



Floodplain Stewardship: Improved Water Quality and Reduced Flood Risk

FSA Winter Conference
December 5, 2024

FOR THE

#GATORGOOD

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Center for Land Use Efficiency (CLUE) - UF|IFAS

A Caveat:

This presentation is neither intended to be, nor may it be taken as legal advice. For legal advice, consult with an attorney licensed to practice in your jurisdiction and demonstrating expertise in applicable subject matter.

Statements of fact and opinions expressed are those of the presenter and are not necessarily the opinions or positions of the Association of State Floodplain Managers, the Florida Floodplain Managers Association, or the University of Florida.

The Problem:

Florida has a dearth of Floodplain Professionals

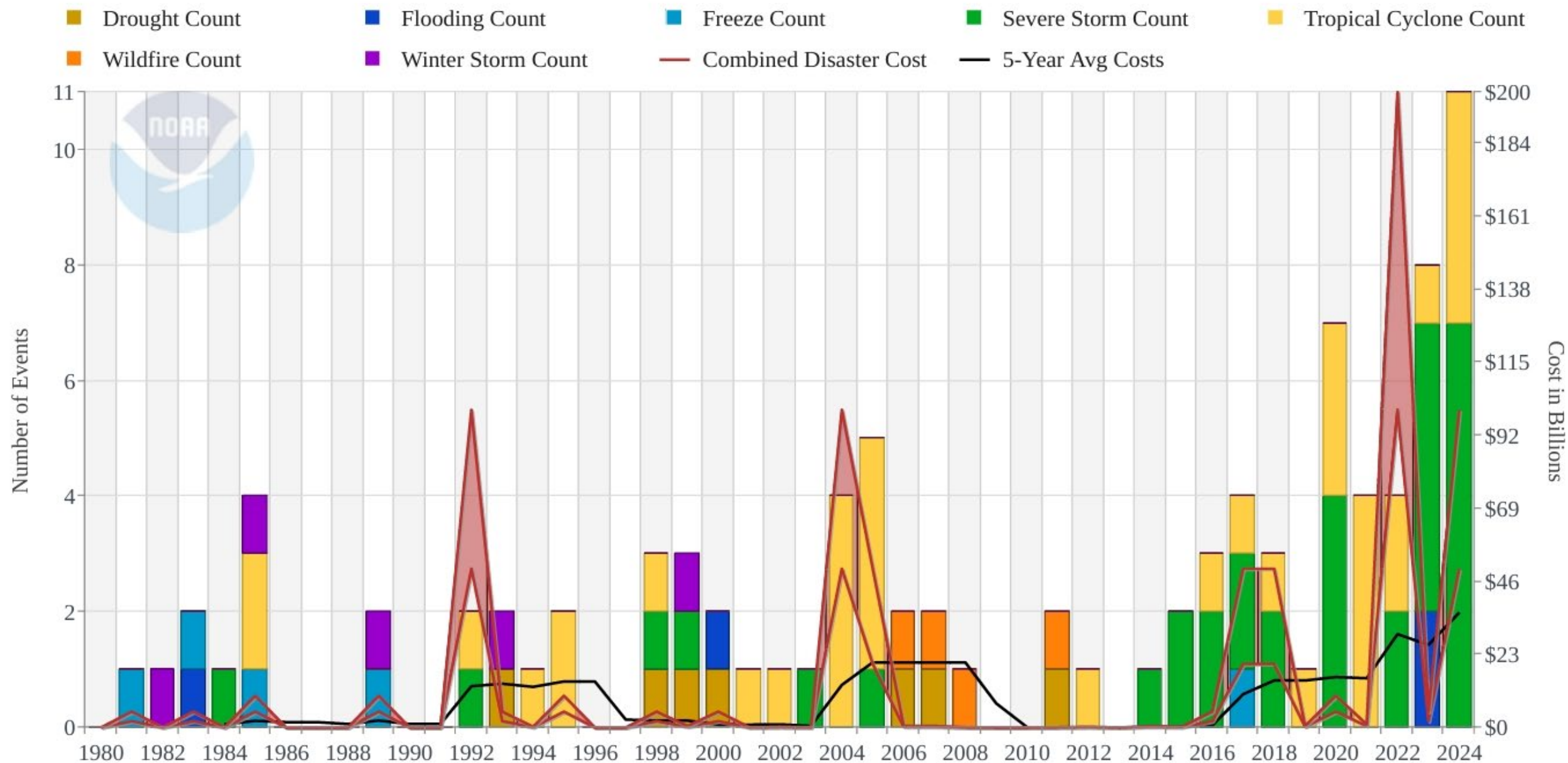
- **Floodplain Administrators (FPAs)**
 - National Flood Insurance Program (NFIP)
- **Building Code Administrators (FL licensed)**
 - Florida Building Code
- **Certified Floodplain Managers® (CFMs)**
 - Association of State Floodplain Managers (ASFPM)
 - **CFM® Exam**
 - Florida Floodplain Managers Association (FFMA)

The Problem:

From 1980-2024, there were

- 94 confirmed climate and weather disaster events with losses **exceeding \$1 billion each** to affect Florida. These events included
 - 7 drought events,
 - 4 flooding events,
 - 5 freeze events,
 - 33 severe storm events,
 - 36 tropical cyclone events,
 - 4 wildfire events, and
 - 5 winter storm events.
- The **1980–2024 annual average is 2.1 events (CPI-adjusted)**; the annual average for the **most recent 5 years (2020–2024) is 6.8 events (CPI-adjusted)**.

