jurisdictional Vulnerability Assessment

Determining risks and hazard vulnerability is very important to do at the county level, but it is even more crucial at a more local jurisdictional level. For this reason, Putnam County has included a multi-jurisdictional vulnerability assessment as part of the 2009 update.

The vulnerability assessment in Appendix B that we are basing the following Tables after is a vital tool that gives a comprehensive analysis of the severity of threats posed from

hazards. When looking at vulnerability, it is important to look at many different components, from the probability of an event occurring to impacts it could produce. Having a comprehensive assessment like this can help the LMS Task Force to develop more meaningful mitigation strategies.

This vulnerability assessment concept seen in Appendix B was taken from Putnam County's Emergency Coop Plan *(2007-2008)* and was modified to fit LMS desires. Since there is no perfect way to determine vulnerabilities, we found that the simplest equations give what we feel are the best results for the county. This section will be updated as other analysis tools that give better results are discovered.

Much of the data found in this assessment comes from reviewing previous occurrences, hazard map data, and Kinetic Analysis Corporation MEMPHIS data. To reinsure the validity of these tables, we cross-checked with the Putnam County CEMP *(2018)*, Putnam County Emergency Coop Plan *(2007-2008)*, TAOS data, the State Mitigation Plan, and with experts from federal, state, and local agencies.

The following Tables 16-19 give multi-jurisdictional hazard probabilities, risks, impacts, and total vulnerabilities. To understand how these ranges where calculated, see Appendix B. In Table 17 'Risks,' calculations were achieved by taking into account 1) probability, 2) frequency, and 3) severity of each hazard. In Table 18 'Impacts,' calculations were achieved by taking into account percent/value of losses/damages to 1) humans, 2) property, 3) businesses for each hazard. In Table 19 'Vulnerabilities,' calculations were achieved by taking into account the totals of 1) 'Risks' and 2) 'Impacts.' For written descriptions of what impacts and vulnerability could actually mean physically to the county and its jurisdictions, see the descriptions throughout Section 4 and Section 6.

Scales Used

Table 16 'probabilities': low, moderate, medium, above medium, high
Tables 17-19: low, moderate, medium, high, severe

The probability of a hazard's occurrence is rated low through high as outlined below.

Each hazard's probability was determined by the following:

- Low: No events in a five year period
- Moderate: Less than one event in a five year period
- Medium: One to two events in a five year period
- Above Medium Three to five events in a five year period
- High: An average of one or more events per year in a five year period

Table 16
Putnam County Multi-Jurisdictional Hazard Probabilities

Hazards*	Putnam County	Crescent City	Interlachen	Palatka	Pomona Park	Welaka
Tropical Storm	Above Medium	Above Medium	Above Medium	Above Medium	Above Medium	Above Medium
Hurricane- Minor	Medium	Medium	Medium	Medium	Medium	Medium
Hurricane- Major	Low	Low	Low	Low	Low	Low
Storm Surge	Low	Low	None	Moderate	None	Low
Severe Thunderstorms	High	High	High	High	High	High
High Winds	Above Medium	Above Medium	Medium	Above Medium	Above Medium	Above Medium
Flooding	High	Above Medium	Above Medium	High	Above Medium	High
Tornado	Medium	Medium	Medium	Medium	Medium	Medium
Wildfires	High	Above Medium	High	Medium	Above Medium	Above Medium
Droughts/Heat Waves	Above Medium	Above Medium	Above Medium	Above Medium	Above Medium	Above Medium
Freeze	Medium	Medium	Medium	Medium	Medium	Medium
Earthquakes	Low	Low	Low	Low	Low	Low
Tsunamis	Low	None	None	Low	None	Low
Sinkholes/Landslides	Medium	Moderate	Above Medium	Moderate	Moderate	Moderate
Dam/Lock Hazard	Low	None	None	None	None	Low
Hazardous Material Incidents	Moderate	Moderate	Low	Medium	Low	Low
Terrorism	Low	Low	Low	Moderate	Low	Low

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Table 17
Putnam County Multi-Jurisdictional Risks

Hazards*	Putnam County	Crescent City	Interlachen	Palatka	Pomona Park	Welaka
Tropical Storm	Medium	Medium	Medium	Medium	Medium	Medium
Hurricane- Minor	Medium	Medium	Medium	Medium	Medium	Medium
Hurricane- Major	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Storm Surge	Low	Low	None	Low	None	Low
Severe Thunderstorms	High	High	High	High	High	High
High Winds	Moderate	Medium	Medium	Medium	Medium	Medium
Flooding	High	Medium	Medium	Severe	Medium	Severe
Tornado	Medium	Medium	Medium	High	Medium	Medium
Wildfires	High	High	Severe	High	High	High
Droughts/Heat Waves	Medium	Medium	Medium	Medium	Medium	Medium
Freeze	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Earthquakes	Low	Low	Low	Low	Low	Low
Tsunamis	Low	None	None	Low	None	Low
Sinkholes/Landslides	Moderate	Moderate	Medium	Moderate	Moderate	Moderate
Dam/Lock Hazard	Moderate	None	None	None	None	Moderate
Hazardous Material Incidents	Moderate	Low	Low	Medium	Low	Low
Terrorism	Low	Low	Low	Medium	Low	Low

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Table 18
Putnam County Multi-Jurisdictional Impacts

Hazards*	Putnam County	Crescent City	Interlachen	Palatka	Pomona Park	Welaka
Tropical Storm	Medium	Medium	Medium	Medium	Medium	Medium
Hurricane- Minor	Medium	Medium	Medium	Medium	Medium	Medium
Hurricane- Major	Severe	Severe	Severe	Severe	Severe	Severe
Storm Surge	Low	Low	None	Low	None	Low
Severe Thunderstorms	Medium	Medium	Medium	Medium	Medium	Medium
High Winds	Medium	Medium	Medium	Medium	Medium	Medium
Flooding	Medium	Medium	Medium	High	Medium	Medium
Tornado	High	High	High	High	High	High
Wildfires	Medium	Medium	Medium	Medium	Medium	Medium
Droughts/Heat Waves	Low	Low	Low	Low	Low	Low
Freeze	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Earthquakes	Low	Low	Low	Low	Low	Low
Tsunamis	Low	None	None	Low	None	Low
Sinkholes/Landslides	Moderate	Moderate	Moderate	Medium	Moderate	Moderate
Dam/Lock Hazard	High	None	None	None	None	High
Hazardous Material Incidents	Medium	Medium	Medium	Medium	Medium	Medium
Terrorism	High	High	High	Severe	High	High

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

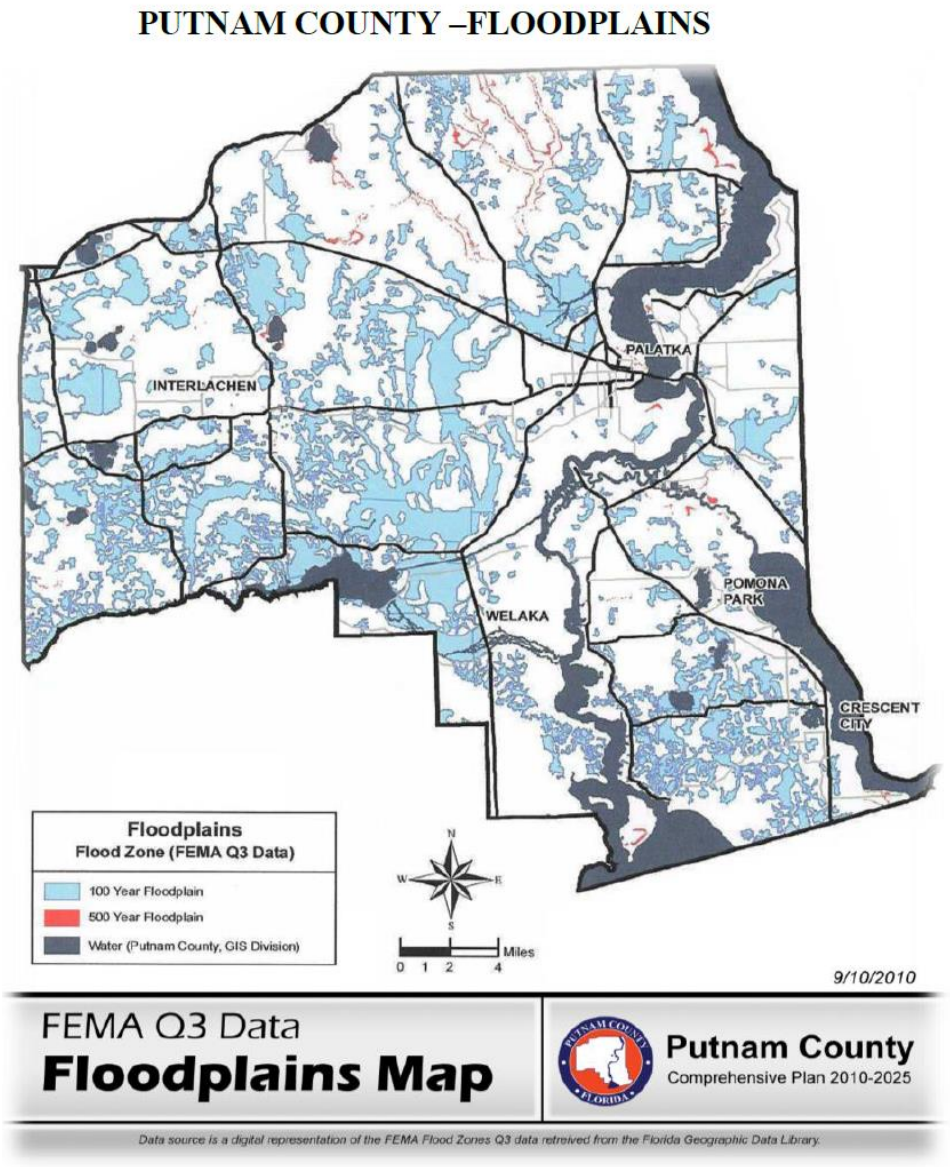
Table 19
Putnam County Multi-Jurisdictional Vulnerabilities

Hazards*	Putnam County	Crescent City	Interlachen	Palatka	Pomona Park	Welaka
Tropical Storm	Medium	Medium	Medium	Medium	Medium	Medium
Hurricane- Minor	Medium	Medium	Medium	Medium	Medium	Medium
Hurricane- Major	High	High	Medium	High	Medium	High
Storm Surge	Low	Low	None	Low	None	Low
Severe Thunderstorms	Medium	Medium	Medium	Medium	Medium	Medium
High Winds	Medium	Medium	Medium	Medium	Medium	Medium
Flooding	High	Medium	Medium	High	Medium	High
Tornado	High	High	High	High	High	High
Wildfires	High	High	High	High	Medium	High
Droughts/Heat Waves	Moderate	Moderate	Moderate	Moderate	Low	Moderate
Freeze	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Earthquakes	Low	Low	Low	Low	Low	Low
Tsunamis	Low	None	None	Low	None	Low
Sinkholes/Landslides	Moderate	Moderate	Medium	Medium	Moderate	Moderate
Dam/Lock Hazard	Medium	None	None	None	None	Medium
Hazardous Material Incidents	Medium	Moderate	Moderate	Medium	Medium	Moderate
Terrorism	Moderate	Moderate	Moderate	High	High	Moderate

* *Tropical Storms*, *Hurricane-Minor*, & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

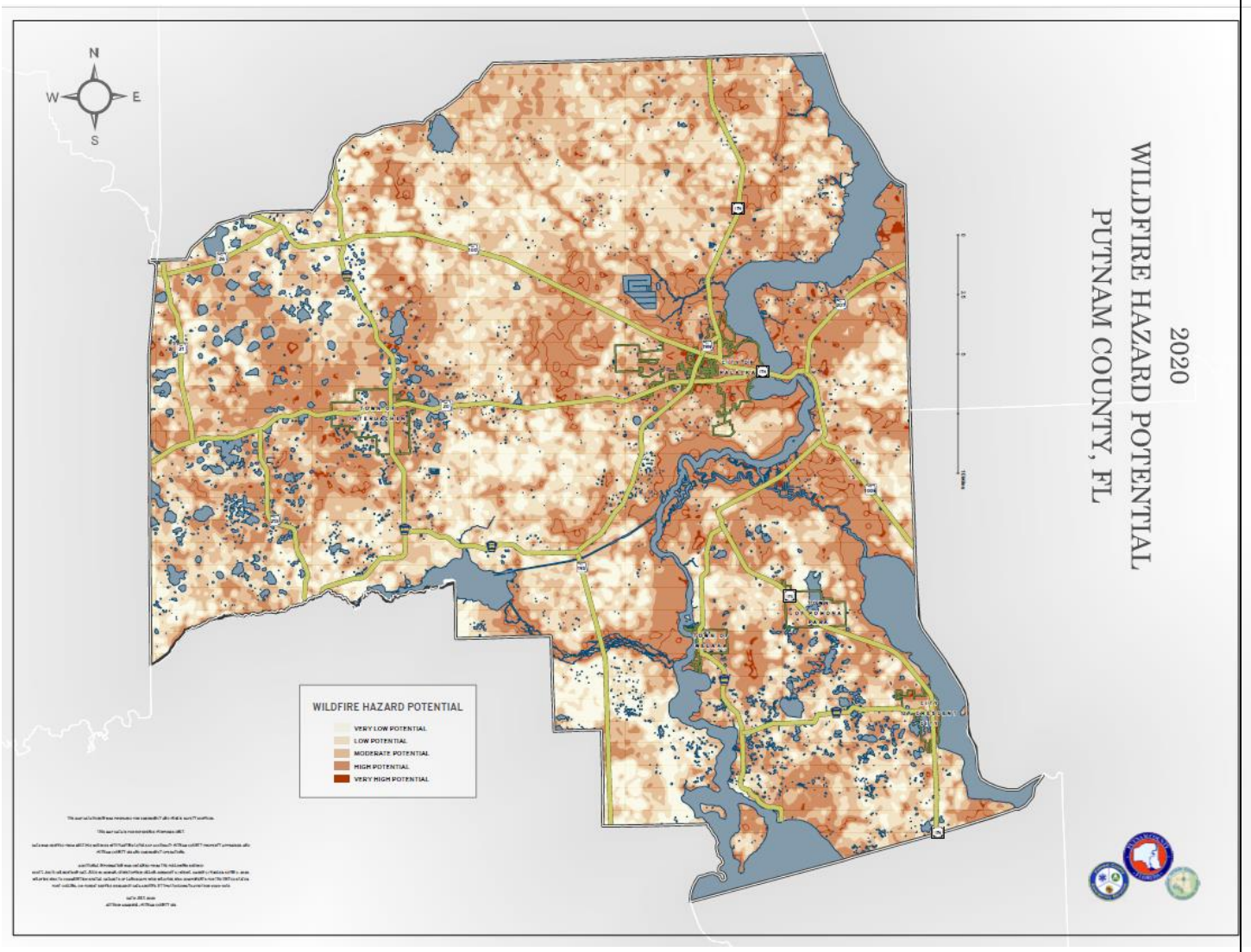
D. Hazard Maps

Putnam County FEMA Floodplains

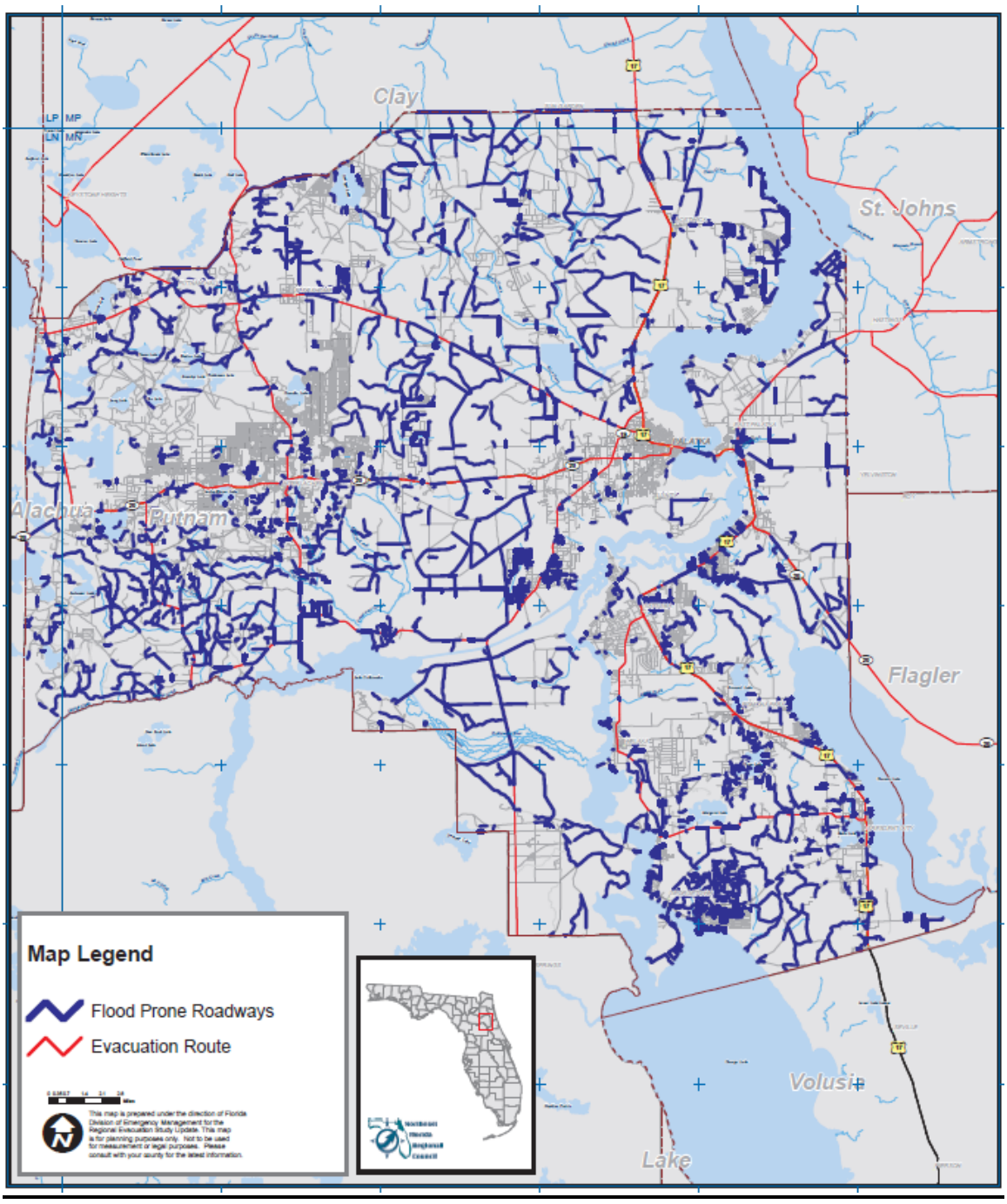


Source: Putnam County CEMP, 2018

Putnam County Wildfire Risk



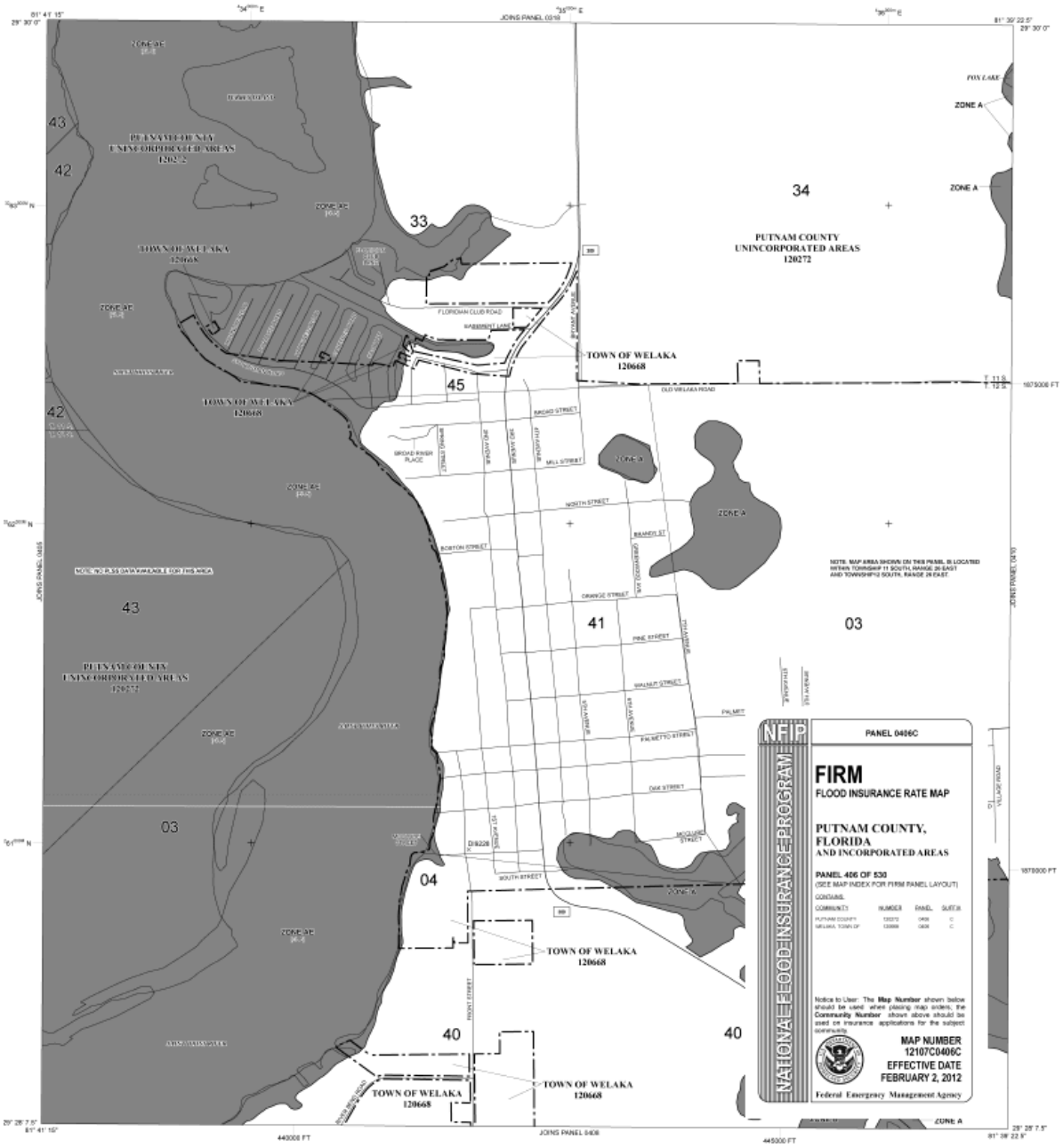
Putnam County Flood Prone Roadways



Source: Statewide Regional Evacuation Study, Map produced by NEFRC

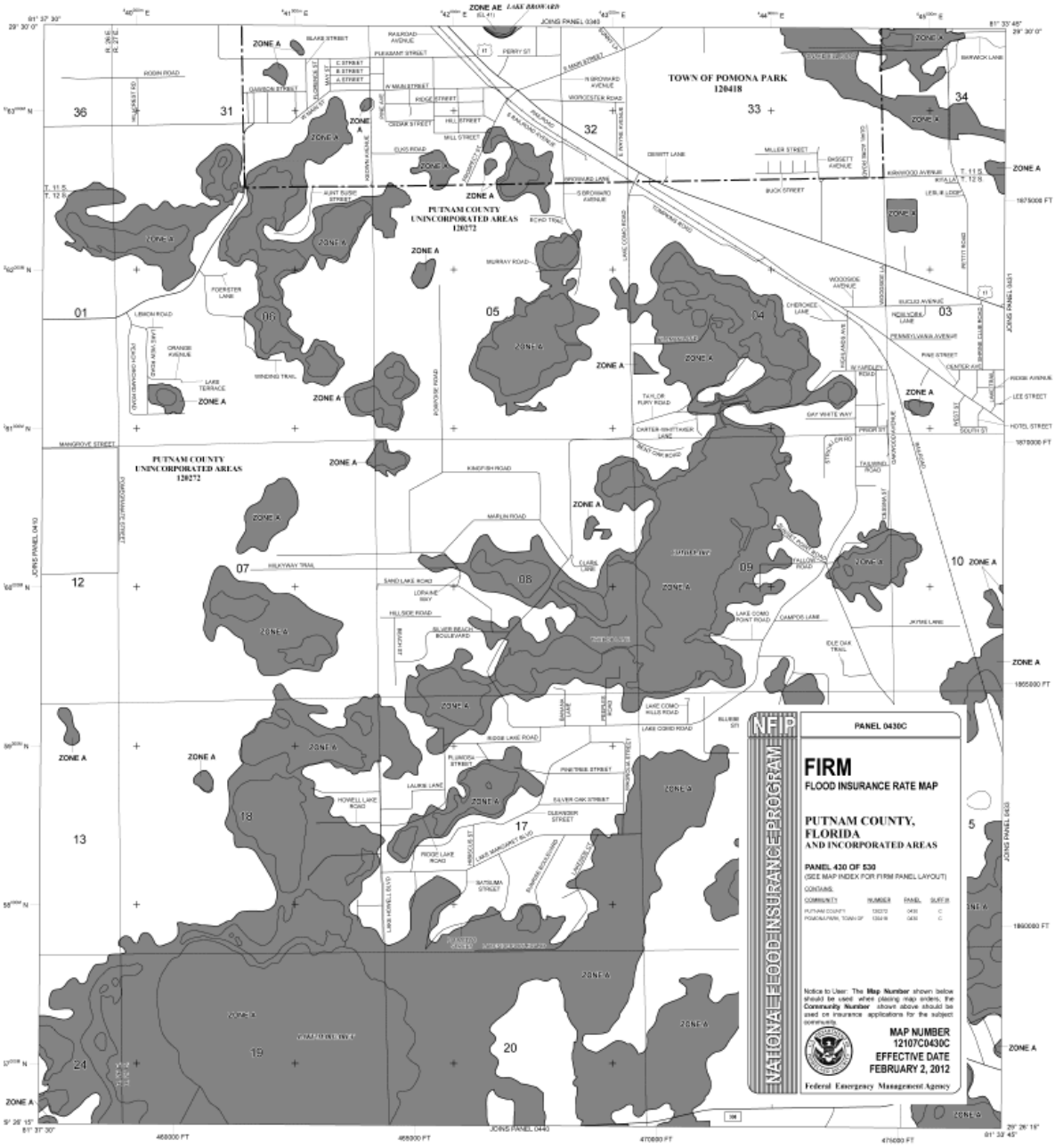
Putnam County FEMA FIRM Floodplains

Welaka, FEMA FIRM



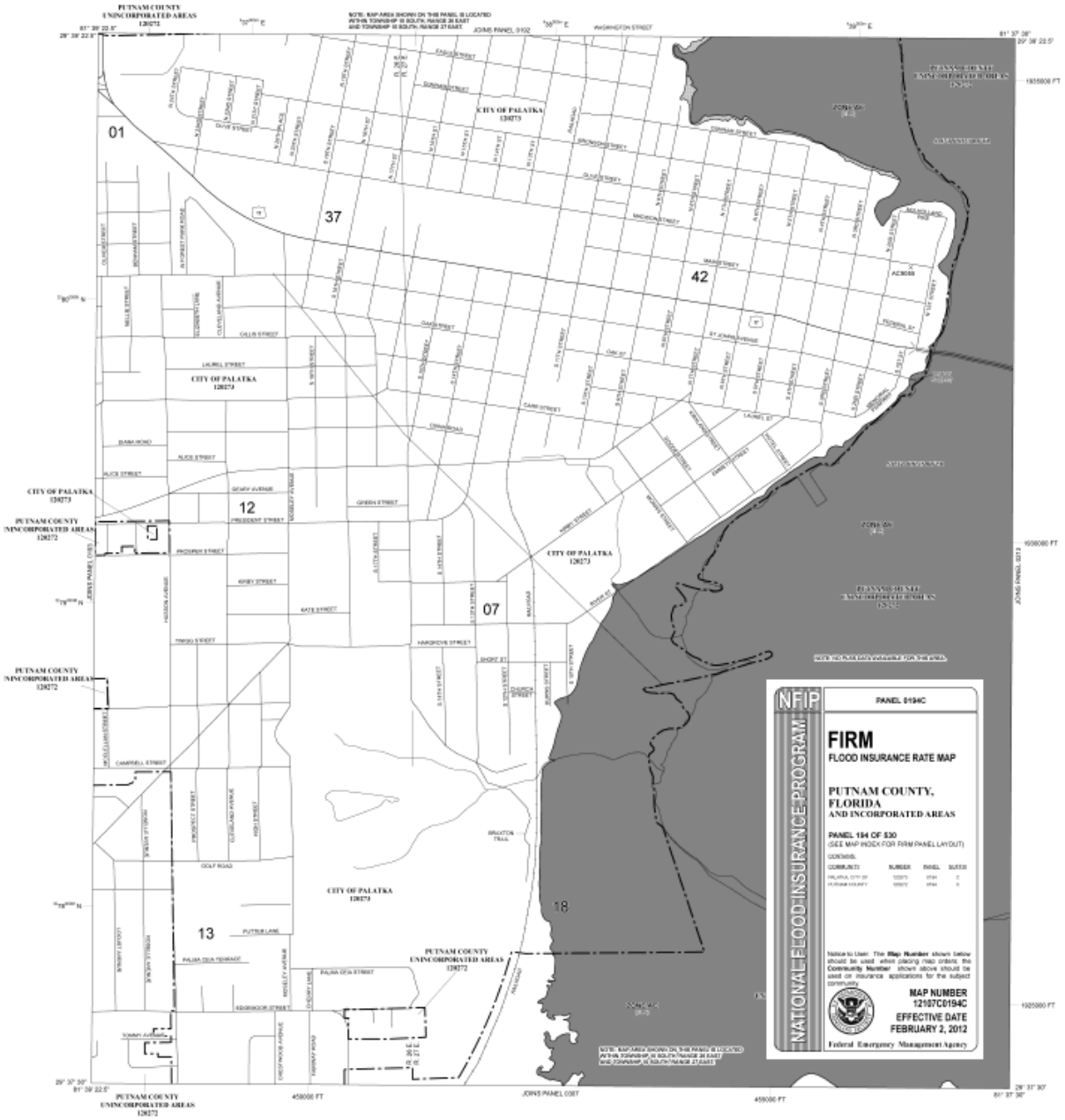
Source: https://msc.fema.gov/portal**, 2014**

Pomona Park, FEMA FIRM



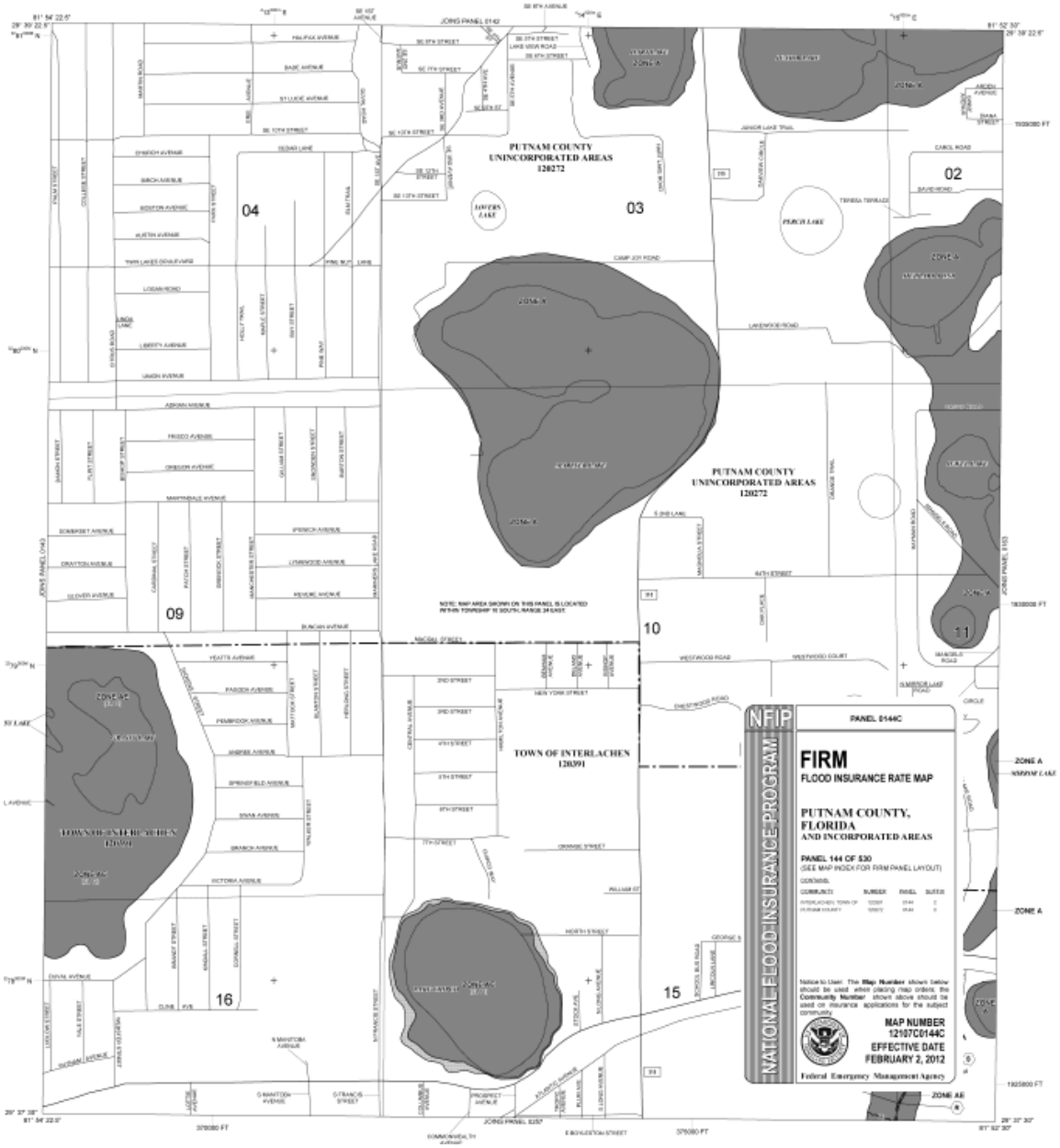
Source: https://msc.fema.gov/portal, **2014**

Palatka, FEMA FIRM



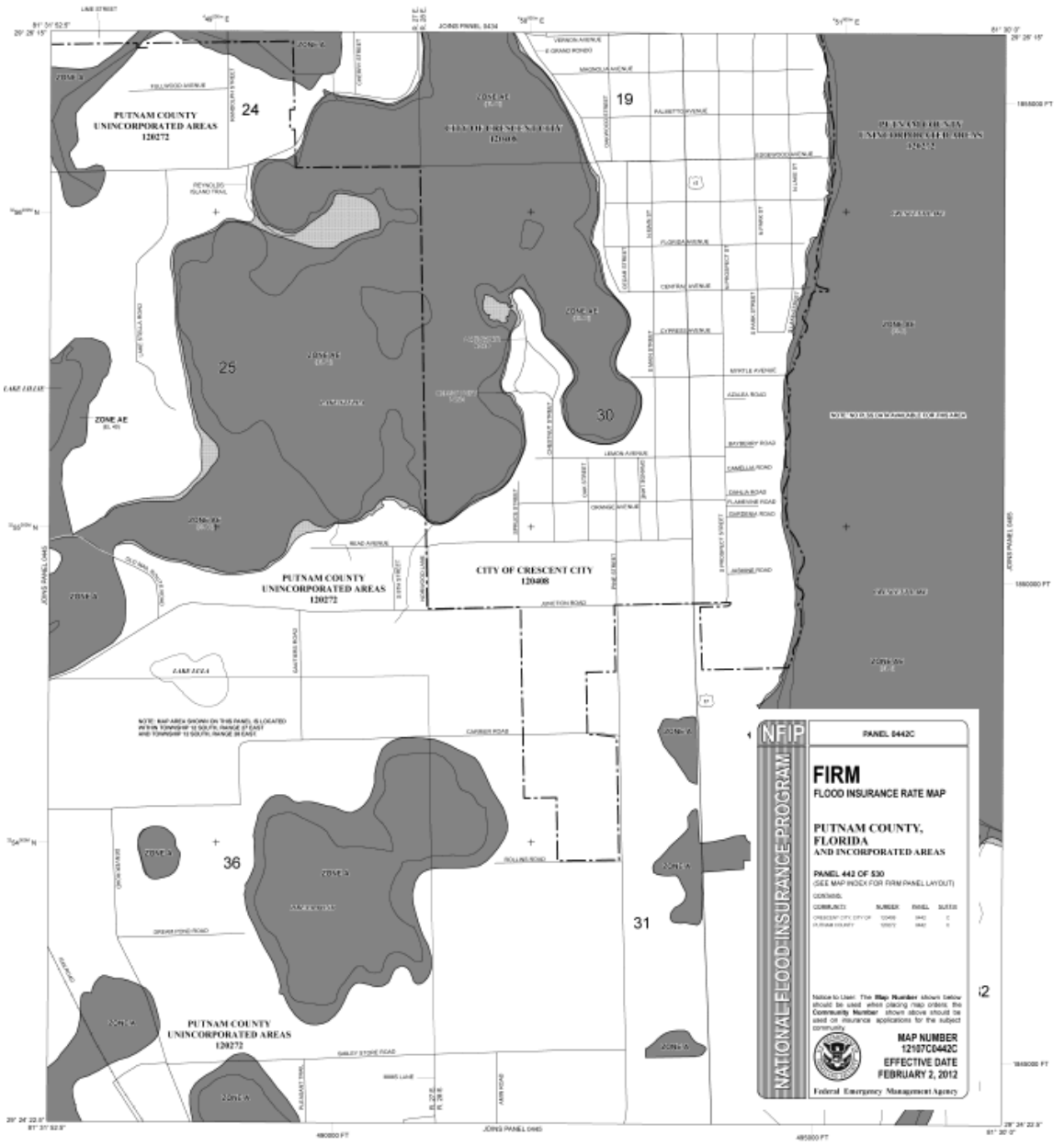
Source: https://msc.fema.gov/portal**, 2014**

Interlachen, FEMA FIRM



Source: https://msc.fema.gov/portal**, 2014**

Crescent City, FEMA FIRM



Source: https://msc.fema.gov/portal, 2014

SECTION 5: Critical Facilities/Repetitive Losses/Flood Insurance

A. Introduction

Section 5 deals with facilities/buildings that may want more attention in the mitigation process because of their potential importance or from their history of receiving significant impacts. Determining these facilities, whether as critical facilities or repetitive loss properties, can make mitigation planning more worthwhile in the situation of hazard events. This section also deals with the National Flood Insurance Program and the importance of how it mitigates towards assisting properties.

- 2015 Update

Section 5 was updated using the latest information available. The critical facilities update includes how the LMS Task Force discussed what a critical facility was and now provides a 2015 list of critical facilities by name and address. Next, the repetitive loss properties update includes a new chart providing more information than previously. Following this, Appendix C was created to supplement the repetitive loss properties with repetitive flooding roadways. This list comes from Putnam County Public Works and Putnam County Emergency Management for the purpose of naming the exact locations of the roads where flooding repetitively occurs, thus helping guide the LMS Task Force to pinpoint worthwhile flood mitigation strategies. The National Flood Insurance Program (NFIP) subsection is entirely new, as per LMS update requirements, showing information on the county's participation and continued compliance.

B. Critical Facilities

According to information from the Florida Department of Community Affairs, critical facilities are defined as: "those structures from which essential services and functions for victim survival, continuation of public safety actions, and disaster recovery are performed or provided. Supporting life-line infrastructure essential to the mission of critical facilities must also be included in the inventory when appropriate."

As per decision with the Putnam County LMS Task Force in late 2007, Critical Facilities may be considered in the following categories for the county:

Power- facilities for generation, transmission and distribution of electric power including Electrical Power Generating Plants, Substations, Major Electrical Distribution Systems/Routes

Water- facilities for the treatment, transmission and distribution of water for drinking, fire protection or electricity generation purposes including public and private potable water distribution systems, deep wells, tanks, treatment plants, and lift stations.

Sewer and Wastewater Treatment- facilities for collection, transmission, and treatment of wastewater.

Communications- facilities for transmission, switching and distribution of telephone, radio, television and cable, including government communications towers and repeaters, Emergency Alerting System (EAS) stations, telephone system points of distribution and towers, land line, cellular, microwave.

Emergency Medical Care- EMS stations and facilities which provide direct patient care to include hospitals, clinics, outpatient services and nursing homes.

Fire Protection/Emergency- fire and EMS facilities including buildings and vehicles essential to providing emergency services.

Law Enforcement- facilities including police/sheriff stations, jails, and correctional facilities.

Government- facilities necessary for continuity of government including emergency operations centers, administration, roads and bridges facilities, engineering, other public service offices.

Shelters- facilities that serve as risk/host shelters, special Needs shelters, refuges of Last Resort, animal shelters.

Vital Private/Commercial Facilities/Services- high hazard dams/dikes, hazardous materials facilities, food processing plants, fuel pipelines, terminals, storage tank farms, flood control prevention stations and devices.

Special Population Centers- facilities or areas with populations that require special considerations (nursing/convalescent/group homes, etc.)

Education- public and private schools, community colleges, universities

Emergency Response and Recovery Support- facilities such as Disaster Recovery Centers, Disaster Field Offices, Comfort Stations, Distribution Sites, Response Operations Staging Areas, Debris Removal Staging Areas

Transportation- facilities/routes such as airports/heliports, public transportation, railroad lines, commercial ports and waterways, critical links/bridges, evacuation routes/major transportation arteries.

Other Community Facilities- including churches/synagogues, motels/hotels, civic

Each local government must decide which of its facilities is critical. In light of this, Putnam County has completed an inventory of critical facilities, which it deems are necessary to provide with extra protection in the event of a natural or man-made disaster.

The following page provides a map of Putnam County's critical facilities for 2008-2009 as determined by the LMS Task Force and Putnam County Emergency Management. Appendix F provides the addresses and names of the critical facilities. This facilities list has and will be amended from time to time as needed.

