

# Planning for Sea Level Rise Legal Issues Facing Florida

## Audio Options

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- We work to save special places and build better communities.
- We educate, advocate and negotiate to protect Florida's high quality of life.
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Constantine honored for his "leadership on critical conservation and water resource protection in Florida." [Read More >](#)

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**Planning for Sea Level Rise in Broward County Webinar on October 8**

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**Scale Back Minto West**

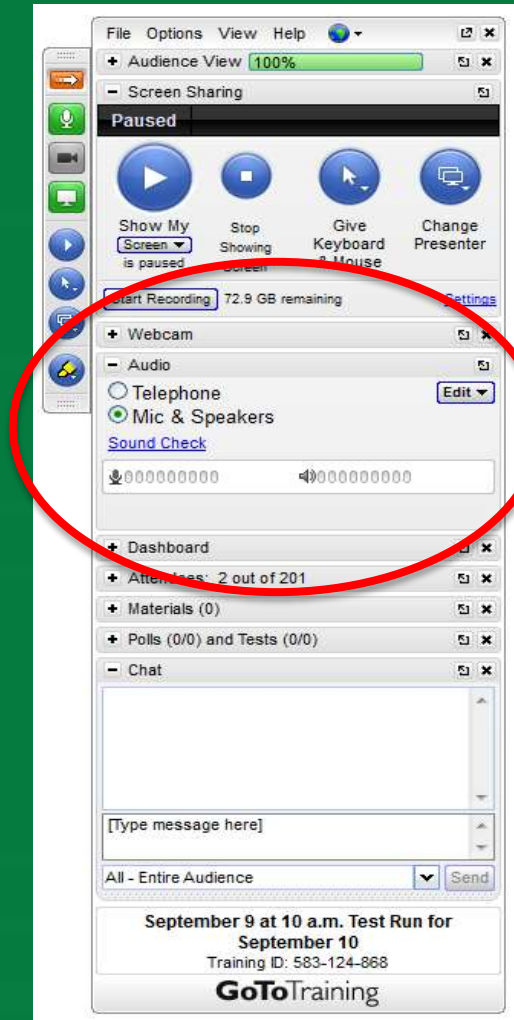
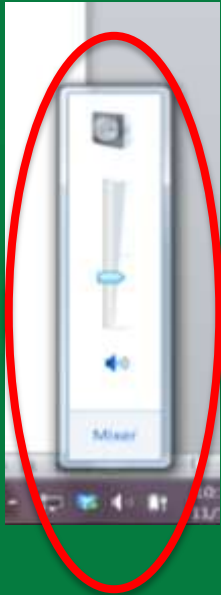
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**Survey on Climate Change/Sea Level Rise**