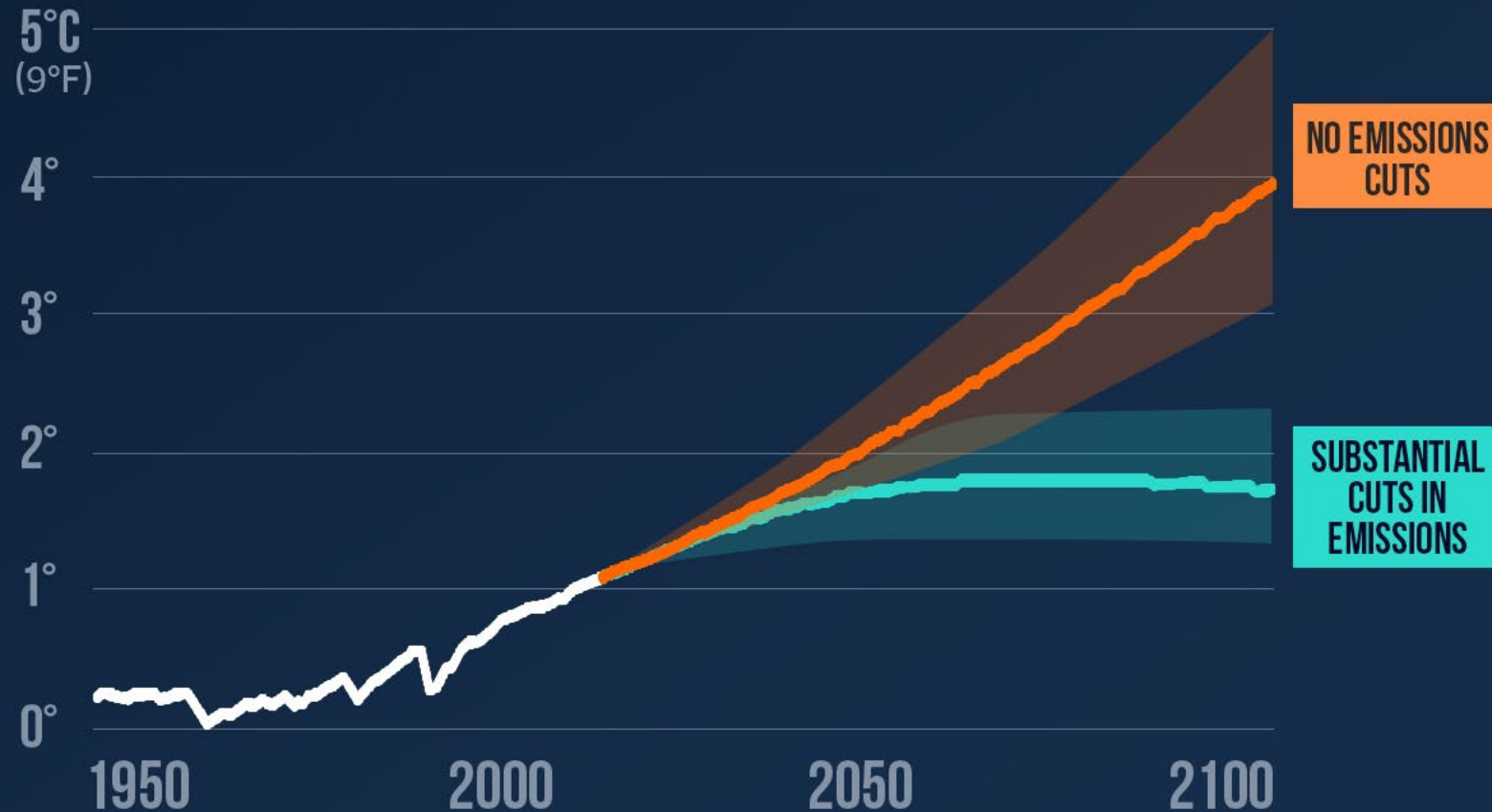
Florida Billion-Dollar Disaster Events 1980-2024 (CPI-Adjusted)



Updated: January 10, 2025

FUTURE TEMPERATURES

WARMING DEPENDS ON CHOICES TODAY



Global surface temperature (°C) anomaly relative to 1850-1900
High warming scenario: SSP3-7, Low warming scenario from SSP1-2.6.
Source: IPCC AR6 WG1



ASSOCIATION OF STATE FLOODPLAIN MANAGERS



What is a Floodplain Manager?

A floodplain manager is a person responsible for administering and implementing federal and state laws as well as local ordinances relating to the management of flood-prone areas.

What is a Certified Floodplain Manager (CFM®)?

The Association of State Floodplain Managers has established a national program for professional certification of floodplain managers. The program recognizes continuing education and professional development that enhance the knowledge and performance of local, state, federal and private-sector floodplain managers.

Who Administers the CFM Program?

ASFPM administers the national program for professional certification of floodplain managers and is governed by the Certification Board of Regents. Nationwide, the program was established in 1999 and today there are over 11,000 active CFMs!



CFMs Make a Difference!

- CFMs reduce community liability
- CFMs promote safer development
- CFMs know how to reduce flood insurance premiums and property damage
- CFMs help improve water quality
- CFMs advise wise land-use
- CFMs are trusted local advisors
- CFMs abide by a Code of Ethics



Association of State Floodplain Managers



What is a Floodplain Manager?

A floodplain manager is responsible for *administering and implementing federal, state, and local regulations* as well as enforcing local ordinances relating to the management of flood-prone areas.

What is a Certified Floodplain Manager (CFM®) ?

The Association of State Floodplain Managers (ASFPM) established a National Program for the professional certification of floodplain managers. This program emphasizes continuing education and professional development to improve the knowledge and performance of local, state, federal, and private sector floodplain managers.

Who Administers the Program?

ASFPM administers the National CFM Program which is governed by the Certification Board of Regents (CBOR). The program was established in 1999 with nearly 11,000 active CFMs worldwide!



Make A Difference In Your Community

- Reduce community liability*
- Promote safer development*
- Help reduce flood insurance costs*
- Promote water quality improvement*
- Advise wise land-use*
- Become a trusted local advisor*
- Abide by a Code of Ethics*
- Make communities safer*

LIKE, SUBSCRIBE, FOLLOW
floods.org or [asfpm](https://asfpm.org)



LEARN MORE
no.floods.org/CFM



How to Become A Certified Floodplain Manager

*By the Association of State
Floodplain Managers*



Why Should I

Become A CFM?

- Professional Credibility
- Improve Job Performance
- Career Advancement
- Expanded Professional Network
- Continued Education Opportunities
- Build Safer Communities

THE GOAL OF THE PROGRAM

Improve the *knowledge and abilities of floodplain managers* which helps *reduce the nation's flood losses* and protect and enhance the natural resources and functions of its floodplains.