Below, is a listing of how many critical facilities are estimated to be vulnerable to each identified LMS hazard. These estimates were created by reviewing hazard maps with a Putnam County critical facility layer placed on top. These structures should be included in the number and value of total structures for each hazard in Section 6.

Hurricane and other cyclonic activities- all critical facilities could be at various levels of risk

Storm Surge- estimated that approximately 7 critical facilities could be at risk

Severe Thunderstorms- all critical facilities could be at various levels of risk

High Winds- all critical facilities could be at various levels of risk

Flooding- estimated that approximately between 10 and 16 critical facilities could be at risk

Tornadoes- all critical facilities could be at various levels of risk

Wildfires- not known at this time, but estimated between 5 to all critical facilities could be at risk

Droughts/Heat Waves- based on previous occurrences this hazard wouldn't cause a major concern to structures

Freeze/Winter Storms- based on previous occurrences this hazard wouldn't cause a major concern to structures

Earthquakes- All, but based on previous occurrences this hazard wouldn't cause a major concern to structures

Tsunamis- estimated that approximately 5 critical facilities could be at risk

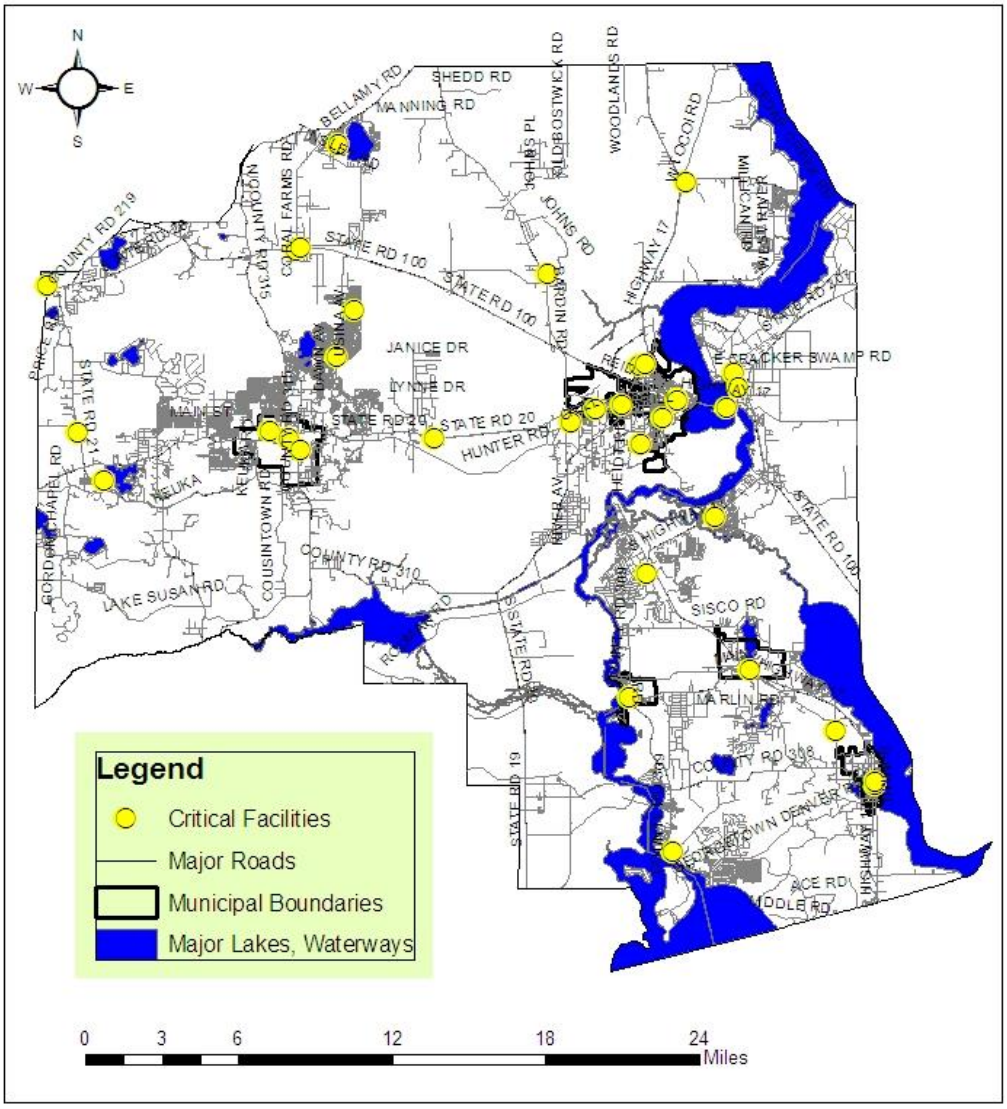
Sinkholes/Landslides- all critical facilities could be at various levels of risk; based on previous occurrences a landslide would be rare in Putnam County

Dam/Lock Hazard- estimated that approximately 1 critical facility could be at risk

Hazardous Material Incidents- all critical facilities could be at various levels of risk

Terrorism- all critical facilities could be at various levels of risk

Putnam County Critical Facilities



Critical Facilities have been defined by those supporting 911/Emergency Operations.

For additional information about critical facility sites please contact Putnam County Emergency Management Emergency Management at (386) 329-0379

C. Repetitive Flood Data

Of all the hazards, flooding is the only one that has caused documented repetitive losses to properties within Putnam County. The 2013 Community Rating System (CRS) Coordinators' Manual, defines a repetitive loss properties in the following manor:

> Repetitive loss property: a property for which two or more National Flood Insurance Program losses of at least $1,000 each have been paid within any 10 year rolling period since 1978.
>
> Severe Repetitive Loss property**:** As defined in the Flood Insurance Reform Act of 2004, those 1–4 family properties that have had four or more claims of more than $5,000 or two to three claims that cumulatively exceed the building's value. For the purposes of the CRS,non-residential buildings that meet the same criteria as for 1–4 family properties are considered Severe Repetitive Loss properties.

While Putnam County has properties that meet the definition of "repetitive loss." FEMA and FDEM have not reported any properties in Putnam County that meeting the definition of severe repetitive loss.

That said, numerous areas throughout the county have experienced repetitive flooding from heavy rainfall. This has caused damage to buildings, homes, roads, and other infrastructure. Some flooding in Putnam County is associated with overflows along the St. Johns River and its tributaries, and other flooding events are associated with ponding of water within low-lying areas. According to the Putnam County Planning and Development Department *(May 2009),* the county has approximately 10,732 homes in the 100-year floodplain (zones A & AE), 645 homes in the 500-year floodplain (zone X500), 4,416 mobile homes in the 100-year floodplain, and 255 mobile homes in the 500-year floodplain. Historically, in Putnam County, one of the well-known areas with repetitive flooding is the Satsuma and Welaka areas south of Palatka.

A repetitive loss property, eligible for the flood mitigation assistance program, is a structure covered by a contract for flood insurance made available under the NFIP that:

> (a) Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
> (b) At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

Table 1, on the following page provides a summary of repetitive losses for Putnam County. Specific information, such as property addresses are considered confidential and thus additional details are only presented in a summarized form. For more information on known flood hazard areas, see "flooding" in Section 4 "Hazards" and Appendix C of the LMS. Appendix C was created to supplement the repetitive loss properties with

repetitive flooding roadways. Repetitive loss property's exact locations have been reviewed within a FEMA FIRM by Putnam County Emergency Management.

The image below is the Repetitive Loss Information for Putnam County provided by FEMA in September of 2019. As of April 30, 2020, Putnam County has 1,257 NFIP policies that generate $810,339 in annual premiums, resulting in a total insurance coverage of $254,976,100.

In 2020, The Putnam County Floodplain Administrator reports a total of 48 repetitive loss properties in Putnam County of which all have at least two losses. All of these properties are classified residential.

Table 1
Repetitive Losses for Putnam County as of 9/30/19

Repetitive Loss Properties by Geographic Area / Jurisdiction	**Number of Properties**
Crescent City	2
East Palatka	7
Georgetown	2
Green Cove Springs	2
Interlachen	1
Palatka	8
San Mateo	4
Satsuma	12
Welaka	10
PUTNAM COUNTY TOTAL	**48**

Source: FDEM (2019)

In 2020, The Putnam County Floodplain Administrator reports a total of 484 historical repetitive loss claims in property in Putnam County within the following justifications / geographic areas. At the time of reporting all claims are classified as residential.

Table 2
Historical Repetitive Losses for Putnam County as of 9/30/19

2020 Historical Repetitive Loss Claims	
Jurisdiction / Geographic Area	**Total**
Lake Ida	1
Melrose	1
Palatka	66
Salt Springs	2
San Mateo	34
Satsuma	89
Welaka	93
Bostwick	3
Crescent City	39
East Palatka	87
Florahome	4
Fruitland	2
Georgetown	31
Green Cove Springs	12
Hawthorne	5
Interlachen	15
	484

D. National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP) is a pre-disaster flood hazard mitigation and insurance protection program which has reduced the increasing cost of disasters *(A Local Official's Guide to Implementing the National Flood Insurance Program in Florida, 2009*). The intent of the program is to: require new and substantially improved structures be designed and constructed to minimize or eliminate future flood damage; provide floodplain residents and business owners with financial insurance assistance in the form of insurance after floods, especially after small floods that do not warrant federal disaster assistance; and it transfers most of the cost of private property flood losses from the taxpayers to floodplain property owners through flood insurance premiums. Participation in the NFIP is based on an agreement between communities and FEMA *(FEMA, 2009)*. Currently, Putnam County and all jurisdictions in Putnam County including: Palatka, Crescent City, Pomona Park, Welaka and Interlachen are active participants of the NFIP. The initial dates the FIRM and FHBM were implemented in the jurisdictions is listed in the table below. See Table 3 and 4 for Putnam County NFIP data, such as the number of policies, losses, total payments, etc.

Table 2
NFIP Data for Putnam County

Policy (as of 10/31/14)

	INIT FHBM	**INIT FIRM IDENTIFIED**	**REG-EMER DATE**
Putnam County	1/10/1975	9/16/1981	9/16/1981
Crescent City	12/3/1976	12/18//1979	12/18/1979
Interlachen	12/3/1976	12/4/1979	12/4/1979
Palatka	7/19/1974	6/4/1980	6/4/1980
Pomona Park	5/26/1978	12/4/1979	12/4/1979

*All above jurisdictions current effective FIRM map date is 2/12/2012
Source: FEMA, 2014

Table 3
NFIP Policy Data for Putnam County

Policy (as of 10/31/14)

	Policies In-force	**Insurance In-force whole $**	**Written Premium In-force $**
Putnam County	1,379	257,397,900	815,613
Crescent City	8	1,794,900	6,809
Interlachen	6	925,000	3,185
Palatka	37	12,419,300	31,089
Pomona Park	6	1,656,600	2,614

Source: FEMA, 2014

Policies In-force: number of NFIP flood insurance policies
Insurance In-force whole $: value of building and contents insured by the NFIP
Written Premium In-force: total premiums paid for NFIP insurance policies

Table 4
NFIP Loss Data for Putnam County

Losses (as of 10/31/14)

	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
Putnam County	127	127	0	0	1,541,675
Crescent City	3	3	0	0	66,766
Interlachen	1	1	0	0	0
Palatka	4	1	1	1	66,596
Pomona Park	1	0	0	0	0

Source: FEMA, 2014

Total Losses: number of flood insurance claims filled by policyholders
Closed Losses: number of flood insurance claims paid to policyholders
Open Losses: claims that are still being processed
CWOP Losses: claims that were "closed without payment"
Total Payments: total dollars paid to policyholders

In Putnam County, floodplain management provisions are integrated into the land development code and some design requirement ordinances. As of 2007, the county does have more restricted floodplain requirements than the basic NFIP standards, including additional marine structure requirements and certain requirements for structures over 600 feet *(DEM, 2009 and Putnam County Planning & Development Department, 2009)*. In the county, the Certified Floodplain Administrator is a Plans Examiner for Putnam County that has received CFM Certification .

The county and its jurisdictions have and will continue compliance with the NFIP and other flood mitigation purposes. To do this the Putnam County Planning and Development Department *(2009)* encourages additional surveys for proposed development in floodplains, provides reference material and maps dealing with flooding in their office and on their website for the public, and the department conducts internal flood training programs for staff members. On 9/20/2006 the county had a community assistant visit *(FEMA, 2009)*.

To supplement the county goals, each LMS participating jurisdiction will continue NFIP compliance by:

1. Continuing to notify the public when changes to Flood Insurance or the floodplain ordinance have been proposed.

2. Continuing to promote Flood Insurance for all properties.

3. Continuing to update all records and maps pertaining to floodplains and floodplain developments.

E. Flood Insurance Rate Maps (FIRMs)

A Flood Insurance Rate Map is the "official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community" (FEMA, 2009). FIRMs are both useful for private citizens, community officials and lending institutions in that they can be utilized to locate properties and buildings to determine the amount of flood risk, or whether insurance is required.

Physically, FIRMS are available for public viewing at the Putnam County Planning and Development Service Office. The effective date of all 106 total FIRMs in Putnam County is February 2, 2012.

F. Community Assistance Visit (CAV)

The purpose of a community assistance visit is to ensure that the flood ordinance and floodplain management regulations are up to the State of Florida standard. The most recent CAV visit to Putnam County was on September 11, 2014. The CAV prior was conducted on September 9, 2006. During this visits County floodplain management regulations were reviewed along with County completion of a detailed questionnaire.

The original County floodplain ordinance was adopted September 11, 2007, and the current flood plain ordinance that is in effect was adopted by Putnam County Board of County Commissioners in September 2013.

SECTION 6: Other Vulnerabilities and Estimates

A. Introduction

When determining a hazard's geographical areas of vulnerability that are based on scientific measurements, it is also important to understand what exactly is located in that spatial area and how it could be affected. This section is dedicated to figuratively zooming into a hazard map to see how property, infrastructure, and building structures may be affected by impacts, and to help determine possible estimated costs of these impacts on the community using the *MEMPHIS data.* Please refer to Section 4 Hazards for updates to some of these estimates. With critical facilities and repetitive loss properties previously discussed, this section will deal with properties, infrastructure, and building structures located in flood zones, at the urban/wildland interface, within the zone of vulnerability of a facility containing hazardous materials, and within other locations that may be determined vulnerable throughout the identification process.

To identify the number and value of structures/infrastructure that may be affected by hazards, Putnam County used data provided from an effort between the State of Florida Department of Community Affairs and Kinetic Analysis Corporation called MEMPHIS (Mapping for Emergency Management, Parallel Hazard Information System). This MEMPHIS system uses data from the U.S. Census Bureau, the Florida Department of Revenue, and other federal and state agencies to provide an inventory of the total number and cost of structures that are potentially vulnerable to a number of the identified hazards. Further explanations on how this methodology was constructed are found within each identified individual hazard in this section. For more information on this system see *http://lmsmaps.kinanco.com/*. **Because new MEMPHIS data is no longer available to Putnam County for the 2015 plan update, most information contained in this section is based on 2009 data analysis.**

County specific hazard information, such as dam/lock hazards and hazardous materials incidents, was provided in county plans, including the "Emergency Action Plan for Kirkpatrick Dam" *(2007)* and the "Putnam County CEMP appendix for Hazardous Materials" *(2007)* to determine a number of vulnerable structures. For additional hurricane impact information, Florida Hurricane Catastrophe Fund *(2008)* information and U.S. Army Corps of Engineers *(2009)* information was incorporated. Also, Putnam County Planning and Zoning Department *(2009)* information and Putnam County Property Appraiser *(2009)* information has been used throughout the section.

Information on the estimated number of vulnerable structures and their costs were attempted to be provided for all the LMS's identified hazards for all jurisdictions. For a few hazards, such as Drought/Heat Wave, estimated structures and structure cost weren't included because impacts to structures from these hazards aren't a grave concern or

occurrence. Other hazards, such as earthquakes, estimated structures affected were included, but costs weren't because the impact to structures would probably be very insignificant to Putnam County, thus making exposure costs unnecessary. Also, some hazards, such as storm surge and tsunamis, don't include estimated structures and structure costs because Putnam County is unique in regards to the St. Johns River and the models reviewed don't take that into consideration (i.e. Putnam County is an inland county, but the St. Johns River, which mouth opens into the Atlantic Ocean, functions less as a river and more like a lagoon that is strongly influenced by tides from the Atlantic Ocean between Putnam County and Duval County).

A very important note to make about the chart's information is that the exposure amounts (the total value of the structure) are estimates for a total failure of all structures/infrastructures (not including clean-up, etc.), which is extremely unlikely (probably even impossible) to occur from the hazards identified. As Kinetic Analysis Corporation said, "It is important to realize that at the state level in particular, no single storm could produce the damage seen here. In other words, these are the exposures and damages at risk from all storms of this category, not from any single event." These estimates should be used as a guide toward discovering areas that may want to receive more mitigation measures, and not as exact measurements.

Throughout this section, one may see several abbreviations in the charts. To describe structure units the following abbreviations were included: SF Res = Single Family Residents, Mob Home = Mobile Home, MF Res = Multi Family Residents, and Gov/Instit = Government and Institutional Structures. Also, some monetary units have abbreviations such as TH = in thousands of dollars, MI = in millions of dollars, and BI = in billions of dollars.

Note: *For all MEMPHIS data provided from here on out, the word "structure" also includes infrastructure for "commercial" and "governmental" information.* Putnam County has little knowledge on how "infrastructure" counts and values were included in "structure" counts and values for these two categories; therefore we can't describe this process. When this information is clarified it will be incorporate in a future update.

This section's purpose is to mainly provide estimates of vulnerability in terms of structures. For other vulnerability information see Sections 4, 5, and Appendix B. All maps in this section are provided by the MEMPHIS system.

Putnam County realizes that estimated costs and numbers of structures that could potentially be impacted by hazards is an important part of a vulnerability assessment, therefore the county will continue the quest to provide the most accurate information that is retrievable. In a future update, this will be done by incorporating two other aspects into the plan. The first is to use the methodology based on FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA 386-2), which will help the county estimate potential hazard losses that are currently not included. Second, the county plans to incorporate FEMA provided HAZUS-MH software (Hazards U.S./Multi-

Hazards) that has been developed specifically to complete risk assessments for earthquakes, floods, and hurricanes. This information will include housing stock and property values, in addition to numerous other data. By incorporating these aspects, the county feels that we will greatly benefit from a better understanding of our community's vulnerability, therefore allowing the LMS Task Force to make even more meaningful mitigation strategies.

B. Putnam County Land Value Totals

Before determining structural costs (exposure) and losses in accordance to hazards, it is important to have an overview of how the county's comprehensive land use value is constructed as a whole. This will allow a better understanding for determining mitigation strategies in terms of relative total damages. (Note: These values are different from MEMPHIS' and are more recent.) Table 1 below provides the most recent Taxable Land Value Totals *(July 1, 2009)* for Putnam County as provided by the Putnam County Property Appraisers office.

Table 1
Putnam County Taxable Land Value Totals (as of July 2009)

Residential	Commercial	Industrial	Agricultural	Institutional	Governmental	Non AG & Other	Total
$2,301,020,427	$330,265,179	$150,782,664	$63,214,265	$31,639,150	$4,862,584	$210,198,007	$3,091,982,276

Source: Putnam County Property Appraisers Office, July 2009

C. Other Vulnerabilities by Hazards

1. Hurricanes and other cyclonic activity

Putnam County is an inland county with a minimal area susceptible to storm surge, but all of the county and its jurisdictions are vulnerable to high wind and excessive rainfall from hurricanes and other cyclonic activities that pass through or close to the county. All structures are susceptible to impacts of hurricanes and other cyclonic activities, especially buildings in floodplains and unsound housing or mobile homes. See hazards *storm surge*, *flooding*, and *tornadoes* for additional information dealing with structures affected by cyclonic activity. Table 2 gives an overview of what the 2008 Florida Hurricane Catastrophe Fund estimates the amount of property exposure and properties at risk from hurricanes for Putnam County.

Table 2
Property Exposure and Properties at Risk from Hurricanes for Putnam County (as of 3/31/08)

	Commercial	Residential	Mobile Home	Tenants	Condo Owners	Total	%of Total
Exposure	39,646,950	3,814,214,262	657,343,903	20,098,317	9,544,707	4,540,848,139	0.22%
Risks	64	13,189	8,753	846	111	22,963	0.36%

Source: Florida Hurricane Catastrophe Fund, 2008

Most hurricane experts feel we are entering a period of increased hurricane formation similar to the levels seen in the 1920s and 1940s. Current hurricane risk calculations are complicated by climatic factors suggesting the potential for even greater hurricane frequency and severity in the world's hurricane spawning grounds. Since 1995, there have been 62 Atlantic hurricanes, 12 of which occurred in 2010 alone. Global warming may cause changes in storm frequency and the precipitation rates associated with storms. A modest 0.9 degree Fahrenheit (0.5 degree centigrade) increase in the mean global temperature will add 20 days to the annual hurricane season, and increase the chances of a storm-making landfall on the U.S. mainland by 22%. The warmer ocean surface will also allow storms to increase in intensity, survive in higher latitudes, and develop storm tracts that could shift farther north, producing more U.S. landfalls. Currently an average of 1.6 hurricanes strikes the U.S. every year. Major (Category 4 or 5 on the Saffir-Simpson scale) hurricanes strike the U.S. on the average of one every 5.75 years. Annually, hurricanes are estimated to cause approximately $1.2 billion in damages. The proximity of dense population to the Atlantic Ocean, as well as the generally low coastal elevations, significantly increases the County's vulnerability. The potential for property damage and human casualties in Putnam County has increased over the last several decades primarily because growth this county has experienced, particularly along the vulnerable St. Johns River bank.

Hurricane damage is caused by two factors:

- High winds
- Storm surge

In the Local Mitigation Strategy both Storm Surge and High Winds are identified as hazards that are a result of Hurricanes. These two hazards vulnerability will be discussed here under the title hurricane.

High Winds

Generally, it is the wind that produces most of the property damage associated with hurricanes, while the greatest threat to life is from flooding and storm surge. Although hurricane winds can exert tremendous pressure against a structure, a large percentage of hurricane damage is caused not by wind, but from flying debris. Tree limbs, signs and sign posts, roof tiles, metal siding, and other lose objects can become airborne missiles that penetrate the outer shells of structures, destroying their structural integrity and allowing the hurricane winds to act against interior walls not designed to withstand such forces. Once a structure's integrity is breached, the driving rains associated with

hurricanes can enter the structure and completely destroy its contents. Hurricane winds are unique in several ways:

- They are more turbulent than winds in most other type storms
- They are sustained for a longer period of time (several hours) than any other type of atmospheric disturbance structure and completely destroy its contents.
- They are more turbulent than winds in most other type storms
- They are sustained for a longer period of time (several hours) than any other type of atmospheric disturbance
- They slowly change direction, thus they are able to penetrate the most vulnerable portion of a given structure.
- They generate large quantities of flying debris as the built environment is progressively damaged, thus amplifying their destructive power.

In hurricanes, gusts of wind can be expected to exceed the sustained wind velocity by 25 to 50 percent. This means a hurricane with sustained winds of 150 mph will have wind gusts exceeding 200 mph. The wind's pressure against a fixed structure increases with the square of the velocity. For example, a 100 mph wind will exert a pressure of approximately 40 lbs per square foot on a flat surface, while a 190 mph wind will exert a force of 122 lbs per square foot on that same structure. In terms of a four by eight foot sheet of plywood nailed over a window, there would be 1,280 lbs of pressure against this sheet in a 100 mph wind, and 2,904 lbs or 1.95 tons of pressure against this sheet in a 190 mph wind. The external and internal pressures generated against a structure vary greatly with increases in elevation, shapes of buildings, openings in the structures, and the surrounding buildings and terrain. Buildings at ground level experience some reductions in wind forces simply because of the drag exerted by the ground against the lowest levels of the air column.

The wind stream generates uplift as it divides and flows around a structure. The stream following the longest path around a building, generally the path over the roof, speeds up to rejoin the wind streams following shorter paths, generally around the walls. This is the same phenomena that generate uplift on an aircraft's wing. The roof, in effect, becomes an airfoil that is attempting to take off from the rest of the building. Roof vortexes generally concentrate the wind's uplift force at the corners of a roof. These key points can experience uplift forces two to five times greater than those exerted on other parts of the roof. Once the envelope of the building has been breached through the loss of a window, door, or roof damage, wind pressure on internal surfaces becomes a critical factor. Openings may cause pressurizing or depressurizing of a building. Pressurizing pushes the walls out, while depressurizing will pull the walls in. Damages from internal pressure fluctuations may range from blowouts of windows and doors to total building collapse due to structural failure. During Andrew, catastrophic failure of one and two-story wood-frame buildings in residential areas was observed more than catastrophic failures in any other type of building. Single-family residential construction is particularly vulnerable because less engineering oversight is applied to its design and construction. As opposed to hospitals and public buildings which are considered fully engineered, and office and industrial buildings which are considered "marginally engineered," residential construction is considered "nonengineered."

Historically, the bulk of wind damage experienced nationwide has occurred to residential construction. Fully engineered construction usually performs well in high winds due to the attention given to connections and load paths.

Hurricane winds generate massive quantities of debris, which can easily exceed a community's entire solid waste capacity by three times or more. This debris can cause environmental concerns due to the nature of the debris, some of which will be considered hazardous materials. The debris will also likely block roads, thus impacting recovery.

The City of Palatka and its location on the St. Johns River leaves it vulnerable to the high winds of hurricanes. Given much of the construction of buildings precede current Florida building code standards, structures and infrastructure is particularly vulnerable to hurricane damage. In addition the County population living near the St. Johns River and canals that access the St. Johns River, especially those in mobile/manufactured homes, and older structures are vulnerable to the effects of high wind if they do not evacuate when ordered to do so by officials.

Storm Surge

Along the coast, storm surge is often the greatest threat to life and property from a hurricane. In the past, large death tolls have resulted from the rise of the ocean associated with many of the major hurricanes that have made landfall. Hurricane Katrina (2005) is a prime example of the damage and devastation that can be caused by surge. At least 1500 persons lost their lives during Katrina and many of those deaths occurred directly, or indirectly, as a result of storm surge.

Storm surge is an abnormal rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge should not be confused with storm tide, which is defined as the water level rise due to the combination of storm surge and the astronomical tide. This rise in water level can cause extreme flooding in coastal areas particularly when storm surge coincides with normal high tide, resulting in storm tides reaching up to almost 15 feet or more in some cases.

The maximum potential storm surge for a particular location depends on a number of different factors. Storm surge is a very complex phenomenon because it is sensitive to the slightest changes in storm intensity, forward speed, size (radius of maximum winds), angle of approach to the coast, central pressure, and the shape and characteristics of the river bank.

The location of structures in the City of Palatka and the Town of Welaka and Georgetown are most vulnerable from storm surge. Residential homes and commercial business are both at risk. US/SR 19 near the Memorial Bridge and Dunns Creek Bridge is vulnerable to category 1-5 storm surge. Due to the geographical location of the City of Palatka and the Town of Welaka and the unincorporated area of Georgetown and San Mateo and Satsuma numerous residential homes, business and infrastructure is vulnerable to storm surge.

The people living in structures located in areas described above and noted in the storm surge map in Section 4 of this plan are susceptible to effects of storm surge if they do not evacuate when order to do so by officials.

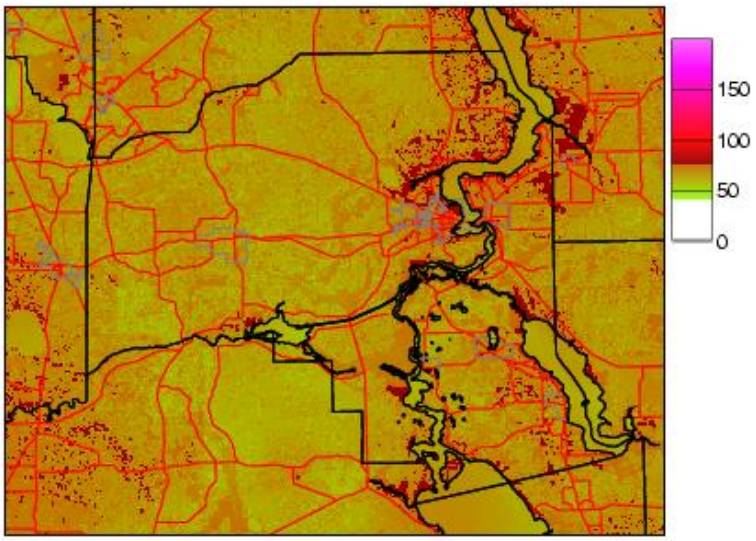
The widely accepted model that was developed by the National Oceanic and Atmospheric Administration, and used by the National Hurricane Center, is called the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model in section 4 of this plan illustrates the storm surge potential in Putnam County. Additional resources are available to individuals to determine if their homes or business are vulnerable to storm surge.
For more information on storm surge locations in Putnam County visit:
http://gis.putnam-fl.com/IMapFAPublic/
http://map.floridadisaster.org/GATOR/map.html

The following information is organized based upon the Kinetic Analysis Corporation's MEMPHIS data from a Category 1 Hurricane to a Category 5. Putnam County currently has no estimates of structure exposure, structure loss, and structures at risk from tropical depressions, tropical storms, subtropical depressions, and subtropical storms. When this information is collected and created, it will be included in a future LMS update.

The Kinetic Analysis Corporation said these hurricane risk assessment projections are based off of the threat of wind *(created using data of maximum peak one minute sustained winds estimated to be produced- based off the Saffir Simpson categories, measured in miles per hours)* and flood damage *(created using data of maximum peak water levels estimated to be produced- based off the Saffir Simpson categories, measured in feet).*

Each category of hurricane first includes a vulnerability map created by Kinetic Analysis Corporation, shown through plotting wind speed by miles per hour. Next is a table dedicated to determining structures at risk to wind and flooding for each jurisdiction. Then there is a table that gives exposure (value of structure at risk) and estimated structural losses (damage cost to structures) for each jurisdiction. In the charts Lower Winds = below 74 mph, Hurricane Winds = between 75 mph to 110 mph, and Extensive Winds = above 111 mph.

Category 1 Hurricane



Wind speed in miles per hour.
Offshore data masked at –100 ft.

Table 3
Category 1 Hurricane: Structures at Risk in Putnam County

		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit
Putnam County	Lower Winds	16,036	14,250	2,651	3,139	2,802	1,365
	Hurricane Winds	946	591	115	188	163	83
	Flooding	2	1	1	0	0	0
Crescent City	Lower Winds	629	53	96	201	62	61
	Hurricane Winds	12	0	2	0	0	0
	Flooding	0	0	0	0	0	0
Interlachen	Lower Winds	283	305	35	55	18	50
	Higher Winds	0	0	0	0	0	0
	Flooding	0	0	0	0	0	0
Palatka	Lower Winds	3,107	224	388	909	122	361
	Hurricane Winds	298	13	23	44	5	42
	Flooding	0	0	0	0	0	0
Pomona Park	Lower Winds	249	156	23	17	27	25
	Hurricane Winds	1	0	0	0	0	0
	Flooding	0	0	0	0	0	0
Welaka	Lower Winds	145	143	45	54	4	26
	Hurricane Winds	0	0	0	0	0	0
	Flooding	0	0	0	0	0	0

Table 4

Category 1 Hurricane: Property Exposure and Loss for Putnam County

Putnam County

	Exposure	Loss	% Loss
SF Res	$3.38 BI	$25.03 MI	0.7%
Mob Home	$1.31 BI	$50.74 MI	3.9%
MF Res	$202.00 MI	$1.51 MI	0.7%
Commercial	$937.49 MI	$8.21 MI	0.9%
Agricultural	$1.47 BI	$10.01 MI	0.7%
Gov / Instit	$705.38 MI	$4.53 MI	0.6%

Palatka

	Exposure	Loss	% Loss
SF Res	$508.06 MI	$4.79 MI	0.9%
Mob Home	$17.59 MI	$869.83 TH	4.9%
MF Res	$57.84 MI	$443.53 TH	0.8%
Commercial	$251.81 MI	$2.24 MI	0.9%
Agricultural	$441.30 MI	$4.00 MI	0.9%
Gov / Instit	$16.22 MI	$133.90 TH	0.8%

Crescent City

	Exposure	Loss	% Loss
SF Res	$103.66 MI	$851.61 TH	0.8%
Mob Home	$4.88 MI	$238.75 TH	4.9%
MF Res	$20.79 MI	$211.85 TH	1.0%
Commercial	$74.66 MI	$624.60 TH	0.8%
Agricultural	$53.33 MI	$397.57 TH	0.7%
Gov / Instit	$16.39 MI	$131.52 TH	0.8%

Pomona Park

	Exposure	Loss	% Loss
SF Res	$41.13 MI	$303.19 TH	0.7%
Mob Home	$13.77 MI	$646.65 TH	4.7%
MF Res	$1.05 MI	$6.02 TH	0.6%
Commercial	$3.20 MI	$22.62 TH	0.7%
Agricultural	$7.00 MI	$53.77 TH	0.8%
Gov / Instit	$6.03 MI	$56.30 TH	0.9%

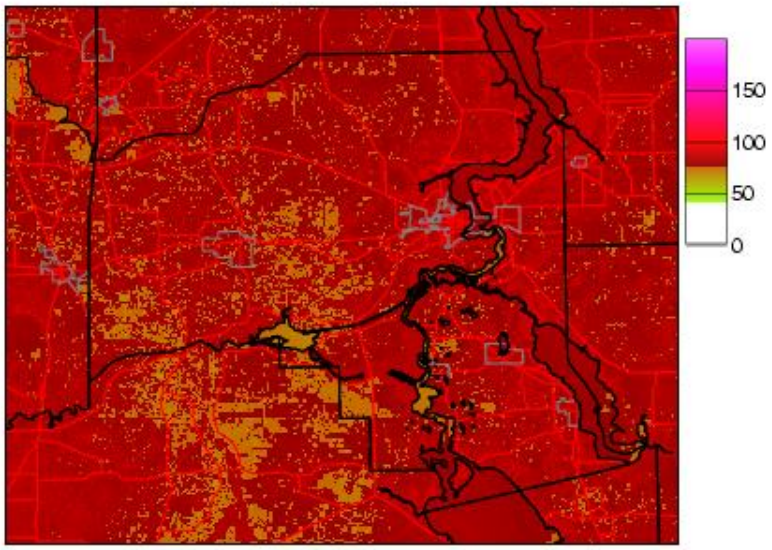
Interlachen

	Exposure	Loss	% Loss
SF Res	$53.24 MI	$228.96 TH	0.4%
Mob Home	$22.61 MI	$734.01 TH	3.2%
MF Res	$541.79 TH	$2.75 TH	0.5%
Commercial	$19.92 MI	$110.10 TH	0.6%
Agricultural	$18.65 MI	$89.76 TH	0.5%
Gov / Instit	$2.83 MI	$15.32 TH	0.5%

Welaka

	Exposure	Loss	% Loss
SF Res	$24.58 MI	$96.22 TH	0.4%
Mob Home	$13.15 MI	$359.28 TH	2.7%
MF Res	$5.23 MI	$16.55 TH	0.3%
Commercial	$7.72 MI	$28.12 TH	0.4%
Agricultural	$8.26 MI	$30.19 TH	0.4%
Gov / Instit	$592.30 TH	$2.90 TH	0.5%

Category 2 Hurricane



Wind speed in miles per hour.
Offshore data masked at –100 ft.

Table 5
Category 2 Hurricane: Structures at Risk in Putnam County

		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit
Putnam County	Lower Winds	16,036	14,250	2,651	3,139	2,802	1,365
	Hurricane Winds	15,146	13,077	2,466	3,017	2,629	1,310
	Flooding	27	49	5	0	2	1
Crescent City	Lower Winds	629	53	96	201	62	60
	Hurricane Winds	629	53	96	201	62	60
	Flooding	0	0	0	0	0	0
Interlachen	Lower Winds	283	305	35	55	18	50
	Hurricane Winds	250	285	33	54	16	48
	Flooding	0	0	0	0	0	0
Palatka	Lower Winds	3,107	224	388	909	122	361
	Hurricane Winds	3,107	224	388	909	122	361
	Flooding	0	0	0	0	0	0
Pomona Park	Lower Winds	249	156	23	17	27	25
	Hurricane Winds	249	156	23	17	27	25
	Flooding	0	0	0	0	0	0
Welaka	Lower Winds	145	143	45	54	4	26
	Hurricane Winds	101	97	29	22	3	19
	Flooding	0	0	0	0	0	0

Table 6

Category 2 Hurricane: Property Exposure and Loss for Putnam County

Putnam County

	Exposure	Loss	% Loss
SF Res	$3.38 BI	$105.36 MI	3.1%
Mob Home	$1.31 BI	$161.73 MI	12.3%
MF Res	$202.00 MI	$6.52 MI	3.2%
Commercial	$937.49 MI	$33.41MI	3.6%
Agricultural	$1.47 BI	$41.91 MI	2.8%
Gov / Instit	$705.38 BI	$19.55 MI	2.8%

Palatka

	Exposure	Loss	% Loss
SF Res	$508.06 MI	$19.16 MI	3.8%
Mob Home	$17.59 MI	$2.72 MI	15.5%
MF Res	$57.84 MI	$1.92 MI	3.3%
Commercial	$251.81 MI	$9.30 MI	3.7%
Agricultural	$441.30 MI	$16.00 MI	3.6%
Gov / Instit	$16.22 MI	$558.61 TH	3.4%

Crescent City

	Exposure	Loss	% Loss
SF Res	$103.66 MI	$3.50 MI	3.4%
Mob Home	$4.88 MI	$713.88 TH	14.6%
MF Res	$20.79 MI	$860.50 TH	4.1%
Commercial	$74.66 MI	$2.59 MI	3.5%
Agricultural	$53.33 MI	$1.63 MI	3.1%
Gov / Instit	$16.39 MI	$537.17 TH	3.3%

Pomona Park

	Exposure	Loss	% Loss
SF Res	$41.13 MI	$1.43 MI	3.5%
Mob Home	$13.77 MI	$2.17 MI	15.7%
MF Res	$1.05 MI	$29.46 TH	2.8%
Commercial	$3.20 MI	$107.21 TH	3.3%
Agricultural	$7.00 MI	$246.53 TH	3.5%
Gov / Instit	$6.03 MI	$252.99 TH	4.2%

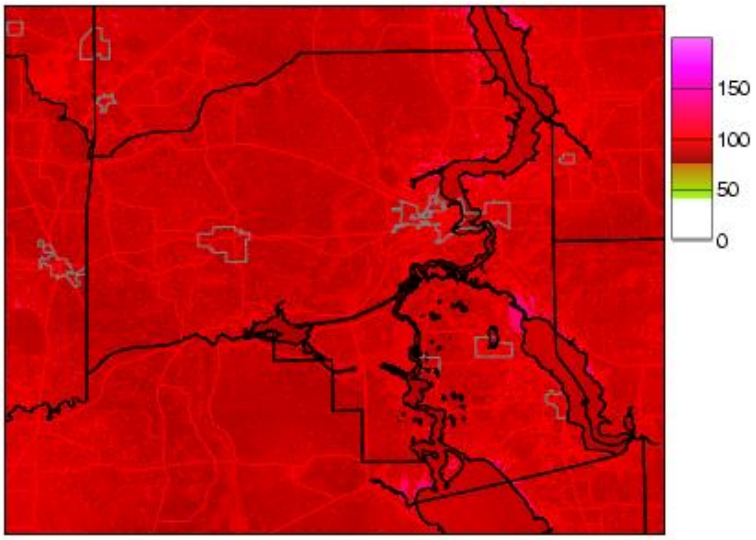
Interlachen

	Exposure	Loss	% Loss
SF Res	$53.24 MI	$1.16 MI	2.2%
Mob Home	$22.61 MI	$2.41 MI	10.6%
MF Res	$541.79 TH	$13.11 TH	2.4%
Commercial	$19.92 MI	$554.29 TH	2.8%
Agricultural	$18.65 MI	$451.41 TH	2.4%
Gov / Instit	$2.83 MI	$71.59 TH	2.5%

Welaka

	Exposure	Loss	% Loss
SF Res	$24.58 MI	$505.23 TH	2.1%
Mob Home	$13.15 MI	$1.25 MI	9.5%
MF Res	$5.23 MI	$92.68 TH	1.8%
Commercial	$7.72 MI	$152.81 TH	2.0%
Agricultural	$8.26 MI	$153.87 TH	1.9%
Gov / Instit	$592.30 TH	$15.61 TH	2.6%

Category 3 Hurricane



Wind speed in miles per hour.
Offshore data masked at –100 ft.