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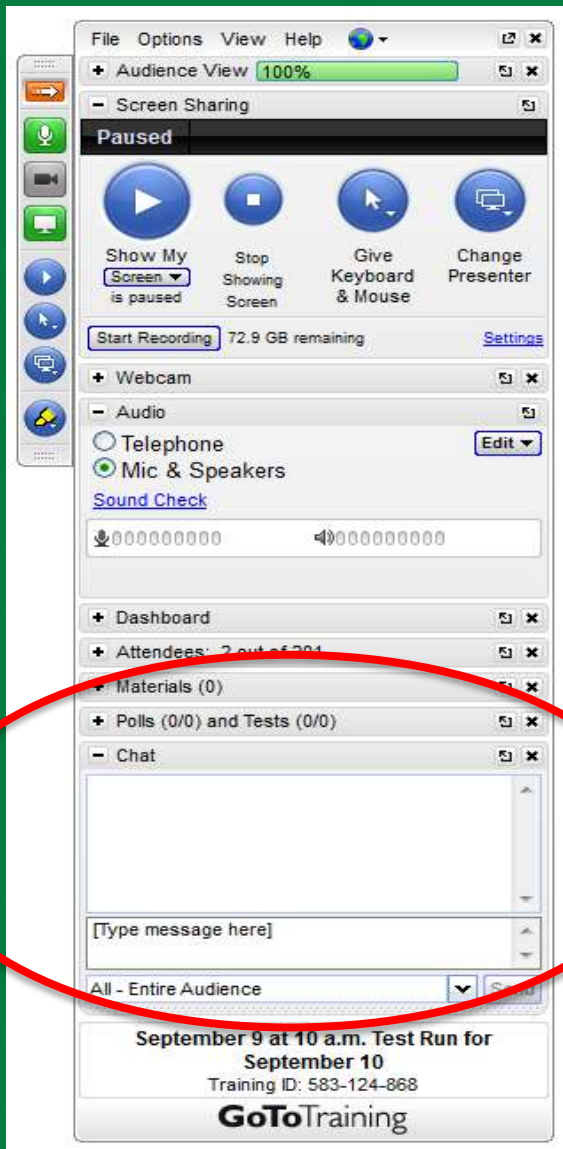
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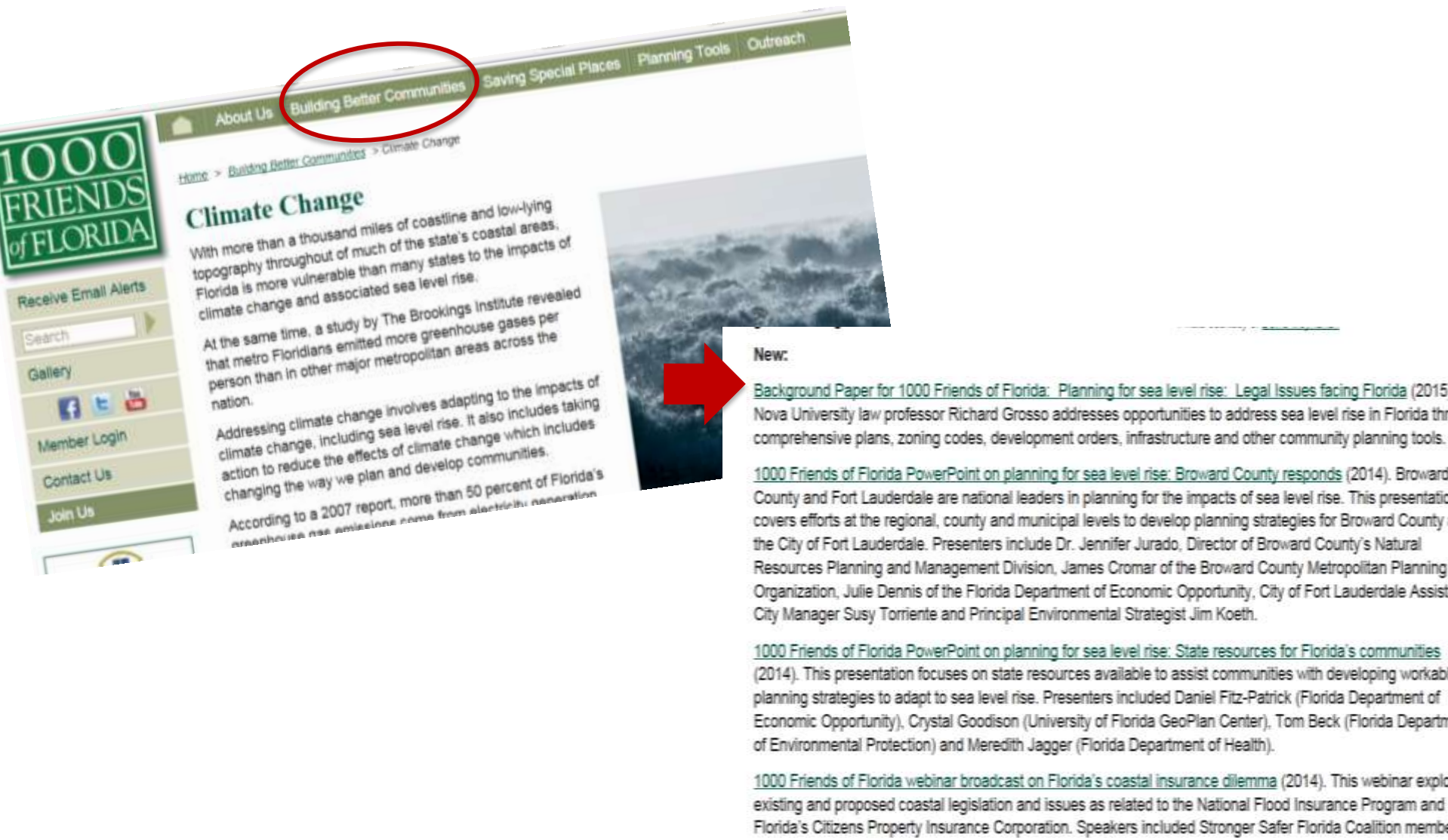
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# For more on climate change and sea level rise in Florida visit:

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## Climate Change

With more than a thousand miles of coastline and low-lying topography throughout of much of the state's coastal areas, Florida is more vulnerable than many states to the impacts of climate change and associated sea level rise.

At the same time, a study by The Brookings Institute revealed that metro Floridians emitted more greenhouse gases per person than in other major metropolitan areas across the nation.

Addressing climate change involves adapting to the impacts of climate change, including sea level rise. It also includes taking action to reduce the effects of climate change which includes changing the way we plan and develop communities.

According to a 2007 report, more than 50 percent of Florida's greenhouse gas emissions come from electricity generation

New:

- [Background Paper for 1000 Friends of Florida: Planning for sea level rise: Legal Issues facing Florida](#) (2015). Nova University law professor Richard Grosso addresses opportunities to address sea level rise in Florida through comprehensive plans, zoning codes, development orders, infrastructure and other community planning tools.
- [1000 Friends of Florida PowerPoint on planning for sea level rise: Broward County responds](#) (2014). Broward County and Fort Lauderdale are national leaders in planning for the impacts of sea level rise. This presentation covers efforts at the regional, county and municipal levels to develop planning strategies for Broward County and the City of Fort Lauderdale. Presenters include Dr. Jennifer Jurado, Director of Broward County's Natural Resources Planning and Management Division, James Cromar of the Broward County Metropolitan Planning Organization, Julie Dennis of the Florida Department of Economic Opportunity, City of Fort Lauderdale Assistant City Manager Susy Torriente and Principal Environmental Strategist Jim Koeth.
- [1000 Friends of Florida PowerPoint on planning for sea level rise: State resources for Florida's communities](#) (2014). This presentation focuses on state resources available to assist communities with developing workable planning strategies to adapt to sea level rise. Presenters included Daniel Fitz-Patrick (Florida Department of Economic Opportunity), Crystal Goodison (University of Florida GeoPlan Center), Tom Beck (Florida Department of Environmental Protection) and Meredith Jagger (Florida Department of Health).
- [1000 Friends of Florida webinar broadcast on Florida's coastal insurance dilemma](#) (2014). This webinar explored existing and proposed coastal legislation and issues as related to the National Flood Insurance Program and Florida's Citizens Property Insurance Corporation. Speakers included Stronger Safer Florida Coalition members

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# Presenters

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# Richard Grosso



- Director of the Environmental and Land Use Clinic and Professor of Law at Nova Southeastern University
- Teaches land use, environmental and Florida Constitutional law
- 28 years of experience litigating and advocating on statewide and south Florida environmental issues
- Former Executive Director and General Counsel of the Everglades Law Center
- Former Legal Director for 1000 Friends of Florida
- Former Attorney for the Florida Departments of Community Affairs and Environmental Regulation



# Thomas Ruppert



- Coastal Planning Specialist with Florida Sea Grant
- Licensed Florida attorney who provides assistance to agents and local governments served by Florida Sea Grant
- Area of expertise includes beach and coastal policy in Florida
- Focuses on hazard mitigation, post-disaster recovery planning, environmental protection, marine coastal planning, and other coastal issues and environmental issues