Steps On How To Become A CFM

- 1 Prepare yourself, take the course, & study
- 2 Register to take the exam anytime, anywhere
- 3 Take and pass the exam, becoming a CFM!

FREE CFM STUDY COURSE

pathlms.com/asfpm/courses/39173



No Adverse Impact (NAI)

No Adverse Impact (NAI) is an approach that ensures that the action of any community or property owner—public or private—**does not adversely impact the rights of others.**



Floodplain Stewardship

Caring for and protecting the **beneficial biologic and hydrologic functions of areas where the risk of flooding is expected**, while managing human uses to minimize the potential for adverse impacts and flood damages.



WHY NAI?



Even if we perfectly implement current federal floodplain management standards, damages will increase.

Current approaches deal primarily with how to **build** in the floodplain rather than how to **minimize future risks and damages**.



WHY NAI?

NFIP Limitations:

Few Restricted Areas

Seaward of mean high tide

Floodways

No requirement to protect natural functions of floodplains

No limits on siting of critical facilities

Fill in floodplain is allowed and facilitated



Today's Floodplain Is Not Necessarily Tomorrow's Floodplain



Flood water spreads out and slows down on undeveloped floodplain.

Today's Floodplain Is Not Necessarily Tomorrow's Floodplain

Large areas of the
floodplain are filled
and developed.

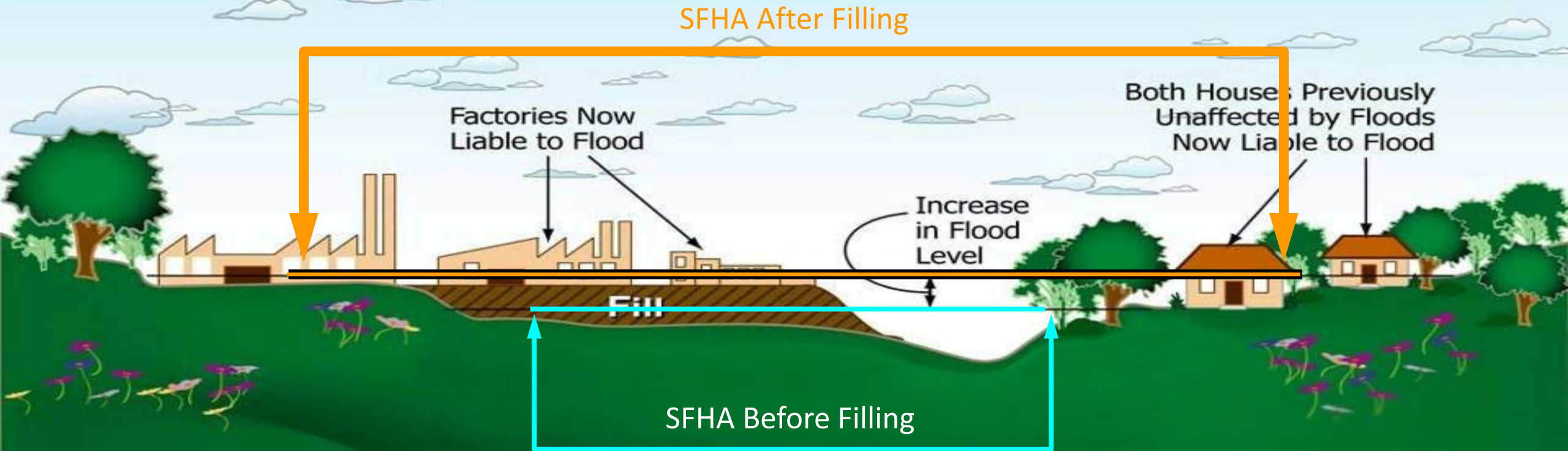


Fill

The diagram shows a cross-section of a landscape. On the left, there is a green hill with a large tree and some purple flowers. In the center, there is a brown, hatched area representing a floodplain. Two brown arrows point upwards from the green area on either side of the floodplain towards the hatched area, indicating the process of filling. The word 'Fill' is written in the center of the diagram.

If you allow fill in the floodplain,
you change the dynamics of the floodplain.

Today's Floodplain Is Not Necessarily Tomorrow's Floodplain



If floodplains are filled, there is an increase in the land area needed to store and convey flood waters.
This means your home or business may be impacted.

WHAT IS NAI?



- **NAI does not mean NO development!**
- **NAI means that adverse impacts are identified and mitigated.**

What is NAI?



The true strength of the No Adverse Impact approach is that it encourages local decision making to ensure that future development **impacts will be identified, considered on a watershed-wide basis, and mitigated.**



It is a comprehensive approach to managing the floodplain to reduce flood losses and costs.

How to Implement NAI

- Identify ALL the impacts of a proposed development or program
 - Drainage, storage
 - Sediment, erosion
 - Access
 - Flood Safety
- Determine which properties or community members will be impacted
- Devise and implement a strategy for mitigating anticipated adverse impacts



How to Implement NAI

- **NAI is a principle** - not a specific set of standards
- The NAI concept can be incorporated into all community activities
- NAI Toolkit and How-To Guides present ideas for integrating NAI into local programs to provide a higher level of flood protection

Each NAI program is unique – It is tailored to the community's specific situation

Community Activities in which to Incorporate NAI approach:

- Hazard Identification (Mapping)
- Planning
- Regulations & Standards
- Mitigation
- Infrastructure
- Emergency Services
- Education & Outreach



NAI Summary

- Every real property has some element of flood risk
- NAI is a principle that leads to a flood risk reduction process
- How-To Guides* for Local Communities are great resources!



*NAI How-to Guides, the NAI Toolkit and other resources are at www.floods.org – click on the NAI page





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No Adverse
Impact Legal
Guide
Common Terminology
About the NAI Legal Guide

Home > Products > No Adverse Impact Legal Guide

No Adverse Impact Legal Guide

The **No Adverse Impact Legal Guide for Flood Risk Management** (a.k.a., the **NAI Legal Guide**) provides legal resources to inform the decisions of community representatives and municipal attorneys who design, implement, and defend NAI programs. It includes:

- Detailed resources for legal professionals, and
- Legal essentials for floodplain managers and community officials.