Table 7
Category 3 Hurricane: Structures at Risk in Putnam County

		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit
Putnam County	Hurricane Winds	16,036	14,250	2,651	3,139	2,802	1,365
	Extensive Winds	358	349	63	85	97	24
	Flooding	41	66	7	1	2	1
Crescent City	Hurricane Winds	629	53	96	201	62	61
	Extensive Winds	5	0	1	0	0	0
	Flooding	0	0	0	0	0	0
Interlachen	Hurricane Winds	283	305	35	55	18	50
	Extensive Winds	0	0	0	0	0	0
	Flooding	0	0	0	0	0	0
Palatka	Hurricane Winds	3,107	224	388	909	122	361
	Extensive Winds	21	3	0	12	0	0
	Flooding	0	0	0	0	0	0
Pomona Park	Hurricane Winds	249	156	23	17	27	25
	Extensive Winds	1	2	0	0	0	0
	Flooding	0	0	0	0	0	0
Welaka	Hurricane Winds	145	143	45	54	4	26
	Extensive Winds	0	0	0	0	0	0
	Flooding	0	0	0	0	0	0

Table 8

Category 3 Hurricane: Property Exposure and Loss for Putnam County

Putnam County

	Exposure	Loss	% Loss
SF Res	$3.38 BI	$295.33 MI	8.7%
Mob Home	$1.31 BI	$394.26 MI	30.1%
MF Res	$202.00 MI	$18.24 MI	9.0%
Commercial	$937.49 MI	$90.50 MI	9.7%
Agricultural	$1.47 BI	$117.76 MI	8.0%
Gov / Instit	$705.38 MI	$55.90 MI	7.9%

Palatka

	Exposure	Loss	% Loss
SF Res	$508.06 MI	$51.48 MI	10.1%
Mob Home	$17.59 MI	$6.21 MI	35.3%
MF Res	$57.84 MI	$5.17 MI	8.9%
Commercial	$251.81 MI	$24.98 MI	9.9%
Agricultural	$441.30 MI	$44.22 MI	10.0%
Gov / Instit	$16.22 MI	$1.52 MI	9.3%

Crescent City

	Exposure	Loss	% Loss
SF Res	$103.66 MI	$9.92 MI	9.6%
Mob Home	$4.88 MI	$1.72 MI	35.2%
MF Res	$20.79 MI	$2.38 MI	11.5%
Commercial	$74.66 MI	$7.41 MI	9.9%
Agricultural	$53.33 MI	$4.71 MI	8.8%
Gov / Instit	$16.39 MI	$1.55 MI	9.5%

Pomona Park

	Exposure	Loss	% Loss
SF Res	$41.13 MI	$4.21 MI	10.2%
Mob Home	$13.77 MI	$5.36 MI	38.9%
MF Res	$1.05 MI	$86.60 TH	8.2%
Commercial	$3.20 MI	$319.82 TH	10.0%
Agricultural	$7.00 MI	$702.53 TH	10.0%
Gov / Instit	$6.03 MI	$703.38 TH	11.7%

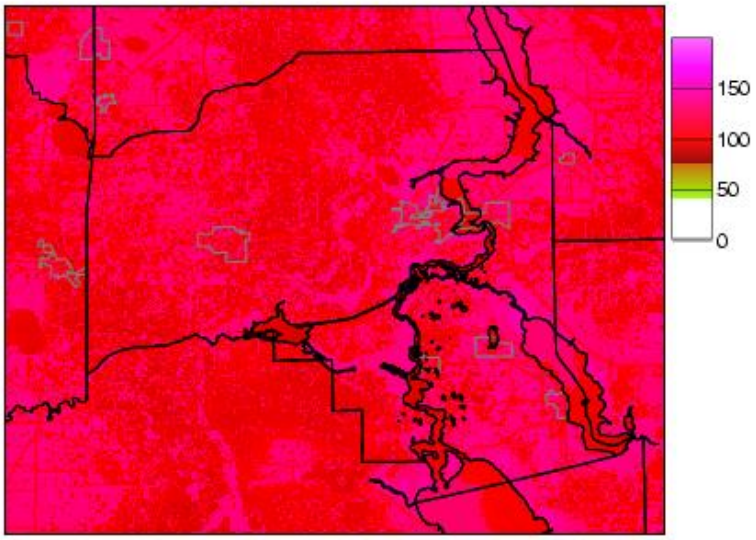
Interlachen

	Exposure	Loss	% Loss
SF Res	$53.24 MI	$3.52 MI	6.6%
Mob Home	$22.61 MI	$5.92 MI	26.2%
MF Res	$541.79 TH	$39.90 TH	7.4%
Commercial	$19.92 MI	$1.67 MI	8.4%
Agricultural	$18.65 MI	$1.38 MI	7.4%
Gov / Instit	$2.83 MI	$217.71 TH	7.7%

Welaka

	Exposure	Loss	% Loss
SF Res	$24.58 MI	$1.61 MI	6.5%
Mob Home	$13.15 MI	$3.32 MI	25.3%
MF Res	$5.23 MI	$301.00 TH	5.8%
Commercial	$7.72 MI	$506.92 TH	6.6%
Agricultural	$8.26 MI	$499.67 TH	6.1%
Gov / Instit	$592.30 TH	$47.56 TH	8.0%

Category 4 Hurricane



Wind speed in miles per hour.
Offshore data masked at –100 ft.

Table 9
Category 4 Hurricane: Structures at Risk in Putnam County

		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit
Putnam County	Hurricane Winds	16,036	14,250	2,651	3,139	2,802	1,365
	Extensive Winds	13,684	11,156	2,175	2,892	2,102	1,215
	Flooding	306	219	46	60	21	10
Crescent City	Hurricane Winds	629	53	96	201	62	61
	Extensive Winds	618	53	95	198	61	54
	Flooding	0	0	0	0	0	0
Interlachen	Hurricane Winds	283	305	35	55	18	50
	Extensive Winds	219	225	27	51	12	42
	Flooding	0	0	0	0	0	0
Palatka	Hurricane Winds	3,107	224	388	909	122	361
	Extensive Winds	3,085	222	385	902	122	361
	Flooding	31	0	10	7	0	1
Pomona Park	Hurricane Winds	249	156	23	17	27	25
	Extensive Winds	243	148	21	17	26	25
	Flooding	0	0	0	0	0	0
Welaka	Hurricane Winds	145	143	45	54	4	26
	Extensive Winds	87	87	27	21	3	16
	Flooding	0	0	0	0	0	0

Table 10

Category 4 Hurricane: Property Exposure and Loss for Putnam County

Putnam County

	Exposure	Loss	% Loss
SF Res	$3.38 BI	$758.03 MI	22.4%
Mob Home	$1.31 BI	$898.55 MI	68.5%
MF Res	$202.00 MI	$47.12 MI	23.3%
Commercial	$937.49 MI	$230.26 MI	24.6%
Agricultural	$1.47 BI	$302.66 MI	20.6%
Gov / Instit	$705.38 MI	$145.25 MI	20.6%

Palatka

	Exposure	Loss	% Loss
SF Res	$508.06 MI	$128.41 MI	25.3%
Mob Home	$17.59 MI	$14.03 MI	79.8%
MF Res	$57.84 MI	$13.26 MI	22.9%
Commercial	$251.81 MI	$62.74 MI	24.9%
Agricultural	$441.30 MI	$110.00 MI	24.9%
Gov / Instit	$16.22 MI	$3.91 MI	24.1%

Crescent City

	Exposure	Loss	% Loss
SF Res	$103.66 MI	$27.04 MI	26.1%
Mob Home	$4.88 MI	$3.96 MI	81.2%
MF Res	$20.79 MI	$6.46 MI	31.1%
Commercial	$74.66 MI	$20.39 MI	27.3%
Agricultural	$53.33 MI	$12.39 MI	23.2%
Gov / Instit	$16.39 MI	$4.25 MI	26.0%

Pomona Park

	Exposure	Loss	% Loss
SF Res	$41.13 MI	$10.94 MI	26.6%
Mob Home	$13.77 MI	$12.02 MI	87.3%
MF Res	$1.05 MI	$228.32 TH	21.7%
Commercial	$3.20 MI	$830.32 TH	25.9%
Agricultural	$7.00 MI	$1.84 MI	26.4%
Gov / Instit	$6.03 MI	$1.82 MI	30.2%

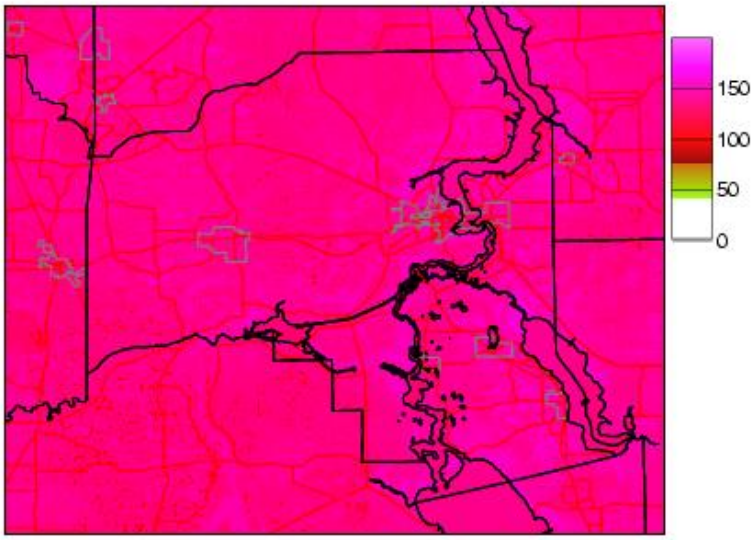
Interlachen

	Exposure	Loss	% Loss
SF Res	$53.24 MI	$9.58 MI	18.0%
Mob Home	$22.61 MI	$14.09 MI	62.3%
MF Res	$541.79 TH	$107.20 TH	19.8%
Commercial	$19.92 MI	$4.32 MI	21.7%
Agricultural	$18.65 MI	$3.63 MI	19.5%
Gov / Instit	$2.83 MI	$573.42 TH	20.3%

Welaka

	Exposure	Loss	% Loss
SF Res	$24.58 MI	$4.42 MI	18.0%
Mob Home	$13.15 MI	$8.15 MI	62.0%
MF Res	$5.23 MI	$854.52 TH	16.3%
Commercial	$7.72 MI	$1.43 MI	18.5%
Agricultural	$8.26 MI	$1.36 MI	16.4%
Gov / Instit	$592.30 TH	$119.13 TH	20.1%

Category 5 Hurricane



Wind speed in miles per hour.
Offshore data masked at –100 ft.

Table 11
Category 5 Hurricane: Structures at Risk in Putnam County

		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit
Putnam County	Hurricane Winds	16,036	14,250	2,651	3,139	2,802	1,365
	Extensive Winds	16,036	14,250	2,651	3,139	2,802	1,365
	Flooding	503	361	116	105	53	53
Crescent City	Hurricane Winds	629	53	96	201	62	61
	Extensive Winds	629	53	96	201	62	61
	Flooding	0	0	0	0	0	0
Interlachen	Hurricane Winds	283	305	35	55	18	50
	Extensive Winds	283	305	35	55	18	50
	Flooding	0	0	0	0	0	0
Palatka	Hurricane Wind	3,107	224	388	909	122	361
	Extensive Winds	3,107	224	388	909	122	361
	Flooding	87	4	15	22	0	8
Pomona Park	Hurricane Winds	249	156	23	17	27	25
	Extensive Winds	249	156	23	17	27	25
	Flooding	0	0	0	0	0	0
Welaka	Hurricane Winds	145	143	45	54	4	26
	Extensive Winds	145	143	45	54	4	26
	Flooding	0	0	0	0	0	0

Table 12
Category 5 Hurricane: Property Exposure and Loss for Putnam County

Putnam County

	Exposure	Loss	% Loss
SF Res	$3.38 Bl	$1.49 Bl	44.0%
Mob Home	$1.31 Bl	$1.28 Bl	97.3%
MF Res	$202.00 Ml	$93.07 Ml	46.1%
Commercial	$937.49 Ml	$446.76 Ml	47.7%
Agricultural	$1.47 Bl	$575.68 Ml	39.1%
Gov / Instit	$705.38 Ml	$293.08 Ml	41.6%

Palatka

	Exposure	Loss	% Loss
SF Res	$508.06 Ml	$235.87 Ml	46.4%
Mob Home	$17.59 Ml	$17.53 Ml	99.7%
MF Res	$57.84 Ml	$24.95 Ml	43.1%
Commercial	$251.81 Ml	$115.25 Ml	45.8%
Agricultural	$441.30 Ml	$199.80 Ml	45.3%
Gov / Instit	$16.22 Ml	$7.20 Ml	44.4%

Crescent City

	Exposure	Loss	% Loss
SF Res	$103.66 Ml	$59.72 Ml	57.6%
Mob Home	$4.88 Ml	$4.88 Ml	100.0%
MF Res	$20.79 Ml	$13.59 Ml	65.4%
Commercial	$74.66 Ml	$44.06 Ml	59.0%
Agricultural	$53.33 Ml	$28.04 Ml	52.6%
Gov / Instit	$16.39 Ml	$9.40 Ml	57.4%

Pomona Park

	Exposure	Loss	% Loss
SF Res	$41.13 Ml	$21.02 Ml	51.1%
Mob Home	$13.77 Ml	$13.74 Ml	99.8%
MF Res	$1.05 Ml	$447.22 TH	42.5%
Commercial	$3.20 Ml	$1.61 Ml	50.3%
Agricultural	$7.00 Ml	$3.56 Ml	50.9%
Gov / Instit	$6.03 Ml	$3.47 Ml	57.5%

Interlachen

	Exposure	Loss	% Loss
SF Res	$53.24 Ml	$19.59 Ml	36.8%
Mob Home	$22.61 Ml	$22.12 Ml	97.8%
MF Res	$541.79 TH	$222.28 TH	41.0%
Commercial	$19.92 Ml	$8.63 Mi	43.3%
Agricultural	$18.65 Ml	$7.65 Ml	41.0%
Gov / Instit	$2.83 Ml	$1.13 Ml	40.0%

Welaka

	Exposure	Loss	% Loss
SF Res	$24.58 Ml	$9.47 Ml	38.5%
Mob Home	$13.15 Ml	$12.58 Ml	95.6%
MF Res	$5.23 Ml	$1.85 Ml	35.3%
Commercial	$7.72 Ml	$3.02 Ml	39.2%
Agricultural	$8.26 Ml	$2.97 Ml	36.0%
Gov / Instit	$592.30 TH	$247.03 TH	41.7%

Hurricanes and other cyclonic activities cause more impacts than just those done to structures. To assist with determining other impacts on Putnam County communities, the U.S. Army Corps of Engineers *(2009)* in Jacksonville, FL created a model of the demands and clean-up costs a Category 3 hurricane going straight through Putnam County could possibly create. The model's results, based on a Category 4 hurricane going through Daytona Beach and digressing into a Category 3 as it cuts straight through Putnam County, can be seen on Table 13.

Table 13
Category 3 Hurricane Demands & Clean-up for Putnam County

- 1,437,00 cubic yards of debris to clean up
- 1,300 housing units may need temporary roofing
- 300 housing units may need temporary housing

Source: U.S. Army Corps of Engineers of Jacksonville (2009)

2. Storm Surge

Although Putnam County is an inland county and doesn't have the risks like a coastal county, it does have some storm surge possibilities associated with the St. Johns River. Here the river's mouth opens into the Atlantic Ocean in nearby Duval County, meaning that in Putnam County, it functions less as a river and more like a lagoon that is strongly influenced by tides from the Atlantic Ocean.

In Putnam County, areas of particular vulnerability to storm surge are the adjacent shorelines to the St. Johns River and its tributaries, especially in northeastern Putnam County and within the eastern part of the Ocala National Park. Specifically, Palatka, Welaka, and Crescent City are vulnerable. Out of these, Palatka is more vulnerable than Welaka and Crescent City because of its closer vicinity to the ocean mouth, its general location/river depth, and since it is not located on a tributary.

Impacts in Putnam County are low but could include damaged piers/boats and possibly some effects to buildings and subdivisions built in close proximity to the St. Johns River, especially in the northern section of the county around the river.

Because Putnam County is a unique inland county that has the potential for minimal storm surge, Putnam County is not including details on structure impacts and estimated costs because the models reviewed don't take this uniqueness with the St. Johns River into consideration. Additional findings from the state evacuation study program will provide the county with data and tools to accurately model surge and examine the potential effect.

3. Severe Thunderstorms

All of the county and its jurisdictions are vulnerable to severe thunderstorm hazards as a whole and all structures are susceptible to impacts of severe thunderstorms, especially buildings in floodplains and manufactured or mobile homes. See further information about thunderstorms in the *flooding* and *tornado* hazards of this section.

Besides flooding, one hazard that usually comes along with severe thunderstorms in Putnam County is high winds. Within the county, areas of higher topography, areas adjacent to large bodies of water, and areas of certain land use patterns, such as large clear-cuts within the forest, are the most susceptible to high winds. Impacts from high winds that have occurred in the county and will occur again are tree and natural environment destruction, infrastructure and house damage or collapse, pier and boat damage, downed power lines, and massive amounts of storm generated debris.

The risk of severe thunderstorms and lightning is high in Putnam County, but the vulnerability to Putnam County is medium, simply because this particular

hazard generally affects a much smaller segment of the population at any given time and the effects can be managed with local resources with the recovery lasting days to weeks.

Lightning enters a structure in three main ways: a direct strike, through wires or pipes that extend outside the structure, and through the ground. Once in a structure, lightning can travel through the electrical, phone, plumbing, and radio/television reception systems. Lightning can also travel through any metal wires or bars in concrete walls or flooring.

Lightning can be one of the most dangerous and frequently encountered weather hazards. Deaths caused by lightning are second only to those weather-related deaths resulting from floods and flash floods. Many lightning victims are individuals engaged in recreation or work. Although most survive, survivors generally suffer long-term effects, including memory problems, numbness, attention deficits, sleep disorders, confusion and general loss of strength. Many also are left with a storm phobia.

Individuals participating in the following recreational activities could be vulnerable to lightning including: golf, football, baseball, soccer, surfing, horseback riding, walking, jogging, tennis, boating, fishing, kite flying, kayaking, paddle boarding, beach activities, picnicking, camping, hiking, gardening, hunting, swimming, basketball, softball, cycling, lacrosse, lawn bowling, croquet, archery, beach volleyball, horse shoes, diving, skiing, track and field events and outdoor festivals. A significant portion of the County population participates in at least one of these recreational activities, and is thus vulnerable to lightning

Occupations that are generally preformed outdoors would be the most susceptible to the dangers of lightning and include: Landscapers, tree trimmer, roofers, residential and commercial construction employees, lifeguards, utility workers (cable, telephone, electricity), delivery drivers, farmers, ranchers emergency workers (law enforcement and Emergency Medical Services), horse and carriage drivers, park rangers, marine industry employees, street performers, dog walkers, painters, outdoor advertising specialist, sanitation workers, parking attendant, tour guides, foresters, and road construction crews. It is estimated that 15- 30% of the population works in one of these industries. These occupations occur throughout the County with no one area more vulnerable than another. Annual property losses caused by lightning nationwide regularly total in the hundreds of millions of dollars. Communication equipment and computer systems/networks are getting more sophisticated and businesses rely on them quite heavily. The loss of a computer system and communication system can result in large business income losses in addition to the physical damage to the equipment and structures. Some of the most susceptible communications and computer systems are those used by local public safety.

For example while some communications towers in Putnam County, these towers are equipped with lightening protection but if this were to fail, it would cripple public safety's ability to communicate. Often times these communication towers are also occupied by cell phone providers and a loss of communications from one of these towers could result in an economic loss to those cell phone companies. Another industry that

may be affected by lightning is aviation. The City of Palatka Airport could be at increased risk if aviation equipment was damaged from a lighting strike.

Properties most likely to be struck by lightning are those that are located on higher ground or that project above surrounding properties such as chimneys, flagpoles, towers, water tanks, steeples, ridges and parapets. On flat-roofed buildings, the edge of the roof is the most likely area to be struck. Some of these structures include: Communication Towers (as previously discussed), the Putnam County East Putnam Regional Water Tower, the City of Palatka Water Towers. While these are not structures drawing tourism, several of these structures are significant capital improvements made by the County. Additional vulnerability from severe thunderstorms can be wind damage, less intense than what might be experienced in a hurricane but the effects of wind on structures will follow the same methodology as described in the high winds sections of this plan.

Based on MEMPHIS data created by Kinetic Analysis Corporation, structure values (exposure) and the number of structures at risk from thunderstorms are presented below on Table 14. This information was largely based on wind risks, but also includes lightning, flooding, and hail. Kinetic Analysis Corporation defines the threat "in terms of the chances that a thunderstorm or lightning will cause economic damage or loss over $50." They did this by dividing the probability in five categories: 1 in 25 (very high), 1 in 50, 1 in 100, 1 in 200, and 1 in 500 (very low). Putnam County as a whole is placed in the 1 to 50 (high) category.

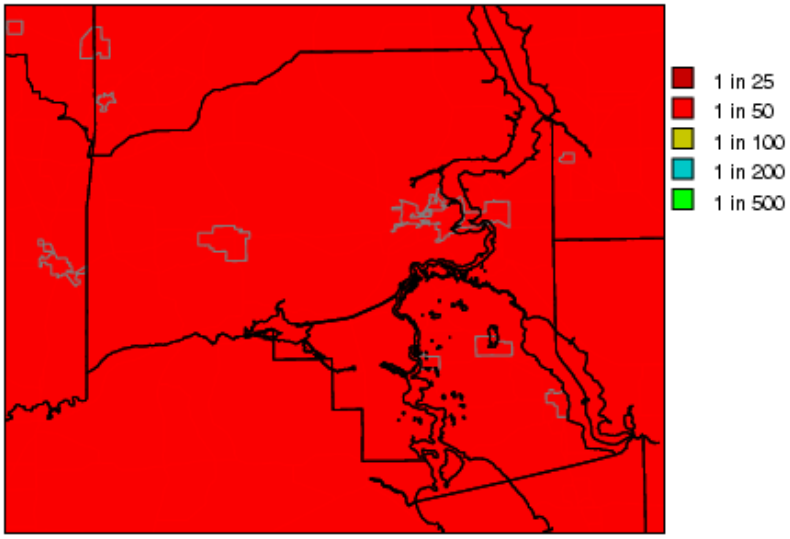


Table 14
Number and Value of Structures at Risk for Thunderstorms in Putnam County

Putnam County

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
High Zone (50)	Exposure	$3.38 BI	$1.31 BI	$202.00 MI	$937.49 MI	$1.61BI	$705.38 MI	$8.15 BI
	Bldgs	*16,044*	*14,252*	*2,655*	*3,161*	*1,399*	*2,802*	*40,313*

Crescent City

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
High Zone (50)	Exposure	$103.66 MI	$4.88 MI	$20.79 MI	$74.66 MI	$53.33 MI	$16.39 MI	$273.70 MI
	Bldgs	*629*	*53*	*96*	*201*	*61*	*62*	*1,102*

Interlachen

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
High Zone (50)	Exposure	$53.24 MI	$22.61 MI	$541.79 TH	$19.92 MI	$18.65 MI	$2.83 MI	$117.80 MI
	Bldgs	*283*	*305*	*35*	*55*	*50*	*18*	*746*

Palatka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
High Zone (50)	Exposure	$508.06 MI	$17.59 MI	$57.84 MI	$251.81 MI	$441.30 MI	$16.22 MI	$1.29 BI
	Bldgs	*3,107*	*224*	*388*	*909*	*361*	*122*	*5,111*

Pomona Park

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
High Zone (50)	Exposure	$41.13 MI	$13.77 MI	$1.05 MI	$3.20 MI	$7.00 MI	$6.03 MI	$72.18 MI
	Bldgs	*249*	*156*	*23*	*17*	*25*	*27*	*497*

Welaka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
High Zone (50)	Exposure	$24.58 MI	$13.15 MI	$5.23 MI	$7.72 MI	$8.26 MI	$592.30 TH	$59.53 MI
	Bldgs	*145*	*143*	*45*	*54*	*26*	*4*	*417*

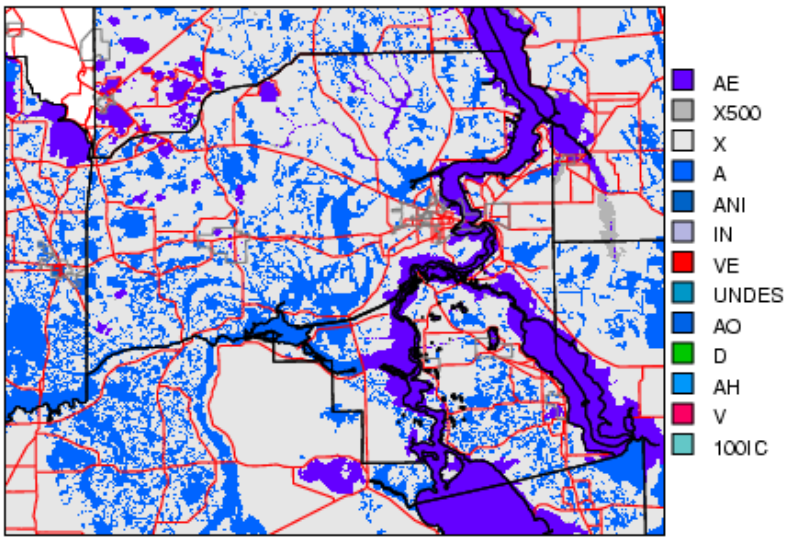
4. High Winds

High winds structural impacts are previously discussed in the hazards "Hurricanes and Other Cyclonic Activity" and "Severe Thunderstorms" within this section. Please refer to those hazards for high wind information. Also, see Table 6 in Section 4 for information on how wind speeds correlate to different types of structure damage.

5. Flooding

In Putnam County, flooding is an issue because approximately 1/3 of the county and around 20% of the county's population are within the 100-year floodplain *(Putnam County CEMP, 2009)*. Parts of the county and parts of every jurisdiction are vulnerable to flooding, especially parts of Palatka, lands adjacent to the St. Johns River and its tributaries, land adjacent to some lakes, and some low lying areas. Also, all jurisdictions have some acreage located in the 100-year flood zone. Within the county, bank overflowing and pooling are the most common types of flooding due to the number of small lakes and swampy areas along the waterways *(Putnam County CEMP, 2009)*.

To determine the number and value (exposure) of structures located in flood-prone areas, Putnam County used MEMPHIS data created by the Kinetic Analysis Corporation. This data is presented through FEMA FIRM zones on Table 15. Also, to provide more recent information on the number of homes located in 100 and 500-year floodplains, Putnam County Planning and Zoning Department *(2009)* has provided additional information, as seen in Table 16.



*For 2014 data refer to Section 4 Hazards

Table 15

Number and Value of Structures at Risk for Flooding in Putnam County

Putnam County

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
AE	Exposure	$487.37 MI	$207.61 MI	$39.46 MI	$69.99 MI	$266.29 MI	$64.21 MI	$1.13 BI
	Bldgs	*2,036*	*2,146*	*404*	*480*	*207*	*210*	*5,483*
X500	Exposure	$14.09 MI	$5.19 MI	$252.83 TH	$372.73 TH	$135.53 MI	$168.24 TH	$155.60 MI
	Bldgs	*59*	*56*	*11*	*2*	*3*	*3*	*134*
X	Exposure	$2.57 BI	$937.16 MI	$154.73 MI	$981.26 MI	$1.18 BI	$499.75 MI	$6.32 BI
	Bldgs	*12,542*	*10,276*	*1,993*	*2,378*	*1,064*	*2,063*	*30,316*
A	Exposure	$310.28 MI	$161.87 MI	$7.56 MI	$296.84 MI	$83.09 MI	$141.25 MI	$1.00 BI
	Bldgs	*1,405*	*1,774*	*247*	*299*	*125*	*526*	*4,376*
ANI	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
IN	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
VE	Exposure	$207.61 MI	$39.46 MI	$69.99 MI	$266.29 MI	$64.21 MI	$0.00	$647.55 MI
	Bldgs	*2,146*	*404*	*480*	*207*	*210*	*0*	*3,447*
UNDES	Exposure	$5.19 MI	$252.83 TH	$372.73 TH	$135.53 MI	$168.24 TH	$0.00	$141.51 MI
	Bldgs	*56*	*11*	*2*	*3*	*3*	*0*	*75*
AO	Exposure	$937.16 MI	$154.73 MI	$981.26 MI	$1.18 BI	$499.75 MI	$0.00	$3.75 BI
	Bldgs	*10,276*	*1,993*	*2,378*	*1,064*	*2,063*	*0*	*17,774*
D	Exposure	$161.87 MI	$7.56 MI	$296.84 MI	$83.09 MI	$141.25 MI	$0.00	$690.61 MI
	Bldgs	*1,774*	*247*	*299*	*125*	*526*	*0*	*2,971*
AH	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
V	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
100IC	Exposure	$39.46 MI	$69.99 MI	$266.29 MI	$64.21 MI	$0.00	$0.00	$439.94 MI
	Bldgs	*404*	*480*	*207*	*210*	*0*	*0*	*1,301*

Crescent City

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
AE	Exposure	$22.90 MI	$1.16 MI	$5.43 MI	$10.63 MI	$19.98 MI	$932.84 TH	$61.05 MI
	Bldgs	*149*	*10*	*19*	*56*	*29*	*5*	*268*
X500	Exposure	$1.69 MI	$0.00	$0.00	$0.00	$454.27 TH	$0.00	$2.14 MI
	Bldgs	*9*	*0*	*0*	*0*	*2*	*0*	*11*
X	Exposure	$74.80 MI	$3.03 MI	$15.26 MI	$53.47 MI	$18.19 MI	$15.39 MI	$180.15 MI
	Bldgs	*437*	*37*	*73*	*144*	*23*	*55*	*769*
A	Exposure	$4.27 MI	$692.08 TH	$91.43 TH	$10.56 MI	$14.70 MI	$58.22 TH	$30.37 MI
	Bldgs	*34*	*6*	*4*	*1*	*7*	*2*	*54*
ANI	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
IN	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
VE	Exposure	$1.16 MI	$5.43 MI	$10.63 MI	$19.98 MI	$932.84 TH	$0.00	$38.14 MI
	Bldgs	*10*	*19*	*56*	*29*	*5*	*0*	*119*
UNDES	Exposure	$0.00	$0.00	$0.00	$454.27 TH	$0.00	$0.00	$454.27 TH
	Bldgs	*0*	*0*	*0*	*2*	*0*	*0*	*2*
AO	Exposure	$3.03 MI	$15.26 MI	$53.47 MI	$18.19 MI	$15.39 MI	$0.00	$105.34 MI
	Bldgs	*37*	*73*	*144*	*23*	*55*	*0*	*332*
D	Exposure	$692.08 TH	$91.43 TH	$10.56 MI	$14.70 MI	$58.22 TH	$0.00	$26.10 MI
	Bldgs	*6*	*4*	*1*	*7*	*2*	*0*	*20*
AH	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
V	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
100IC	Exposure	$5.43 MI	$10.63 MI	$19.98 MI	$932.84 TH	$0.00	$0.00	$36.98 MI
	Bldgs	*19*	*56*	*29*	*5*	*0*	*0*	*109*

Interlachen

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
AE	Exposure	$6.42 MI	$3.07 MI	$43.99 TH	$2.62 MI	$1.18 MI	$463.09 TH	$13.80 MI
	Bldgs	*42*	*44*	*4*	*6*	*7*	*2*	*105*
X500	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
X	Exposure	$41.63 MI	$17.82 MI	$460.40 TH	$17.04 MI	$15.06 MI	$1.91 MI	$93.91 MI
	Bldgs	*215*	*241*	*28*	*35*	*38*	*14*	*571*
A	Exposure	$5.18 MI	$1.73 MI	$37.40 TH	$262.06 TH	$2.41 MI	$457.39 TH	$10.08 MI
	Bldgs	*26*	*20*	*3*	*14*	*5*	*2*	*70*
ANI	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
IN	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
VE	Exposure	$3.07 MI	$43.99 TH	$2.62 MI	$1.18 MI	$463.09 TH	$0.00	$7.38 MI
	Bldgs	*44*	*4*	*6*	*7*	*2*	*0*	*63*
UNDES	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
AO	Exposure	$17.82 MI	$460.40 TH	$17.04 MI	$15.06 MI	$1.91 MI	$0.00	$52.28 MI
	Bldgs	*241*	*28*	*35*	*38*	*14*	*0*	*356*
D	Exposure	$1.73 MI	$37.40 TH	$262.06 TH	$2.41 MI	$457.39 TH	$0.00	$4.90 MI
	Bldgs	*20*	*3*	*14*	*5*	*2*	*0*	*44*
AH	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
V	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
100IC	Exposure	$43.99 TH	$2.62 MI	$1.18 MI	$463.09 TH	$0.00	$0.00	$4.31 MI
	Bldgs	*4*	*6*	*7*	*2*	*0*	*0*	*19*

Palatka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
AE	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
X500	Exposure	$0.00	$0.00	$87.91 TH	$336.05 TH	$0.00	$0.00	$423.95 TH
	Bldgs	*0*	*0*	*1*	*1*	*0*	*0*	*2*
X	Exposure	$505.92 MI	$17.59 MI	$57.55 MI	$249.49 MI	$441.30 MI	$16.22 MI	$1.29 BI
	Bldgs	*3,096*	*224*	*385*	*901*	*361*	*122*	*5,089*
A	Exposure	$2.14 MI	$0.00	$200.25 TH	$1.98 MI	$0.00	$0.00	$4.32 MI
	Bldgs	*11*	*0*	*2*	*7*	*0*	*0*	*20*
ANI	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
IN	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
VE	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
UNDES	Exposure	$0.00	$87.91 TH	$336.05 TH	$0.00	$0.00	$0.00	$423.95 TH
	Bldgs	*0*	*1*	*1*	*0*	*0*	*0*	*2*
AO	Exposure	$17.59 MI	$57.55MI	$249.49 MI	$441.30 MI	$16.22 MI	$0.00	$782.15 MI
	Bldgs	*224*	*385*	*901*	*361*	*122*	*0*	*1,993*
D	Exposure	$0.00	$200.25 TH	$1.98 MI	$0.00	$0.00	$0.00	$2.18 MI
	Bldgs	*0*	*2*	*7*	*0*	*0*	*0*	*9*
AH	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
V	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
100IC	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Pomona Park

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
AE	Exposure	$4.17 MI	$1.40 MI	$54.41 TH	$46.88 TH	$200.91 TH	$616.12 TH	$6.49 MI
	Bldgs	*19*	*12*	*4*	*1*	*3*	*2*	*41*
X500	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
X	Exposure	$36.32 MI	$11.42 MI	$962.49 TH	$3.15 MI	$5.45 MI	$5.41 MI	$62.72 MI
	Bldgs	*226*	*136*	*18*	*16*	*18*	*25*	*439*
A	Exposure	$641.26 TH	$948.13 TH	$34.21 TH	$0.00	$1.35 MI	$0.00	$2.97 MI
	Bldgs	*4*	*8*	*1*	*0*	*4*	*0*	*17*
ANI	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
IN	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
VE	Exposure	$1.40 MI	$54.41 TH	$46.88 TH	$200.91 TH	$616.12 TH	$0.00	$2.32 MI
	Bldgs	*12*	*4*	*1*	*3*	*2*	*0*	*22*
UNDES	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
AO	Exposure	$11.42 MI	$962.49 TH	$3.15 MI	$5.45 MI	$5.41 MI	$0.00	$26.40 MI
	Bldgs	*136*	*18*	*16*	*18*	*25*	*0*	*213*
D	Exposure	$948.13 TH	$34.21 TH	$0.00	$1.35 MI	$0.00	$0.00	$2.33 MI
	Bldgs	*8*	*1*	*0*	*4*	*0*	*0*	*13*
AH	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
V	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
100IC	Exposure	$54.41 TH	$46.88 TH	$200.91 TH	$616.12 TH	$0.00	$0.00	$918.33
	Bldgs	*4*	*1*	*3*	*2*	*0*	*0*	*10*

Welaka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
AE	Exposure	$13.55 MI	$7.47 MI	$4.10 MI	$6.84 MI	$3.29 MI	$0.00	$35.25 MI
	Bldgs	*70*	*80*	*30*	*48*	*11*	*0*	*239*
X500	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
X	Exposure	$10.38 MI	$5.40 MI	$1.13 MI	$875.99 TH	$2.63 MI	$592.30 TH	$21.00 MI
	Bldgs	*71*	*58*	*15*	*6*	*7*	*4*	*161*
A	Exposure	$654.21 TH	$290.97 TH	$0.00	$0.00	$2.34 MI	$0.00	$3.28 MI
	Bldgs	*4*	*5*	*0*	*0*	*8*	*0*	*17*
ANI	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
IN	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
VE	Exposure	$7.47 MI	$4.10 MI	$6.84 MI	$3.29 MI	$0.00	$0.00	$21.70 MI
	Bldgs	*80*	*30*	*48*	*11*	*0*	*0*	*169*
UNDES	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
AO	Exposure	$5.40 MI	$1.13 MI	$875.99 TH	$2.63 MI	$592.30 TH	$0.00	$10.62 MI
	Bldgs	*58*	*15*	*6*	*7*	*4*	*0*	*90*
D	Exposure	$290.97 TH	$0.00	$0.00	$2.34 MI	$0.00	$0.00	$2.63 MI
	Bldgs	*5*	*0*	*0*	*8*	*0*	*0*	*13*
AH	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
V	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
100IC	Exposure	$4.10 MI	$6.84 MI	$3.29 MI	$0.00	$0.00	$0.00	$14.24 MI
	Bldgs	*30*	*48*	*11*	*0*	*0*	*0*	*89*

Table 16
Number of Homes Located in Putnam County Floodplains (2009)

	Zone	Total Homes	Mobile Homes
100-year	A & AE	10,732	4,416
500-year	X500	645	255

Source: Putnam County Planning and Development Department, 2009
*For 2014 data refer to Section 4 Hazards

6. Tornadoes

All of Putnam County and its jurisdictions are vulnerable to tornado hazard, with the western central portion of the county and its jurisdictions of Interlachen and Palatka possibly being more vulnerable based on past trends.
The biggest threats of tornado impacts to Putnam County are hits to critical facilities, densely populated areas, and the county's vast amount of mobile homes. With this being said, a tornado or a series of tornadoes could affect 20% of the county's population if it occurred in a heavily populated area like Palatka *(Putnam County CEMP, 2009)*. Overall, this hazard poses a high associated risk level to the most susceptible structures of manufactured and mobile homes. In 2000 the county had 14,935 mobile homes with approximately 32,857 people living in them, comprising approximately 47% of the county population in 2000 *(Northeast Florida Housing Report, 2008*).

To determine the number and value (exposure) of structures located in tornado vulnerable areas, Putnam County used MEMPHIS data created by the Kinetic Analysis Corporation. This data describes the threat of damage from tornadoes based on an analysis of National Severe Storms Forecast Center data from 1950-2003. Using this information, the MEMPHIS system put all of Putnam County in a medium tornado risk level except for a small southern section, which has a high tornado risk level but no structures within it. These estimated figures are presented on Table 16.

Table 16

Number and Value of Structures at Risk from Tornadoes in Putnam County

Putnam County

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Medium (1 in 250)	Exposure	$3.38 BI	$1.31 BI	$202.00 MI	$937.49 MI	$1.61 BI	$705.38 MI	$8.15 BI
	Bldgs	*16,044*	*14,252*	*2,655*	*3,161*	*1,399*	*2,802*	*40,313*

Crescent City

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Medium (1 in 250)	Exposure	$103.66 MI	$4.88 MI	$20.79 MI	$74.66 MI	$53.33 MI	$16.39 MI	$273.70 MI
	Bldgs	*629*	*53*	*96*	*201*	*61*	*62*	*1,102*

Interlachen

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Medium (1 in 250)	Exposure	$53.24 MI	$22.61 MI	$541.79 TH	$19.92 MI	$18.65 MI	$2.83 MI	$117.80 MI
	Bldgs	*283*	*305*	*35*	*55*	*50*	*18*	*746*

Palatka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Medium (1 in 250)	Exposure	$508.06 MI	$17.59 MI	$57.84 MI	$251.81 MI	$441.30 MI	$16.22 MI	$1.29 BI
	Bldgs	*3,107*	*224*	*388*	*909*	*361*	*122*	*5,111*

Pomona Park

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Medium (1 in 250)	Exposure	$41.13 MI	$13.77 MI	$1.05 MI	$3.20 MI	$7.00 MI	$6.03 MI	$72.18 MI
	Bldgs	*249*	*156*	*23*	*17*	*25*	*27*	*497*

Welaka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Medium (1 in 250)	Exposure	$24.58 MI	$13.15 MI	$5.23 MI	$7.72 MI	$8.26 MI	$592.30 TH	$59.53 MI
	Bldgs	*145*	*143*	*45*	*54*	*26*	*4*	*417*

7. Wildfires

Many areas in Putnam County and parts within all jurisdictions are vulnerable to wildfire hazard, particularly the dense forest areas located in the northern section of the county stretching southwest and along the Marion County border.

More than 75% of the land acreage in Putnam County is forest land with a large concentration of residents living in these rural wooded areas *(Putnam County CEMP, 2009).* Generally, areas located at the urban/rural interface, like the placement of homes adjacent to large undeveloped areas of forestland or land owned by timber companies, are the most susceptible for risks. Examples of this urban/rural interface occur in all jurisdictions, especially in Interlachen, which is surrounded by wooded areas. Therefore structures located near the urban/rural interface are likely to receive potential wildfire contact. Impacts of wildfires include, and are not limited to, losses to agriculture, wildlife, the timber industry, closed roads, and destruction or damage to building/housing structures.

To determine the number and value (exposure) of structures located in wildfire concern areas, Putnam County used MEMPHIS data created by the Kinetic Analysis Corporation. To do this the Kinetic Analysis Corporation took data from the Florida Division of Forestry Fire Risk Assessment System (FRAS) and created Levels of Concern using an integer scale from 0 to 9, indicating the relative risk of Wildland Fire. Putnam County has structures found for every Level of Concern. This data is presented on Table 17.