This Guide supplements other NAI documents that present tools and guidance for integrating NAI principles into local regulations, policies, and programs. It will help readers to understand, anticipate, and manage legal issues that may arise when a community implements activities that enhance flood resilience, especially when those activities exceed state and federal requirements for floodplain management.



The No Adverse Impact Legal Guide for Flood Risk Management is found at <https://no.floods.org/NAI-Legal>

no.floods.org/LegalGuide

Use this link to view/download the entire *NAI Legal Guide*:

No Adverse Impact Legal Guide for
Flood Risk Management

This Guide is divided into five sections that can be viewed/downloaded individually using the links below.

- Section I – Introduction to No Adverse Impact**
 - I.A. Local Implementation of NAI
 - I.B. A Legal Foundation for NAI
 - I.C. The National Flood Insurance Program (NFIP)
 - I.D. Limitations of Minimum NFIP Standards
 - I.E. The NAI Approach
- Section II – Introduction to Legal Concepts for No Adverse Impact**
 - II.A. Lawsuits
 - II.B. Venue – state courts, federal district courts, and federal court of claims
 - II.C. Property
 - II.D. Sovereign Submerged Land
 - II.E. Land Use Limitations
- Section III – Torts**
 - III.A. Negligence
 - III.B. Trespass to Land
 - III.C. Nuisance
 - III.D. Governmental and Sovereign Immunity from Liability
- Section IV – The Constitution and Its Protection of Property Rights**
 - IV.A. Fourteenth Amendment
 - IV.B. Fifth Amendment
 - IV.C. Summary of Takings
- Section V – Federal Laws**
 - V.A. Generally
 - V.B. Executive Orders: Floodplain Stewardship



Please Hold Questions for the End

CENTER FOR LAND USE EFFICIENCY

UF | IFAS Research
UNIVERSITY of FLORIDA



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SHENEMAN THE STAR-LEDGER



THE THREE LITTLE PIGS: CLIMATE CHANGE EDITION



Floodplain Stewardship: Improved Water Quality and Reduced Flood Risk

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Eban Z. Bean, PhD, PE

Asst. Professor & Ext. Specialist

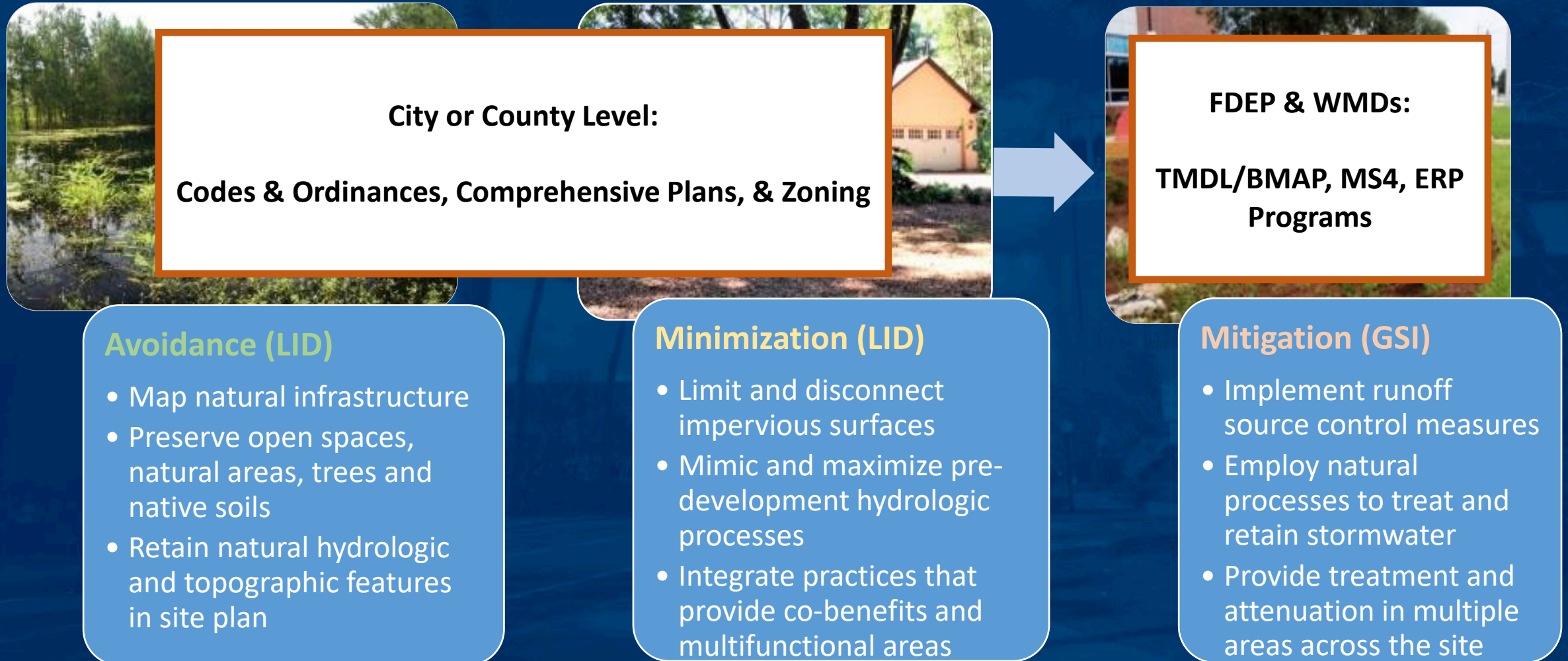
Urban Water Resources Engineering

Agricultural & Biological Engineering, UF|IFAS

A blue-tinted photograph of a city street scene. In the foreground, there are palm trees and a sidewalk. In the background, a building with a clock tower is visible. The overall scene is urban and tropical.

Updating Codes to Achieve Stormwater Management Goals

LID vs. GSI: Development Process



Conservation Requirements

Traditional Site Development



LID Site Development





Curb & Gutter Requirements

- Directly Connected Impervious Area
- Indirectly Prohibits Swales

Minimum Parking Requirements

- Commercial and residential codes
- Directly/indirectly increases impervious parking areas
- Seldomly used spaces
- Pervious parking



VERSION: MAY 11, 2022 (CURRENT) ▼

CODE OF ORDINANCES CITY OF
GAINESVILLE, FLORIDASUPPLEMENT HISTORY TABLE **modified**

> PART I - CHARTER LAWS

> Chapter 1 - GENERAL PROVISIONS

> Chapter 2 - ADMINISTRATION

> Chapter 3 - ECONOMIC DEVELOPMENT

> Chapter 4 - ALCOHOLIC BEVERAGES

> Chapter 5 - ANIMAL CONTROL

> Chapter 5.5 - ART IN PUBLIC PLACES

> Chapter 6 - BUILDING

Code of Ordinances

Supplement 56 Update 2

Online content updated on May 11, 2022

CODE OF ORDINANCES City of GAINESVILLE, FLORIDA Codified through Ordinance No. 210666, adopted January 20, 2022 and Ordinance No. 200744, adopted February 17, 2022. (Supp. No. 56, Update 2)

[VIEW WHAT'S CHANGED](#)*This Code of Ordinances and/or any other documents that appear on this site may not reflect the most current legislation adopted by the Municipality.*

Adopted Ordinances Not Yet Codified

The listing below includes all legislation received by Municipal Code since the last update (printed or electronic) to the Code of Ordinances. This legislation has been enacted, but has not yet been codified.

Ordinance No. 210163

Adopted 5/5/22

AN ORDINANCE OF THE CITY OF GAINESVILLE, FLORIDA, AMENDING SECTION 9-1.1 ELECTION DISTRICTS OF
THE CITY OF GAINESVILLE INTO FOUR BATABLY OR FORM

Code Audit

- Coordinated & objective review of codes to identify unintended, unnecessary, or no longer necessary restrictions or prohibitions
- Identify weak areas of code that can be addressed currently or when opportunity arises
- www.municode.com

Code Audit Process: Conducting Audit

Adapt the CAST

- *Full audit, section of audit, or individual topics*
- *Gather applicable codes and ordinances*

Perform the Code Audit

- *Work through questions, finding & referencing code locations*
- *Record comments and score questions*
- *Seek input from liaisons*

Summarize Results

- *Calculate and compare scores by category or topic*
- *Identify relative strengths & weaknesses of sections*
- *Report findings*

Code Audit Spreadsheet Tool (CAST)

Enabling Low Impact Development and Green Stormwater Infrastructure

A CODE AUDIT TOOL FOR FLORIDA COUNTIES AND MUNICIPALITIES

Points	Criteria	Example Code Requirement
4	Required	The practices are specifically required by the code for appropriate situations.
3.5	Incentivized	The practice is incentivized, either monetarily or through accelerated review or other benefits, but not required and no penalties if the practice is not used.
3	Encouraged	The practice is encouraged in the code, but no incentives are available.
2	Allowed	The practice is allowed in the code, but no incentives are available.
1	Not Mentioned	The practice is not mentioned in the code.
0	Prohibited	The practice is restricted or prohibited in the code.

Administrative

- About
- Definitions
- Codes Review Log
- Contact Information
- Scoring Instructions
- Score Summary

Local Government Planning and Policy

- Comprehensive Plan
- Zoning

Protecting Nature

- Natural Resources Protection and Management
- Coastal Areas
- Trees
- Sensitive Groundwater Areas

Stormwater and Water Quality

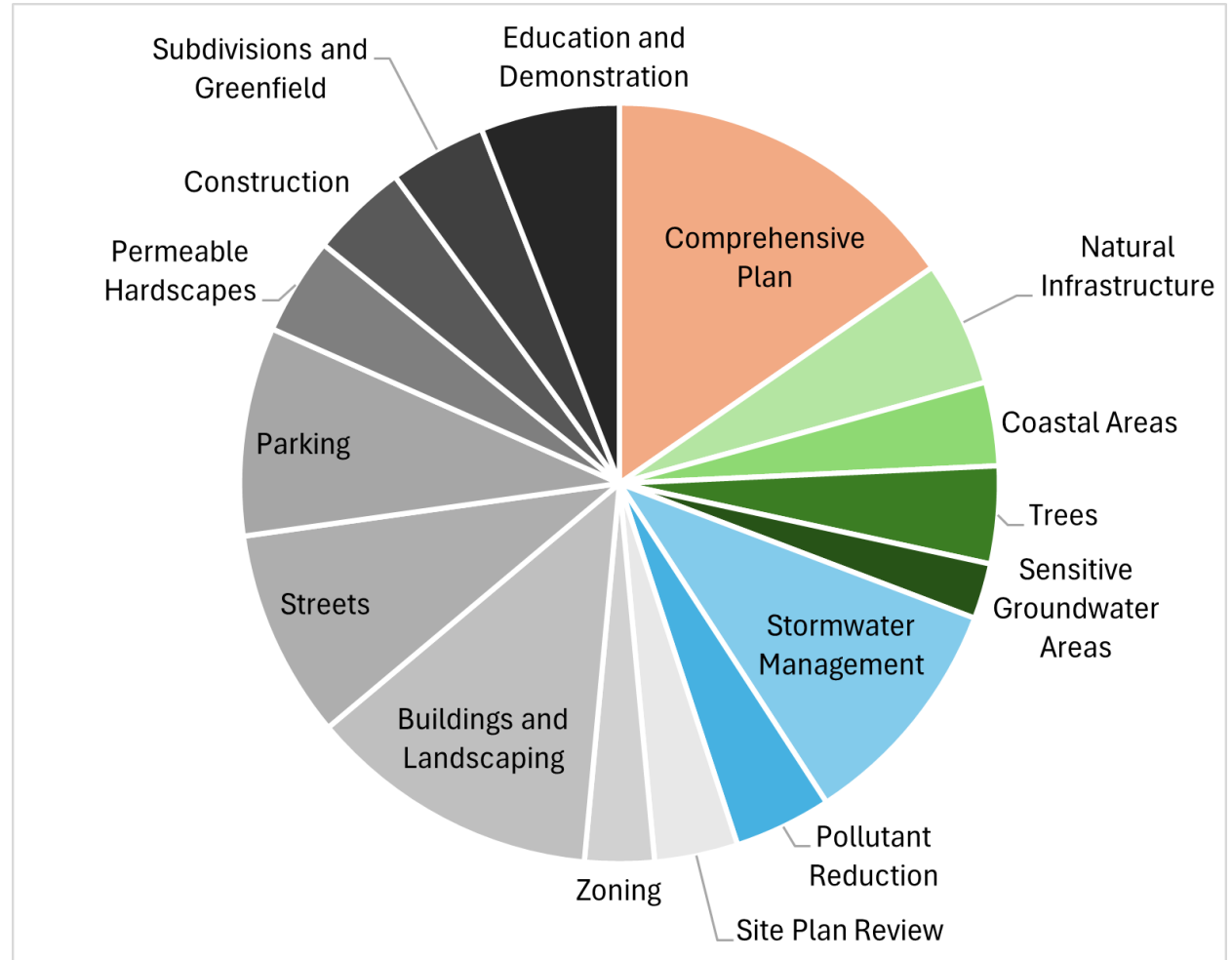
- Stormwater Management
- Pollutant Reduction