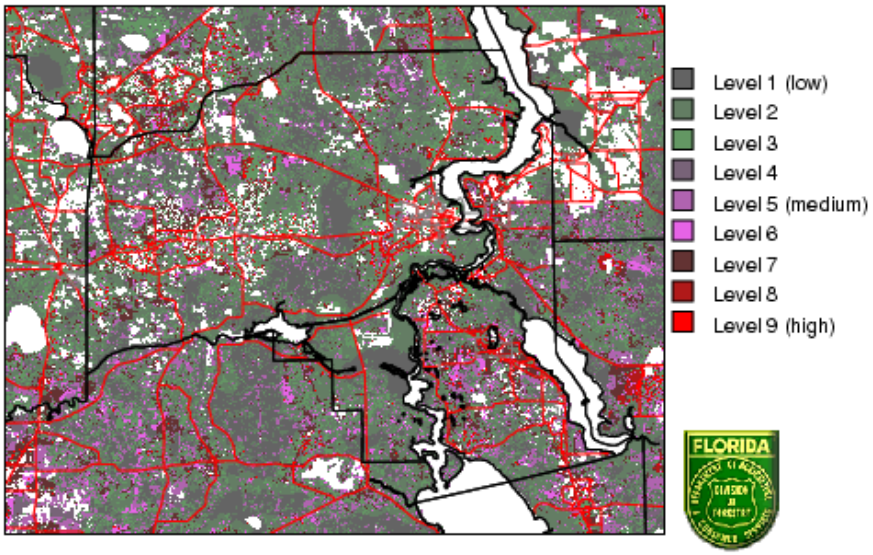


Table 17
Number and Value of Structures at Risk from Wildfires in Putnam County

Putnam County

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Level 1 (low)	Exposure	$89.86 MI	$300.47 MI	$163.70 MI	$36.05 MI	$71.00 MI	$117.67 MI	$778.76 MI
	Bldgs	*437*	*1,426*	*1,743*	*288*	*250*	*290*	*4,434*
Level 2	Exposure	$517.81 MI	$362.98 MI	$99.07 MI	$82.88 MI	$301.27 MI	$336.38 MI	$1.70 BI
	Bldgs	*2,219*	*2,855*	*1,250*	*509*	*279*	*742*	*7,854*
Level 3	Exposure	$921.22 MI	$398.43 MI	$79.31 MI	$432.57 MI	$387.60 MI	$145.68 MI	$2.36 BI
	Bldgs	*4,449*	*3,900*	*1,100*	*694*	*453*	*558*	*11,154*
Level 4	Exposure	$154.44 MI	$71.61 MI	$5.35 MI	$51.50 MI	$36.75 MI	$25.27 MI	$344.91 MI
	Bldgs	*697*	*756*	*111*	*98*	*59*	*122*	*1,843*
Level 5 (medium)	Exposure	$222.20 MI	$82.24 MI	$13.60 MI	$75.66 MI	$76.06 MI	$50.27 MI	$520.24 MI
	Bldgs	*1,033*	*907*	*171*	*309*	*68*	*436*	*2,924*
Level 6	Exposure	$111.55 MI	$46.23 MI	$13.27 MI	$99.23 MI	$12.53 MI	$28.59 MI	$311.39 MI
	Bldgs	*538*	*498*	*101*	*123*	*59*	*78*	*1,397*
Level 7	Exposure	$300.47 MI	$163.70 MI	$36.05 MI	$71.00 MI	$117.67 MI	$50.35 MI	$739.25 MI
	Bldgs	*1,426*	*1,743*	*288*	*250*	*290*	*215*	*4,212*
Level 8	Exposure	$362.98 MI	$99.07 MI	$82.88 MI	$301.27 MI	$336.38 MI	$11.78 MI	$1.19 BI
	Bldgs	*2,855*	*1,250*	*509*	*279*	*742*	*63*	*5,698*
Level 9 (high)	Exposure	$398.43 MI	$79.31 MI	$432.57 MI	$387.60 MI	$145.68 MI	$2.15 MI	$1.45 BI
	Bldgs	*3,900*	*1,100*	*694*	*453*	*558*	*26*	*6,731*

Crescent City

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Level 1 (low)	Exposure	$17.17 MI	$877.14 TH	$4.59 MI	$11.53 MI	$16.48 MI	$2.90 MI	$53.54 MI
	Bldgs	*109*	*14*	*18*	*27*	*19*	*11*	*198*
Level 2	Exposure	$9.37 MI	$2.05 MI	$506.97 TH	$20.09 MI	$11.76 MI	$605.54 TH	$44.39 MI
	Bldgs	*55*	*18*	*9*	*52*	*8*	*5*	*147*
Level 3	Exposure	$10.42 MI	$117.62 TH	$134.90 TH	$1.42 MI	$17.00 MI	$0.00	$29.09 MI
	Bldgs	*65*	*3*	*7*	*7*	*14*	*0*	*96*
Level 4	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Level 5 (medium)	Exposure	$17.72 MI	$742.12 TH	$5.32 MI	$5.45 MI	$2.11 MI	$6.16 MI	$37.51 MI
	Bldgs	*116*	*11*	*22*	*23*	*7*	*18*	*197*
Level 6	Exposure	$21.20 MI	$798.53 TH	$9.39 MI	$24.31 MI	$3.56 MI	$5.38 MI	$64.64 MI
	Bldgs	*97*	*7*	*30*	*49*	*5*	*21*	*209*
Level 7	Exposure	$877.14 TH	$4.59 MI	$11.53 MI	$16.48 MI	$2.90 MI	$0.00	$36.37 MI
	Bldgs	*14*	*18*	*27*	*19*	*11*	*0*	*89*
Level 8	Exposure	$2.05 MI	$506.97 TH	$20.09 MI	$11.76 MI	$605.54 TH	$25.83 TH	$35.05 MI
	Bldgs	*18*	*9*	*52*	*8*	*5*	*1*	*93*
Level 9 (high)	Exposure	$117.62 TH	$134.90 TH	$1.42 MI	$17.00 MI	$0.00	$0.00	$18.67 MI
	Bldgs	*3*	*7*	*7*	*14*	*0*	*0*	*31*

Interlachen

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/instit	Total
Level 1 (low)	Exposure	$0.00	$1.26 MI	$1.20 MI	$51.67 TH	$0.00	$0.00	$2.51 MI
	Bldgs	*0*	*6*	*16*	*2*	*0*	*0*	*24*
Level 2	Exposure	$2.94 MI	$7.75 MI	$3.62 MI	$68.88 TH	$2.19 MI	$2.52 MI	$19.09 MI
	Bldgs	*11*	*36*	*43*	*6*	*5*	*7*	*108*
Level 3	Exposure	$20.39 MI	$7.86 MI	$1.58 MI	$1.53 MI	$9.11 MI	$889.21 TH	$41.36 MI
	Bldgs	*107*	*108*	*27*	*11*	*24*	*6*	*283*
Level 4	Exposure	$5.13 MI	$1.45 MI	$12.86 TH	$4.02 MI	$2.87 MI	$229.84 TH	$13.71 MI
	Bldgs	*31*	*16*	*1*	*6*	*6*	*2*	*62*
Level 5 (medium)	Exposure	$770.03 TH	$91.53 TH	$0.00	$623.46 TH	$0.00	$0.00	$1.49 MI
	Bldgs	*5*	*1*	*0*	*1*	*0*	*0*	*7*
Level 6	Exposure	$1.52 MI	$1.32 MI	$0.00	$719.76 TH	$585.34 TH	$0.00	$4.15 MI
	Bldgs	*7*	*14*	*0*	*16*	*2*	*0*	*39*
Level 7	Exposure	$1.26 MI	$1.20 MI	$51.67 TH	$0.00	$0.00	$455.00 TH	$2.97 MI
	Bldgs	*6*	*16*	*2*	*0*	*0*	*2*	*26*
Level 8	Exposure	$7.75 MI	$3.62 MI	$68.88 TH	$2.19 MI	$2.52 MI	$163.44 TH	$16.31 MI
	Bldgs	*36*	*43*	*6*	*5*	*7*	*3*	*100*
Level 9 (high)	Exposure	$7.86 MI	$1.58 MI	$1.53 MI	$9.11 MI	$889.21 TH	$0.00	$20.97 MI
	Bldgs	*108*	*27*	*11*	*24*	*6*	*0*	*176*

Palatka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/instit	Total
Level 1 (low)	Exposure	$10.57 MI	$3.89 MI	$805.92 TH	$881.54 TH	$2.26 MI	$11.77 MI	$30.18 MI
	Bldgs	*49*	*22*	*7*	*7*	*19*	*3*	*107*
Level 2	Exposure	$40.05 MI	$14.86 MI	$4.13 MI	$25.55 MI	$11.61 MI	$24.24 MI	$120.44 MI
	Bldgs	*229*	*92*	*31*	*70*	*43*	*14*	*479*
Level 3	Exposure	$178.94 MI	$16.29 MI	$17.36 MI	$66.04 MI	$175.54 MI	$22.08 MI	$476.26 MI
	Bldgs	*1,106*	*129*	*137*	*185*	*172*	*63*	*1,792*
Level 4	Exposure	$19.02 MI	$905.97 TH	$2.22 MI	$4.20 MI	$0.00	$908.40 TH	$27.25 MI
	Bldgs	*95*	*10*	*11*	*19*	*0*	*11*	*146*
Level 5 (medium)	Exposure	$15.91 MI	$651.15 TH	$115.56 TH	$10.57 MI	$26.87 MI	$20.52 TH	$54.14 MI
	Bldgs	*97*	*9*	*4*	*18*	*6*	*1*	*135*
Level 6	Exposure	$9.44 MI	$44.82 TH	$183.04 TH	$1.18 MI	$0.00	$0.00	$10.85 MI
	Bldgs	*52*	*1*	*1*	*2*	*0*	*0*	*56*
Level 7	Exposure	$3.89 MI	$805.92 TH	$881.54 TH	$2.26 MI	$11.77 MI	$619.83 TH	$20.23 MI
	Bldgs	*22*	*7*	*7*	*19*	*3*	*3*	*61*
Level 8	Exposure	$14.86 MI	$4.13 MI	$25.55 MI	$11.61 MI	$24.24 MI	$0.00	$80.39 MI
	Bldgs	*92*	*31*	*70*	*43*	*14*	*0*	*250*
Level 9 (high)	Exposure	$16.29 MI	$17.36 MI	$66.04 MI	$175.54 MI	$22.08 MI	$0.00	$297.32 MI
	Bldgs	*129*	*137*	*185*	*172*	*63*	*0*	*686*

Pomona Park

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Level 1 (low)	Exposure	$0.00	$10.55 MI	$4.39 MI	$228.76 TH	$510.09 TH	$1.57 MI	$17.25 MI
	Bldgs	*0*	*65*	*52*	*9*	*5*	*5*	*136*
Level 2	Exposure	$5.52 MI	$9.12 MI	$1.86 MI	$457.08 TH	$1.11 MI	$2.18 MI	$20.24 MI
	Bldgs	*30*	*70*	*20*	*6*	*6*	*9*	*141*
Level 3	Exposure	$9.23 MI	$4.63 MI	$775.36 TH	$838.02 TH	$1.00 MI	$565.58 TH	$17.04 MI
	Bldgs	*56*	*44*	*9*	*4*	*4*	*2*	*119*
Level 4	Exposure	$2.82 MI	$1.61 MI	$29.14 TH	$0.00	$1.50 MI	$0.00	$5.97 MI
	Bldgs	*13*	*13*	*3*	*0*	*5*	*0*	*34*
Level 5 (medium)	Exposure	$254.86 TH	$751.21 TH	$215.60 TH	$46.88 TH	$0.00	$816.28 TH	$2.08 MI
	Bldgs	*3*	*8*	*1*	*1*	*0*	*4*	*17*
Level 6	Exposure	$251.58 TH	$0.00	$0.00	$0.00	$558.42 TH	$0.00	$810.01 TH
	Bldgs	*2*	*0*	*0*	*0*	*1*	*0*	*3*
Level 7	Exposure	$10.55 MI	$4.39 MI	$228.76 TH	$510.09 TH	$1.57 MI	$2.14 MI	$19.38 MI
	Bldgs	*65*	*52*	*9*	*5*	*5*	*13*	*149*
Level 8	Exposure	$9.12 MI	$1.86 MI	$457.08 TH	$1.11 MI	$2.18 MI	$2.23 MI	$16.95 MI
	Bldgs	*70*	*20*	*6*	*6*	*9*	*4*	*115*
Level 9 (high)	Exposure	$4.63 MI	$775.36 TH	$838.02 TH	$1.00 MI	$565.58 TH	$0.00	$7.81 MI
	Bldgs	*44*	*9*	*4*	*4*	*2*	*0*	*63*

Welaka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Level 1 (low)	Exposure	$2.46 MI	$2.23 MI	$1.23 MI	$1.70 MI	$842.53 TH	$302.75 TH	$8.76 MI
	Bldgs	*12*	*17*	*9*	*11*	*16*	*1*	*66*
Level 2	Exposure	$6.07 MI	$2.42 MI	$1.29 MI	$453.61 TH	$2.94 MI	$0.00	$13.17 MI
	Bldgs	*32*	*31*	*11*	*3*	*6*	*0*	*83*
Level 3	Exposure	$4.86 MI	$3.80 MI	$434.62 TH	$79.33 TH	$1.41 MI	$559.12 TH	$11.13 MI
	Bldgs	*26*	*36*	*7*	*1*	*2*	*2*	*74*
Level 4	Exposure	$1.77 MI	$752.50 TH	$226.62 TH	$661.48 TH	$41.31 TH	$28.72 TH	$3.48 MI
	Bldgs	*11*	*9*	*2*	*4*	*1*	*1*	*28*
Level 5 (medium)	Exposure	$1.88 MI	$2.02 MI	$548.51 TH	$2.14 MI	$227.66 TH	$0.00	$6.82 MI
	Bldgs	*11*	*19*	*3*	*7*	*1*	*0*	*41*
Level 6	Exposure	$4.91 MI	$1.12 MI	$807.00 TH	$1.99 MI	$2.34 MI	$4.45 TH	$11.16 MI
	Bldgs	*36*	*22*	*7*	*10*	*9*	*1*	*85*
Level 7	Exposure	$2.23 MI	$1.23 MI	$1.70 MI	$842.53 TH	$302.75 TH	$0.00	$6.30 MI
	Bldgs	*17*	*9*	*11*	*16*	*1*	*0*	*54*
Level 8	Exposure	$2.42 MI	$1.29 MI	$453.61 TH	$2.94 MI	$0.00	$0.00	$7.11 MI
	Bldgs	*31*	*11*	*3*	*6*	*0*	*0*	*51*
Level 9 (high)	Exposure	$3.80 MI	$434.62 TH	$79.33 TH	$1.41 MI	$559.12 TH	$0.00	$6.28 MI
	Bldgs	*36*	*7*	*1*	*2*	*2*	*0*	*48*

8. Droughts/Heat Waves

All of Putnam County and its jurisdictions are vulnerable to drought and heat wave conditions and the effects associated with them. Impacts of droughts can affect crops, water supply, and can lead to increased hazards from wildfires that could impact structures. Impacts from heat waves can put lives at risk with the possibility of heat strokes and heat exhaustion.

Besides the possible connection of droughts helping to induce wildfires, neither droughts nor heat waves have or will cause vast amounts of structural damage. Therefore, neither structural numbers nor structural values are included in this section dealing with this specific type of impact.

9. Freezes/Winter Storms

Putnam County and its jurisdictions are all vulnerable to freezing conditions.
Injuries and death to people in structures are very low during Putnam County freezes, but indirectly, through fire caused by incorrect or careless use of space heaters, could occur within the buildings. Additionally, consumer demand of electricity during these periods of extreme cold weather may require the electric utility to implement rolling blackouts to selected areas in order to avert a total electrical grid overload. These blackouts can have a significant impact on electrical dependent critical facilities and persons. Winter storms would be a rare occurrence, therefore not considered a risk to focus on.

Besides the possible connection of freezes, space heater fires, blackouts, and plumbing freezing, freezes will not cause major structural risks in the warmer climate of Putnam County. Therefore, neither structural numbers nor structural values are included in this section dealing with this specific type of impact.

10. Earthquakes

Putnam County and its jurisdiction are vulnerable to lesser significant earthquake hazards, where impacts would possibly be no more than slight structure and household item damage. Because structure damage would be so minimal, structure values are not included for this hazard.

The vulnerability of property to seismic hazards is determined by the prevalence of earthquake-resistant construction, of which is very rare in Putnam County. Buildings, lifelines and other elements of the built environment that have been constructed in compliance with the latest seismic building codes and standards will be more resistant to

earthquake damage. Older structures that were built under earlier, less-effective codes and have not been retrofitted to meet later standards are likely to sustain more damage. Earthquake casualties are limited by the number of people present in stricken areas and losses are constrained by the quantity and value of the buildings, infrastructure and other property in those areas. Seismic risk increases as earthquake-prone regions become more densely populated and urbanized. Although local planning and zoning activities can help shape regional growth over time, additional development is generally (and understandably) promoted as a means of strengthening local economies.

To determine the number of structures at risk, Putnam County used MEMPHIS data created by the Kinetic Analysis Corporation. This MEMPHIS system used the peak ground acceleration (PGA) values from the USGS 50 year earthquake risk to create four zones: <0.01g = almost none, 0.01g = minimal, 0.02g = very low, and 0.03g = low. All of Putnam County is located within the "very low" zone, except for three structures that are in the "low" zone. Information at the county level is provided in Table 18.

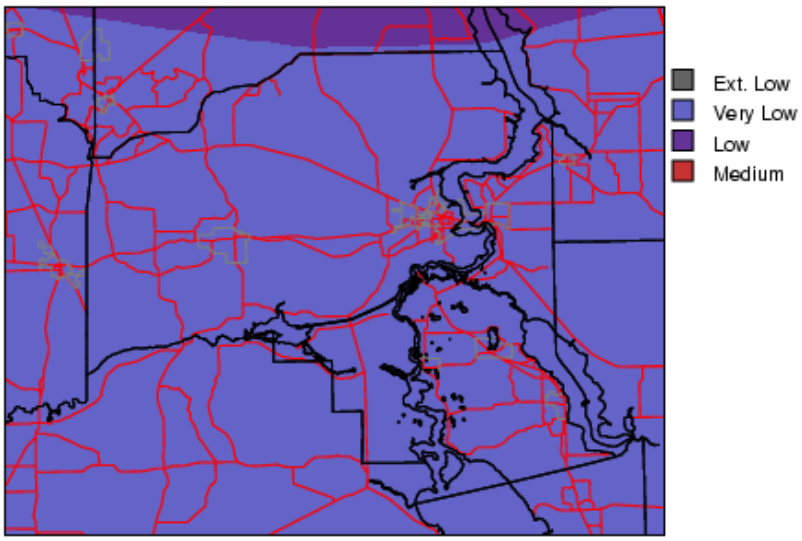


Table 18
Number of Structures at Risk from Earthquakes in Putnam County

Zone	SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit
very low	16,043	14,252	2,655	3,161	1,399	2,800
low	1	0	0	0	0	2

11. Tsunamis

With Putnam County's most eastern border over 20 miles away from the coast, it has no coastal lands that are vulnerable to the effects of a tsunami. According to the FSU Center for Ocean-Atmospheric Prediction Studies *(2009)*, the probability of a tsunami hitting the northeast coast of Florida is extremely low. However, if one did occur, some of the more tidal sections of the St. Johns River could feel slight effects. In the instance of a 1:500 year tsunami (which is very unlikely), areas in the jurisdictions of Palatka and possibly Welaka could be vulnerable with a lower level of associated risk.

Impacts could include damaged piers/boats and possibly some effects to structures built in close proximity to the St. Johns River.

Because Putnam County is a unique inland county that still has the potential for tsunami impacts in regards to the St. Johns River, Putnam County is not including details on structure impacts and estimated costs because the models reviewed don't take this uniqueness with the St. Johns River into consideration. Hopefully by the next update, the county will have a more accurate model to make these estimates.

12. Sinkholes/Landslides

All of the county and its jurisdictions are vulnerable to sinkholes, but the overall vulnerability is lower due to a somewhat unfavorable topography for sinkholes. The western and southeastern parts of the county have a slightly higher vulnerability to sinkholes and based on previous occurrences, the jurisdiction of Interlachen may be more susceptible than other jurisdictions.

A sinkhole would be even more disruptive if it struck a densely populated area, critical facility, or major road. This includes parts within Palatka. Impacts could include damage to infrastructure and buildings that are located on or below topographical slopes. Landslides have never been recorded in Putnam County and the county's geography would lead it to be a rare occurrence, therefore structural vulnerability will not be included for landslides.

To determine the number and value (exposure) of structures located in sinkhole concern areas, Putnam County used MEMPHIS data created by the Kinetic Analysis Corporation. The sinkhole potential was determined according to points assigned by the Kinetic Analysis Corporation to each 90m grid cell in the state. To this, classes of points were assigned to the grid for distance to historic sinkholes, geology, and soils: 2 points if the cell was within 2000m of an existing sinkhole; 1 point if the cell was between 2000m and 5000m of an existing sinkhole; 1 point if the cell was in the same USGS surface geologic unit as an existing sinkhole; and 1 point if the cell was in the same NRCS soil unit as an existing sinkhole. This point system allowed categories of area vulnerabilities to determined: 0 = very low risk, 1 = low risk, 2 = moderate risk, 3 = high risk, and 4 = very high risk. Putnam County has all categories of sinkhole areas. This data is presented on Table 19.

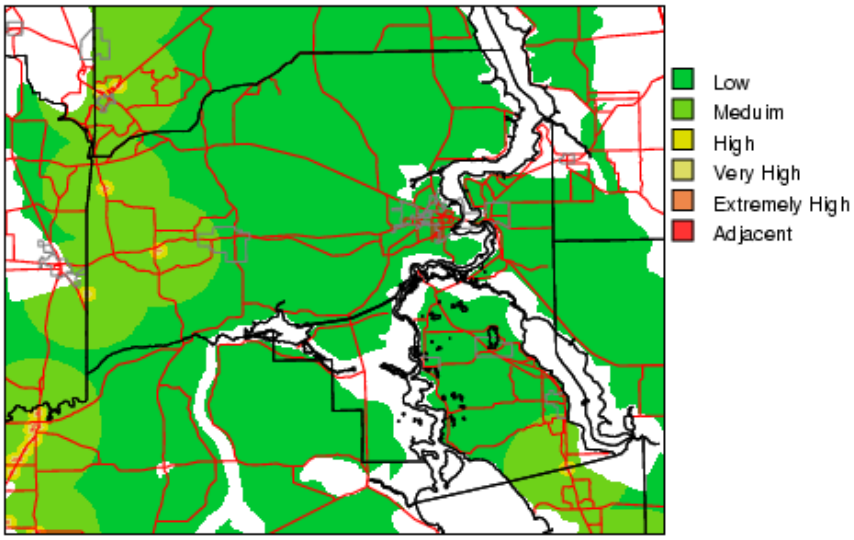


Table 19
Number and Value of Structures at Risk from Sinkhole Potential in Putnam County

Putnam County

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Low	Exposure	$2.48 BI	$859.25 MI	$151.88 MI	$650.46 MI	$1.20 BI	$566.25 MI	$5.91 BI
	Bldgs	*11,932*	*9,354*	*1,760*	*2,434*	*1,084*	*2,291*	*28,855*
Medium	Exposure	$442.99 MI	$214.14 MI	$16.48 MI	$71.49 MI	$227.25 MI	$90.38 MI	$1.06 BI
	Bldgs	*2,270*	*2,455*	*449*	*279*	*147*	*282*	*5,882*
High	Exposure	$21.88 MI	$17.89 MI	$591.01 TH	$335.09 MI	$1.63 MI	$3.33 MI	$380.40 MI
	Bldgs	*112*	*215*	*29*	*2*	*3*	*9*	*370*
Very High	Exposure	$9.29 MI	$4.67 MI	$80.98 TH	$0.00	$515.11 TH	$231.58 TH	$49.77 MI
	Bldgs	*42*	*60*	*7*	*0*	*2*	*1*	*112*
Extreme	Exposure	$3.02 MI	$2.14 MI	$24.99 TH	$55.42 MI	$0.00	$774.70 TH	$61.37 MI
	Bldgs	*13*	*27*	*1*	*10*	*0*	*4*	*55*
Adjacent	Exposure	$0.00	$198.97 TH	$0.00	$122.34 MI	$0.00	$0.00	$122.54 MI
	Bldgs	*0*	*2*	*0*	*0*	*0*	*0*	*2*

Crescent City

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Low	Exposure	$83.28 MI	$3.54 MI	$19.43 MI	$65.91MI	$26.73 MI	$13.51 MI	$212.39 MI
	Bldgs	*493*	*38*	*88*	*169*	*39*	*49*	*876*
Medium	Exposure	$20.39 MI	$1.35 MI	$1.36 MI	$8.75 MI	$26.60 MI	$2.88 MI	$61.31 MI
	Bldgs	*136*	*15*	*8*	*32*	*22*	*13*	*226*
High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Very High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Extreme	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Adjacent	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Interlachen

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Low	Exposure	$46.74 MI	$11.75 MI	$331.35 TH	$17.76 MI	$15.85 MI	$2.23 MI	$94.66 MI
	Bldgs	*240*	*146*	*21*	*37*	*39*	*14*	*497*
Medium	Exposure	$6.50 MI	$10.86 MI	$210.44 TH	$2.16 MI	$2.81 MI	$597.54 TH	$23.13 MI
	Bldgs	*43*	*159*	*14*	*18*	*11*	*4*	*249*
High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Very High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Extreme	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Adjacent	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Palatka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Low	Exposure	$506.14 MI	$17.59 MI	$57.16 MI	$244.53 MI	$434.43 MI	$16.22 MI	$1.28 BI
	Bldgs	*3,092*	*224*	*384*	*895*	*359*	*122*	*5,076*
Medium	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Very High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Extreme	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Adjacent	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Pomona Park

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Low	Exposure	$41.13 MI	$13.77 MI	$1.05 MI	$3.20 MI	$7.00 MI	$6.03 MI	$72.18 MI
	Bldgs	*249*	*156*	*23*	*17*	*25*	*27*	*497*
Medium	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Very High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Extreme	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Adjacent	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Welaka

Zone		SF Res	Mob Home	MF Res	Commercial	Agriculture	Gov/Instit	Total
Low	Exposure	$10.79 MI	$5.75 MI	$1.08 MI	$736.34 TH	$4.97 MI	$592.30 TH	$23.92 MI
	Bldgs	*77*	*63*	*13*	*8*	*16*	*4*	*181*
Medium	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Very High	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Extreme	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Adjacent	Exposure	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Bldgs	*0*	*0*	*0*	*0*	*0*	*0*	*0*

13. Dam/Lock Hazard

An incident categorized within in this hazard has not occurred occurred in the last 5 years. In Putnam County, the only dam/lock of significance is the Kirkpatrick (Rodman) Dam formed on the Ocklawaha River for the impoundment of the Rodman Reservoir and the Buckman Lock. In 2007, an Emergency Action Plan was created for the Kirkpatrick Dam, which gives a worst-case scenario of complete failure of the dam. The number of structures at risk from complete dam failure, according URS Engineering Consultants, is shown below.

- 378 structures at risk with complete dam failure, about 90% located in the jurisdiction of Welaka. *(Emergency Action Plan, 2007)*

The estimated time required to achieve this maximum flood elevation to damage these structures range from 10 to 33 hours, with the immense majority of structures having at least 27 hours' notice before the flood wave arrives. Lesser dam failures, such as slight dam gate malfunctions, would result in little to no structural damage downstream. Structure value (exposure) data should be present in future updates.

*For 2014 data refer to Section 4 Hazards

14. Hazardous Material Incidents

In Putnam County and its jurisdictions, areas along major transportation routes where hazardous materials are transported and areas adjacent to facilities that store hazardous materials are the most vulnerable to hazardous material incidents. With hazardous material incident vulnerability largely being covered in Section 4 "Hazards," this section will describe particular facilities included in the Putnam County CEMP Appendix for Hazardous Materials. In this case, vulnerable populations take more precedents than vulnerable structures, since most of the incidents that have the potential of occurring won't cause structural damage. Table 20 presents this information. Putnam County Emergency Management is leaving out facility names and exact addresses for privacy reasons.

Table 20
Vulnerabilities to Hazardous Material Releases in Putnam County (2006-2007)

General Location	Chemical	Vulnerability Zone	Vulnerable Jurisdictions	Vulnerable Populations
CR 216, Palatka	Sulfuric Acid	0.1 miles	Palatka	350
	Chlorine	0.5 miles	Palatka	360
	Cyclohexylamine	0.3 miles	Palatka	360
SR 207, East Palatka	Oxamyl	10 miles	Palatka	34,585
	Aldicarb	10 miles	Palatka	34,585
	Paraquat Dichloride	10 miles	Palatka	34,585
Moody Rd, Palatka	Hydrofluosilic Acid	<1 mile	Palatka	2,345
	Chlorine	3.1 miles	Palatka	7,270
Hwy. 17, East Palatka	Sulfuric Acid	0.1 miles	Palatka	50
	Chlorine	2.5 miles	Palatka	4,850
Janice Drive, Hollister	Hydrogen Chloride	2.4 miles	--	740
Browns Landing Rd, Palatka	Chlorine	10 miles	Palatka, Pomona Park	37,627
	Sulfur Dioxide	0.9 miles	Palatka	1,898

15. Terrorism

Because of the human factor, it is extremely hard to determine the number of structures that are vulnerable to a terrorist act. For this reason Putnam County currently has no structural estimates for terrorist acts besides the information given for "Dam Failure" and "Hazardous Materials Incidents," which can both be brought about by terrorism acts.

The possibility for terrorism in St. Johns County does exist, but the County's risk and vulnerability to this hazard is low. The City of St. Augustine has a slightly higher vulnerability to terrorism since it is the Nation's Oldest City and draws tourism from all over the world, but this vulnerability is still considered low.

The warm temperatures, onshore winds, high rate of sunshine (UV exposure), and rainfall in Putnam County make this area a less favorable target for biological or chemical terrorism than many other areas of the United States. The population here is dispersed when compared to major cities in the northeastern U.S., and the transportation system infrastructure is highly dependent upon individual vehicles. Both of these features make Putnam County a less desirable target for transportation system or conventional type (bomb related) terrorist acts.

Perhaps, the most vulnerable structures, infrastructure, and populations are:

- City of Palatka Airport

- Putnam County Courthouse
- Putnam Community Medical Center
- Florida National Guard Armory
- Putnam County Schools
- Putnam County Places of worship
- Special Events
- County and City Government Office/Complex

SECTION 7: Mitigation Initiatives

A. *Introduction*

In Putnam County there are numerous areas and locations that are vulnerable to hazardous events such as floods, wildfires, and other natural and man-made disasters. The mitigation initiatives that Putnam County developed began with evaluating the guiding principles that were completed during the initial phases of the LMS process. The initiatives revolved around these principles regarding the reduction of the county's vulnerability to natural and man-made hazards. The LMS Task Force, comprised of a variety of people in the public and private sector, created the initiatives, which reflected the needs of the community. The Task Force reviewed a number of documents including: Future Land Use Policies, Land Development Code Regulations, and data collected from the Department of Public Safety.

Over the process of several meetings, the LMS Task Force discussed and listed potential projects in Putnam County, which are discussed in detail in the following subsections. The projects were both structural and non-structural mitigation initiatives. These projects were then discussed in the context of cost, responsible entity, implementation time, funding, and areas affected. After all the data was compiled, the Task Force ranked the projects. Information on this process is located in Section 7C.

- *2015 Update*

The LMS Task Force thought this to be one of the most important sections to update and reorganize; therefore it was expanded vastly for the 2009 update. One of the main reasons for this was because it is seen as a great way to give new LMS Task Force members a solid stance on where each project is currently at along the implementation process. For more information on this update see Section 1I.

B. *Comprehensive Range of Actions*

Putnam County has developed a comprehensive range of different types of projects. Each of Putnam County's LMS projects can be divided into six broad categories:

- Public Education & Awareness- Actions to educate and inform citizens, officials, business owners, and property owners about the potential risk from hazards and ways to mitigate against them (e.g. providing mitigation education reading materials, outreach programs, etc.).

- Structural Retrofits & Additions- Actions to modify and/or add to existing structures as a way to mitigate against potential risks from hazards (e.g. storm shutters, back-up generators, etc.).

- Governmental Prevention- Governmental actions that influence the way existing/future property and structures are built and developed to help bring forth mitigation goals (e.g. adopting a fire prevention ordinance, building codes that promote hazard mitigation, etc.).

- Technology- Actions that require technological advancements to move mitigation goals forward (e.g. special GIS hazard layers, improved communication devices, etc.).

- Study- Actions that develop new information on risks, vulnerability, etc. to help with mitigation goals (e.g. stormwater drainage efficiency study, survey on how much citizens know about hurricane evacuations, etc.).

- Infrastructure Improvements- Actions that improve infrastructure before and after hazardous events (e.g. new stormwater drainage systems, fixing road wash-out areas, etc.).

At least three mitigation action items (projects) fit into each of these categories, thus making a well-rounded list of mitigation projects. To see which project(s) belongs to each category, see Section 7C.

Putnam County currently has 39 main mitigation action items (projects) on the Project Priority List, with many of them having multiple sub-projects. Of all of these, at least 5 projects, which mitigation efforts encompass the entirety of the county and its jurisdictions, address all 15 identified hazards for the county. To see what projects incorporate the various hazards, please see Section 7F "Project Priority List", and to see what jurisdictions each project takes into account, see Section 7E.

The five all-hazard-inclusive mitigation projects have all had developments in the last five years and are continuous efforts that will be implemented years down the LMS road. One of these projects *(#07-03)* deals with reinforcing community shelters to be able to handle all identified hazard events that could occur in the county. Currently with this project's development over the past five years, four of its sub-projects have acquired HMGP contracts. Another one of these five all-hazard projects *(#07-01)* deals with the creation /distribution of mitigation materials for all hazards. In the past few years, materials have been created regarding the highly vulnerable wildfire and flooding hazards in Putnam County. All hazards will eventually be addressed with the implementation order starting with the hazards with the highest vulnerabilities down to the lowest. The last three of these projects *(#07-05, #08-01, #08-02)* deal with improving/protecting communications within the county and region during a hazardous event. These projects are continuous efforts for the county.

Besides the all-hazard-inclusive projects, Putnam County also has hazard specific projects. Out of the county's most considerable hazard impacts (As seen in Section 4), mitigation towards flooding from hurricanes and other cyclonic activities and severe thunderstorms cover over half of the total mitigation projects, high winds mitigation from hurricanes and other cyclonic activities and severe thunderstorms make up over a quarter of the projects, and wildfire is included in two individual projects.

C. Prioritizing and Current Status of Projects

Each mitigation project selected by the LMS Task Force will benefit the community by preserving and protecting life and property. It is important to take into account that each mitigation project also represents a large investment of financial and personal resources. Due to these constraints, a method of prioritizing and evaluating the degree of feasible implementation for each project was adopted. This method helps determine when and which projects should be implemented. In Putnam County, the prioritization method is roughly based on FEMA's STAPLEE (social, technical, administrative, political, legal, economic, and environmental) method and is used as a guide for Task Force members to determine which projects to implement first.

The LMS Task Force adopted a prioritization method early on and has continued to use it (See Appendix E). This method considers and evaluates a number of different decision factors:

1. Populations Benefitted
2. Problem Area Benefitted
3. Health and Safety Considerations
4. Cost of Initiative
5. Benefit/Cost Ratio
6. Community Acceptance
7. Probability of Funding
8. Feasibility of Implementation and Environmental Acceptability
9. Consistency with other Plans and Programs
10. Timeframe for Accomplishing

Putnam County believes that taking into account economic/financial conditions are an extremely important endeavor in determining project priorities. Therefore, the project score guide (See Appendix E), that all LMS Task Force members are encouraged to fill out, has three categories dedicated to economic/financial conditions: Cost of the Initiative, Probability of Funding, and FEMA's adapted Benefit/Cost Ratio. The LMS Task Force has been applying these categories in good mitigation decision making and plans on using the Benefit/Cost Ratio more in upcoming years.

With each Task Force member assigning a numerical figure ranking the project according to each category, a final ranking is drawn from the averages and then placed accordingly on the Project Prior List. Note: Some projects ranked in the middle of the prior list have

been implemented before a few others ranked higher because of certain available funds, staff time, etc.

As a benchmark of mitigation projects in the last five years, Putnam County has included a Status column in the Project Priority List (See Section 7F). In this column there are four classifications. "Complete" means that the project or sub-project has been completed in the last five years, "In progress" means that efforts have been made toward the project or sub-project and that it is on its way to completion, "Continuous" means that progress is continuously being made and that the project has no end point (it can also be improved), and "Pending" (deferred) means the LMS Task Force is going to put more thought into the project and decide what to do about it. At this time the LMS Task Force wanted no projects deleted from the Project Priority List, thus the list hasn't changed in the past five years, except for two projects being added last year *(#08-01 & #08-02).* "Pending" projects have not currently been implemented because of limited capabilities, prohibitive costs, low rankings on the priority list, and from other concerns. For a description/explanation of why a project is put in a certain category, see the "Update" for each project in the following section, Section 7D.

D. Actions/Projects

This section lists all of the LMS projects based on priority order and provides a description of the project, an update of what has occurred to the project in the last five years, an estimated cost of the project, an existing funding source for the project, a category of the type of project, and if it is applicable to new or existing buildings and infrastructure. For additional information, such as what LMS goal(s) fits into the project, the estimated amount of time needed to implement the project, a sponsoring agency of the project, the status of the project, and the hazards the project covers, see Section 7F. Also, for more information on possible funding sources see Section 8. *Note: In Putnam County, the sponsoring agency is responsible for implementation and administration of the projects.*

- **07-01 Educational Materials on Mitigation**

    - Description- This project deals with the creation/distribution of mitigation materials for all hazards. All hazards will eventually be addressed with the implementation order starting with the hazards with the highest vulnerabilities down to the lowest. Putnam County Emergency Management and federal/state/regional agencies will help with the creation of the material and Putnam County Emergency Management and the jurisdictions will help with the distribution of them.

    - Update- In the past few years, materials have been created regarding the highly vulnerable wildfire and flooding hazards in Putnam County. Also, FEMA-created hurricane and other cyclonic activity information have been and will continue to be provided at Putnam County Emergency

Management community participation events (including church groups, Rotary Club, etc.) and materials are provided in some jurisdiction's Town/City Halls.

- Estimated Cost- $8,000 *(2004 estimate)*

- Funding- Putnam County Emergency Services budget, etc.

- Applicable to New/Existing Buildings & Infrastructure- Indirectly contributing to personal knowledge toward new and existing buildings & infrastructure mitigation.

- Category- Public Education & Awareness

- **07-02 GIS Mapping Technology**

  - Description- To develop and acquire GIS equipment, software, and training that will further hazard mitigation capabilities in order to better mitigate for, plan for, respond to, and recover from disasters. In addition this project furthers public education through online public GIS interactive maps.

  - Update- Since 2009, the online GIS system interface has been improved. Also, updated FEMA flood layers have been acquired and advancements in geo-coding capabilities are described in the NFIP section (Section 5D).

  - Estimated Cost- $15,000 *(2004 estimate)*

  - Funding- Putnam County IT Department budget, etc.

  - Applicable to New/Existing Buildings & Infrastructure- Indirectly contributing toward guiding new buildings away from flood-prone areas.

  - Category- Technology

- **07-03 County All Hazard Shelters**

  - Description- This project is composed of 10 separate sub-projects dealing with retrofitting the public facilities in the county.

  - Update- Since the last LMS update in 2009, Middleton Burney Wind Retrofit has been completed and Browning Pearce Elementary is in progress.

- Estimate-
  - Crescent City Jr/Sr High School Retrofit- $3 million *(2008 estimate)*
  - Kelly Smith School Retrofit- $1 million *(2008 estimate)*
  - Jenkins Middle School Retrofit- $1 million *(2008 estimate)*
  - Palatka High School Retrofit- $1 million *(2008 estimate)*
  - Browning Pearce School Retrofit- $1 million *(2008 estimate)*
  - Ochwilla Elementary School Retrofit- $1 million *(2008 estimate)*
  - Other sub-project estimates have not been determined at this time

- Funding- HMGP grant money, Putnam County School Board budget, etc.

- Applicable to New/Existing Buildings & Infrastructure- Directly to existing buildings

- Category- Structural Retrofit & Additions

- **07-04 Domestic Terrorism Study (CITAMS)**

  - Description- This project is comprised of a survey and site vulnerability assessment of public and private facilities that could be subject to domestic terrorism threats. Areas will be identified and recommendations for improvement will be made.

  - Update- About a dozen sites in Putnam County have had the site vulnerability assessments done with more to come.

  - Estimate- Staff time

  - Funding- Federal Government, Florida Division of Law Enforcement budget (Jacksonville, FL), Putnam County Emergency Services budget, etc.

  - Applicable to New/Existing Buildings & Infrastructure- Directly to existing buildings

  - Category- Study

- **07-05 Countywide Communication Improvements**

  - Description- To increase countywide emergency radio coverage to cover signal gaps within the county.

- Update- Putnam County Emergency Service is currently doing a signal gap assessment and deciding the process needed toward implementation.
- Estimate- Not determined at this time
- Funding- Putnam County Sheriff's Department & Putnam County Emergency Services budgets, etc.
- Applicable to New/Existing Buildings & Infrastructure- N/A
- Category- Technology

- **07-25 Generator and water supply at each EMS Rescue and Fire Station**
  - Description- Provision of back-up generators and water well sources at all EMS rescue and fire stations that currently do not have these amenities.
  - Update- The lack of back-up generators have been documented. In the last year, two back-up generators were placed in two fire stations.
  - Estimate- Varies; Putnam County Emergency Management has more information.
  - Funding- Putnam County Emergency Services budget, etc.
  - Applicable to New/Existing Buildings & Infrastructure- Directly to existing buildings (and infrastructure in some cases)
  - Category- Structural Retrofit & Additions

- **07-07 Permanent Generators for Continuity of Operations**
  - Description- To lead and educate nursing homes, etc. about the importance of buying back-up generators.
  - Update- Pending; participants of the LMS plan to talk with the county's private nursing homes and other critical care centers.
  - Estimate- Staff time
  - Funding- None needed
  - Applicable to New/Existing Buildings & Infrastructure- Directly to existing buildings
  - Category- Structural Retrofit & Additions

- **07-08 Wildfire Mitigation Activities**

    - Description- With help from FDOF, the activities will include to conducting public education programs focusing on FireWise principles and outdoor burning laws and tips, creating a Putnam County Wildfire Mitigation Project Committee, and integrating wildfire mitigation principles in the County Land Development Code, etc.

    - Update- The Putnam Wildfire Mitigation Project Committee was created in 2008. They have accomplished a number of meaningful projects in 2008-2009 including providing wildfire educational materials at a number of events and sites. Within the next year, the Putnam County Wildfire Mitigation Project Committee plans to conduct a prescribed burning educational program.

    - Estimate- Staff time; Contact Putnam County Emergency Services & FDOF for budget information

    - Funding- Putnam County Emergency Services & FDOF budgets, etc.

    - Applicable to New/Existing Buildings & Infrastructure- Indirectly to new and existing buildings/infrastructure because of educational values learned about safe burning and wildfire mitigation.

    - Category- Public Education & Awareness

- **07-09 Master Stormwater Plan**

    - Description- This is an ongoing comprehensive stormwater study of Putnam County. By working in conjunction with the jurisdictions, this study would indicate areas subject to flooding and identify ways to alleviate these problems.

    - Update- Putnam County will find out in the near future when we are going to receive this plan and the process of how this is going to be achieved.

    - Estimate- $50,000 *(2004 estimate)*

    - Funding- Putnam County Public Works & Putnam County Planning and Development budgets, etc.

    - Applicable to New/Existing Buildings & Infrastructure- New and Existing

    - Category- Study

- **07-10 Adoption of Fire Protection Ordinance for New and Existing Buildings**

    - Description- By developing and adopting a Fire Protection Ordinance, this would formally recognize applicable fire protection regulation prescribed by Putnam County.
    -
    - Update- Currently the LMS Task Force is considering the effectiveness of this project and has considered removal from the project priority list**.**
    -
    - Estimate- Staff Time

    - Funding- None needed

    - Applicable to New/Existing Buildings & Infrastructure- New and Existing

    - Category- Governmental Prevention

- **07-22 Sustainable Shelter**

    - Description- To encourage the creation of safe rooms in new construction projects. This would be incorporated into an incentive system for Putnam County Planning and Development.

    - Update- Currently the LMS Task Force is determining if they want to keep this project on the Project Priority List.

    - Estimate- Staff Time

    - Funding- None needed

    - Applicable to New/Existing Buildings & Infrastructure- New

    - Category- Governmental Prevention / Structural Retrofit & Additions

- **07-11 Statewide Regional Evacuation Study Plan- (SRESP)**

    - Description- This project is focused on the State Regional Evacuation Study Program. This information includes new storm surge data, clearance times, behavior analysis, etc. This plan will have an effect on new development in the county through a growth management component.

    - Update- This plan is currently in the works by the Northeast Florida Regional Council and should be available in the next year.

    - Estimate- To be determined

- Funding- Coordinated by the Northeast Florida Regional Council through the federal and state budget

- Applicable to New/Existing Buildings & Infrastructure- New

- Category- Study

- **07-12 Retrofitting Critical Facilities**

  - Description- To include storm shutters and generators to important county and jurisdictional buildings. This project consists of 6 sub-projects.

  - Update- The entirety of this project will probably be completely by next year. The Putnam County Emergency Operation Center retrofit was completed in 2009. The retrofits include the building exterior to be able to withstand 160 mph winds, an outside water supply, a back-up generator, etc. This was completed using a number of grants and county funds. Interlachen's Town Hall/Town E.O.C. used $43,718 of HMGP grant funds to replace doors, windows, vault roofs, gable end vents, soffits, vault siding and strapped the roof to the sub-floor of the building for their retrofit in 2009. Pomona Park's Town Hall retrofit, completed in September 2008, used HMGP funds to include the installation of hurricane/wind born debris screen on 4 windows and 3 doors. The retrofit at the Main Fire Station on 11th Street was also completed. The Kay Larkin Fire Station retrofit and the Palatka Police Department just need their final inspections to be removed from the list.

  - Estimate- $450,000 *(2004 estimate)* Contact Putnam County Emergency Management for completed sub-project amounts.

  - Funding- HMGP grants, technology grants, funding commitments by the county and jurisdictions, etc.

  - Applicable to New/Existing Buildings & Infrastructure- Existing

  - Category- Structural Retrofit & Additions

- **07-13 State Road 100 Flooding Rice Creek**

  - Description- Flooding has been persistent in this area along SR 100 that serves as an evaluation route. Some work has been performed by DOT but problems in some segments of the road are still evident. This project would consist of elevating portions of the road to solve flooding problems.

  - Update- Putnam County Public Works and the LMS Task Force are evaluating this project and determining the best course of action.

- Estimate- Must be assessed by professional engineers and DOT before a cost can be determined.

- Funding- To be determined

- Applicable to New/Existing Building & Infrastructure- Existing infrastructure

- Category- Infrastructure Improvements

- **07-14 Drainage System Improvements**

  - Description- This consists of a wide variety of infrastructure projects, including 7 sub-projects identified by the LMS Task Force and Putnam County Public Works. This includes regularly scheduled ditch and major outfall cleaning, drainage improvements at a number of sites, a basin and road swale conveyance survey, engineering stormwater routing model, soil stabilization and road stabilization paving design, etc.

  - Update- Recently the LMS Task Force has been working on sub-project C first because of its importance. Currently the LMS Task Force is waiting to hear if a 2010 Pre-Disaster Mitigation Grant will be received for this project.

  - Estimate- Sub-project C= $825,000; other estimates not determined yet

  - Funding- Sub-project C will hopefully be funded in the 2010 Pre-Disaster Mitigation Grant Project; other funding will come from Putnam County Public Works budget.

  - Applicable to New/Existing Building & Infrastructure- Existing infrastructure

  - Category- Infrastructure Improvements

- **07-15 Bardin Road Flooding**

  - Description- The Bardin Road area is historically known for flooding. Although no homes are generally affected, it does impact roadways and creates standing water, which is a particular concern due to mosquito outbreaks.

  - Update- Putnam County Public Works and the LMS Task Force are evaluating this project and determining the best course of action.

- Estimate- $45,000 *(2004 estimate)*
- Funding- Putnam County Public Works budget, etc.
- Applicable to New/Existing Building & Infrastructure- Existing infrastructure
- Category- Infrastructure Improvements

- **07-16 River Park Flooding near Crescent City**
  - Description- The River Park area is historically known for flooding. Although no homes are generally affected, it does impact roadways and creates standing water, which is a particular concern due to mosquito outbreaks.
  - Update- Putnam County Public Works and the LMS Task Force are evaluating this project and determining the best course of action.
  - Estimate- $45,000 *(2004 estimate)*
  - Funding- Putnam County Public Works budget, etc.
  - Applicable to New/Existing Building & Infrastructure- Existing infrastructure
  - Category- Infrastructure Improvements

- **07-17 Transportation Improvements**
  - Description- This project basically deals with a list of improvements that can be made to hurricane evacuation routes around the county, especially on State Roads 100, SR 17, etc.
  - Update- Some improvements have been made to the roads, such as fixing some wash out spots. The City of Palatka, Putnam County Public Works, and the LMS Task Force are evaluating this project to determine the best course of action.
  - Estimate- To be determined
  - Funding- To be determined
  - Applicable to New/Existing Building & Infrastructure- Existing infrastructure

- Category- Infrastructure Improvements

- **07-18 Enhance Public Water Supply System**

  - Description- This project considers contamination of private wells caused by excess stormwater and enhancing the water service capabilities during hazardous events.

  - Update- The LMS Task Force is evaluating this project, determining the best course of action, and discussing what agency should support the project.

  - Estimate- To be determined

  - Funding- To be determined

  - Applicable to New/Existing Building & Infrastructure- Existing infrastructure

  - Category- Infrastructure Improvements

- **07-19 Wastewater System Improvements**

  - Description- This project is focused on eliminating the malfunction of septic drain fields due to flooding and enhancing sewage treatment outlets during storms.

  - Update- The LMS Task Force is evaluating this project, determining the best course of action, and discussing what agency should support the project.

  - Estimate- To be determined

  - Funding- To be determined

  - Applicable to New/Existing Building & Infrastructure- Existing infrastructure

  - Category- Infrastructure Improvements

- **07-20 Improve Flood plain portions of LMS & Repetitive Flood Loss Properties**

  - Description- Improving the floodplain portions of the LMS to address CRS requirements. This project is also concerned with the county

addressing repetitive loss properties and helping residents who have experienced repetitive losses through grant support.

- Update- The LMS Task Force has decided not to focus on acquiring repetitive loss properties. Putnam County Emergency Management has looked over a number of grants, such as the FMA, to help residents with repetitive losses, but no conclusions have been made.

- Estimate- To be determined

- Funding- FMA grant, Putnam County budget, etc.

- Applicable to New/Existing Building & Infrastructure- Existing buildings

- Category- Governmental Prevention / Structural Retrofit & Additions

- **07-21 Home retrofitting – Survey of Homes**

  - Description- Established as FS 215.5586, the Department of Financial Services created the My Safe Florida Home Program that provides hurricane mitigation inspections and mitigation grants.
  - Update- Putnam County Emergency Management is in favor of the LMS Task Force helping interested persons participate. Currently, with this state program expiring, Putnam County is looking for other ways to provide hurricane mitigation inspections and mitigation grants.

  - Estimate- Staff Time

  - Funding- None needed

  - Applicable to New/Existing Building & Infrastructure- Existing buildings

  - Category- Structural Retrofit & Additions / Public Education & Awareness

- **08-01 North Florida 911 Routing Network**

  - Description- An ID routing Network utilizing the MyFloridaNet for wireless 911 routing in Northern Florida. This project would be valuable for disaster recovery. During an event that would force an evacuation of the Putnam County PSAP, primary and back up calls can be forwarded to another county agency on the MyFloridaNet.

  - Update- Currently the LMS Task Force is looking over this proposed estimate before implementation begins.

- Estimate- $37,077 *(2008 estimate)*
- Funding- Putnam County IT Department budget, etc.
- Applicable to New/Existing Building & Infrastructure- Indirectly
- Category- Technology

- **08-02 Putnam County Back-Up Communications Center**
  - Description- This project's purpose is to establish a back-up 911 dispatch center in case the regular dispatch center is non-functioning during a hazardous event.
  - Update- Putnam County IT Department, Emergency 911, and the LMS Task Force are evaluating this project and determining the best course of action.
  - Estimate- To be determined
  - Funding- Putnam County IT Department budget, Emergency 911 budget, etc.
  - Applicable to New/Existing Building & Infrastructure- Indirectly
  - Category- Structural Retrofit & Additions

- **10-01 Data Communications Fiber Loop**
  - Description- Installation/burial of fiber optic cable to complete "looped" connections in key areas to provide redundant data/communications connectivity for critical County offices. Explanation of need for proposed project: the fiber utilized to provide data and voice services to the primary data center, the EOC, the Gov't Complex and the Sheriff's Office suffers from a severe vulnerability. If a single cut occurs in any given place, the facility "downstream" of the cut will lose full voice/data services. This project will mitigate that vulnerability by completing a full loop in key areas. Multiple cuts would have to occur in order to cause a full outage.
  - Update- Added since 2009 update, County is evaluating Funding Sources
  - Estimate- To be determined
  - Funding- Putnam County IT Department budget, Emergency 911 budget, etc.

- Applicable to New/Existing Building & Infrastructure- Indirectly
- Category- Technology

- **10-2 Post Disaster Redevelopment Plan**
  - Description- Completion of County PDRP Plan.
  - Update- Added since 2009 update, This project was completed in 2012 and updated in 2014
  - Estimate- $20,000
  - Funding – EMPA, SHSGP
  - Applicable to New/Existing Building & Infrastructure- Indirectly
  - Category- Study/Plan

- **11-1 Putnam County Fairgrounds Retrofit of Judy Rawson Building**
  - Description- Wind Retrofit of Judy Rawson Building
  - Update- Added since 2009 update, This project was added in 2011 and construction is in progress as of 2014.
  - Estimate- $98,000
  - Funding – L-PDM
  - Applicable to New/Existing Building & Infrastructure- Directly
  - Category- Structural Retrofit & Additions

E. Jurisdictional Participation

Each jurisdiction within Putnam County has participated in determining and implementing mitigation projects within the last 5 years. Besides each jurisdiction attending LMS Task Force meetings where they promote mitigation ideas, prioritize actions (projects), and support agencies/ organizations that are conducting actions within the county, they also have a more prominent role. The jurisdictions of Interlachen, Palatka, Crescent City, and Pomona Park have been directly involved as the sponsoring agency for an action (project) in the 5-year time span. This includes the Towns of Interlachen (#07-12) and Pomona Park (#07-12) which completed retrofit projects for their Town Halls in 2009, the in-progress work of transportation improvements by the

City of Palatka (#07-17), and the City of Crescent City (#07-07) currently looking at different funding options for a project dealing with backing-up their power supply.

In Putnam County, over half of the LMS prioritized projects benefit everyone within the county, not just a specific jurisdiction. This includes projects like countywide improvements on GIS flood mapping technologies (#07-02), equipping all jurisdictional and community EMS Rescue and Fire Stations with generators (#07-25), and establishing needed retrofits to all major public schools as shelters for accommodating the jurisdictions in times of hazard driven emergencies (#07-03).

All jurisdictions have participated in identifying and analyzing a comprehensive range of mitigation actions for each and every identified hazard. Below information on jurisdictional participation for each LMS mitigation action (project) can be seen. This includes which jurisdictions benefited from the action (project), the sponsoring agencies of the projects, the jurisdictions that can/will support the projects, and the actions those jurisdictions can take to help implement the projects. More multi-jurisdiction information on potential funding sources; implementation timelines; and completed, deleted, and deferred projects can be found in Section 7F and within the text of this section.

- **07-01 Educational Materials on Mitigation**

  Jurisdictions Benefitted- All

  Sponsoring Agency- Putnam County Emergency Services

  Jurisdictional Support- All

  Jurisdictional Actions- All jurisdictions can stock the educational materials in their Town or City Halls, community centers, local departments, etc. They can then provide educational materials at building inspections, etc. The jurisdictions can also help Putnam County Emergency Services develop the information to better fit community desires.

- **07-02 GIS Mapping Technology**
  - Jurisdictions Benefitted- All
  - Sponsoring Agency- Putnam County IT Department
  - Jurisdictional Support- All

- Jurisdictional Actions- All jurisdictions can provide support by providing information, updated mapping materials, and assistance to the Putnam County IT Department.

- **07-03 County All Hazard Shelter**

  - Jurisdictions Benefitted- All

  - Sponsoring Agency- Putnam County School Board and Putnam County

  - Jurisdictional Support- Directly: Crescent City, Palatka, & Interlachen; indirectly: Welaka and Pomona Park

  - Jurisdictional Actions- Crescent City, Palatka, and Interlachen can provide any needed assistance to the Putnam County School Board.

- **07-04 Domestic Terrorism Study (CITAMS)**

  - Jurisdictions Benefitted- All, but mainly Palatka

  - Sponsoring Agency- Putnam County Emergency Services

  - Jurisdictional Support- All, but mainly Palatka

  - Jurisdictional Actions- All jurisdictions can participate in CITAMS training sponsored by Putnam County Emergency Services. All jurisdictions can also participate by having vulnerability assessments done on critical facilities and the jurisdictions can encourage other prominent businesses to have vulnerability assessments completed.

- **07-05 Countywide Communication Improvements**

  - Jurisdictions Benefitted- All

  - Sponsoring Agency- Putnam County Emergency Services

  - Jurisdictional Support- All

  - Jurisdictional Actions- All jurisdictions can provide assistance and information needed by Putnam County Emergency Services. All jurisdictions can make it a goal to participate in the communication improvements.

- **07-25 CF- Generator and water supply at each EMS Rescue and Fire Station**

- Jurisdictions Benefitted- All
- Sponsoring Agency- Putnam County Emergency Services
- Jurisdictional Support- All
- Jurisdictional Actions- All jurisdictions can provide assistance to Putnam County Emergency Services.

- **07-07 Permanent Generators for Continuity of Operations**
  - Jurisdictions Benefitted- Palatka and Crescent City
  - Sponsoring Agency- Palatka Community Medical Center and City of Crescent City
  - Jurisdictional Support- Palatka and Crescent City
  - Jurisdictional Actions- Crescent City finds funding to implement project; Palatka can provide assistance to the Palatka Community Medical Center.

- **07-08 Wildfire Mitigation Activities**
  - Jurisdictions Benefitted- All
  - Sponsoring Agency- Florida Division of Forestry and Putnam County Emergency Services
  - Jurisdictional Support- All
  - Jurisdictional Actions- All jurisdictions can participate by adopting a burn ban, by putting Firewise components into their comprehensive plans, by allowing educational programs to take place in their Town/City Halls, and by providing educational materials within their Town/City Halls.

- **07-09 Master Stormwater Plan**
  - Jurisdictions Benefitted- All
  - Sponsoring Agency- Putnam County Planning and Development, and Putnam County Public Works and Engineering
  - Jurisdictional Support- All

- Jurisdictional Actions- All jurisdictions can assist and provide updated information to the two county departments, and, if necessary, can adopt the Master Stormwater Plan.

- **07-10 Adoption of Fire Protection Ordinance for new and existing buildings**
  - Jurisdictions Benefitted- All
  - Sponsoring Agency- Putnam County Emergency Services
  - Jurisdictional Support- All
  - Jurisdictional Actions- All jurisdictions can adopt the Fire Protection Ordinance for new and existing buildings, and enforce it.

- **07-22 Sustainable Shelters**
  - Jurisdictions Benefitted- To be determined
  - Sponsoring Agency- Putnam County Public Works and Engineering
  - Jurisdictional Support- To be determined
  - Jurisdictional Actions- To be determined

- **07-11 Post Disaster Redevelopment Plan (SRESP)**
  - Jurisdictions Benefitted- All
  - Sponsoring Agency- Northeast Florida Regional Council
  - Jurisdictional Support- All
  - Jurisdictional Actions- All jurisdictions can provide information, partake in any SRESP development meetings, and, if necessary, can adopt the plan.

- **07-12 Retrofitting Critical Facilities**
  - Jurisdictions Benefitted- Mainly Palatka, Pomona Park, and Interlachen; indirectly Welaka and Crescent City.
  - Sponsoring Agency- Town of Pomona Park, Town of Interlachen, City of Palatka Fire Department, and Putnam County Emergency Services
  - Jurisdictional Support- Palatka, Pomona Park, and Interlachen

- Jurisdictional Actions- The Towns of Pomona Park and Interlachen have already completed this project. Palatka can provide assistance to the City's Fire Department.

- **07-13 State Road 100 Flooding Rice Creek**
  - Jurisdictions Benefitted- None directly
  - Sponsoring Agency- Putnam County Public Works and Engineering
  - Jurisdictional Support- None directly, county support overall
  - Jurisdictional Actions- None directly, county actions overall

- **07-14 Drainage System Improvements**
  - Jurisdictions Benefitted- Mainly Palatka, but also all other jurisdictions
  - Sponsoring Agency- Putnam County Public Works and Engineering, and the City of Palatka
  - Jurisdictional Support- Mainly Palatka, but also all other jurisdictions
  - Jurisdictional Actions- Palatka and other jurisdictions can support Public Works by providing information, services, possibly funding, and continued support for the projects.

- **07-15 Bardin Road Flooding**
  - Jurisdictions Benefitted- None directly
  - Sponsoring Agency- Putnam County Public Works and Engineering
  - Jurisdictional Support- None directly, county support overall
  - Jurisdictional Actions- None directly, county actions overall

- **07-16 River Park Flooding**
  - Jurisdictions Benefitted- Possibly Crescent City
  - Sponsoring Agency- Putnam County Public Works and Engineering
  - Jurisdictional Support- Possibly Crescent City

- Jurisdictional Actions- Crescent City will provide assistance to Putnam County Works and Engineering

- **07-17 Transportation Improvements**
  - Jurisdictions Benefitted- Directly: Palatka; indirectly: all.
  - Sponsoring Agency- City of Palatka & Putnam County Public Works and Engineering
  - Jurisdictional Support- Palatka
  - Jurisdictional Actions- Palatka is the sponsoring agency, therefore all responsibilities are within their hands.

- **07-18 Enhance Public Water Supply System**
  - Jurisdictions Benefitted- To be determined
  - Sponsoring Agency- -----
  - Jurisdictional Support- To be determined
  - Jurisdictional Actions- To be determined

- **07-19 Wastewater System Improvements**
  - Jurisdictions Benefitted- To be determined
  - Sponsoring Agency- -----
  - Jurisdictional Support- To be determined
  - Jurisdictional Actions- To be determined

- **07-20 Repetitive Flood Loss Properties**
  - Jurisdictions Benefitted- To be determined
  - Sponsoring Agency- Putnam County Planning and Development
  - Jurisdictional Support- To be determined
  - Jurisdictional Actions- To be determined. When determined the representative jurisdiction will provide support, will provide information

to Putnam County Planning and Development, and assist in implementation.

- **07-21 My Safe Florida Home Program**
    - Jurisdictions Benefitted- All
    - Sponsoring Agency- Putnam County Emergency Services
    - Jurisdictional Support- All
    - Jurisdictional Actions- All jurisdictions can support this by providing information and participating in hurricane mitigation inspections.
- **08-01 North Florida 911 Routing Network**
    - Jurisdictions Benefitted- All
    - Sponsoring Agency- Putnam County GIS/E911
    - Jurisdictional Support- All
    - Jurisdictional Actions- All jurisdictions can provide assistance in implementing this project.
- **08-02 Putnam County Back-Up Communications Center**
    - Jurisdictions Benefitted- All
    - Sponsoring Agency- Putnam County GIS/E911
    - Jurisdictional Support- All
    - Jurisdictional Actions- All jurisdictions can provide assistance in implementing this project.

F. Project Priority List

Please reference last few pages of each LMS meeting information packet (Appendix K) for the most recent project priority list. A larger format list is available upon request.

Section 8: Potential Funding Sources for Proposed Initiatives

A. Introduction

The following list provides information on sources of available funding that is used for hazard mitigation projects. This includes the name of the grant, the sponsoring agency, type of assistance available and who is eligible. This table is reviewed when new mitigation projects are submitted.

B. Potential Funding Sources

Hazard Mitigation Grant Program

- Hazard- All
- Agency- FEMA
- Objective- implementation of long-tern hazard mitigation after a major disaster declaration
- Assistance Provided- Project Funding
- Eligibility- State/local governments, Indian tribes, some non-profit organizations

Pre-Disaster Mitigation Program

- Hazard- All
- Agency- FEMA
- Objective- Cost-effective pre-disaster hazard mitigation activities that reduce injuries, loss of life, and damaged/destroyed properties
- Assistance Provided- Technical and financial assistance
- Eligibility- Local governments, tribal government

Emergency Management Performance Grants

- Hazard- All
- Agency- FEMA
- Objective- Develop comprehensive emergency management and to improve emergency planning, preparedness, mitigation, response, and recovery capabilities.
- Assistance Provided- Project Grants
- Eligibility- State

Project Impact- Building Disaster Resistant Communities

- Hazard- All
- Agency- FEMA

- Objective- Encourage the implementation of a sustained pre-disaster mitigation program with activities that reduce the existing risk of natural hazard loses within the geographic location of the designated communities.
- Assistance Provide- Project Grants
- Eligibility- Any community or jurisdiction that the State has recommended as a Project Impact community

Development of Technologies for Assurance of the U.S. Energy Infrastructure

- Hazard- All
- Agency- DOE
- Objective- Ensure the reliability and security of the nation's energy infrastructure, including understanding vulnerabilities, and developing protection, detection, mitigation, and response strategies for all hazards
- Assistance Provided- Project Grant
- Eligibility- Unrestricted

National Dam Safety Program

- Hazard- Dam
- Agency- DHS
- Objective- To encourage the establishment and maintenance of effective State programs intended to ensure dam safety, to protect human life and property, and to improve State dam safety programs.
- Assistance Provided- To encourage the establishment and maintenance of effective State programs intended to ensure dam safety, to protect human life and property, and to improve State dam safety programs.
- Eligibility- All States

Fire Prevention and Safety Grant Program

- Hazard- Fire
- Agency- USFA
- Objective- To reduce the overall loss of life from fire; establish comprehensive multi-hazard risk reduction plans led by or including the local fire service in 2,500 communities; create the ability for communities to respond appropriately to emergency issues in a timely manner.

Wildland Urban Interface Community and Rural Fire Assistance

- Hazard- Fires
- Agency- DOI
- Objective- Implement the National Fire Plan and assist communities at risk from catastrophic wildland fires through a variety of activities
- Assistance Provided- Project Grants; Use of property, facilities, and equipment; provision of specialized services; Advisory services and counseling; Dissemination of technical information; Training

- Eligibility- State and local governments, Indian tribes, public and private education institutions, non-profit organizations, and rural fire departments serving a population of 10,000 or less

Fire Suppression Assistance

- Hazard- Fire
- Agency- FEMA
- Objective- Suppression of any fire on public or privately owned forest or grassland that threatens to become a major disaster.
- Assistance Provided- Project Grants; use of property, facilities, and equipment; Provision of specialized services
- Eligibility- States

Assistance to Firefighters

- Hazard- Fire
- Agency- ODP, USFA
- Objective- Assist fire departments in improving their capacities to prevent and suppress fires and respond to chemical, biological, radiological, nuclear and explosive incidents
- Assistance Provided- Program Grants
- Eligibility- Fire departments

Watershed Protection and Flood Prevention

- Hazard- Flood
- Agency- DOA
- Objective- Technical and Financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in small watersheds
- Assistance Provided- Project Grants, Advisory services and counseling
- Eligibility- State agency, county or groups of counties, municipalities, town or townships, soil and water conservation district, flood prevention of flood control district, Indian tribe, or any other non-profit agency.

Flood Mitigation Assistance Program

- Hazard- Flood
- Agency- FEMA
- Objective- Reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, or other structures insurable under the NFIP
- Assistance Provided- Technical, planning, or project assistance grants
- Eligibility- NFIP-participating states and communities

Protection of Essential Highways, Highway Bridge Approaches, and Public Works

- Hazard- Flood

- Agency- DoD
- Objective- To provide bank protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other non-profit public services endangered by flood-caused erosion
- Assistance Provided- Provision of Specialized Services
- Eligibility- States, political subdivisions of States or other responsible local agencies

Flood Control Projects

- Hazard- Flood
- Agency- DoD
- Objective- To reduce flood damage through projects not specifically authorized by congress
- Assistance Provided- Provision of Specialized Services
- Eligibility- States, political subdivisions of States or other responsible local agencies

Snagging and clearing for Flood Control

- Hazard- Flood
- Agency- DoD
- Objective- To reduce flood damages
- Assistance Provided- Provision of Specialized Services
- Eligibility- States, political subdivisions of States or other responsible local agencies

Emergency Advance Measures for Flood Prevention

- Hazard- Flood
- Agency- DoD
- Objective- To perform activities prior to flooding that would assist in protecting against loss of life and damages to property due to flooding
- Assistance Provided- Provision of Specialized Services
- Eligibility- Governor must request assistance

NIEHS Hazardous Waste Worker Health and Safety Training

- Hazard- Hazardous Materials
- Agency- DHHS
- Objective- Provide cooperative agreements and project grant support for the development and administration of model worker health and safety training programs for workers and their supervisors who are engaged in activities related to hazardous materials, hazardous waste generation, treatment, storage, disposal, removal, containment, transportation, or emergency response
- Assistance Provided- Project Grants
- Eligibility- A public or private nonprofit entity providing education and training

Surveillance of Hazardous Substances Emergency Events

- Hazard- Hazardous Materials
- Agency- DHHS
- Objective- Develop and maintain a state-based surveillance system for monitoring hazardous substances emergency events, and conducting appropriate prevention activities
- Assistance Provided- Program Grants
- Eligibility- State Health Department, Native American Tribal

Grants-in-Aid for Railroad Safety- State participation

- Hazard- Hazardous Materials
- Agency- DOT
- Objective- Promote Safety in all areas of railroad operations reduce railroad related accidents and casualties, reduce damage to property caused by accidents involving any carrier of hazardous materials
- Assistance Provided- Project Grants
- Eligibility- States

Interagency hazardous Materials Public Sector Training and Planning Grants

- Hazard- Hazardous Materials
- Agency- DOT
- Objective- Increase State, local, territorial, and Native American tribal effectiveness to safely and efficiently handle hazardous materials accidents and incidents
- Assistance Provide- Project Grants
- Eligibility- States, U.S. Territories and Federally recognized Native American Tribes

Technical Assistance Grant Program

- Hazard- Hazardous Materials
- Agency- EPA
- Objective- Financial assistance for chemical accident prevention activities that relate to the risk management program
- Assistance Provided- Project Grants
- Eligibility- State/local governments, and Indian Tribes

Hazardous Materials Assistance Program

- Hazard- Hazardous Materials
- Agency- FEMA
- Objective- Technical and financial assistance through states to support state, local and Indian tribal governments in oil and hazardous materials emergency planning and exercising

- Assistance Provided- Project Grants
- Eligibility- State/local governments, tribes, U.S. Territories, SERC's and LEPC's

State and Local Domestic Preparedness Exercise Support

- Hazard- Terrorism
- Agency- DOJ
- Objective- To provide exercise planning to State and local jurisdictions and to conduct national, State, and local exercises for response to Weapons of Mass Destruction domestic terrorist incidents involving nuclear, biological, chemical, and explosive devices
- Assistance Provided- Project Grants
- Eligibility- State and local jurisdictions, or public and private nonprofit agencies

State and Local Domestic Preparedness Technical Assistance

- Hazard- Terrorism
- Agency- DOJ
- Objective- To provide direct assistance to State and local jurisdictions in enhancing their capacity and preparedness to respond to WMD incidents
- Assistance Provided- Project Grants
- Eligibility- Public or Private nonprofit agency or a for profit agency providing

First Responded Counter-Terrorism Training Assistance

- Hazard- Terrorism
- Agency- FEMA
- Objective- Enhance the capabilities of first responders in managing the consequences of terrorist acts
- Assistance Provided- Project Grants
- Eligibility- Provided through States

APPENDIX A

Putnam County Hazards Quick Reference

Appendix A - Putnam County Hazards Quick Reference Table

Hazard	Hurricanes and other cyclonic activity
Description	A Hurricane is a tropical cyclone characterized by thunderstorms and defined surface wind circulation. They are developed over warm waters and are caused by the atmospheric instability created by the collision of warm air with cooler air. Hurricane winds range from 75 mph to 155+ mph. Tropical storms are also tropical cyclones with sustained surface winds greater than 39 mph and less than 74 mph, and tropical depressions have winds of less than 39 mph. A subtropical storm is a non-frontal low pressure system that has characteristics of both tropical and extratropical cyclones. These particular storms can't turn into hurricanes while being subtropical and they are usually characterized as having less rainfall than tropical storms. With all of this being said, hurricanes and some other cyclonic activities, have the potential of producing four major associated hazards: storm surge, high winds, flooding, and tornadoes.
Location, Extent, Damages	With hurricane and other cyclonic associated hazards being separately addressed in the LMS (e.g. *storm surge*, *high winds*, *flooding*, *tornadoes*), all of the county and its jurisdictions are vulnerable to hurricane and other cyclonic activity hazards as a whole. Putnam County is an inland county and most of it isn't susceptible to storm surge, but all the county and its jurisdictions are vulnerable to high wind and excessive rainfall from hurricanes and other cyclonic activities that pass through or close to the county. While it is possible for the county to be hit by a category 4 or 5 hurricane, it is very unlikely based on past trends that have seen Florida's northeastern region mainly receiving tropical depressions/storms and categories 1-3. Impacts from these storms can include tree and natural environment destruction, infrastructure and house damage or collapse, downed power lines, blocked roads, flooding, and massive amounts of storm-generated debris. All structures are susceptible to impacts of hurricanes, especially buildings in floodplains and unsound housing or mobile homes.
Measurement Scales	Saffir-Simpson Hurricane Scale; see Table 1 in section 4
Vulnerability*	Medium/High

Previous Occurrences	It was recorded that 31 hurricane "eyes" have come within a 100-mile radius around Putnam County between 1885-2008: fifteen Category 1, three Category 2, eleven Category 3, two Category 4. The most recent of these were Hurricanes Jeanne and Charley in 2004 and out of these 31, the "eye" of six Category 1 and a Category 2 passed directly through Putnam County. Between 1960-2008, Putnam County had approximately 10 Tropical Depressions, 13 Tropical Storms, 4 Subtropical Depressions, and 2 Subtropical Storms within a 100-mile radius of the county. Previous occurrences of *storm surge*, *high winds*, *flooding*, and *tornadoes* are being separately addressed in the LMS.
Probability of Future Occurrences*	Medium (also see Table 5 in Section 4 for NOAA NHC hurricane estimated return periods)
Risk Level*	Medium
Impacts*	Medium
References	NOAA Coastal Services Center (2009), Hurricane Watch Net (2009), NOAA NHC (2007), Hurricane Evacuation Study (2004), Putnam County CEMP (2018), TAOS (2004), www.floridadisaster.org (2004), NOAA NHC (2009)
Map	Yes

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Hazard	Storm Surge
Description	Storm surge is an onshore surge of water associated with a low pressure weather system, usually a tropical cyclone like hurricanes. This surge is caused mainly by high winds pushing the ocean's surface water to pile up higher than the typically sea level. Storm surge can cause vast flooding impacts to coastal areas and can run up into rivers that open into the ocean.
Location, Extent, Damages	Although Putnam County is an inland county and doesn't have the risk like a coastal county, it does have some storm surge possibilities associated with the St. Johns River. Along the lower basin, from Putnam County to the mouth of the Atlantic Ocean in Duval County, the St. Johns River functions less as a river and more like a lagoon that is strongly influenced by tides from the Atlantic Ocean. In Putnam County, areas of particular vulnerability to storm surge are the adjacent shorelines to the St. Johns River and its tributaries, especially in northeastern Putnam County and within the eastern part of the Ocala National Park. Specifically, Palatka, Welaka, and Crescent City are vulnerable. Out of these Palatka is more vulnerable than Welaka and Crescent City because of its closer vicinity towards the ocean mouth, its general location/river depth, and since it is not located on a tributary. While it is possible for storm surge to raise over 5 feet in the St. Johns River from a high category hurricane, it is very unlikely based on past trends of mainly receiving between 0.5 – 3.5 feet. Impacts in Putnam County are low but could include damaged piers/boats and possibly some effects to buildings built in close proximity to the St. Johns River, especially in the northern section of the county around the river.
Measurement Scales	Storm surge is measured in feet along the St. Johns River. This method is used by NOAA National Weather Service for Putnam County since it is a non-coastal county.
Vulnerability*	Low
Previous Occurrences	Putnam County has seen 0.5' to 3.2' of storm surge along the St. Johns River as a result of Tropical Storm Fay in 2008 and Hurricane Dora in 1964.

Probability of Future Occurrences*	Low (The probability of future occurrences that could cause noticeable damages is low because of the historical small-scale storm surge measurements received in Putnam County associated with being over 40 miles away from the river's Atlantic Ocean mouth and from the historical lower probability of strong hurricanes to directly impact the northeast Florida region. If a storm surge were to occur, it would probably happen within hurricane season, between June 1 and November 30(NWS and Putnam County Emergency Management *(2009)*)
Risk Level*	Low
Impacts*	Low
References	NOAA NWS of Jacksonville (2009), Weather World 2010 Project (2009), TAOS (2004), Putnam County CEMP (2018)
Map	Yes

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Hazard	Severe Thunderstorms
Description	A thunderstorm results from strong rising air currents and is associated with heavy rain, wind, hail, thunder, and lightning. To consider a thunderstorm severe it must encompass one of three traits: produce winds greater than 58 miles per hour, produce hail ¾ of an inch or greater in diameter, or produce tornadoes.
Location, Extent, Damages	With severe thunderstorm associated hazards largely being separately addressed in the LMS (e.g. *high winds, flooding, tornadoes*), all of the county and its jurisdictions are vulnerable to severe thunderstorm hazards as a whole. Other thunderstorm hazards include hail and lightning. The risk of impacts from hail is relatively low, with the possibility of hail causing damage to car or building windows and small dents on mobile home roofs. The risk of lightning impacts are higher because of the possibility of causing building or forest fires, especially due to the large concentration of the county's residents living in rural wooded areas. Past records show that thunderstorms have occurred in every month of the year for the county. These storms have the potential of causing power outages, localized flooding, destruction or damage to buildings, and can result in loss of life. While severe thunderstorms in Putnam County could have winds over 80 mph, hail bigger than 3 inches, and create numerous tornadoes, it would be very unlikely for thunderstorms to reach this extent based on past trends. Minor damages have occurred from thunderstorms each year within the county. All structures are susceptible to impacts of severe thunderstorms, especially buildings in floodplains and manufactured or mobile homes.
Measurement Scales	In Putnam County, the NOAA NDCC measures thunderstorms by wind speed in mph, hail diameter in inches, and by taking lighting and tornado counts *(See other associated hazards).* A Thunderstorm Scale could also be used as another measurement tool *http://screen7.adventuredevelopers.com/sostorms/scale.htm* , as well as the TORRO Hail Scale.
Vulnerability*	Medium

Previous Occurrences Between 1950-2008, Putnam County has reported having more than 163 thunderstorm events. With hail and lightning being addressed within this hazard; high winds, flooding, and tornadoes are being addressed as separate hazards in this LMS. Between 1974-2008, the county had over 80 reports of hail ¾ of an inch or greater, with the occurrence of diameters being over 2 inches in 1974. Then between 1994-2007, Putnam County reported over 15 significant lightning events. Out of these there were approximately 7 reports of lightning causing building fires, some of which completely destroyed homes and caused injuries. In 1995, a lightning strike fatality occurred to someone boating in the St. Johns River.

Probability of Future Occurrences* High (When it comes to thunderstorms experienced in the United States, Florida is ranked number one *(NWS, 2007)*. Past records show that thunderstorms have occurred in every month of the year for Putnam County *(NCDC, 2009)*)

Risk Level* High
Impacts* Medium

References NOAA NCDC (2009), NOAA NWS (2007), Putnam County CEMP (2018)

Map Yes

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Hazard	High Winds
Description	Strong damaging winds associated with powerful storms such as hurricanes, tropical storms, and severe thunderstorms.
Location, Extent, Damages	With high wind hazards, all of the county and its jurisdictions are vulnerable. Areas of higher topography, areas adjacent to large bodies of water, and areas of certain land use patterns, such as large clear-cuts within the forest, are the most susceptible. Within the county, Interlachen would be the least vulnerable, with Palatka and all shoreline development located adjacent to the St. Johns River being the most vulnerable. Hurricane/tropical storm winds will usually be seen during hurricane season and thunderstorm winds can occur in any month for the county. Impacts from high winds that have occurred in the county and will occur again are tree and natural environment destruction, infrastructure and house damage or collapse, pier and boat damage, downed power lines, and massive amounts of storm generated debris. While it is possible for the county to receive winds that could destroy mobile homes and cause complete roof failure (category 4 or 5 hurricane winds), it is very unlikely according to past storm trends which have created only minimal building damage with wind speeds less than 110 mph. This hazard overall poses high associated risk level with the most susceptible structures in the county being manufactured and mobile homes. In 2000 the county had 14,935 mobile homes with approximately 32,857 people living in them, making up approximately 47% of the county population in 2000.
Measurement Scales	Wind Damage Index based on the Saffir-Simpson Scale from the University of Florida; see Table 6 in section 4. Also the Beaufort Wind Scale could be used.
Vulnerability*	Medium
Previous Occurrences	Between 1950-2008, Putnam County reported having over 163 thunderstorm/high wind events with thunderstorm winds clocked as high as 65 knots, around 75 mph. These thunderstorm winds caused roof damage to mobile homes, sheds, barns, and to an old church in Palatka (including

instances where some of these roofs were completely blown off). In 1993, thunderstorm winds damaged 15 homes along SR-315 making this one of the higher reported property damage caused by thunderstorm winds at $50,000. Most damage in the county is from wind causing tree branches to fall onto power lines and homes/buildings. Only a few injuries in the county have been knowingly caused by thunderstorm winds, including an injury received in 2008 from a tree falling on a mobile home. Regarding hurricane winds between 1885 and 2008, Putnam County had over seven events with winds over 74 mph, including winds between 96-110 mph. All of these wind events caused damages within the county. In 2001, Tropical Storm Gabrielle downed many trees and power lines in the county resulting in more than 11,000 businesses and homes without power.

Probability of Future Occurrences* Above Medium (see Table 5 in section 4 for hurricane wind probability & see "severe t-storms")

Risk Level* Moderate

Impacts* Medium

References Putnam County CEMP (2018), NOAA NCDC (2009), NOAA Coastal Services Center (2009), TAOS (2004), Northeast Florida Housing Report (2008)

Map Yes

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Hazard	Flooding
Description	Flooding events can occur when excess water from rivers and other bodies of water overflow onto riverbanks and adjacent floodplains. In addition lower lying regions can collect water, as would a bucket, from rainfall and flat, poorly drained land can also accumulate rainfall through sheet flow or ponding on the surface. Floods in Putnam County are usually caused by rainfall (snowmelt doesn't affect the county); also see LMS hazard storm surge.
Location, Extent, Damages	In Putnam County, flooding is an issue because approximately 1/3 of the county and around 20% of the county's population are within the 100-year floodplain. Parts of the county and parts of every jurisdiction are vulnerable to flooding, especially parts of Palatka, lands adjacent to the St. Johns River and its tributaries, land adjacent to some lakes, and some low lying areas. Also, all jurisdictions have some acreage located in the 100-year flood zone. Within the county, bank overflowing and pooling are the most common types of flooding due to the number of small lakes and swampy areas along the waterways. This is important to know since the county has approximately 10,732 homes in the 100-year floodplain (zones A & AE), 645 homes in the 500-year floodplain (zone X500), 4,416 mobile homes in the 100-year floodplain, and 255 mobile homes in the 500-year floodplain. These residences, especially the mobile homes, could potentially feel the impacts of flooding. In addition to the impact on structures, flooding can cause impacts to agriculture, utilities, can spread hazardous chemicals, and disrupt transportation networks. Out of natural threats like freezes and droughts, flooding has caused the most agricultural damage to the county. Also, floods disrupt traffic and cause damage to the county's roads, thus putting travelers at risk by disrupting the flow of traffic. This is one of the county's main concerns when it comes to flooding because of past trends from road washouts. Areas and roads of flooding concern for the county include the communities of Putnam Hall, Grandin, Welaka, Florahome, Rice Creek, St. Johns River area, the City of Palatka (notably Reid State), SR-26, SR-100, US-17, Crill Ave., Manning Grade Road, Paradise Point Road, Payne Road

subdivision, Elsie Drive, and Port Comfort Road. See Appendix C for a more detailed analysis of flooded roadways. While it is possible for the county to receive 500-year floods that cause vast structure damage due to water accumulation from extremely strong storms and continuing precipitation events, it would be less common.