The Built Environment

- Site Plan Review
- Buildings & Landscape
- Streets
- Parking
- Permeable
- Construction
- Subdivisions & Greenfield
- Education and Demonstration

CAST Introduction

- Code Audit Spreadsheet Tool (CAST)
- Overall sections:
 - **Comprehensive Plan**
 - **Protecting Nature**
 - **Stormwater and Water Quality**
 - **The Built Environment**



Code Audit: Scoring Examples

C3. Does code encourage infill and compact development to minimize urban sprawl and minimize land consumption?

Tips	Code References	Notes, Ideas and Strategies	Score
<p>Purpose: Encourage LID+GSI</p> <p>Infill development adds growth to areas already served by city infrastructure rather than "greenfield" perimeter growth. Compact development can achieve the same or higher levels of economic and social activity with less land consumption. However, it is important to incorporate vegetated undeveloped areas in the overall plan and not allow infill to increase the site's overall imperviousness. The ultimate goal is to retain undeveloped land in its natural state.</p>	<p>Chapter 407 general development standards and Chapter 403 zoning districts</p> <p>ULDC 400.02(12)-(13): Allows for Clustering and flexible design options; bonuses for clustering where consistent with the Comp Plan</p> <p>ADD TDR Code Reference</p> <p>Sec 406.03 "Applicants are encouraged to use conservation design techniques such as clustering and density transfer to produce marketable projects while protecting natural and historic resources." (c) Eligibility for cluster bonus. A parcel may be eligible to receive cluster bonus units for rural/agriculture clustered subdivisions under Table 407.78.2 where there are areas determined through ground-truthing to be non-conservation areas that are suitable for development to which density may be transferred, and protection of regulated natural and historic resources is provided in accordance with an approved management plan that identifies measures taken to conserve, maintain, and enhance ecological integrity and resource value while avoiding or minimizing adverse impact.</p>	<p>Yes through certain zoning districts, subdivision regulations, Traditional neighborhood and Transit Oriented development and other means</p>	4

M7. Is shared parking allowed for multiple businesses or sites with different peak usage times?

Tips	Code References	Notes, Ideas and Strategies	Score
<p>Purpose: Reduce number of onsite parking spaces</p> <p>Facilities in close proximity to each other with different peak usage times, e.g., stores, restaurants, churches, and recreation areas, are good candidates to share parking. Physical access may be needed at multiple locations, and a legal agreement is necessary. Maintenance responsibilities must be addressed.</p>	<p>Sec. 407.18. - Parking reductions or increases.</p> <p>Article 40 chapter 407 Sec. 407.68. - Transit supportive area design standards. (2)Parking spaces may be pooled and utilized anywhere within the development.</p>	<p>Code does not specifically address "Peak usage times" but it does consider shared parking as a means of sufficient documentation for a decrease in off street parking spaces</p> <p>Consider providing guidance for the documentation including this approach.</p>	2