Measurement Scales In Putnam County, the NOAA NCDC measures rainfall in inches and the County uses floodplain maps (and FEMA FIRM zones) to provide possible severities and vulnerable areas.

Vulnerability* High

Previous Occurrences On average Putnam County receives around 51 inches of rainfall a year. Between 1994-2014, the county had over a dozen severe flooding events and over 10 events where severe road flooding occurred, including closing down parts of the county's major roads: US-17, SR-20, and SR-100. Between this time span, local flooding damages have been noted to range from $1,000 to over $10,000 and Florida northeast regional flooding damages have totaled over $500,000. In 1996, flooding submerged a mobile home on a creek off of SR-207 near Orange Mills where four people had to evacuate. In 1997, some areas of Putnam County reported water being as deep as 20 feet in low-lying spots. In 2002, a fatality occurred when a man's bass boat flooded with rainwater and sank. Recently, in May 2009, after receiving between 10 to 20 inches of rain in less than a week, flooding caused extensive crop damage in the county. Putnam County was included in a three-county area, along with Volusia and Flagler, where flooding was estimated to cause $45 million dollars in crop damage. Also, out of the approximate 250 linear miles or dirt roads in the county, this flood caused damage to an estimated 60-80%. In May of 2009 Putnam County was declared for FEMA DR#1840 due to flooding and financial damages exceeded $730,000.

Probability of Future Occurrences* High (As previously stated, flooding from hurricanes/tropical storms are most likely to occur during hurricane season, and thunderstorm and rain related flooding can occur in any month. Typically at least minor flooding has occurred almost every year in the county *(Putnam County Emergency Management, 2009)*.)

Risk Level*	High
Impacts*	Medium
References	NOAA NCDC (2009), Putnam County Emergency Management (2009), Putnam County CEMP (2018), Putnam County Building and Zoning Department (2009), TAOS (2004), Putnam County Farm Bureau (2009)
Map	Yes

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Hazard	Tornadoes
Description	A violently rotating column of air that extends from a thunderstorm, hurricane, etc. down to the ground, and can reach wind speeds of 40 mph to 250 mph and higher. Tornadoes paths, lengths, and widths vary.
Location, Extent, Damages	All of Putnam County and its jurisdictions are vulnerable to tornado hazard, with the western central portion of the county and its jurisdictions of Interlachen and Palatka, possibly being more vulnerable based on trends. This hazard could occur during any time of the year but is more prevalent during time periods with stronger thunderstorms and during the hurricane season. The most common, usually less destructive, tornadoes are warm weather tornadoes that occur between May and August. Cool season tornadoes are usually the more destructive, occurring between December and April. While it is possible for Putnam County to receive a F3, F4, or F5 tornado, it would be very unlikely based on past trends that have created mainly F0's and F1's. Impacts of tornadoes can include roof damage, power outages, blown down signage, massive amounts of debris, uprooting trees, debris missile launching, and in very bad tornadoes, well-constructed buildings can be completely destroyed. The biggest threats of tornado impacts to Putnam County are hits to critical facilities, densely populated areas, and the county's vast amount of mobile homes. With this being said, a tornado or a series of tornadoes could affect 20% of the county's population if it occurred in a heavily populated area like Palatka. Overall, this hazard poses a high associated risk level to the most susceptible structures of manufactured and mobile homes. In 2000 the county had 14,935 mobile homes with approximately 32,857 people living in them, making up approximately 47% of the county population in 2000.
Measurement Scales	Enhanced Fujita Scale; note Section 4
Vulnerability*	High
Previous Occurrences	Putnam County has had 31 recorded tornadoes between 1950 and April 2015; 22-F0, 5-F1, and 4-F2. During this

	time frame, a number of injuries were reported and two fatalities from tornado effects occurred, including a tree branch that crashed through a porch in 1996. In Putnam County, the majority of tornadoes have been seen to move from southwest to northeast and the bulk of them usually occur on the county side, west of the St. Johns River.
Probability of Future Occurrences*	Medium (See Section 4 "Tornadoes)
Risk Level*	Medium
Impacts*	High
References	NOAA NHC (2009), FEMA (2009), Putnam County CEMP (2018), NOAA NCDC (2009), Tornado History Project (2009), TAOS (2004), Northeast Florida Housing Report (2008)
Map	Yes

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Hazard	Wildfires
Description	An uncontrollable fire that spreads through the consumption of vegetative fuels and any other flammable materials in its path. These wildfires, which occur many times in drought periods, can start from items such as lightning strikes, arson, and escaped yard debris burns.
Location, Extent, Damages	Many areas in Putnam County and parts within all jurisdictions are vulnerable to wildfire hazard, particularly the dense forest areas located in the northern section of the county stretching down southwest and along the Marion County border. The majority of forest land acreage is privately owned by timber companies. Putnam County has more than 75% of the land acreage in the county as forest land and a large concentration of residents live in these rural wooded areas. Generally, areas located at the urban/rural interface, like the placement of homes that occur adjacent to large undeveloped areas of forestland or land owned by timber companies, are the most susceptible for risks. Examples of this urban/rural interface occur in all jurisdictions, especially in Interlachen which is surrounded by wooded areas. Therefore structures located near the urban/rural interface are most likely to receive potential wildfire impacts. According to Florida's Division of Forestry, the Areas of Concern for Putnam County are the communities of Bostwick, Georgetown, Grandin, Mondex, Putnam Hall, Rice Creek, Satsuma, and Springside. Most years, the spring months (March, April, and May) are Florida's driest times and when the number of wildfires and acreage burned are the highest, but some years are drier than others and extended drought periods can occur for several years. While wildfires in Putnam County have the potential to burn over 4,000 acres in a year, this is less likely to occur because of geographical patterns, precipitation events, and fire services designed to fight the fires. From the occurrences of wildfires in almost every year for the county, the probability for wildfires is high. Historically, a major forest fire has occurred at least once every five years in the county. Impacts of wildfires include and are not limited to losses to agriculture, wildlife, the timber industry, closed down roads, and destruction or damage to building/housing structures.

Measurement Scales	FDOF measures Putnam County fires by acres burned per timeframe. The Keetch-Byram Fire Drought Index for wildfires likelihood is used in Putnam County.
Vulnerability*	High
Previous Occurrences	Between 1999-2008, Putnam County had 1,135 fires and 11,341 acres burned. In this approximate 10-year span, the worst years for wildfires were 1999, 2000, 2006, 2007 and 2008. (See Table 10 in section 4 for more details). This includes events where homes were destroyed, buildings were evacuated, roads were closed, and a resident or two had to be treated for smoke inhalation in a hospital.
Probability of Future Occurrences*	High (The county has had some type of wildfires about every year *(FDOF, 2009)*, see Table 11 in Section 4 for wildfires causes)
Risk Level*	High
Impacts*	Medium
References	DOF Forest Management Information System (2009), NOAA NCDC (2009), FDOF (2009), Putnam County CEMP (2018)
Map	Yes

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Hazard	Droughts/Heat Waves
Description	Droughts are a normal climatic occurrence that takes place in the majority of inhabited areas of the planet, although its characteristics vary throughout different regions. Droughts are a normal climatic occurrence that takes place in the majority of inhabited areas of the planet, although its characteristics vary throughout different regions. They are recognized as a persistent and abnormal moisture deficiency with the potential of causing adverse impacts on vegetation, animals, and people. Heat waves are different from droughts in that these waves occur when temperatures are abnormally and uncomfortably hot for an extended period of time. Heat waves are often accompanied by high humidity and can have a great impact on lives.
Location, Extent, Damages	All of Putnam County and its jurisdictions are vulnerable to drought conditions and the effects associated with them. Impacts of droughts can affect crops, water supply, and can lead to increased hazards from wildfires that could impact structures. Putnam County has had some crop damage because of droughts and usually sees their most destructive wildfires during drought periods. Most years, the spring months (March, April, and May), are Florida's driest months, but some years have been drier than others. While Putnam County can receive D3 and D4 drought declarations, it is more likely they will receive D0-D2 declarations. Also, all of Putnam County and its jurisdictions are vulnerable to heat wave conditions with a higher probability in summer months. Impacts from heat waves can put lives at risk with the possibility of heat strokes and heat exhaustion. Urban areas in Putnam County, especially Palatka, may be more susceptible to the effects of a heat wave due to the Urban Heat Island effect from urban development. Therefore it is possible to experience heat index ranges over 110 degrees F in some places.
Measurement Scales	One of the main sources for charting drought scales in Putnam County is by using the U.S. Drought Monitor that categorized droughts by levels of drought declarations; see Table 12 in section 4. The county also uses the Palmer Index and the Keetch-Byram Drought Index for wildfire

	likelihood. Heat waves are measured using heat index ranges and degrees F.
Vulnerability*	Moderate
Previous Occurrences	From 2000 through the beginning of May 2009, the county has had drought declarations between the beginning of January 2000 to the middle of August 2001, in August 2006, between late October 2006 to the beginning of August 2007, between late May 2008 to the middle of June 2008, and between the middle of March 2009 through the beginning of May 2009. Out of those events, conditions between middle June 2000-middle July 2000 and beginning December 2000-late July 2001 were declared D3's (extreme drought), and between middle February 2001-middle March 2001 was declared the highest category - D4 (exceptional drought). These events have caused crop damage in the county. In terms of heat waves, Putnam County's summer temperatures can reach the mid to high 90s with heat index ranges of 105-115 degrees F. There have been a few temperatures in the past over 100 degrees F.
Probability of Future Occurrences*	Above Medium
Risk Level*	Medium
Impacts*	Low
References	U.S. Drought Monitor Archives (2009), Putnam County Farm Bureau (2009), FDOF (2009), Putnam County CEMP (2018)
Map	No

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Hazard	Freeze/Winter Storm
Description	Freezing occurs when temperatures are below freezing over a wide spread area for a period of time. These temperatures can damage agricultural crops and burst water pipes. Frost, a layer of ice crystals that is produced by the deposition of water from the air onto a surface that is at or below freezing, is often associated with freezes and can increase damaging effects. Winter storms are storms that can range from a few hours of moderate snow to blizzard-like circumstances that can affect driving conditions due to a lack of visibility and can have an impact on communications, electricity, and other services. Putnam County is not generally susceptible to winter storms because temperatures rarely, if ever, reach snow-producing levels making these storms unlikely. But temperatures in Putnam County can reach levels low enough to cause damage to crops and possibly water lines.
Location, Extent, Damages	Putnam County and its jurisdictions are all vulnerable to freezing conditions. With that being said, the county is not favorable to winter storms due to their climatic conditions. Most counties in North Central Florida experience hard freezes every year, especially within the months of December, January, and February, thus leading to a higher level of future occurrences. If temperatures reach freezing levels for extended periods of time and are combined with other climatic factors, crop damage will and has occurred. While it is not likely for temperatures to reach the teens or to stay below freezing for a number of days, it is still possible. Injuries and death to people in structures are very low in Putnam County freezes, but indirectly through fire caused by incorrect or careless use of space heaters could occur within the buildings. Additionally, consumer demand of electricity during these periods of extreme cold weather may require the electric utility to implement rolling blackouts to selected areas in order to avert a total electrical grid overload. These blackouts can have a significant impact on electrical dependent critical facilities and persons.
Measurement Scales	Temperatures equal to or below 32 degrees F and the number of days within that temperature range. This is what

	the Southeast Regional Climate Center uses for the Putnam County.
Vulnerability*	Moderate
Previous Occurrences	Between 1998-May 2009, Putnam County had 63 recorded days with freezing temperatures (equal to or below 32 degrees F) as seen between two weather recording stations in Crescent City and Federal Point. All of these events occurred during the months of December, January, and February except for one account in late November. In this 10-year span, the lowest recorded temperature was 21 degrees F on January 24, 2003. Events colder than this have occurred in years past including a few in the "teen" degrees. Putnam County has no seen report of significant winter storm conditions.
Probability of Future Occurrences*	Medium
Risk Level*	Moderate
Impacts*	Moderate
References	Southeast Regional Climate Center (2009), DOF (2009), Putnam County Farm Bureau (2009), Putnam County CEMP (2018)
Map	No

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Hazard	Earthquake
Description	Earthquakes are rapid movements of the earth causing the shifting of rock beneath the surface. This motion or trembling of the Earth is usually caused by a release of tension that has accumulated within or along the edge of the Earth's tectonic plates.
Location, Extent, Damages	The event of an earthquake occurring in Putnam County is rare although past events have been recorded in the state. Florida is very geologically stable and the geology does not contain any incontestable fault lines or volcanoes, which are generally associated with earthquakes. Florida is different than earthquake-prone California, which is located on an active margin (bounded by faults). Florida is situated on a passive (trailing) margin of the North American Plate. Putnam County and its jurisdiction are vulnerable to lesser significant earthquake hazards, and the probability and risk levels are extremely low. It is possible that the county could experience something such as a 4 on the Richter Scale, but this is extremely unlikely. Impacts could possibly include slight structure and household item damage.
Measurement Scales	Richter Scale; see Table 14 in section 4
Vulnerability*	Low
Previous Occurrences	Florida has reportedly "felt" around twenty-four "seismic events," with six being felt between 1950-1991. Determining seismic events since 1991 in Florida through data sourcing is a little complicated. USGS shows two earthquakes in Alabama in 2003 and 2004 that may have possibly been felt in the western "panhandle" of Florida. USGS supposedly recorded an earthquake 2km south of Tampa in March 2005 (but the FAA said it was a sonic boom from fighter jets). In September 2006 in the Gulf 405 km south-southwest of Apalachicola, an earthquake of a magnitude of 5.8 was said to be felt by some Floridians. The actual number of earthquakes that originated under Florida is few, with most originating in adjoining states or offshore. Even though earthquakes are not a major hazard concern in the state of Florida, in 1879 an earthquake felt

around the northern half of the state was said to shake down plaster and cause articles to be thrown from shelves in St. Augustine, which is approximately 30 miles east of Putnam County. This earthquake was assumed to be the largest recorded in Florida. It only caused minimal damage.

Probability of Future Occurrences* Low (Florida is very geologically stable and the geology does not contain any incontestable fault lines or volcanoes, which are generally associated with earthquakes. Florida is different than earthquake-prone California, which is located on an active margin (bounded by faults). Florida is situated on a passive (trailing) margin of the North American Plate *(USGS, 2009)*)

Risk Level* Low

Impacts* Low

References FDEP FGS (2007 & 2009), TAOS (2004), USGS (2009)

Map Yes

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Hazard	Tsunamis
Description	Tsunamis are giant waves generated in a body of water that can be caused as a result of an earthquake, volcano, landslide, or explosions. These giant waves can greatly affect low-lying coastal areas by inundating mass areas of land.
Location, Extent, Damages	With Putnam County's most eastern border being over 20 miles away from the coast, it has no coastal lands that are vulnerable to the effects of a tsunami. According to the FSU Center for Ocean-Atmospheric Prediction Studies *(2009)*, the probably of a tsunami hitting the northeast coast of Florida is extremely low. However, if one did occur, some of the more tidal sections of the St. Johns River could feel slight effects. In the instance of a 1:500 year tsunami (which is very unlikely), areas in the jurisdictions of Palatka and possibly Welaka could be vulnerable with a lower level of associated risk. Impacts could include damaged piers/boats and possibly some effects to structures built in close proximity to the St. Johns River.
Measurement Scales	Tsunamis effects are measured in feet along the St. Johns River. This method is used for Putnam County since it is a non-coastal county.
Vulnerability*	Low
Previous Occurrences	NOAA's NGDC Tsunami Runup database shows 9 incidences of slight tsunami effects having been recorded in Florida. These natural hazards have happened in the Pacific Ocean in past decades and are not common in the Atlantic Ocean. However, scientists in England have been studying the effects of a potential tsunami in the Atlantic Ocean caused by the possible eruption of a volcano in the Canary Islands, off of Northwest Africa, that would lead to a portion of the mountain falling into the ocean. The probability of this creating a "mega-tsunami" is widely debated. On July 3, 1992, Daytona Beach, southeast of Putnam County, experienced a rogue wave, which is different than a tsunami but has similar end results. The water rose 10 feet at the beach and caused the majority of its damage to be felt within 5 miles of the shore. Little is

	known about the formation of a rogue wave but many assume it has to do with an ocean swell being magnified by currents or the atmosphere.
Probability of Future Occurrences*	Low (According to the FSU Center for Ocean-Atmospheric Prediction Studies *(2009)*, the probably of a tsunami hitting the northeast coast of Florida is extremely low)
Risk Level*	Low
Impacts*	Low
References	NOAA NGDC Tsunami Runup database (2009), NOAA NWS (2009), TAOS (2004), FSU Center for Ocean-Atmospheric Prediction Studies (2009)
Map	Yes

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Hazard	Sinkholes/Landslides
Description	Sinkholes originate beneath the surface as groundwater passes through limestone and erodes large cavities, or holes, in the bedrock. If the water table drops, while water was supporting the walls and ceiling of the cavity, the cavity will eventually collapse causing a surface indenture, or sinkhole. When sinkholes like this form, some can suddenly or slowly cause damage to homes, roads, and other infrastructure. Landslides, the sliding of large amounts of earth, occurs in areas where there are steep slopes and unconsolidated soils and sediments
Location, Extent, Damages	All of the county and its jurisdictions are vulnerable to sinkholes, but the vulnerability is overall lower due to a somewhat unfavorable topography for sinkholes. The western and southeastern parts of the county have a slightly higher vulnerability to sinkholes and based on previous occurrences, the jurisdiction of Interlachen may be more susceptible than other jurisdictions. In Putnam County, most sinkholes are small (less than a few feet wide and deep) and have occurred after an increase in rain or fluctuation in river levels. Impacts that sinkholes could cause in the county include road damages, building/housing damages, utility damages, natural damages, and possibly the total destruction of certain infrastructure. A sinkhole would be even more disruptive if it struck a densely populated area, critical facility, or major road. While it is possible for a sinkhole in the county to be over 100 feet in length/width and over 50 feet deep, it is very unlikely since only smaller sinkholes have developed in the area. The probability of future sinkholes occurring is somewhere between low and remotely common, with the majority of these probably being very small and not imposing any drastic risks. Landslides are uncommon due to the lack of large slopes of land that cause them and since Florida has only one “true” landslide report in a different Florida region. In the county, an area that has steep slopes and unconsolidated soils and sediments is vulnerable. This includes parts within Palatka. Impacts could include damage to infrastructure and buildings that are located on or below topographical slopes. The probability of a

	landslide is low, but there could be a possibility after heavy rains.
Measurement Scales	The FGS uses measures of length, width, and depth in feet for sinkhole measurements in Putnam County.
Vulnerability*	Moderate
Previous Occurrences	As of May 2009, Putnam County has had 2 significant sinkholes since the 1960's and a number of smaller ones. One significant sinkhole occurred in 1970, on State Road 21, northwest of Interlachen. This sinkhole measured eight foot in length and width, and 10 foot deep. The other major one occurred in 1985, in Interlachen near Morris Lake. It was measured as 50 feet in length and width, and 30 feet deep. This sinkhole was caused by drilling a water well. These sinkholes were generally located in western Putnam County in an area spotted by lakes created from pre-historic sinkholes. Putnam County has no reported landslides, but some unrecorded events may have occurred after heavy rains.
Probability of Future Occurrences*	Medium (According to FGS *(2009)*, the County has somewhat of an unfavorable topography for major sinkholes)
Risk Level*	Moderate
Impacts*	Moderate
References	FDEP FGS (2009), UF Center for Aquatic & Invasive Plants (2003), TAOS (2004), Putnam County Emergency Management (2009), NFRPC (2004), Putnam County CEMP (2018)
Map	Yes

Appendix A - Putnam County Hazards Quick Reference Table

Hazard	Dam/Lock Hazard
Description	Dam or lock failures have the potential to cause damage to properties downstream. Failure to these structures, or mis-operation, could be caused by a number of situations, such as structural/electrical/mechanical problems, seismic conditions, flooding induced high water spillover, and sabotage.
Location, Extent, Damages	In Putnam County, the only dam/lock of significance is the Kirkpatrick (Rodman) Dam formed on the Ocklawaha River for the impoundment of the Rodman Reservoir and the Buckman Lock. Here the Buckman Lock is used to lift boats and barges from the water level of the St. Johns River to the level of the Rodman Reservoir. This dam and lock were originally designed by the U.S. Army Corps of Engineers for the proposed, and now deceased, Cross-Florida Barge Canal, a waterway connecting the Atlantic Ocean to the Gulf of Mexico. The dam/lock is owned and operated by FDEP. Currently, only sparse development has occurred downstream of these structures, but areas including part of State Road 19, the jurisdiction of Welaka, and the community of Satsuma are still vulnerable. For this reason, the Kirkpatrick Dam and Rodman Reservoir have an Emergency Action Plan prepared for the FDEP by URS Engineering, which gives detailed information on vulnerabilities, probability, and risk of structure failure or mis-operation. According to the National Inventory of Dams, Kirkpatrick Dam is currently listed as a low hazard facility, meaning failure or mis-operation would result in low estimates of economic, environmental, and human losses. This was seconded by the Army Corps of Engineers who said both the dam and lock have a low potential for being a hazard to areas downstream. Even though these studies give an overall low categorization of vulnerability, probability, and risk, the Emergency Action Plan gives impacts for a worst case scenario of complete failure for Kirkpatrick Dam. According to this plan, there are an estimated 378 structures at risk from complete dam failure, with the vast majority in the jurisdiction of Welaka. The estimated time required to achieve this maximum flood elevation to damage these structures range from 10 to 33 hours, with the immense majority of structures having at least 27 hours notice before the floodwave arrives. Lesser

dam failures, such as slight dam gate malfunctions, would result in little to no structural damage downstream.

Measurement Scales -------

Vulnerability* Low - Medium

Previous Occurrences There are no known previous occurrences of significant dam or lock failure.

Probability of Future Occurrences* Low (According to the National Inventory of Dams *(2009)*, Kirkpatrick Dam is currently listed as a low hazard facility, meaning failure or mis-operation would result in low estimates of economic, environmental, and human losses, and the Dam has a low probability of major future problems)

Risk Level* Moderate

Impacts* High

References Putnam County Emergency Management (2009), Emergency Action Plan for Kirkpatrick Dam and Rodman Reservoir (2007), National Inventory of Dams (2009), Army Corps of Engineers (2003)

Map No

Appendix A - Putnam County Hazards Quick Reference Table

Hazard Hazardous Material Incidents

Description Hazardous material incidents are the accidental or purposefully release or spill of hazardous chemicals into the environment where human, plant, and animal life could be endangered.

Location, Extent, Damages If a hazardous material incident was to occur in Putnam County, it would probably be an accidental spill, such as a surface transportation spill, a spill at a facility that works with hazardous materials, or a non-commercial spill from residents using hazardous products. In Putnam County and its jurisdictions, areas along major transportation routes where hazardous materials are transported and areas adjacent to facilities that store hazardous materials are the most vulnerable. Specifically, this includes Palatka because of the heavily populated areas located next to these routes and facilities. Most of the county's highways are classified as part of the SIS (Strategic Inter-modal System) including the county's major routes of SR 100, SR 20, SR 19, and US 17. These roads carry the most hazardous materials in the county, therefore drivers and areas around these routes are more vulnerable to surface transportation spills from traffic accidents, especially in the busier areas in the jurisdiction of Palatka. Even though other collector roads in the county will experience some local traffic carrying hazardous materials, these are the main routes. Among the hazardous materials transported are gasoline, propane, chlorine, and ammonia. Also, other routes included in the SIS are the St. Johns River and the CSX Rail Line, but accidents here are considered less probable and do not pose as major of a threat to the county's residents. When identifying facilities of hazardous waste handlers, the EPA Envirofacts Date Warehouse provides a list of EPA-regulated facilities. Locations around these facilities have a higher vulnerability to hazardous waste incidents. Putnam County has 141 of these facilities, with Crescent City having 3, Interlachen- 7, Palatka- 90, Pomona Park- 4, and Welaka- 1. Another way of identifying facilities that could be significant in terms of hazardous material incidents is through reviewing the Putnam County Hazards Analysis for 2007-2008. This

identifies the EPCRA section 302 facilities containing Extremely Hazardous Substances (EHS) that are at or above Threshold Planning Quantities (TPQ). The US EPA determines the Extremely Hazardous Substances based on their potential to cause significant health effects in a single exposure. Identifying these facilities allows the county to develop chemical emergency preparedness and response capabilities through better coordination/planning with local businesses. Putnam County Emergency Management keeps a list of these facilities with 11 listed in 2008. This includes five facilities in Palatka, two in East Palatka, two in Crescent City, and one in Hollister and Melrose. Any release from these fixed station facilities could affect up to 10 percent of the county's population, but the likelihood of this occurring would be very rare. One other source of hazardous material incidents, that is harder to determine spatially, is non-commercial hazardous materials. With much of the county being rural residential or agricultural, many properties have sheds, barns, and storage buildings that may contain a mixture of chemicals. These chemicals could include paints, insecticides, fertilizers, petroleum products, lubricants and other common household or agricultural products *(Putnam County CEMP, 2009)*. It can be assumed that the majority of these residents may not be in full compliance with the law when storing and/or disposing of these items. Since most materials are in such small quantities, concern of a full "hazmat" incident is minimal. For more information of estimated populations at risk to identified facilities carrying hazardous materials, see "hazardous materials incidents" in Section 6: Other Vulnerabilities and Estimates.

Measurement Scales -------

Vulnerability* Medium

Previous Occurrences According to the Putnam County Volunteer Fire Department, there have only been a few incidents regarding hazardous material accidents, with almost all of them being spills of oil and gasoline. This is seconded by the county's CEMP that states several minor incidents, mostly fuel spills, occur in the county each year. Putnam County Emergency Management has some records of hazmat incidents called in (not including natural gas or propane leaks) with 13 calls in 2005, 14 in 2006, 26 in 2007, and 11

	in 2008. There are no known previous occurrences of major hazardous material incidents.
Probability of Future Occurrences*	Moderate (See Section 4 "Hazardous Materials Incidents)
Risk Level*	Moderate
Impacts*	High
References	Putnam County Volunteer Fire Department (2009), Putnam County CEMP (2018), FDOT (2009), Putnam County Planning Department (2009), Putnam County Emergency Management (2009), EPA Envirofacts Data Warehouse (2009), Putnam County Hazards Analysis (2007-2008)
Map	No

Appendix A - Putnam County Hazards Quick Reference Table

Hazard	Terrorism
Description	Terrorism is a term that is somewhat hard to define, but for our purposes, we will define terrorism as a criminal act that influences an audience beyond the immediate victim *(www.terrorism-research.com, 2009)*. Terrorism incidents span over an array of different forms including chemical weapons, biological weapons, explosives, nuclear weapons, incendiary weapons, eco-terrorism and cyber-terrorism. All counties in Florida are vulnerable to all types of terrorist attacks. Even though rural Putnam County doesn't have the high levels of vulnerability, as do other larger urban areas in Florida, local and regional incidents could still occur.
Location, Extent, Damages	All of Putnam County and its jurisdictions are vulnerable to terrorism events, but the probability associated with them is lower since it's a more rural county. Areas thought to be particularly vulnerable within the county are schools *(see "Critical Facilities" in Section 5)*, special events and festivals, government complexes *(see "Critical Facilities" in Section 5)*, facilities holding hazardous waste *(see "Hazardous Material Incidents" in Section 4 and 6)*, and the Kirkpatrick Dam *(see "Dam/Lock Hazard" in Section 4 and 6)*. Also related to terrorism, if an incident occurred at the nuclear research reactor located at the University of Florida in Gainesville, Putnam County could serve as a massive care site for evacuees from areas around the reactor. Shelter and public health issues pertaining to contamination and exposure of evacuees could become a relevant issue for the county. Because of the possibility of terrorism occurring within the county, a Terrorism Response Annex has been created as an appendix to the Putnam County CEMP to provide the county with a continuing assessment of the community's vulnerability and capability to respond to a terrorism incident. This hazard has just recently been added to the LMS, as of July 2009, because of the need shown by Putnam County Emergency Management and the LMS Task Force. In addition, the Terrorism Response Annex has also been recently added to the county's CEMP. Currently Putnam County Emergency Management is developing and

	retrieving more information dealing with terrorism that will be added in future LMS and Terrorism Response Annex updates
Measurement Scales	-------
Vulnerability*	Moderate
Previous Occurrences	Putnam County hasn't had any significant terrorism events per-se, but the county had a few of what some could call "scares." According to Putnam County Sheriff Dispatch *(2009)*, between 2005-2008 the county received "bomb threat" calls every year. In most cases the "bomb threat" calls weren't a threat; they were usually someone calling in to report that they had seen a suspicious looking package that resembled an explosive. Even though these types of calls rarely, if ever, turned up to be valid assumptions, it is still extremely important for authorities to take all precautions and act accordingly. The most recent "scare" incident took place on July 7, 2009 when a survey crew in a patch of woods near Bostwick found a military training ammunition known as an Mk-26. This training device typically isn't explosive but it could have had a small explosive charge on it for certain training exercises.
Probability of Future Occurrences*	Low **(**the probability associated with terrorism is lower for Putnam County since it's a more rural county)
Risk Level*	Low
Impacts*	High
References	www.terrorism-research.com (2009), Putnam County Sheriff Dispatch (2009), Putnam County CEMP (2018)
Map	No

*** See <u>Attachment B</u> "Vulnerability Assessment" for more information. Also, more information is provided in <u>Section 4, 5, & 6</u> of the LMS.**

- <u>Note</u>: probability of future occurrences, risk levels, impacts, and vulnerabilities are noted as for the County as a whole. Please refer to <u>Appendix B</u> and <u>Section 4C</u> for jurisdictions specific information.

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APPENDIX B

Vulnerability Assessment

Appendix B - Vulnerability Assessment

A vulnerability assessment is a vital tool that gives a comprehensive analysis of the severity of threats posed from hazards. When looking at vulnerability, it is important to look at many different components, from the probability of an event occurring to impacts it could produce. Having a comprehensive assessment like this can help the LMS Task Force to develop more meaningful mitigation strategies.

This vulnerability assessment concept was taken from Putnam County's Emergency Coop Plan *(2007-2008)* and was modified to fit LMS desires. Since there is no perfect way to determine vulnerabilities, we found that the simplest equations give what we feel are the best results for the county. This section will be updated as other analysis tools that give better results are discovered.

Much of the data found in this assessment comes from reviewing previous occurrences, hazard map data, and Kinetic Analysis Corporation MEMPHIS data. To reinsure the validity of these tables, we cross-checked with the Putnam County CEMP *(2018),* Putnam County Emergency Coop Plan *(2007-2008),* TAOS data, the State Mitigation Plan, and with experts from federal, state, and local agencies. For more information of specific risks, impacts, and vulnerability ratings please refer to Sections 4, 5, 6 and the hazard maps. Section 4C gives side-by-side jurisdictional vulnerability comparisons comprised of this data.

Appendix B - Vulnerability Assessment

Table 1 - Risk: Putnam County

Hazard*	Probability *P*	Frequency *F*	Severity *S*	Risk *P+F+S=RF*	
Tropical Storm	4	2	3	9	Medium
Hurricane- Minor	3	2	4	9	Medium
Hurricane- Major	1	1	5	7	Moderate
Storm Surge	1	1	1	3	Low
Severe Thunderstorms	5	3	3	11	High
High Winds	4	3	3	10	Moderate
Flooding	5	4	3	12	High
Tornado	3	2	4	9	Medium
Wildfires	5	4	3	12	High
Droughts/Heat Waves	4	3	1	8	Medium
Freeze	3	2	1	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	1	1	1	3	Low
Sinkholes/Landslides	3	2	2	7	Moderate
Dam/Lock Hazard	1	1	4	6	Moderate
Hazardous Material Incidents	2	2	3	7	Moderate
Terrorism	1	1	2	4	Low

Scale	
Low	1
Moderate	2
Medium	3
Above Medium	4
High	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 2 - Impact: Putnam County

Hazard*	Human *H*	Property *Py*	Business *B*	Impact *H+Py+B=PD*	
Tropical Storm	3	3	2	8	Medium
Hurricane- Minor	3	3	3	9	Medium
Hurricane- Major	4	5	5	14	Severe
Storm Surge	1	1	1	3	Low
Severe Thunderstorms	3	3	2	8	Medium
High Winds	3	3	2	8	Medium
Flooding	3	4	3	10	Medium
Tornado	4	5	3	12	High
Wildfires	3	3	3	9	Medium
Droughts/Heat Waves	2	1	2	5	Low
Freeze	2	1	3	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	1	1	1	3	Low
Sinkholes/Landslides	2	3	2	7	Moderate
Dam/Lock Hazard	4	4	3	11	High
Hazardous Material Incidents	4	2	3	9	Medium
Terrorism	4	4	3	11	High

Scale	
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

<u>Appendix B</u> - Vulnerability Assessment

Table 3 - Vulnerability: Putnam County

Hazard*	**Vulnerability** *RF+PD=V*	
Tropical Storm	17	Medium
Hurricane- Minor	18	Medium
Hurricane- Major	21	High
Storm Surge	6	Low
Severe Thunderstorms	19	Medium
High Winds	18	Medium
Flooding	22	High
Tornado	21	High
Wildfires	21	High
Droughts/Heat Waves	13	Moderate
Freeze	12	Moderate
Earthquakes	6	Low
Tsunamis	6	Low
Sinkholes/Landslides	14	Moderate
Dam/Lock Hazard	17	Medium
Hazardous Material Incidents	16	Medium
Terrorism	15	Moderate

Scale	
Low	6 - 10.7
Moderate	10.8 - 15.5
Medium	15.6 - 20.3
High	20.4 - 25.1
Severe	25.2 - 30

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

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Table 4 - Risk: Crescent City

Hazard*	**Probability** *P*	**Frequency** *F*	**Severity** *S*	**Risk** *P+F+S=RF*	
Tropical Storm	4	2	3	9	Medium
Hurricane- Minor	3	2	4	9	Medium
Hurricane- Major	1	1	5	7	Moderate
Storm Surge	1	1	1	3	Low
Severe Thunderstorms	5	3	3	11	High
High Winds	4	3	3	10	Medium
Flooding	4	3	3	10	Medium
Tornado	3	2	4	9	Medium
Wildfires	4	4	4	12	High
Droughts/Heat Waves	4	3	1	8	Medium
Freeze	3	2	1	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	0	0	0	0	None
Sinkholes/Landslides	2	2	2	6	Moderate
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	2	1	2	5	Low
Terrorism	1	1	2	4	Low

Scale	
Low	1
Moderate	2
Medium	3
Above Medium	4
High	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 5 - Impact: Crescent City

Hazard*	Human *H*	Property *Py*	Business *B*	Impact *H+Py+B=PD*	
Tropical Storm	3	3	2	8	Medium
Hurricane- Minor	3	3	3	9	Medium
Hurricane- Major	4	5	5	14	Severe
Storm Surge	1	1	1	3	Low
Severe Thunderstorms	3	3	2	8	Medium
High Winds	3	3	2	8	Medium
Flooding	3	4	3	10	Medium
Tornado	4	5	3	12	High
Wildfires	3	4	3	10	Medium
Droughts/Heat Waves	1	1	2	4	Low
Freeze	2	1	3	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	0	0	0	0	None
Sinkholes/Landslides	2	3	2	7	Moderate
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	3	2	3	8	Medium
Terrorism	4	4	3	11	High

Scale	
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms*, *Hurricane-Minor*, & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 6 - Vulnerability: Crescent City

Hazard*	Vulnerability *RF+PD=V*	
Tropical Storm	17	Medium
Hurricane- Minor	18	Medium
Hurricane- Major	21	High
Storm Surge	6	Low
Severe Thunderstorms	19	Medium
High Winds	18	Medium
Flooding	20	Medium
Tornado	21	High
Wildfires	22	High
Droughts/Heat Waves	12	Moderate
Freeze	12	Moderate
Earthquakes	6	Low
Tsunamis	0	None
Sinkholes/Landslides	13	Moderate
Dam/Lock Hazard	0	None
Hazardous Material Incidents	13	Moderate
Terrorism	15	Moderate

Scale	
Low	6 - 10.7
Moderate	10.8 - 15.5
Medium	15.6 - 20.3
High	20.4 - 25.1
Severe	25.2 - 30

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

<u>Appendix B</u> - Vulnerability Assessment

Table 7 - Risk: Interlachen

Hazard*	**Probability** *P*	**Frequency** *F*	**Severity** *S*	**Risk** *P+F+S=RF*	
Tropical Storm	4	2	2	8	Medium
Hurricane- Minor	3	2	3	8	Medium
Hurricane- Major	1	1	4	6	Moderate
Storm Surge	0	0	0	0	None
Severe Thunderstorms	5	3	3	11	High
High Winds	3	2	3	8	Medium
Flooding	4	3	3	10	Medium
Tornado	3	3	4	10	Medium
Wildfires	5	4	4	13	Severe
Droughts/Heat Waves	4	3	1	8	Medium
Freeze	3	2	1	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	0	0	0	0	None
Sinkholes/Landslides	4	3	2	9	Medium
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	1	1	2	4	Low
Terrorism	1	1	2	4	Low

Scale	
Low	1
Moderate	2
Medium	3
Above Medium	4
High	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

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Table 8 - Impact: Interlachen

Hazard*	Human *H*	Property *Py*	Business *B*	Impact *H+Py+B=PD*	
Tropical Storm	3	3	2	8	Medium
Hurricane- Minor	3	3	3	9	Medium
Hurricane- Major	4	5	5	14	Severe
Storm Surge	0	0	0	0	None
Severe Thunderstorms	3	3	2	8	Medium
High Winds	3	3	2	8	Medium
Flooding	3	4	3	10	Medium
Tornado	4	5	3	12	High
Wildfires	3	4	3	10	Medium
Droughts/Heat Waves	1	1	2	4	Low
Freeze	2	1	3	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	0	0	0	0	None
Sinkholes/Landslides	2	3	2	7	Moderate
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	3	2	3	8	Medium
Terrorism	4	4	3	11	High

Scale	
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

<u>Appendix B</u> - Vulnerability Assessment

Table 9 - Vulnerability: Interlachen

Hazard*	**Vulnerability** *RF+PD=V*	
Tropical Storm	16	Medium
Hurricane- Minor	17	Medium
Hurricane- Major	20	Medium
Storm Surge	0	None
Severe Thunderstorms	19	Medium
High Winds	16	Medium
Flooding	20	Medium
Tornado	22	High
Wildfires	23	High
Droughts/Heat Waves	12	Moderate
Freeze	12	Moderate
Earthquakes	6	Low
Tsunamis	0	None
Sinkholes/Landslides	16	Medium
Dam/Lock Hazard	0	None
Hazardous Material Incidents	12	Moderate
Terrorism	15	Moderate

Scale	
Low	6 - 10.7
Moderate	10.8 - 15.5
Medium	15.6 - 20.3
High	20.4 - 25.1
Severe	25.2 - 30

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 10 - Risk: Palatka

Hazard*	Probability *P*	Frequency *F*	Severity *S*	Risk *P+F+S=RF*	
Tropical Storm	4	2	3	9	Medium
Hurricane- Minor	3	2	4	9	Medium
Hurricane- Major	1	1	5	7	Moderate
Storm Surge	2	1	1	4	Low
Severe Thunderstorms	5	3	3	11	High
High Winds	4	3	3	10	Medium
Flooding	5	4	4	13	Severe
Tornado	3	3	5	11	High
Wildfires	3	4	4	11	High
Droughts/Heat Waves	4	3	1	8	Medium
Freeze	3	2	1	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	1	1	1	3	Low
Sinkholes/Landslides	2	2	3	7	Moderate
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	3	2	3	8	Medium
Terrorism	2	1	4	7	Medium

Scale	
Low	1
Moderate	2
Medium	3
Above Medium	4
High	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 11 - Impact: Palatka

Hazard*	Human *H*	Property *Py*	Business *B*	Impact *H+Py+B=PD*	
Tropical Storm	3	3	2	8	Medium
Hurricane- Minor	3	3	3	9	Medium
Hurricane- Major	4	5	5	14	Severe
Storm Surge	1	1	1	3	Low
Severe Thunderstorms	3	3	2	8	Medium
High Winds	3	3	2	8	Medium
Flooding	3	5	3	11	High
Tornado	4	5	3	12	High
Wildfires	3	4	3	10	Medium
Droughts/Heat Waves	2	1	2	5	Low
Freeze	2	1	3	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	1	1	1	3	Low
Sinkholes/Landslides	3	4	2	9	Medium
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	4	2	3	9	Medium
Terrorism	5	5	4	14	Severe

Scale	
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

<u>Appendix B</u> - Vulnerability Assessment

Table 12 - Vulnerability: Palatka

Hazard*	**Vulnerability** *RF+PD=V*	
Tropical Storm	17	Medium
Hurricane- Minor	18	Medium
Hurricane- Major	21	High
Storm Surge	7	Low
Severe Thunderstorms	19	Medium
High Winds	18	Medium
Flooding	24	High
Tornado	23	High
Wildfires	21	High
Droughts/Heat Waves	13	Moderate
Freeze	12	Moderate
Earthquakes	6	Low
Tsunamis	6	Low
Sinkholes/Landslides	16	Medium
Dam/Lock Hazard	0	None
Hazardous Material Incidents	17	Medium
Terrorism	21	High

Scale	
Low	6 - 10.7
Moderate	10.8 - 15.5
Medium	15.6 - 20.3
High	20.4 - 25.1
Severe	25.2 - 30

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 13 - Risk: Pomona Park

Hazard*	**Probability** *P*	**Frequency** *F*	**Severity** *S*	**Risk** *P+F+S=RF*	
Tropical Storm	4	2	3	9	Medium
Hurricane- Minor	3	2	4	9	Medium
Hurricane- Major	1	1	4	6	Moderate
Storm Surge	0	0	0	0	None
Severe Thunderstorms	5	3	3	11	High
High Winds	4	3	3	10	Medium
Flooding	4	3	3	10	Medium
Tornado	3	2	4	9	Medium
Wildfires	4	4	4	12	High
Droughts/Heat Waves	4	3	1	8	Medium
Freeze	3	2	1	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	0	0	0	0	None
Sinkholes/Landslides	2	2	2	6	Moderate
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	1	1	2	4	Low
Terrorism	1	1	2	4	Low

Scale	
Low	1
Moderate	2
Medium	3
Above Medium	4
High	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 14 - Impact: Pomona Park

Hazard*	Human *H*	Property *Py*	Business *B*	Impact *H+Py+B=PD*	
Tropical Storm	3	3	2	8	Medium
Hurricane- Minor	3	3	3	9	Medium
Hurricane- Major	3	4	3	10	Medium
Storm Surge	0	0	0	0	None
Severe Thunderstorms	3	3	2	8	Medium
High Winds	3	3	2	8	Medium
Flooding	3	4	3	10	Medium
Tornado	4	5	3	12	High
Wildfires	3	4	3	10	Medium
Droughts/Heat Waves	1	1	2	4	Low
Freeze	2	1	3	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	0	0	0	0	None
Sinkholes/Landslides	2	3	2	7	Moderate
Dam/Lock Hazard	0	0	0	0	None
Hazardous Material Incidents	3	2	3	8	Medium
Terrorism	4	4	3	11	High

Scale	
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 15 - Vulnerability: Pomona Park

Hazard*	Vulnerability *RF+PD=V*	
Tropical Storm	17	Medium
Hurricane- Minor	18	Medium
Hurricane- Major	20	Medium
Storm Surge	0	None
Severe Thunderstorms	19	Medium
High Winds	18	Medium
Flooding	20	Medium
Tornado	21	High
Wildfires	22	High
Droughts/Heat Waves	12	Moderate
Freeze	12	Moderate
Earthquakes	6	Low
Tsunamis	0	None
Sinkholes/Landslides	13	Moderate
Dam/Lock Hazard	0	None
Hazardous Material Incidents	12	Moderate
Terrorism	15	Moderate

Scale	
Low	6 - 10.7
Moderate	10.8 - 15.5
Medium	15.6 - 20.3
High	20.4 - 25.1
Severe	25.2 - 30

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 16 - Risk: Welaka

Hazard*	**Probability** *P*	**Frequency** *F*	**Severity** *S*	**Risk** *P+F+S=RF*	
Tropical Storm	4	2	3	9	Medium
Hurricane- Minor	3	2	4	9	Medium
Hurricane- Major	1	1	5	7	Moderate
Storm Surge	1	1	2	4	Low
Severe Thunderstorms	5	3	3	11	High
High Winds	4	3	3	10	Medium
Flooding	5	4	4	13	Severe
Tornado	3	2	4	9	Medium
Wildfires	4	4	4	12	High
Droughts/Heat Waves	4	3	1	8	Medium
Freeze	3	2	1	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	1	1	1	3	Low
Sinkholes/Landslides	2	2	2	6	Moderate
Dam/Lock Hazard	1	1	4	6	Moderate
Hazardous Material Incidents	1	1	2	4	Low
Terrorism	1	1	2	4	Low

Scale	
Low	1
Moderate	2
Medium	3
Above Medium	4
High	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

Appendix B - Vulnerability Assessment

Table 17 - Impact: Welaka

Hazard*	Human *H*	Property *Py*	Business *B*	Impact *H+Py+B=PD*	
Tropical Storm	3	3	2	8	Medium
Hurricane- Minor	3	3	3	9	Medium
Hurricane- Major	4	5	5	14	Severe
Storm Surge	1	1	1	3	Low
Severe Thunderstorms	3	3	2	8	Medium
High Winds	3	3	2	8	Medium
Flooding	3	4	3	10	Medium
Tornado	4	5	3	12	High
Wildfires	3	4	3	10	Medium
Droughts/Heat Waves	1	1	2	4	Low
Freeze	2	1	3	6	Moderate
Earthquakes	1	1	1	3	Low
Tsunamis	1	1	1	3	Low
Sinkholes/Landslides	2	3	2	7	Moderate
Dam/Lock Hazard	4	4	4	12	High
Hazardous Material Incidents	3	2	3	8	Medium
Terrorism	4	4	3	11	High

Scale	
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Scale	
Low	3 - 5.3
Moderate	5.4 - 7.7
Medium	7.8 - 10.1
High	10.2 - 12.5
Severe	12.6 - 15

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

<u>Appendix B</u> - Vulnerability Assessment

Table 18 - Vulnerability: Welaka

Hazard*	**Vulnerability** *RF+PD=V*	
Tropical Storm	17	Medium
Hurricane- Minor	18	Medium
Hurricane- Major	21	High
Storm Surge	7	Low
Severe Thunderstorms	19	Medium
High Winds	18	Medium
Flooding	23	High
Tornado	21	High
Wildfires	22	High
Droughts/Heat Waves	12	Moderate
Freeze	12	Moderate
Earthquakes	6	Low
Tsunamis	6	Low
Sinkholes/Landslides	13	Moderate
Dam/Lock Hazard	18	Medium
Hazardous Material Incidents	12	Moderate
Terrorism	15	Moderate

Scale	
Low	6 - 10.7
Moderate	10.8 - 15.5
Medium	15.6 - 20.3
High	20.4 - 25.1
Severe	25.2 - 30

* *Tropical Storms, Hurricane-Minor,* & *Hurricane- Major* are all apart of "Hurricane and other cyclonic activities"
* *Severe Thunderstorms* include all hazards associated with them (flooding, wind, hail, lightning, etc.)
* Winter Storms are very rare in Putnam County, so *Freeze* was only taken into account for the vulnerability assessment
* Landslides are very rare in Putnam County, so *Sinkholes* were only taken into account for the vulnerability assessment

APPENDIX C

Flooded Roadway List

Appendix C- Flooded Roadways List

This information was compiled by Putnam County Public Works *(2009)* and Putnam County Emergency Management *(2009).* For additional information pertaining to flooding, reference Section 4 Hazards.

- Coral Farms Road Cross Culvert near the electrical substation – This culvert is a metal pipe arch culvert which is failing from repeated flood sediment loss and corrosion. The existing culvert is a corrugated metal pipe arch culvert 10' X 7' with an equivalent round pipe diameter of 8.5 feet and 36 feet long.
- Palmetto Bluff Road has a flood over topping location at Happy Days Trail the existing concrete box cross culvert is an 11' X 5" opening and 22 feet long.
- Silver Lake Drive cross culvert at Devall Branch – This culvert is failing causing frequent erosion and sediment loss from repeated flood events. The roadway was repaired and is a major paved thoroughfare in the Palatka area.
- Rector Road cross culvert failure and removal, was a result of flood damage, and requires a proposed replacement bridge at the west run of the cut off canal.
- River Park Subdivision- Palmetto Street flooding –Lake Laverne and Lake Maxine flooding
- Red Fox Trail – Mud Lake tail water flooding
- SR 207 at Dog Branch – currently proposed to have debris cleared downstream East Palatka Drainage District ditch cleaning grant
- Whispering Pines Road – now under County road maintenance – clearing and cleaning of green belts needed to increase stormwater storage capacity and conveyance.
- CR 315 at 2nd lane cross culvert needed to prevent water topping the road during high capacity overflows to Mariner Lake
- Johns Road in Bardin, approximately 200 feet of dirt road was washed out and requires new cross culverts including building up the road base and stabilization of the roadway area
- Sections of SR 100 and SR26 near Palatka have flooded for extended periods
- Paine Road and Palm Street in the Paine subdivision
- Elsie Drive – in the vicinity of East Palatka Boat Ramp
- Port Comfort Road – East Palatka Federal Point Road
- Boca Raton Road in the Dunns Creek area
- Sportsman Harbor area
- Davis Lake Road near the SR 20 end
- Hoover Road, Keystone Road, Commercial Avenue (south end)
- Old Woods Road, Rodeo Road, Twin Lakes Boulevard
- Milican Road
- West Tocoi Road, Bardin Road (near Keystone)
- Pico Street
- Orange Springs Shortcut Road

APPENDIX D

LMS Project Priority Ranking System

Putnam County Local Mitigation Strategy Workgroup

Project Score Guide Instructions

Purpose

These instructions are to be used by jurisdictions and organizations participating in the development and maintenance of the Putnam County Local Mitigation Strategy (LMS) in accordance to 9G-2.002 State Comprehensive Emergency Management Plan. The purpose of this document is to provide the instructions for the prioritization of mitigation projects.

Countywide use of the standardized approach described herein will assure both the Putnam County LMS Work Group and participating organizations that project prioritization has been completed in an objective and consistent manner. This will allow for the most effective comparison of projects when potential funding sources are available and remains consistent with previous methods of project prioritization.

Overview of the Prioritization Approach

The approach to prioritizing mitigation projects incorporates three basic considerations:

1. The approach needs to incorporate all foreseeable significant **decision factors** involved in the merit and feasibility of implementing project proposals.
2. The approach needs to be quantified to enable the ranking of numerous projects.
3. The priority ranking will help the LMS Work Group respond to funding opportunities regardless of their origin, restrictions, and purposes by identifying the projects with highest priority for the particular funding source.

Decision Factors Considered in the Prioritization Process

The general categories of **decision factors** considered in this process are the following:

1. Population Benefited
2. Problem Area Benefited
3. Health and Safety Considerations
4. Cost of Initiative
5. Benefit /Cost Ratio
6. Community Acceptance
7. Probability of Funding
8. Feasibility of Implementation and Environmental Acceptability
9. Consistency with other Plans and Programs
10. Timeframe for Accomplishing

Project Score Sheet

Name: _____

Jurisdiction/Organization/Department Name**:**

_____

1. The Percentage of the Population Benefited: This **decision factor** allows for consideration of a defined population category that would directly benefit from implementation of the intended project, including areas beyond the jurisdiction of the project.

Score	Description of the Decision Factor
10	91-100% of the population benefited
9	81-90% of the population benefited
8	71-80% of the population benefited
7	61-70% of the population benefited
6	51-60% of the population benefited
5	41-50% of the population benefited
4	31-40% of the population benefited
3	21-30% of the population benefited
2	11-20% of the population benefited
1	5-10% of the population benefited
0	0-5% of the population benefited

Individual Score: _____

Group Score: _____ (TBD)

2. The Percentage of the Problem Area Benefited: This **decision factor** allows for consideration of the percentage of the problem area benefited.

Score	Description of the Decision Factor
10	91-100% of the jurisdiction's population
9	81-90% of the jurisdiction's population
8	71-80% of the jurisdiction's population
7	61-70% of the jurisdiction's population
6	51-60% of the jurisdiction's population

5	41-50% of the jurisdiction's population
4	31-40% of the jurisdiction's population
3	21-30% of the jurisdiction's population
2	11-20% of the jurisdiction's population
1	5-10% of the jurisdiction's population
0	0-5% of the jurisdiction's population

Individual Score: _____

Group Score: _____ (TBD)

3. Health and Safety Considerations: This **decision factor** evaluates the importance of human health and safety benefits that are to be derived from implementation of the project.

Score	Description of the Decision Factor
10	Benefits the health & safety of between 91-100% of the population
9	Benefits the health & safety of between 81-90% of the population
8	Benefits the health & safety of between 71-80% of the population
7	Benefits the health & safety of between 61-70% of the population
6	Benefits the health & safety of between 51-60% of the population
5	Benefits the health & safety of between 41-50% of the population
4	Benefits the health & safety of between 31-40% of the population
3	Benefits the health & safety of between 21-30% of the population
2	Benefits the health & safety of between 11-20% of the population
1	Benefits the health & safety of between 5-10% of the population
0	Benefits the health & safety of between 0-5% of the population

Individual Score: _____

Group Score: _____ (TBD)

4. Cost of Implementing the Initiative: This **decision factor** evaluates financial costs associated with the project.

Score	Description of the Decision Factor
10	< $ 500,000
9	$ 5000,000 - $ 1,000,000
8	$ 1,000,000 - $ 1,500,000
7	$ 1,500,000 - $ 2,000,000
6	$ 2,000,000 - $ 2,500,000
5	$ 2,500,000 - $ 3,000,000
4	$ 3,000,000 - 3,500,000
3	$ 3,500,000 - 4,000,000
2	$ 4,000,000 - 4,5000,000
1	$ 4,500,000 - 5,000,000
0	> $ 5,000,000

Individual Score: _____

Group Score: _____ (TBD)

5. The Benefit/Cost Ratio: (MAY NOT BE APPLICABLE TO EACH PROJECT) This **decision factor** considers the benefit to cost ratio (BCR). According to FEMA and FDEM, a Benefit-Cost Analysis is required for all mitigation projects. Additionally noted by the FDEM, only projects with a Benefit-Cost Analysis ratio of 1 or above will be considered for funding. Applicants can use programs or mechanisms other than the FEMA Benefit-Cost Model to conduct the Benefit-Cost Analysis; however, the methodology used must be consistent with the FEMA Benefit-Cost Model and approved in advance. FEMA has also developed an alternative program to determine cost-effectiveness for certain insured repetitive Loss Properties

Score	Description of the Decision Factor
10	More than 5.0
9	4.5 - 5
8	4.0 - 4.4
7	3.5 - 3.9
6	3.0 - 3.4
5	2.5 - 2.9
4	2.0 - 2.4
3	1.5 - 1.9
2	1.0 - 1.4
1	.5 - .9

0	< 5,000,000

Individual Score: _____

Group Score: _____ (TBD)

6. The Probability of Community Acceptance: This **decision factor** considers community response.

Score	Description of the Decision Factor
10	The project has been endorsed by the community
9	N/A
8	Likely to be endorsed by the entire community
7	N/A
6	Of benefit only to those directly affected and would not adversely affect others
5	N/A
4	Would be somewhat controversial with special interest groups or a small percentage of the community
3	N/A
2	Would be strongly opposed by special interest groups or a significant percentage of the community
1	N/A
0	Would be strongly opposed by nearly all of the general population

Individual Score: _____

Group Score: _____ (TBD)

7. The Probability of Receiving Funding for Implementation:

This **decision factor** considers the likelihood that appropriate officials or agencies would fund the project adequately for its implementation as proposed.

Score	Description of the Decision Factor
10	A guaranteed funding source has been identified and obtained

9	N/A
8	Funding can probably be obtained through local short term budgeting
7	N/A
6	Funding can probably be obtained through local long term budgeting
5	N/A
4	Funding could be obtained through matching local
3	N/A
2	The only funding source is post disaster mitigation funds
1	N/A
0	No potential funding sources readily apparent

Individual Score: _____

Group Score: _____ (TBD)

8. The Feasibility of Implementation and Environmental Acceptability:

This **decision factor** considers issues that are influential to the feasibility of implementation of the project from an administrative or managerial perspective. The following list of considerations is to be evaluated for project:

- The time involved from planning to completion, including engineering studies and ecological surveys.
- The type, number and time needed to secure permits and approvals
- If the project proposal would require a referendum vote by the general public
- If the project proposal would require a public hearing and/or commission/council approval

Score	Description of the Decision Factor
10	Can be put in place almost immediately and is environmentally sound
9	N/A
8	Relatively easy to put in place within one year and environmentally sound
7	N/A
6	Not anticipated to be put in place and environmentally acceptable
5	N/A

4	Somewhat difficult to put in place because of complex requirements and environmental concerns
3	N/A
2	Difficult to put in place because of significantly complex requirements and environmental permitting
1	N/A
0	Very difficult to put in place due to extremely complex requirements and environmental permitting problems

Individual Score: _____

Group Score: _____ (TBD)

9. Consistency with other Plans and Programs:

This **decision factor** is used to consider the level of consistency that the mitigation project has with other current plans and programs that have been approved, accepted or utilized by the community to be affected or benefited by the project. The premise here is that proposed project proposal should be ranked higher if they are consistent with these other plans and programs, rather than if they are inconsistent or in conflict with the goals and objectives of generally accepted guiding principles.

The following types of plans, policies and programs that may be considered under this decision factor are the following:

- The goals and objectives of the Putnam County Local Mitigation Strategy (LMS)
- The jurisdiction's Comprehensive Growth Management Plan
- The jurisdiction's Comprehensive Emergency Management Plan and or the Putnam County Comprehensive Emergency Management Plan (CEMP).
- Any applicable Land Development Code, Zoning Ordinance, or Land Use Plan
- Any applicable environmental resource preservation or protection plan, policy or ordinance any other applicable local, state building code or federal law, regulation or plan.

Score	Description of the Decision Factor
10	Initiative is included in 4 or more plans and programs
9	N/A
8	Initiative is included in several other plans and program
7	N/A

6	Initiative is included in two other plans and programs
5	N/A
4	Initiative is included in one other plan or program
3	N/A
2	Initiative is not listed in another plan or program
1	N/A
0	Initiative may be inconsistent with other plans or programs

Individual Score: _____

Group Score: _____ (TBD)

10. Timeframe for Accomplishing: Project period of performance.

Score	Description of the Decision Factor
10	< 6 months
9	6-12 months
8	> 12-18 months
7	> 18-24 months
6	> 24-30 months
5	> 30-36 months
4	> 36 -42 months
3	> 42 -48 months
2	> 48 -54 months
1	> 54 -60 months
0	> 60 months

Individual Score: _____

Group Score: _____ (TBD)

11. Tie Breaker: (if needed)

This **decision factor** will be used only when the scores of projects result in a tie. Projects supporting life/safety considerations shall be ranked above non-life safety projects.

A. Does the project support Life Safety considerations:

☐ Yes ☐ No

B. Provide the number of people that the project will directly benefit: _____

Putnam County Local Mitigation Strategy Workgroup

Project Score Summary

Sponsor/Agency Contact:

_____

Project Proposal Name (or brief description)

_____

Date Scoring validated by LMS Committee: _____

Applicant Scores	Determining Factors	Committee Validation
	1. Population Benefited	
	2. Problem area Benefited	
	3. Health and Safety Considerations	
	4. Cost of Implementation	
	5. Benefit Cost Ratio	
	6. Probability of Community Acceptance	
	7. Probability of Funding	
	8. Feasibility of Implementation and Environmental	
	9. Consistency with other plans and programs	
	10. Time Frame for Accomplishing	
	11. Tie Breaker (if needed)	

Total Project Score		Maximum Score	Total Validation Score
		100	

LMS Chair:

_____, _____

Printed name Signature

APPENDIX E

Putnam County Critical Facilities List

Appendix E

Putnam County Critical Facilities List, 2020

LOCATION NAME	*Location Address*	*City*	*Zip*
EOC			
Putnam County EOC	410 Hwy 19 South	Palatka	32177
LAW ENFORCEMENT			
Putnam County Sheriffs Dept.	130 Orie Griffin Blvd	Palatka	32177
State of Fla Highway Patrol	152 US Highway 17 S	East Palatka	32131
Interlachen Police Dept	101 Manitoba Ave	Interlachen	32142
City of Palatka Police Dept.	110N 11th St	Palatka	32177
Putnam County Public Works	223 Putnam County Blvd	East Palatka	32131
Welaka Police Department	100 Main Street	Welaka	32193
Crescent City Police Department	203 N Summit St	Crescent City	32157
FIRE STATIONS			
City of Palatka Fire Dept. #2	112 N 11th Street	Palatka	32177
Crescent City VFD #3	20 I N Summit St	Crescent City	32157
Interlachen Fire VFD #4	202 Common Wealth Ave	Interlachen	32148
Southwest VFD #5	3409 Park Street	Palatka	32177
East Palatka VFD #6	158 Louis Broer Road	East Palatka	32131
Georgetown VFD #9	1411 CR 309	Georgetown	32139
Pomona Park VFD #10	109 Worcester Rd	Pomona Park	32157
Putnam Main #11	120 Orie Griffin Blvd	Palatka	32177
Welaka VFD #12	Palmetto St & 5 St	Welaka	32193
Hollister VFD #13	617 SR 20	Hollister	32147
Florahome VFD #14	201 West Ohio Street	Florahome	32140
Georges Lake VFD #16	114 Sarasota Street	Florahome	32140
Unit 16-17 VFD #17	217 Kennedy Ave	Interlachen	32148
Bardin VFD #18	107 Johns Road	Bardin	32177
Riverside VFD 19	101 Gail Dr	San Mateo	32187
West Putnam VFD #20	104 Race Street	Hawthorne	32640
21st Precinct VFD #21	110 Mulberry Street	Bostwick	32007
Francis VFD #22	7414 Crill Ave	Palatka	32177
Satsuma VFD #23	103 South 1st Street	Satsuma	32198
Melrose VFD #24	301 Cypress Street	Melrose	32666
EMS STATIONS			
Main Station (81,85, 71)	120 Orie Griffin Rd	Palatka	32177
East Palatka (84)	158 Louis Broer RD	East Palatka	32131
Interlachen (82,72)	170 CR 315 South	Interlachen	32148
Crescent City (86)	312 Union Ave	Crescent City	32157
Pomona Park (73)	109 Worchester Rd	Pomona Park	32157
Florahome (88)	103 N. Oak Street	Florahome	32140
Ochwilla (87)	275 N. SR 21	Hawthorne	32640
Satsuma (83)	109 1st Street	Satsuma	32198

HOSPITAL			
Putnam Community Medical Center	116 Zeagler Drive	Palatka	32177

EVACUATION SHELTERS			
Interlachen Elementary School	251 County Road 315	Interlachen	
Palatka High School	303 Mellon Rd	Palatka	32177
Kelly Smith Elementary (special needs)	141 Kelly Smith School Rd	Palatka	32177
Crescent City Jr/ High School	2201 S. Highway 17	Crescent City	32148
Browning- Pearce Elementary School	100 Bear Blvd	San Mateo	32187
Ochwilla Elementary School	299 N. Hwy 21	Hawthorne	32640
Jenkins Middle School	1100 N. 19th Street	Palatka	32177
Middleton- Burney Elementary School	1020 Huntington Rd	Crescent city	32148
QI Roberts Middle School	901 SR 100	Florahome	32140

OTHER FEDERAL GOVERNMENT			
U S Govt Dept. Of Immigration Border Control	Us Highway 17 S (Commons tower)	East Palatka	32131
Florida National Guard	1301 Mosley Ave	Palatka	32177
United States Army Reserve	101 Stllwell Ave	Palatka	32177

APPENDIX F

2004 Adopted Resolutions

RESOLUTION OF THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY TASKFORCE, ACCEPTING THE PUTNAM LMS DOCUMENT

WHEREAS, The Putnam County Local Mitigation Strategy Taskforce was created in August 1998, with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, Putnam County initiated the Local Mitigation Strategy Plan development by entering into a contract with the Florida State Department of Community Affairs Division of Emergency Management,

WHEREAS, the Putnam County LMS Taskforce has completed a Local Mitigation Strategy plan which has been reviewed by the Florida State Department of Community Affairs as meeting the criteria for such plans; and

WHEREAS, this Local Mitigation Strategy plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery in the event of a hazardous events occurring in Putnam County; and

NOW, THEREFORE, BE IT RESOLVED that the Putnam County LMS Taskforce, hereby accepts the Putnam County Local Hazard Mitigation Plan.

Unanimously adopted by the Putnam County LMS Taskforce in regular meeting assembled in the office of the Putnam County Emergency Operations Center, November 18 , 2004.

LMS Taskforce Contact

Resolution No. 2004-147

Resolution of the Putnam County Commission, Accepting the Putnam County Local Hazard Mitigation Plan Document

WHEREAS, The Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998, with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, this Local Mitigation Strategy is intended to provided a strategy to mitigate dangers and costs associated with weather and manmade hazards and to provide a priority for recovery in the event of a hazardous event occurring in Putnam County; and

WHEREAS, the Putnam County LMS Taskforce has completed a Local Mitigation Strategy which has been reviewed by the Florida State Department of Community Affairs and The Federal Emergency Management agency that necessitated revision and re-adoption of the document throughout the county as meeting the criteria for such plans; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the Strategy to be complete in 2000, and revised on December 14, 2004.

NOW THEREFORE, BE IT RESOLVED that Putnam County accepts and adopts the Putnam County Local Mitigation Strategy and assigns maintenance of the Project List to the Local Mitigation Strategy Taskforce to be coordinated by Putnam County Emergency Services with review by the Board of County Commissioners at least annually or as requested by the Board of County Commissioners.

Adopted by the Putnam County Commission in regular meeting assembled in the offices of the Putnam County Commission, December 14, 2004.

BOARD OF COUNTY COMMISSONERS
PUTNAM COUNTY, FLORIDA

Chairman, Putnam County Commission

ATTEST:

Putnam County, Clerk of the Court

RESOLUTION # R06-05

RESOLUTION OF THE CITY OF CRESCENT CITY, CITY COMMISSION ACCEPTING THE PUTNAM LMS DOCUMENT

WHEREAS, The Putnam County Local Mitigation Strategy Taskforce was created in August 1998, with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, Putnam County initiated the Local Mitigation Strategy Plan development by entering into a contract with the Florida State Department of Community Affairs Division of Emergency Management,

WHEREAS, the Putnam County LMS Taskforce has completed a Local Mitigation Strategy plan which has been reviewed by the Florida State Department of Community Affairs as meeting the criteria for such plans; and

WHEREAS, this Local Mitigation Strategy plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery in the event of a hazardous events occurring in Putnam County; and

NOW, THEREFORE, BE IT RESOLVED that the City of Crescent City, City Commission, hereby accepts the Putnam County Local Hazard Mitigation Plan.

Unanimously adopted by the City of Crescent City, City Commission in regular meeting assembled in the chamber of the City Commission, June 8, 2006.

Mayor, Lee Kinsella

A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF INTERLACHEN, FLORIDA, ACCEPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY DOCUMENT.

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce was created in August 1998, with the responsibility of developing a Local Hazard Mitigation Plan, and

WHEREAS, Putnam County initiated the Local Mitigation Strategy Plan development by entering into a contract with the Florida State Department of Community Affairs Division of Emergency Management, and

WHEREAS, the Putnam County LMS Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida State Department of Community Affairs as meeting the criteria for such plans; and

WHEREAS, this Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery in the event of hazardous events occurring in Putnam County.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF INTERLACHEN, FLORIDA, that the Town of Interlachen Town Council, hereby accepts the Putnam County Local Hazard Mitigation Plan.

PASSED AND ADOPTED in Regular Session this 8th day of March, 2005.

Chairman, David E. Trout, 3rd

Mayor, John D. Lylee

Council, James R. Coulter

Council, Janet C. Davis

Council, John K. Larsen

Council, Diane B. Rogers

Attest:

Pamela S. Wellmers
Town Clerk

(TOWN SEAL)

Resolution 2005-3

Page 1 of 1

RESOLUTION NO. 7-131

entitled

A RESOLUTION OF THE CITY OF PALATKA, FLORIDA, ACCEPTING THE PUTNAM COUNTY LOCAL HAZARD MITIGATION PLAN DOCUMENT

WHEREAS, The Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998, with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, this Local Mitigation Strategy is intended to provide a strategy to mitigate dangers and costs associated with weather and manmade hazards and to provide a priority for recovery in the event of a hazardous event occurring in Putnam County; and

WHEREAS, the Putnam County LMS Taskforce has completed a Local Mitigation Strategy which has been reviewed by the Florida State Department of Community Affairs and the Federal Emergency Management agency that necessitated revision and re-adoption of the document throughout the county as meeting the criteria for such plans; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the Strategy to be complete in 2000, and revised on December 14, 2004.

NOW, THEREFORE, BE IT RESOLVED by the City Commission of the City of Palatka, Florida, that the City of Palatka accepts and adopts the Putnam County Local Mitigation Strategy and assigns maintenance of the Project List to the Local Mitigation Strategy Taskforce to be coordinated by Putnam County Emergency Services with review by the Board of County Commissioners at least annually or as requested by the Board of County Commissioners.

PASSED AND ADOPTED by the City Commission of the City of Palatka, Florida on this 10th day of February 2005.

CITY OF PALATKA

By: _____
Its MAYOR

ATTEST:

_____
CITY CLERK

Resolution No. 1-2005

A RESOLUTION OF THE TOWN OF POMONA PARK OF PUTNAM COUNT FLORIDA: ACCEPTING THE PUTNAM COUNTY LOCAL HAZARD MITIGATIO PLAN DOCUMENT; PROVIDING AN EFFECTIVE DATE; PROVIDING FO CONFLICTS WITH PRIOR RESOLUTIONS.

WHEREAS, The Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998, with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, this Local Mitigation Strategy is intended to provided a strategy to mitigate dangers and costs associated with weather and manmade hazards and to provide a priority for recovery in the event of a hazardous event occurring in Putnam County: and

WHEREAS, the Putnam County LMS Taskforce bas completed a Local Mitigation Strategy which has been reviewed by the Florida State Department of Community Affairs and The Federal Emergency Management Agency that necessitated revision and re-adoption of the document throughout the County as meeting the criteria for such plans; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the Strategy to be complete in 2000, and revised on December 14, 2004.

NOW, THEREFORE, BE IT RESOLVED that the Town of Pomona Park accepts and adopts the Putnam County Local Mitigation Strategy and assigns maintenance of the Project List to the Local Mitigation Strategy Taskforce to be coordinated by Putnam County Emergency Services with review by the Board of County Commissioners at least annually or as requested by the Board of County Commissioners.

This Resolution shall take effect immediately upon its passage and shall prevail over any previous Resolutions to the extent of any conflict.

IN WITNESS WHERE OF, this Resolution has been duly adopted this 14th day of December, 2004 A.D.

ATTEST:

D'Nel Flateau, Town Clerk

TOWN OF POMONA PARK

T. Alonzo Middleton, Mayor

APPROVED AS TO FORM

James Padgett, Town Attorney

I hereby certify the foregoing to be a true and correct copy of Resolution #1-2005 adopted by the Pomona Park Town Council the 11th day of January, A.D. 2005.

D'Nel Flateau, Town Clerk

TOWN OF WELAKA
RESOLUTION 2005-01R

A RESOLUTION FOR THE TOWN OF WELAKA, FLORIDA ACCEPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce was created in August 1998, with the responsibility of developing a local hazard mitigation plan; and

WHEREAS, Putnam County initiated the Local Mitigation Strategy Plan development by entering into a contract with the Florida State Department of Community Affairs Division of Emergency Management; and

WHEREAS, the Putnam County LMS Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida State Department of Community Affairs as meeting the criteria for such plans; and

WHEREAS, this Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery in the event of hazardous events occurring in Putnam County; and

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Welaka, Florida hereby accepts the Putnam County Local Mitigation Strategy Plan.

ADOPTED this 11th day of January 2005 by the Town Council of the Town of Welaka, Florida.

ATTEST:

Joylene Taylor, Town Clerk

SIGNED:

Gordon Sands, Mayor

APPROVAL AS TO FORM:

Scott & Sheppard, Town Attorney

Vivian Dreessen, Council President

APPENDIX G

2010 Adopted Resolutions

RESOLUTION NO. 2010- 40

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF PUTNAM COUNTY, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida Division of Emergency Management (FDEM) and the Federal Emergency Management Agency (FEMA) as meeting the criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2004; and

WHEREAS, the Disaster Mitigation Act of 2000, as a condition for qualifying for and receiving future Federal mitigation assistance funding, requires such governments to have a Federal Emergency Management Agency approved hazard mitigation plan in place that identifies the natural hazards that could impact the County.

NOW THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Putnam County that: The Local Mitigation Strategy Plan is hereby approved and adopted effective immediately.

DULY PASSED AND ADOPTED THIS 22nd DAY OF June, 2010.

ATTEST:

TIM SMITH, CLERK OF COURTS

BOARD OF COUNTY COMMISSIONERS
PUTNAM COUNTY, FLORIDA

BY: _____
CHIP LAIBL, CHAIRMAN

APPROVED AS TO LEGAL FORM AND CORRECTNESS:

BY: _____
RUSSELL CASTLEBERRY, COUNTY ATTORNEY

RESOLUTION NO. 08 - 73

A RESOLUTION OF THE CITY OF PALATKA, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man-made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida Division of Emergency Management (FDEM) and the Federal Emergency Management Agency (FEMA) as meeting the criteria for such plans and was approved by the City of Palatka City Commission in 2005; and

WHEREAS, the Disaster Mitigation Act of 2000, as a condition for qualifying for and receiving future Federal mitigation assistance funding, requires such governments to have a Federal Emergency Management Agency approved hazard mitigation plan in place that identifies the natural hazards that could impact the City.

NOW THEREFORE, BE IT RESOLVED by the City Commission of the City of Palatka, Florida, that: The Putnam County Local Mitigation Strategy/Plan is hereby approved and adopted effective immediately.

PASSED AND ADOPTED by the City Commission of the City of Palatka, Florida, on this **24th day of June, 2010.**

CITY OF PALATKA

By: _____
Its MAYOR

ATTEST:

_____
CITY CLERK

RESOLUTION NO R10-07

A RESOLUTION OF THE CITY COMMISSION FOR THE CITY OF CRESCENT CITY, PUTNAM COUNTY, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida Division of Emergency Management (FDEM) and the Federal Emergency Management Agency (FEMA) as meeting the criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2004; and

WHEREAS, the Disaster Mitigation Act of 2000, as a condition for qualifying for and receiving future Federal mitigation assistance funding, requires such governments to have a Federal Emergency Management Agency approved hazard mitigation plan in place that identifies the natural hazards that could impact the County.

NOW THEREFORE, BE IT RESOLVED by the by the City Commission of the City of Crescent City that The Putnam County Local Mitigation Strategy Plan is hereby approved and adopted effective immediately.

APPROVED AND ADOPTED by the City Commission of the City of Crescent City at its regular meeting assembled this 15th day of July 2010.

Joseph A Santa, Mayor

Attest:

Patrick Kennedy, City Manager

RESOLUTION 2010-2

A RESOLUTION OF THE TOWN COUNCIL OF THE OF THE TOWN OF INTERLACHEN, FLORIDA; APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida Division of Emergency Management (FDEM) and the Federal Emergency Management Agency (FEMA) as meeting the criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2004; and

WHEREAS, the Disaster Mitigation Act of 2000, as a condition for qualifying for and receiving future Federal mitigation assistance funding, requires such governments to have a Federal Emergency Management Agency approved hazard mitigation plan in place that identifies the natural hazards that could impact the County.

NOW THEREFORE, BE IT RESOLVED by the Town Council Members of the Town of Interlachen: The Local Mitigation Strategy Plan is hereby approved and adopted effective immediately.

PASSED and ADOPTED in Regular Session this 13th day of July, 2010.

Chairman, D. Wayne Corbin

Mayor, John D. Tyles

Vice-Chairman, John K. Larsen

Council, Lois F. Godwin

Council, Frances C. Martin

Council, Janet C. Medler

Attest:

Pamela S. Wilburn, Town Clerk

(TOWN SEAL)

Resolution 2010-2

Page 1 of 1

RESOLUTION #5-2010

**A RESOLUTION OF THE TOWN OF POMONA PARK
OF PUTNAM COUNTY, FLORIDA
APPROVING AND ADOPTING
THE PUTNAM COUNTY LOCAL HAZARD MITIGATION PLAN.**

WHEREAS, This Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and cost associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, The Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998, with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida Division of Emergency Management (FDEM) and the Federal Emergency Management Agency (FEMA) as meeting the criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2004; and

WHEREAS, the Disaster Mitigation Act of 2000, as a condition for qualifying for and receiving future Federal mitigation assistance funding, requires such governments to have a Federal Emergency Management Agency approved hazard mitigation plan in place that identifies the natural hazards that could impact the County.

NOW THEREFORE, BE IT RESOLVED by the Town Council of Pomona Park that: The Local Mitigation Strategy Plan is hereby Approved and Adopted effective immediately.

IN WITNESS THEREOF, this Resolution has been duly adopted this 13th day of July, 2010.

Raymond Singleton, Mayor
Town of Pomona Park, Florida

Attest:

D'Nel Flateau, Town Clerk
Town of Pomona Park, Florida

Approved as to Legal form and correctness:

James Padgett, Town Attorney

TOWN OF WELAKA
RESOLUTION 2010-06R

A RESOLUTION FOR THE TOWN OF WELAKA, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and manmade hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Local Mitigation Strategy Plan which has been reviewed by the Florida Division of Emergency Management (FDEM) and the Federal Emergency Management Agency (FEMA) as meeting the criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2004; and

WHEREAS, the Disaster Mitigation Act of 2000, as a condition for qualifying for and receiving future Federal mitigation assistance funding, requires such governments to have a Federal Emergency Management Agency approved hazard mitigation plan in place that identifies the natural hazards that could impact the County.

NOW THEREFORE, BE IT RESOLVED that the Town Council of the Town of Welaka, Florida hereby accepts the Putnam County Local Mitigation Strategy Plan.

ADOPTED this 13th day of July 2010 by the Town Council of the Town of Welaka, Florida.

ATTEST:

Judy Jones, Town Clerk

SIGNED:

Gordon Sands, Mayor

APPROVAL AS TO FORM:

Allen Scott, Town Attorney

Gilbert McGauley, Council President

APPENDIX H

2015 Adoption Resolutions

RESOLUTION NO. 2015- 60

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF PUTNAM COUNTY, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44 CFR 201/6(b)-(d). criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2010 (Resolution 2010-40); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended (42 U.S.C. 5121-5206) shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce conducted an advertised public meeting to comment on the Putnam County Mitigation Plan on December 4, 2014 and the Local Mitigation Strategy Task Force accepted all revisions of the plan on June 11, 2015; and

NOW THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Putnam County that: The Putnam County Mitigation Plan is hereby approved and adopted effective immediately.

DULY PASSED AND ADOPTED THIS 28th DAY OF July, 2015.

ATTEST:

BOARD OF COUNTY COMMISSIONERS
PUTNAM COUNTY, FLORIDA

CLERK OF COURTS PUTNAM COUNTY, FLORIDA

for TIM SMITH, CLERK OF COURTS

BY: KARL N. FLAGG, CHAIRMAN

APPROVED AS TO LEGAL FORM AND CORRECTNESS:

BY: RUSSELL CASTLEBERRY, COUNTY ATTORNEY

RESOLUTION NO. 2015- 11 - 66

A RESOLUTION OF THE CITY OF PALATKA, FLORIDA, APPROVING AND ADOPTING THE 2015 PUTNAM COUNTY MITIGATION PLAN.

WHEREAS, the Putnam County Mitigation Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44 CFR 201/6(b)-(d). criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2010 (Resolution 2010-40); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended (42 U.S.C. 5121-5206) shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce conducted an advertised public meeting to comment on the Putnam County Mitigation Plan on December 4, 2014 and the Local Mitigation Strategy Task Force accepted all revisions of the plan on June 11, 2015; and

WHEREAS, on July 28, 2015 the Putnam County Board of County Commissioners adopted BOCC Resolution No. 2015-60 accepting all revisions included in the 2015 Putnam County Local Mitigation Strategy Plan and adopting same.

NOW THEREFORE, BE IT RESOLVED by the City Commission of the City of Palatka, Florida, that the 2015 Putnam County Local Mitigation Plan is hereby approved and adopted effective immediately.

PASSED AND ADOPTED by the City Commission of the City of Palatka, Florida, on this 10th day of September, 2015.

PALATKA CITY COMMISSION

BY: _____
Terrill L. Hill, its MAYOR

ATTEST:

_____
CITY CLERK

APPROVED AS TO LEGAL FORM AND CORRECTNESS:

_____
CITY ATTORNEY

RESOLUTION 2015-10

A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF INTERLACHEN FLORIDA, REPEALING RESOLUTION 2010-2, AND APPROVING AND ADOPTING THE 2015 PUTNAM COUNTY MITIGATION PLAN.

WHEREAS, Putnam County has updated their Mitigation Plan, Resolution 2010-2 is hereby repealed; and

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44 CFR 201/6(b)-(d). criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2010 (Resolution 2010-40); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended (42 U.S.C. 5121-5206) shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce conducted an advertised public meeting to comment on the Putnam County Mitigation Plan on December 4, 2014 and the Local Mitigation Strategy Task Force accepted all revisions of the plan on June 11, 2015.

NOW THEREFORE, BE IT RESOLVED by the Town Council of the Town of Interlachen, Florida that: The 2015 Putnam County Mitigation Plan is hereby approved and adopted effective immediately.

DULY PASSED AND ADOPTED by the Town Council of the Town of Interlachen, Florida at a regular meeting on this 8th day of September, 2015

Chairperson, Judi Costanzo

Mayor, Ken Larsen

Vice-Chairperson, Carolyn Meadows

Council, Beverly Bakker

Council, Wayne Corbin

Council, John Lahert

Attest:

By: Pamela S. Wilburn, Town Clerk

(TOWN SEAL)

CERTIFIED TO BE A TRUE COPY
By: Pamela S. Wilburn
Pamela S. Wilburn, Town Clerk
Town of Interlachen

Resolution 2015-10

Page 1 of 1

RESOLUTION NO. 15- 10

A RESOLUTION OF THE CITY OF CRESCENT CITY, PUTNAM COUNTY, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Putnam County Local Mitigation Strategy Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44 CFR 201/6(b)-(d) criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2010 (Resolution 2010-40); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended (42 U.S.C. 5121-5206) shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce conducted an advertised public meeting to comment on and update the Putnam County Mitigation Plan on December 4, 2014 and the Local Mitigation Strategy Task Force accepted all revisions of the plan on June 11, 2015; and

WHEREAS, the Putnam County Board of County Commissioners approved and adopted the revised and updated Local Mitigation Strategy Plan on July 28, 2015, and seeks concurrence from the City of Crescent in approving this Plan;

NOW THEREFORE, BE IT RESOLVED by the City Commission for the City of Crescent City that the Putnam County Local Mitigation Strategy Plan is hereby approved and adopted effective immediately.

PASSED AND ADOPTED THIS 13th DAY OF August, 2015.

BY: _____
Joseph A Santa, Mayor

ATTEST:

_____
Patriek Kennedy, City Manager

RESOLUTION 2015-12

A RESOLUTION OF THE TOWN OF POMONA PARK, FLORIDA, ADOPTING THE 2015 PUTNAM COUNTY MITIGATION PLAN.