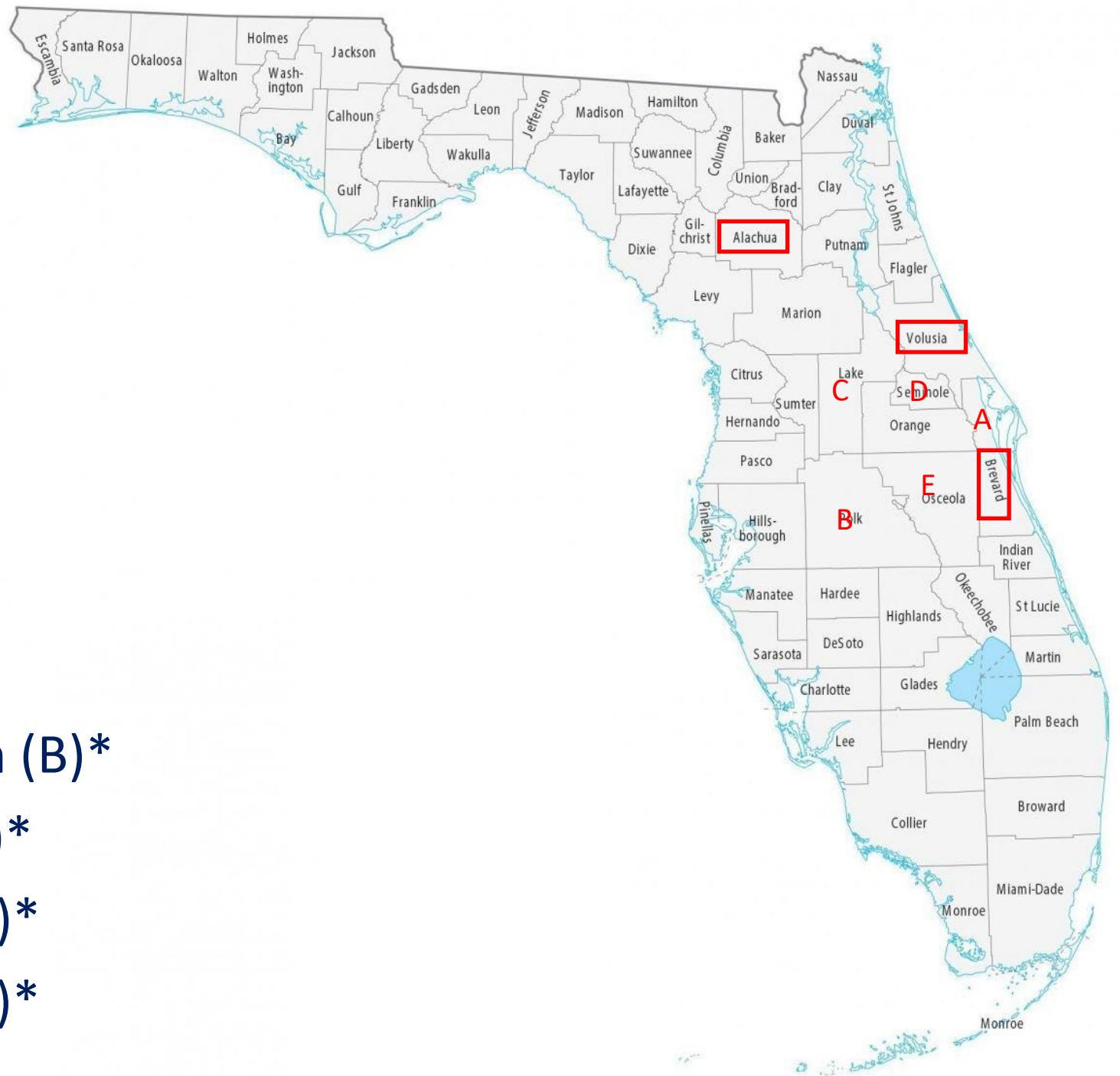
Code Audit: Summarization

Section Topic	Section	Total Points	Potential Points	Percentage of points credited	
				Section	Topic
Local Government Planning and Policy	Comprehensive Plan	0	104	0%	
Local Government Planning and Policy	Zoning	0	20	0%	
	Average for Local Government Planning and Policy	0	124		0%
Protecting Nature	Natural Resources Protection Management	0	36	0%	
Protecting Nature	Coastal Areas	0	24	0%	
Protecting Nature	Trees	0	28	0%	
Protecting Nature	Sensitive Groundwater	0	16	0%	
	Average for Protecting Nature	0	104		0%
Stormwater and Water Quality	Stormwater Management	0	68	0%	
Stormwater and Water Quality	Pollutant Reduction	0	28	0%	
	Average for Stormwater and Water Quality	0	96		0%
The Built Environment	Site Plan Review	0	24	0%	
The Built Environment	Building & Landscape	0	84	0%	
The Built Environment	Streets	0	60	0%	
The Built Environment	Parking	0	60	0%	
The Built Environment	Permeable Hardscape	0	28	0%	
The Built Environment	Construction	0	28	0%	
The Built Environment	Subdivisions & Greenfield	0	28	0%	
The Built Environment	Education & Demonstration	0	40	0%	
	Average for The Built Environment	0	284		0%
Average for full audit		0	608		0%

Code Audits

Counties: Alachua
Brevard*
Volusia

Cities: Cocoa (A)
Winter Haven (B)*
Groveland (C)*
Longwood (D)*
Kissimmee (E)*





Copilot

Your everyday AI companion

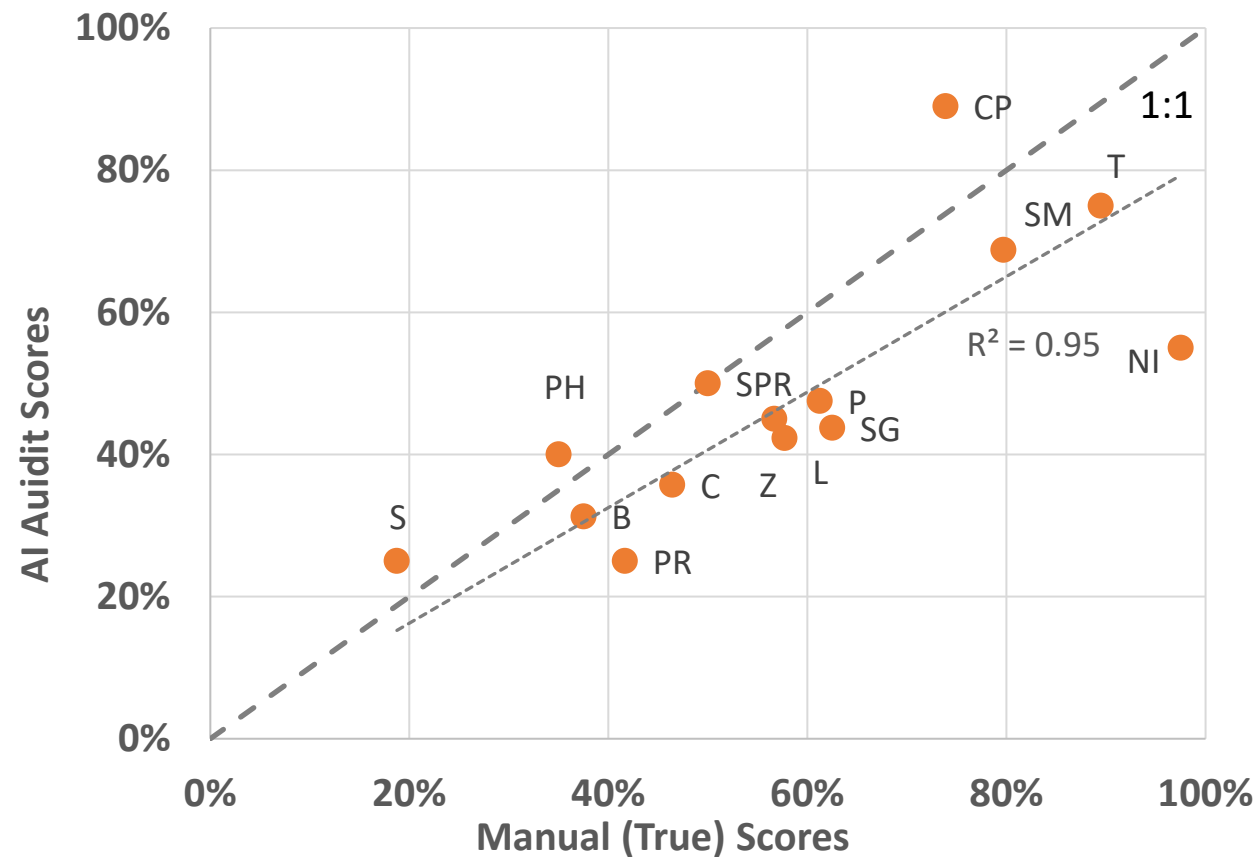
ClaudeAI

Gemini

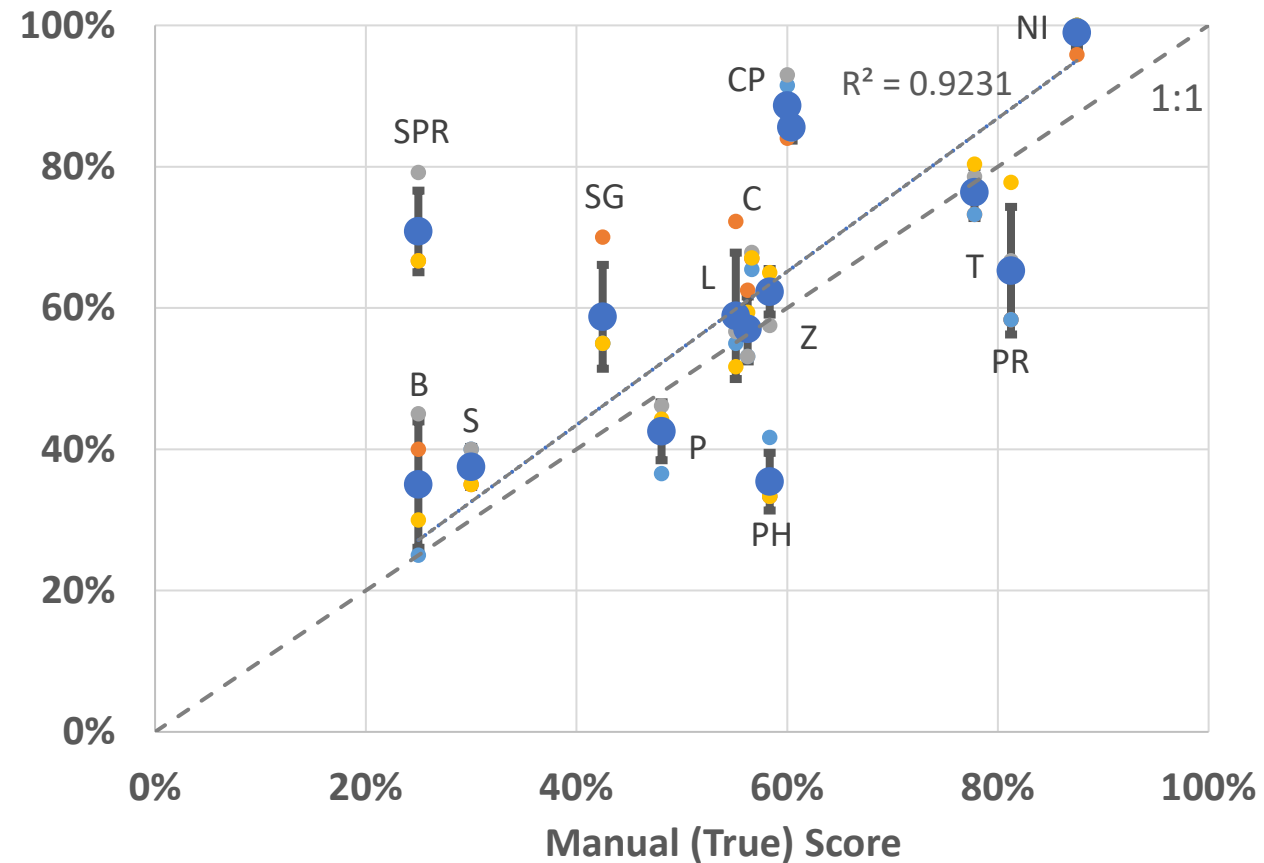


ChatGPT

Performance of AI Audits: Preliminary Results



Winter Haven Code Audit



Longwood Code Audit; Error bars: 95% C.I.; $n = 4$

[GSI BASICS](#) ▾[RESOURCES](#) ▾[COMMUNITY ENGAGEMENT](#)[SUCCESS STORIES](#)[FUNDING](#)[CONTACT](#)[Technical Resources](#) [Regional GI/LID Manuals](#)[Community Engagement Resources](#)[U.S. Environmental Protection Agency \(EPA\) Resources](#)

A FLORIDA DEP INITIATIVE

Green Stormwater Infrastructure

Preserving local water quality through smart stormwater management.

Planning & Design

[LID+GSI Code Audit Tool](#)

Type: Audit Tool

Summary: The code audit tool is intended to identify codes that directly and indirectly restrict or prohibit the use of LID or GSI. A local government can apply the tool themselves or have an outside entity perform the audit.

Source: Dr. Eban Bean (University of Florida)

<https://gsi.floridadep.gov/>

Click the links below to download the Manual and Code Audit Spreadsheet Tool (CAST).

[Enabling LID & GSI: A Code Audit Tool for Florida Counties and Municipalities \(Manual - PDF Format\)](#)

The document provides background on what LID+GSI is, provides a process for auditing local codes, includes a community scoping exercise, and provides an overview of the Code Audit Spreadsheet Tool.

[Community Scoping Exercise - PDF Format](#) (also included in Appendix A of the Manual linked above)

The Community Scoping Exercise is a precursor to the Code Audit. It is designed to help users consider the natural assets of the community, appreciate the importance of these assets, recognize any existing LID and GSI within the community, and help guide the focus of the Code Audit Spreadsheet Tool.

[Code Audit Spreadsheet Tool CAST - Excel Format](#)
[Code Audit Survey Tool CAST - Qualtrics Format](#)

The Code Audit Spreadsheet Tool or CAST is a spreadsheet tool with questions on specific topics for conducting an audit of a local government's codes. It is intended to evaluate which sections of code and identify those that can be improved.



Questions?

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SUSTAINABLE HUMAN AND
ECOLOGICAL DEVELOPMENT