WHEREAS, Putnam County recommends adoption of the 2015 Putnam County Mitigation Plan by resolution; and,

WHEREAS, Multi-jurisdictional participation in the planning process identified by the 2015 Putnam County Mitigation Plan has reduced and minimized the potential impacts that hazards may have on Putnam County; and,

WHEREAS, FEMA requires that all Hazard Mitigation plans be reviewed and updated every five years. The Putnam County Mitigation Plan has been updated by Putnam County Emergency Management and the participants of the Local Mitigation Strategy Task Force. The plan has been approved by the Florida Division of Emergency Management based on standards contained in 44 CFR 201/6(b)-(d); and,

WHEREAS, FEMA requires that local governments adopt a FEMA approved mitigation plan to be eligible for FEMA's Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant Program, Flood Mitigation Assistance Program and other FEMA assistance programs.

NOW THEREFORE, BE IT RESOLVED; by the Town of Pomona Park, Putnam County, Florida, that:

Section 1. Purpose
The Town Council of the Town of Pomona Park adopted the 2015 Putnam County Mitigation Plan.

Section 2. Severability
Each phrase, sentence, paragraph, section or other provision of this Resolution is severable from all other such phrases, sentences, paragraphs, sections and provisions. Should any phrase, sentence, paragraph, section or provision of this Resolution be declared by the courts to be unconstitutional or invalid, such declaration shall not affect any other portion or provision of this Resolution.

Section 3. Conflicts
All Resolutions, or parts of Resolutions, in conflict herewith including, are hereby repealed.

Section 4. Effective Date
This Resolution shall take effect October 13, 2015 upon final passage as provided by law.

IN WITNESS THEREOF, this Resolution has been duly adopted at a Public Meeting on October 13, 2015.

By: John C Bergquist Jr. **Attest:** Cindy Hair

John C. Bergquist, Jr. Mayor **Cindy Hair, Town Clerk**

Deleted items are denoted by strike through. Added items are denoted by underline.

RESOLUTION NO. 2015-5R

A RESOLUTION OF THE TOWN OF WELAKA OF PUTNAM COUNTY, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY MITIGATION PLAN.

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44 CFR 201/6(b)-(d). criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2010 (Resolution 2010-40); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended (42 U.S.C. 5121-5206) shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce conducted an advertised public meeting to comment on the Putnam County Mitigation Plan on December 4, 2014 and the Local Mitigation Strategy Task Force accepted all revisions of the plan on June 11, 2015; and

NOW THEREFORE, BE IT RESOLVED by the Town of Welaka of Putnam County that: The Putnam County Mitigation Plan is hereby approved and adopted effective immediately.

DULY PASSED AND ADOPTED THIS 13th DAY OF OCTOBER, 2015.

ATTEST: **SIGNED:**

Jennifer McDaniel, Town Clerk — Gordon Sands, Mayor

APPROVAL AS TO FORM:

Allen Scott, Town Attorney — Jamie Watts, Council President

APPENDIX I

2020 Adoption Resolutions

RESOLUTION NO. 2020-082

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF PUTNAM COUNTY, FLORIDA ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION PLAN.

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigation dangers and costs associated with weather and man-made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation plan; and

WHEREAS the Putnam County Local Mitigation Strategy Taskforce has compiled a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44CFR 201 criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2015 (Resolution 2015-60); and

WHEREAS, in accordance w the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the plan to be complete and revised in 2020; and

NOW THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Putnam County that: The Putnam County Mitigation Plan is hereby approved and adopted effective immediately.

DULY PASSED AND ADOPTED THIS 24th DAY OF November, 2020.

ATTEST:

BOARD OF COUNTY COMMISSIONERS
PUTNAM COUNTY, FLORIDA

for TIM SMITH, CLERK OF COURTS

BY: _____
CHAIRMAN

RESOLUTION NO. 20-11

A RESOLUTION OF THE CITY OF CRESCENT CITY, PUTNAM COUNTY, FLORIDA APPROVING AND ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION STRATEGY PLAN.

WHEREAS, this Putnam County Local Mitigation Strategy Plan is intended to provide a strategy to mitigation dangers and costs associated with weather and man made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Local Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy (LMS) Taskforce has compiled a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management FDEM) as meeting 44CFR 201 criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2015 (Resolution 2015-60); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the plan to be complete and revised in 2020; and

NOW THEREFORE, BE IT RESOLVED by the City Commission of the City of Crescent City that the Putnam County Local Mitigation Strategy Plan is hereby approved and adopted effective immediately.

PASSED AND ADOPTED THIS 10th DAY OF December 10, 2020.

BY: _____
Michele Myers, Mayor

ATTEST:

_____
Michael Esposito, City Manager

RESOLUTION 2021-1

A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF INTERLACHEN FLORIDA, REPEALING RESOLUTION 2015-10; APPROVING AND ADOPTING THE 2020 PUTNAM COUNTY MITIGATION PLAN.

WHEREAS, Putnam County has updated their Mitigation Plan, Resolution 2015-10 is hereby repealed; and

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigate dangers and costs associated with weather and man-made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation Plan; and

WHEREAS, the Putnam County Local Mitigation Strategy Taskforce has completed a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44 CFR 201 criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2015 (Resolution 2015-60); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the plan to be complete and revised in 2020.

NOW THEREFORE, BE IT RESOLVED by the Town Council of the Town of Interlachen, Florida that: The Putnam County Mitigation Plan is hereby approved and adopted effective immediately.

DULY PASSED AND ADOPTED by the Town Council of the Town of Interlachen, Florida at a regular meeting on this 12th day of January, 2021.

Chairperson, Joni Conner

Mayor, Ken Larsen

Absent

Vice-Chairperson, Judi Costanzo

Council, Beverly Bakker

Council, Carolyn Bennett

Council, Carolyn Meadows

Attest:

By: _____
Joni Payne, Town Clerk

(TOWN SEAL)

Resolution 2021-1

Page 1 of 1

RESOLUTION NO. 2021-1

A RESOLUTION OF THE TOWN OF POMONA PARK, FLORIDA, AUTHORIZING THE ADOPTION OF THE PUTNAM COUNTY LOCAL MITIGATION PLAN.

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigation dangers and costs associated with weather and man-made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation plan; and

WHEREAS the Putnam County Local Mitigation Strategy Taskforce has compiled a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44CFR 201 criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2015 (Resolution 2015-60); and

WHEREAS, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the plan to be complete and revised in 2020; and

NOW THEREFORE, BE IT RESOLVED by the Town Council of Pomona Park, Florida that: The Putnam County Mitigation Plan is hereby approved and adopted effective immediately.

DULY PASSED AND ADOPTED THIS 12th DAY OF JANUARY, 2021.

By: _____
Joseph Syngala,, Mayor

Attest: _____
Donna Fontana, Town Clerk

RESOLUTION NO. 2021-R-05

A RESOLUTION OF THE CITY OF PALATKA, FLORIDA, ADOPTING THE PUTNAM COUNTY LOCAL MITIGATION PLAN.

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigation dangers and costs associated with weather and man-made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation plan; and

WHEREAS the Putnam County Local Mitigation Strategy Taskforce has compiled a Mitigation Plan update which has been reviewed by the Florida Division of Emergency Management (FDEM) as meeting 44CFR 201 criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2015 (Resolution 2015-60); and

WHEREAS, in accordance w the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program; and

WHEREAS, the Local Mitigation Strategy Taskforce accepted the plan to be complete and revised in 2020; and

NOW, THEREFORE, BE IT RESOLVED by the City Commission of the City of Palatka, Florida,

1. The Putnam County Mitigation Plan is hereby approved and adopted effective immediately.
2. That the City Manager or designee, without public hearing, is authorized to correct any typographical scrivener's errors, which do not affect eh intent of this Resolution, a corrected copy will be posted in the public record by the City Clerk.

PASSED AND ADOPTED by the City Commission of the City of Palatka, Florida this 14th day of January, 2021.

CITY OF PALATKA

BY: _____
Its Mayor

ATTEST:

_____
Acting City Clerk

APPROVED AS TO FORM AND CORRECTNESS:

_____
Interim City Attorney

RESOLUTION NO. 2021 - 11

A RESOLUTION OF THE TOWN COUNCIL FOR THE TOWN OF WELAKA, FLORIDA AUTHORIZING AND APPROVING THE PUTNAM COUNTY LOCAL MITIGATION PLAN.

WHEREAS, this Putnam County Mitigation Plan is intended to provide a strategy to mitigation dangers and costs associated with weather and man-made hazards and to provide a priority for recovery of hazardous events occurring in Putnam County; and

WHEREAS, the Putnam County Mitigation Strategy (LMS) Taskforce was created in August 1998 with the responsibility of developing a Local Hazard Mitigation plan; and

WHEREAS the Putnam County Local Mitigation Strategy Taskforce compiled a Mitigation Plan update, which was been reviewed by the Florida Division of Emergency Management (FDEM) and determined to meet 44CFR 201 criteria for such plans and was approved by the Putnam County Board of County Commissioners in 2015 (Resolution 2015-60); and

WHEREAS, the Local Mitigation Strategy Taskforce presented and the Putnam County Board of County Commissioners accepted revisions and updates to this Mitigation Plan in November 2020 which were also reviewed and determined by the Florida Division of Emergency Management (FDEM) and determined to meet 44CFR 201 criteria subject to the adoption of the plan by the local jurisdictions in Putnam County, including the Town of Welaka; and

WHEREAS, in accordance w the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended a local jurisdiction shall prepare and adopt a jurisdiction wide Local Mitigation Strategy Plan as a condition of receiving project grant funds under that Hazard Mitigation Grant Program.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL FOR THE TOWN OF WELAKA, FLORIDA THAT,

The Putnam County Local Mitigation Plan as amended and approved by FDEM and adopted by the Putnam County Board of County Commissioners in November 2020 is hereby approved and adopted effective immediately.

APPROVED AND ADOPTED by the Town Council for the Town of Welaka at its regular meeting assembled this 12th day of October 2021.

Town of Welaka, Florida

Jamie D. Watts

Jamie Watts, Mayor

Attest:

Jennifer McDaniel

Jennifer McDaniel, Town Clerk

APPENDIX J

FEMA AND FDEM Correspondence

STATE OF FLORIDA

DIVISION OF EMERGENCY MANAGEMENT

Ron DeSantis
Governor

Jared Moskowitz
Director

September 28, 2020

Ryan Simpson, Director
Putnam County Emergency Management
410 South SR 19,
Palatka, Florida 32177

Re: Putnam County Local Hazard Mitigation Plan Approved Pending Adoption

Dear Director Simpson,

This is to confirm that we have completed a State review of the Putnam 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, Putnam County developed and submitted all the necessary plan revisions and our staff has reviewed and approved these revisions. We have determined that the Putnam County LMS plan is compliant with federal standards, subject to formal community adoption, for the jurisdictions below:

Putnam County, Unincorporated
City of Crescent City
Town of Interlachen
City of Palatka
Town of Pomona Park
Town of Welaka

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 Putnam 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: 2020.09.28 14:15:18 -04'00'

Miles E. Anderson,
Bureau Chief, Mitigation
State Hazard Mitigation Officer

DIVISION HEADQUARTERS
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Telephone: 850-815-4000
www.FloridaDisaster.org

STATE LOGISTICS RESPONSE CENTER
2702 Directors Row
Orlando, FL 32809-5631

U. S. Department of Homeland Security
Region IV
3005 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

December 9, 2020

Mr. Miles Anderson
State Hazard Mitigation Officer
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Reference: Local Mitigation Strategy: Putnam County

Dear Mr. Anderson:

The Putnam County, FL Local Mitigation Strategy (LMS) Plan Update is in compliance with the Federal hazard mitigation planning requirements resulting from the Disaster Mitigation Act of 2000 as contained in 44 CFR 201.6. The plan is approved for a period of five (5) years to December 2, 2025. This letter is to confirm that the following jurisdiction is approved under the Putnam County, FL Local Mitigation Strategy Plan Update in accordance with the Program Administration by States (PAS) requirements, effective December 2, 2020, as follows:

This plan approval extends to the following participating jurisdiction that provided a copy of its resolution adopting the Putnam County, FL LMS plan:

- Putnam County, Unincorporated

The approved participating jurisdiction is hereby an eligible applicant through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Putnam County, FL LMS plan for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for **funding will be evaluated individually according to the specific eligibility and other requirements of the** particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years. We also encourage each community to conduct a plan update process within one (1) year of being included in a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive

Land Use Plan or other plans that affect hazard mitigation or land use and development. When you prepare a comprehensive plan update, it must be resubmitted through the State as a "plan update" and is subject to a formal review and approval process by our office. If the plan is not updated prior to the required five (5) year update, please ensure that the draft update is submitted at least six (6) months prior to expiration of this plan approval.

The State and the participants in the Putnam County, FL LMS plan should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Putnam County have any questions or need any additional information, please do not hesitate to contact Gabriela Vigo, of the Hazard Mitigation Assistance Branch, at (229) 225-4546 or Darlene Booker, of my staff at, (770) 220-5404.

Sincerely,

Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV

U. S. Department of Homeland Security
Region IV
3005 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

January 5, 2021

Mr. Miles Anderson
State Hazard Mitigation Officer
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Reference: Local Mitigation Strategy: Putnam County

Dear Mr. Anderson:

We are pleased to inform you that the Putnam County, FL Local Mitigation Strategy (LMS) Plan Update is in compliance with the Federal hazard mitigation planning requirements resulting from the Disaster Mitigation Act of 2000 as contained in 44 CFR 201.6. This plan is approved for a period of five (5) years to December 2, 2025. This letter is to confirm that the following jurisdiction is approved under the Putnam County, FL Local Mitigation Strategy Plan Update in accordance with Program Administration by States (PAS) requirements, effective December 2, 2020 as follows:

Submitted and originally approved as of December 2, 2020 which established the five-year period for the Plan:

- Putnam County, Unincorporated

Jurisdiction added as of January 5, 2021:

- City of Crescent City

The approved participating jurisdiction is hereby an eligible applicant through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Putnam County, FL LMS Plan Update for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years. We also encourage each community to conduct a plan update process within one (1) year of being included in a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development. When the Plan is amended or revised, the amendments and revisions should be incorporated into the next plan update. If the plan is not updated prior to the required five (5) year update, please ensure that the Draft update is submitted at least six (6) months prior to expiration of this plan approval.

The State and the participants in the Putnam County, FL LMS should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Putnam County have any questions or need any additional information, please do not hesitate to contact Gabriela Vigo, of the Hazard Mitigation Assistance Branch, at (229) 225-4546, or Darlene Booker, of my staff, at (770) 220-5404.

Sincerely,

Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV

U. S. Department of Homeland Security
Region IV
3005 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

January 27, 2021

Mr. Miles Anderson
State Hazard Mitigation Officer
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Reference: Local Mitigation Strategy: Putnam County

Dear Mr. Anderson:

We are pleased to inform you that the Putnam County, FL Local Mitigation Strategy (LMS) Plan Update is in compliance with the Federal hazard mitigation planning requirements resulting from the Disaster Mitigation Act of 2000 as contained in 44 CFR 201.6. This plan is approved for a period of five (5) years to December 2, 2025. This letter is to confirm that the following jurisdictions are approved under the Putnam County, FL Local Mitigation Strategy Plan Update in accordance with Program Administration by States (PAS) requirements, effective December 2, 2020 as follows:

Submitted and originally approved as of December 2, 2020 which established the five-year period for the Plan:

- Putnam County, Unincorporated

Jurisdictions added as of January 27, 2021:

- Town of Interlachen
- Town of Pomona Park
- City of Palatka

The approved participating jurisdictions are hereby eligible applicants through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Putnam County, FL LMS Plan Update for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA

funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years. We also encourage each community to conduct a plan update process within one (1) year of being included in a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development. When the Plan is amended or revised, the amendments and revisions should be incorporated into the next plan update. If the plan is not updated prior to the required five (5) year update, please ensure that the Draft update is submitted at least six (6) months prior to expiration of this plan approval.

The State and the participants in the Putnam County, FL LMS should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Putnam County have any questions or need any additional information, please do not hesitate to contact Gabriela Vigo, of the Hazard Mitigation Assistance Branch, at (229) 225-4546 or Darlene Booker, of my staff, at (770) 220-5404.

Sincerely,

Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV

U. S. Department of Homeland Security
Region 4
3005 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

November 2, 2021

Mr. Miles Anderson
State Hazard Mitigation Officer
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, FL 32399

Reference: Local Mitigation Strategy (LMS): Putnam County

Dear Mr. Anderson:

We are pleased to inform you that the Putnam County, FL Local Mitigation Strategy Plan is in compliance with the Federal hazard mitigation planning requirements resulting from the Disaster Mitigation Act of 2000 as contained in 44 CFR 201.6. This plan is approved for a period of five (5) years to December 2, 2025. This letter is to confirm that the following jurisdiction is approved under the Putnam County, FL Local Mitigation Strategy Plan in accordance with Program Administration by States (PAS) requirements, effective December 2, 2020 as follows:

Submitted and originally approved as of December 2, 2020 which established the five-year period for the Plan:

- Putnam County, Unincorporated

Jurisdiction added as of November 2, 2021:

- Town of Welaka

The approved participating jurisdiction is hereby an eligible applicant through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Putnam County, FL Local Mitigation Strategy Plan for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years. We also encourage each community to conduct a plan update process within one (1) year of being included in a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development. When the Plan is amended or revised, the amendments and revisions should be incorporated into the next plan update. If the plan is not updated prior to the required five (5) year update, please ensure that the Draft update is submitted at least six (6) months prior to expiration of this plan approval.

The State and the participants in the Putnam County, FL Local Mitigation Strategy Plan should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Putnam County have any questions or need any additional information, please do not hesitate to contact Gabriela Vigo, of the Hazard Mitigation Assistance Branch, at (229) 225-4546, or Darlene Booker, of my staff, at (770) 220-5404.

Sincerely,

Kristen M. Martinenza

Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV

STATE OF FLORIDA

DIVISION OF EMERGENCY MANAGEMENT

Ron DeSantis
Governor

Kevin Guthrie
Director

November 16, 2021

Steffen Turnipseed, Chief
Putnam County Emergency Management
410 South SR 19,
Palatka, Florida 32177

Re: Local Hazard Mitigation Plan Approval Notification

Dear Chief Turnipseed,

Congratulations! The enclosed letter constitutes the Federal Emergency Management Agency's (FEMA) formal approval of the Putnam County Local Mitigation Strategy (LMS) plan for the following participating jurisdictions:

Town of Welaka

The plan has been approved for a period of five (5) years and will expire again on December 2, 2025.

The Mitigation Planning Unit would like to thank you for all of your hard work. It has been a pleasure working with you and we look forward to serving you in the future. If you have any questions regarding this matter, please contact your LMS Liaison Kristin Lentz at Kristin.Lentz@em.myflorida.com or 850-815-4519.

Respectfully,

Laura Dhuwe

Digitally signed by Laura Dhuwe
DN: cn=Laura Dhuwe, o=DEM, ou=Mitigation, email=Laura.Dhuwe@em.myflorida.com, c=US
Date: 2021.11.16 11:09:37 -05'00'

for

Miles E. Anderson,
Bureau Chief, Mitigation
State Hazard Mitigation Officer

MEA/kl

Attachments: 11/02/21 FEMA Approval Letter for Town of Welaka

DIVISION HEADQUARTERS
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Telephone: 850-815-4000
www.FloridaDisaster.org

STATE LOGISTICS RESPONSE CENTER
2702 Directors Row
Orlando, FL 32809-5631

APPENDIX K

Southern Wildfire Risk Assessment

APPENDIX L

LMS Task Force Meeting Information & Minutes (2016-2020)

2016

- 3.17.16
- 6.2.16
- 9.22.16
- 12.8.16

2017

- 3.23.17
- 6.15.17
- 12.21.17

2018

- 3.29.18
- 6.28.18
- 10.11.18
- 12.6.18

2019

- 2.27.19
- 6.20.19
- 9.19.19
- 12.11.19

2020

- 3.5.20
- 7.16.20
- 9.10.20
- 12.3.20

APPENDIX M

Hazus –MH: Hurricane Event Report
10 year return period

APPENDIX N

Putnam County LMS Project Priority List

PUTNAM COUNTY LOCAL MITIGATION STRATEGY
COMPREHENSIVE PROJECT PRIORITY LIST AS OF 12/15/21

NOTE: THERE ARE NO DELETED/DEFERRED PROJECTS

PROJECT NUMBER	LMS GOAL(S)	PROJECT STATUS	PROJECT NAME & DESCRIPTION	TIMEFRAME (MONTHS)	SPONSORING AGENCY	TARGET HAZARD(S)	% of the Population Benefitted	% of the Problem Area Benefited	Health and Safety Considerations	The Cost of Implementing the Initiative	Cost Benefit	Probability of Community Acceptance	Probability of Funding	Feasibility of Implementing & Environ. Accept.	Consistency With Other Plans & Programs	Timeframe For Accomplishment	Total Points Awarded	Validation	Estimated Cost (Reference Chart)	Funding Source
07-01	4	Continuous	Educational materials on mitigation	>60	Putnam County Emergency Services	All Indentified Hazards	10	10	10	10		10	10	10	10	10	100	90	10	HMA
07-02	4	Continuous	GIS Mapping Technology	>60	Putnam County IT Department	Flooding	10	10	10	10		10	10	10	10	10	100	90	10	HMA
07-03	1	In progress	County All Hazard Shelter (lettered by priority)	>12	Multi Agency	All Indentified Hazards	10	10	10	9		10	10	10	10	10	99	89	1	HMA
		~~Stopped~~	~~A. Crescent City Jr/Sr High-Wind Retrofit -FEMA/STATE HMGP 1545-57R~~	~~7/14/06 - 11/6/2010~~	~~Putnam County School Board~~															
		~~Complete~~	~~B. Middleton Burney- Hurricane Shelter Retrofit 7121 FEMA/STATE 1551-66R (complete 8/2011)~~	~~Complete~~	~~Putnam County School Board~~															
		~~Complete~~	~~C. Kelley Smith - Hurricane Shelter Retrofit 7121 FEMA/STATE 1551-81R (complete 11/13/10)~~	~~Complete~~	~~Putnam County School Board~~															
		~~N/A~~	~~D. Jenkins Middle- Hurricane - Identified for Hurricane Shelter Retrofit~~	~~>36~~	~~Putnam County School Board~~															
		Pending	E. Palatka High- Identified for Hurricane Shelter Retrofit	>36	Putnam County School Board															
		Pending	F. Browning Pearce- Identified for continued hazard mitigation	>36	Putnam County School Board															
		Pending	G. Ochwilla Elementary- Identified for continued hazard mitigation	>36	Putnam County School Board															
		Pending	H. Interlachen Elementary- Identified for continued hazard mitigation	>36	Putnam County School Board															
		Pending	I. Pet Friendly Shelters- Identified for continued hazard mitigation	>36	Putnam County															
		Pending	J. Large (farm / equestrian) Animal Shelters- Identified for continued hazard mitigation	>36	Putnam County															
~~07-04~~	~~1~~	~~N/A~~	~~Domestic Terrorism Study- Critical Infrastructure Threat Assessment and Mitigation Syst. (CITAMS)~~	~~>36~~	~~Putnam County Emergency Services~~	~~Terrorism, Hazardous Material Incidents~~	~~10~~	~~10~~	~~10~~	~~9~~		~~10~~	~~10~~	~~10~~	~~10~~	~~10~~	~~99~~	~~89~~	~~10~~	~~HMA~~
			Superceded by THIRA																	
07-05	1	In progress	Countywide Communication Improvements	>36	Putnam County Emergency Services	All Indentified Hazards	10	10	10	8		10	10	10	10	8	86	86	0	HMA
07-25	2	In progress	Critical Facilities - EMS, Fire, and Emergency Management	>36	Putnam County Emergency Services	Hurricane & other cyclonic activity, Severe Thunderstorms	9	10	9	8	10	9	6	9	8	7	85	85	5	HMA
07-07	2	Pending	Permanent Generators for Continuity of Operations @	>36	Multi Agency	Hurricane & other cyclonic activity, Severe Thunderstorms, Tornadoes	10	10	10	10		10	6	10	6	10	82	82	5	HMA
		~~Complete~~	~~A. Hospital- City of Palatka~~		~~Palatka Community Medical Center~~															
		Confirming	~~B. Nursing Homes- City of Palatka~~		~~Multi Agency~~															
		Pending	C. Crescent City Back-up Power Supply		Crescent City															
		~~Complete~~	~~D. Putnam County Emergency Service Bostwick Firestation Generator~~		~~Putnam County Emergency Services~~															
07-08	1,2,4	In progress	Wildfire mitigation activities in the wildland/urban interface and around critical facilities	>36	Florida Forest Service	Wildfires	7	10	7	10		10	10	10	8	8	80	80	9	HMA
Merged w 07-10			~~A. Integrating wildfire mitigation principles in the County Land Development Code~~																	
		In progress	B. Identify and designate wildfire high risk areas around the county and develop wildfire mitigation plans																	
		~~Complete~~	~~C. Conduct public education programs, focusing on FireWise principles and outdoor burning laws and tips~~																	
		In progress	D. Develop a prescribed burn program for the county, working with the agencies that manage large tracts of public and private lands																	
		~~Complete~~	~~E. Develop the Putnam County Wildfire Mitigation Project Committee (COMPLETE 2008)~~																	
		~~Complete~~	~~F. Identify and set up a system for locating agricultural wells throughout Putnam County (added 10/27/09)~~																	
		In progress	G. HMGP Eligible Wildfire Activities: Defensible Space Activities, Hazardous Fuels Reduction activities																	
07-09	2,3	Continuous	Master Storm water Plan	>36	Putnam County (Public Works/Planning/Engineering)	Flooding	10	10	10	10		10	10	8	5	7	80	80	9	HMA
			A. Storm water Drainage Basin Improvement Planning and Engineering																	
			B. General Sub-Basin Planning and Engineering Studies																	
			C. Adopted master Stormwater Plan report- 15 Identified County Priority																	
			Project Areas- Ranked Drainage Basin Improvements (10 Priority Areas remaining for completion) see adopted plan																	
		~~Complete~~	~~1. Devall Branch- Silver lake Drive Culvert** Complete 6/10/10~~																	
		~~Compete~~	~~2. Two Mile Creek- Silver Lake Drive Culvert **Compete 6/10/10~~																	
Updated to Project 20-1			~~3. Palmetto Bluff Road- Road flooding~~																	
			4. Millican Road- Mason Branch																	
			5. River Park- Subdivision Lake Outlets																	
			6. Mud Lake- Red Fox Trail **																	
			7. Orange Springs Shortcut- New Bridge Crossing																	
			8. Rector Road- New Bridge Crossing																	
			9. East Palatka- Dog Branch Road/SR 207																	
		~~Complete~~	~~10. Florahome- Coral Farms Road Culvert **Complete 6/10/10~~																	
			11. Saratoga Harbor- Dredging Channel																	
			12. Whispering Pines- Drainage Green Belts																	
			13. CR 315 at 64th. Street- 2nd. Ave Road Sediment																	
			14. Mondex- Annual Flooding Subdivision																	
			15. East River Road- Flooding Public Works facilities																	

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07-10	2	Continuous	Fire Protection Ordinance for: new and existing buildings	>36	Florida Forest Service	Wildfires	10	10	10	6		1	10	10	10	10	77	77	10	HMA
			A. New and existing buildings																	
			B. Lands																	
07-22	2	Pending	Sustainable Shelter	>36	Putnam County Public Works and Engineering	Hurricane & other cyclonic activities	4	7	10	7		10	10	10	10	5	73	73	5	HMA
			A. Provide back-up wells																	
			B. Provide back-up generators for the wells (if required)																	
~~07-11~~	~~3~~	~~Complete~~	~~Statewide Regional Evacuation Study Program (SRESP)~~	~~>36~~	~~Northeast Florida Regional Council~~	~~Hurricane & other cyclonic activities~~	~~10~~	~~10~~	~~10~~	~~0~~		~~8~~	~~4~~	~~4~~	~~8~~	~~7~~	~~61~~	~~61~~	~~5~~	~~HMA~~
~~07-12~~	~~1~~	~~Complete~~	~~Retrofitting Critical Facilities~~		~~Multi Agency~~	~~Hurricane & other cyclonic activities, High Winds, Tornadoes~~	~~10~~	~~10~~	~~10~~	~~5~~		~~10~~	~~4~~	~~4~~	~~5~~	~~3~~	~~61~~	~~61~~	~~5~~	~~HMA~~
		~~Complete~~	~~A. Pomona Park Town Hall: Debris protection on 4 windows and 3 doors (COMPLETE 9/2008)~~	~~Complete~~	~~Town of Pomona Park~~															
		~~Complete~~	~~B. Interlachen Town Hall (COMPLETE 3/11/2009)~~	~~Complete~~	~~Town of Interlachen~~															
		~~Complete~~	~~C. Main Fire Station on 11th Street~~	~~>36~~	~~City of Palatka Fire Department~~															
		~~Complete~~	~~D. Kay Larken Fire Station off Moody Road~~	~~>36~~	~~City of Palatka Fire Department~~															
		~~Complete~~	~~E. Palatka Police Department~~	~~>36~~	~~City of Palatka Fire Department~~															
		~~Complete~~	~~F. Putnam County Emergency Operations Center (COMPLETE 2009)~~	~~Complete~~	~~Putnam County Emergency Services~~															
07-13	2	Pending	State Road 100 Flooding Rice Creek	>36	Putnam County Public Works and Engineering	Flooding	10	10	10	5		10	4	4	5	3	61	61	5	HMA
07-14	2	In progress	Drainage System Improvements	>36	Putnam County Public Works and Engineering & City of Palatka, F	Flooding	10	10	10	0		8	4	6	10	0	58	58	5	HMA
			A. Ditch and Major Outfall Cleaning		Putnam County Public Works and Engineering															
			B. Increase Flow Through Major/ Minor Outfalls		Putnam County Public Works and Engineering															
			C. Install New Drainage Systems and Outfalls		Putnam County Public Works and Engineering															
			D. Improvements to prevent erosion, damage to drainage system, and the environment		Putnam County Public Works and Engineering															
			E. System Restoration to prevent property damage		Putnam County Public Works and Engineering															
		~~Complete~~	~~F. Mosley Ave. drains & SR 20/Mosley Ave. - Improve drainage areas (COMPLETE 3/31/11)~~		Putnam County Public Works and Engineering															
		~~Complete~~	~~G. Zeagler Dr. & St. Johns Ave. - Improve drainage at intersection (COMPLETE 3/31/11)~~		Putnam County Public Works and Engineering															
			H. Town of Welaka 2010 CDBG-DRI Project- 4th. Ave drainage (added 1.14.10)		Town of Welaka															
			I. City of Palatka 2010 CDBG- DR Project Fifteenth and St. Johns Ave (added 1.14.10)		City of Palatka Public Works Department															
			J. Port Comfort Road- Closed Basin		Putnam County Public Works and Engineering															
Updated to Project 20-1			~~K. Palmetto Bluff Road- Cross Culvert and Flow Channels~~		~~Putnam County Public Works and Engineering~~															
			L. Browns Landing Road/Macon Road- drainage system		Putnam County Public Works and Engineering															
			M. Carson Road/Lake Street- Cross Culvert		Putnam County Public Works and Engineering															
			N. Front Street- Cross Culvert and Side Drains		Putnam County Public Works and Engineering															
			O. 7th.& St. Johns (DR 1785-073 St. Johns Ave & Oak St.)		City of Palatka, Public Works Department															
07-15	2	Pending	Bardin Road Flooding	>36	Putnam County Public Works and Engineering	Flooding	1	3	5	6		6	10	10	10	5	56	56	5	HMA
07-16	2	Pending	River Park Flooding near Crescent City	>36	Putnam County Public Works and Engineering	Flooding	1	3	5	6		6	10	10	10	5	56	56	5	HMA
07-17	2,3	In progress	Transportation Improvements	>36	City of Palatka, Putnam County Public Works and Engineering	Hurricane & other cyclonic activity, Flooding	10	10	10	0		10	0	4	10	0	54	54	3	HMA
			A. Road and Bridge Improvements Along Evacuation Routes																	
			B. Paving of Arterial / Connector Roads to Prevent Washouts																	
			C. Bridge Over St. Johns																	
			D. Elevation and Paving of Access Roads																	
07-18	1,2	Pending	Enhance Public Water Supply System	>36	Putnam County Public Works Department and PCEM	Flooding, Droughts/Heat Waves, Wildfires	10	10	10	0		4	0	6	8	0	48	48	8	HMA
			A. Eliminate Contamination of Private Wells Caused by Storm water Excess																	
			B. Enhance Water Service Capabilities During Storms																	
07-19	1,3	Pending	Wastewater System Improvements	>36	Putnam County Public Works and Engineering Dept.	Flooding	10	10	10	0		4	0	6	8	0	48	48	1	HMA
			A. Eliminate Malfunction of Septic Drainfields Due to Flooding																	
			B. Enhance Sewage Treatment Outlets During Storms																	
Under Review			C. Putnam County 2010 HMGP Project Paradise Point WWTF (Updated 09/23/2021: Formerly CDBG DRI)																	
Executed Funding			D. Putnam County 2010 HGMP Project Port Buena Vista WWTF (Updated 09/23/2021 Formerly: CDBG DRI)																	
07-20	3	Pending	Improve the flood portions of the LMS Plan	>36	Putnam County EM, Putnam County PDS Department	Flooding, Storm Surge	1	10	1	10		6	2	4	2	7	43	43	9	HMA
			Repetitive flood loss properties in the County and Municipalities																	
07-21	1	Continuous	Home Retrofitting Survey of Homes	>36	Putnam County Emergency Services	High Winds	3	3	8	5		2	5	4	0	3	33	33	9	HMA
~~08-01~~	~~1~~	Continuous	North Florida 911 Routing Network; connect surroundings Counties 911 system together	~~>36~~	Putnam County Information Technology GIS / E911	All Hazards	9	10	9	10	10	8	10	8	8	10	92	92	9	HMA
~~08-02~~	~~1~~	~~Complete~~	~~Putnam County Back-Up Communications Center; support PCSO Dispatch Center COOP Plan~~	~~>36~~	~~Putnam County Information Technology GIS / E911~~	~~All Hazards~~	~~9~~	~~9~~	~~9~~	~~8~~	~~10~~	~~7~~	~~3~~	~~6~~	~~7~~	~~6~~	~~74~~	~~74~~	~~9~~	~~HMA~~
~~10-1~~	~~1~~	~~Complete~~	~~Data Communication Services Fiber Loop~~	~~>36~~	~~Putnam County Information Technology~~	~~All Hazards~~	~~10~~	~~9~~	~~10~~	~~9~~	~~10~~	~~9~~	~~2~~	~~9~~	~~7~~	~~7~~	~~84~~	~~84~~	~~9~~	~~HMA~~
			~2021/Pending Confirmation																	
~~10-2~~	~~1,2,3,5~~	~~Complete~~	~~Post Disaster Redevelopment Plan and Recovery Activites (PDRP) Score validated/project added 12/1/2011~~	~~>36~~	~~Putnam County Emergency Management~~	~~All Hazards~~												~~80~~	~~9~~	~~HMA~~
			Published in 2013																	
~~11-1~~	~~1,2,3~~	~~Complete~~	~~Putnam County Fairgrounds Retrofit of Judy Rawson Building (added 6.9.11)~~	~~>60~~	~~Putnam County Fair Authority~~	~~All Hazards~~	~~9~~	~~9~~	~~8~~	~~10~~	~~10~~	~~8~~	~~4~~	~~8~~	~~7~~	~~8~~	~~81~~	~~81~~	~~9~~	~~HMA~~
16-1	1, 3	In progress	City of Paltaka Platt Drew Wastewater Treatment Plan Reclaim Water Process Treatment Units Standby Auxiliary Electric Generator System (added 9/22/16)	<17	City of Palatka, Public Works Department	All Hazards	7	10	10	10	0	8	3	9	2	10	69	69	5	HMA
16-2	1, 3	In progress	Hoover Road Culvert Hazard Mitigation (added 9/22/16)	<18	Putnam County Public Works Department	Flooding, Storm Surge	6	8	7	8	1	8	5	8	8	6	65	65	$ 90,000.00	HMGP
16-3	1, 3	In progress	West Bannerville Rd and Rice Creek Watershed Mitigation Project (added 9/22/16)	<33	Putnam County Public Works Department	Flooding, Storm Surge	5	7	7	9	0	10	6	8	8	6	66	66	5	HMA
~~16-4~~	~~1, 3~~	~~Pending~~	~~Tierra Woods Flooding Storm water Retention and Drainage Improvements Project~~	~~<36~~	~~City of Palatka, Public Works Department~~	~~Flooding~~	~~0~~	~~0~~	~~0~~	~~10~~	~~10~~	~~8~~	~~1~~	~~10~~	~~6~~	~~9~~	~~54~~	~~54~~	~~5~~	~~HMA~~
		Project 21-6	Resubmitted																	
17-1	1, 3	Pending	Putnam County, Wastewater Treatment Plant Replacement Project	>36	Putnam County, Public Works Department	Flooding	5	8	9	2	9	5	4	5	5	5	62	62	5	HMA
17-2	1, 3	Pending	Paradise Point Retention Pond Project	>36	City of Palatka, Public Works Department	Flooding	6	7	8	7	10	7	5	7	5	6	73	73	$ 500,000.00	HMGP

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17-3	1, 3	Pending	Camp Generator & Pole Barn Project	>36	Putnam County Public Works Department	Flooding, Hurricane	8	9	8	7	10	7	3	7	3	6	75	75	5	HMA
17-4	1, 3	Pending	Dog Branch Creek Drainage Project	>36	Putnam County Public Works Department	Flooding, Hurricane, Storm Surge	5	8	4	1	9	7	3	7	5	5	59	59	5	HMA
17-5	1, 3	In Closeout	City of Palatka Generator for Lift Stations Project	>36	City of Palatka, Public Works Department	Flooding, Hurricane,	8	9	9	9	9	9	1	9	11	8	86	86	5	HMA
17-6	1, 3	Pending	City of Palatka Kay Larkin Fire Department Project	>36	City of Palatka, Fire Department	Hurricane	8	9	9	8	10	9	3	8	6	8	81	81	4	HMA
17-7	1, 3	Pending	City of Palatka Fire Department downtown generator and strage facity and cover for fueling	>36	City of Palatka, Fire Department	Hurricane	9	10	9	8	10	9	2	8	5	8	82	82	2	HMA
18-1	1, 3	In progress	City of Paltaka Palatka historic district lift station upgrades	>12	City of Palatka, Fire Department	Hurricane, Flooding	9	9	10	8	10	10	9	9	8	8	93	93	5	HMA
18-2	1, 3	In progress	Contracting/Procurement Putnam County/City of Palatka St. Johns Ave Drainage System Project	>12	Putanm County Public Works - City of Palatka PW Dept.	Hurricane, Flooding,	10	10	10	3	10	10	10	10	10	10	10	94	5	HMA
20-1	1, 3	In Progress	Putnam County Critical Bridge Mitigation - Bridge # 764045, 764049, 764050 - Orange Springs, Songbird, Palmetto Bluff	>12	Putnam County Public Works Department	Hurricane, Flooding, Storm Surge	8	8	7	0	10	8	5	7	9	5	67	67	$ 200,000.00	HMGP
21-1	1, 2, 3	Pending	City of Palatka Fire Department Bay Door Replacement	<1	City of Palatka, Fire Department	Hurricane, Tornadoes, Wind Impacts	6	10	9	10	7	8	6	10	10	10	86	86	$ 200,000.00	HMGP
21-2	1, 2, 3	Pending	Station 23 Bay Door Retrofit	<1	Putnam County Fire Rescue	Hurricane, Tornadoes, Wind Impacts	6	9	9	10	8	9	8	10	9	9	87	87	$ 64,110.90	HMGP
21-3	1, 2, 3	Pending	Middleton-Burney Shelter Generator	<12	Putnam County Emergency Services	All Hazards	4	6	6	10	7	8	7	9	9	9	75	75	$91,585.99	HMGP
21-4	1, 2, 3	Pending	Government Complex Backup Generator	<12	Putnam County Information Technology	All Hazards	10	10	8	10	7	8	7	9	10	9	88	88	$ 560,598.15	HMGP
21-5	1, 2, 3	Pending	Disaster Recovery Backup Solution	<3	Putnam County Information Technology	All Hazards	10	10	10	10	7	8	7	10	10	10	92	92	$17,506.65	HMGP
21-6	1, 2, 3	Pending	Tierra Woods Stormwater Retention and Drainage Improvements	>12	City of Palatka	Hurricane, Flooding, Storm Surge	6	7	6	10	8	9	10	10	10	9	85	85	$ 400,000.00	HMGP
21-7	1, 2, 3	Pending	Generator Installation at Putnam County Boulevard Lift Station	>12	Putnam County Public Works Department	Hurricane, Flooding, Storm Surge	6	6	10	10	9	10	7	10	10	10	88	88	$ 150,000.00	HMGP
21-8	1, 2, 3	Pending	Town of Welaka Crifical Lift Stations Backup Pumps	<12	Town of Welaka	Hurricane, Flooding, Storm Surge	10	10	10	9	10	10	10	10	10	9	98	98		HMA
		Updated: 11/ 18/ 04, 2/14/05, 3/10/05, 8/18/05, 11/17/05, 3/16/06, 6/15/06, 01/11/07, 03/14/07, 05/30/07, 08/27/07, 10/19/07,		Updated: 11/ 18/ 04, 2/14/05, 3/10/05, 8/18/05, 11/17/05, 3/16/06, 6/15/06, 01/11/07, 03/14/07, 05/30/07, 08/27/07, 10/19/07,																
		12/13/07, 03/06/08, 06/19/08, 09/11/08, 06/01/09, 7/29/09, 10/27/09, 3/3/10, 6/10/10, 6/9/11, 12/8/11, 3/8/12, 9/6/12, 9/22/16, 12/3/16, 12/21/17, 3/29/18, 6/28/18, 9/10/20, 9/23/21, 10/1/21, 10/19/21, 11/16/21, 11/18/21, 11/19/21,																		
		11/29/21, 12/02/21, 12/10/21, 12/13/21, 12/14/21, 12/15/21																		