## Erin Deady, PA



- A licensed attorney in Florida, a certified land planner and LEED AP
- President of Erin L. Deady, PA, a full service legal and consulting SBA federally-certified woman-owned firm
- Practice focuses on public sector government regulation as well as private sector and agricultural clients
- Authored and/or co-authored eight sustainability or climate plans for local governments in Florida
- Frequent lecturer and author



Richard Grosso, Director, Environmental and Land Use Law Clinic  
& Professor of Law, Nova Southeastern University

# **Planning for Sea Level Rise: Legal Issues Facing Florida**

**1000 Friends of Florida Webinar Jan. 15, 2015**

**Richard Grosso, Esq.**

**Professor**

**Director, Environmental and Land Use Law Clinic**

**Shepard Broad Law Center  
Nova Southeastern University**

**“Zoning is the most powerful tool that local governments have to preemptively mitigate hazards.”**

- **The most effective strategies are about where and how we build buildings and infrastructure.**
- **A successful response to sea level rise cannot be achieved without, effective land use planning and zoning.**
- **Avoiding hazards is the best way to deal with them.**
- **Allowing / building development and infrastructure in vulnerable areas, and encouraging investment there leads to loss of coastal and floodplain resources, precludes landward migration of beach and floodplain ecosystems and commits unsustainable amounts of public resources to protection efforts.**

## **Key Ch. 163 Provisions: Data – Analysis & Planning Timeframe**

- Plans to be “based upon relevant and appropriate data” and “analysis” taken from “professionally accepted” sources. §163.3177(1) (f), Fla. Stat.
- To be “based on” data means to “react to it in an appropriate way and to the extent necessary indicated by the data available on that particular subject at the time of adoption of the plan or plan amendment at issue. §163.3177(1) (f), Fla. Stat.
- Given the overwhelming bulk of the scientific data currently available related to sea level rise and climate change, any planning decisions that are not based upon such information will be legally deficient.
- Local governments may base data and analysis, and the legally operative parts of a comprehensive plan on “at least” a 10-year planning period. §§163.3177(1) (f) (3), 163.3177(2), 163.3177(5) (a), Fla. Stat.
- Planning for sea level rise impacts, particularly as it relates to allowable land uses and infrastructure siting and maintenance, would take advantage of his authorization.

## **Ch. 163: Future Land Use Element**

“distribution, location, and extent of” land uses, and “population densities and building and structure intensities” ... “based upon ... [t]he character of undeveloped land... [and] the availability of water supplies, public facilities, and services.” §163.3177(6) (a), Fla. Stat.

Land use amendments must be based on “the suitability ...for its proposed use considering the character of the undeveloped land, soils, topography, natural resources, ... on site.” §163.3177 (6) (a) 8, Fla. Stat.

Legal mandate that the most basic decisions about what can be built where, how intensely, and how, be based on the character of the land (for example, its vulnerability to sea level rise and storm surge) and the projected availability of infrastructure and services is the primary mechanism by which land use planning decisions impact mitigation and adaptation.

This basic land use authority is the key difference between the power of local governments and that of state permitting agencies. Local governments *alone* have the authority to determine the most appropriate use of land.

## Comprehensive Plans as a Powerful Legal Tool

Ch. 163 provisions re payment for necessary infrastructure by developers, and the factors used to determine the appropriate amount, location and types of development are important legislative requirements for the sea level rise preparedness in land use plans.

Planning decisions are legislative, subject to the most deferential standards of judicial review. *Martin County v. Yusem*, 690 So.2d 1288, 1295 (Fla. 1997)

The law and the nature of planning decisions provides local governments great discretion to prohibit land uses that are inconsistent with the current and projected realities of sea level rise and storm surge.

The nature of planning decisions, which require elected officials to weigh and balance myriad, often unquantifiable, considerations, means that even strict limits on land use will be upheld by courts so long as they are based on study, and not arbitrary or confiscatory.

## **Key Implications**

**Precedent for “carrying capacity”-based planning. Fla. Keys**

**Uses, intensities and standards based on physical, structural, safety, limits**

**Declining to intensify current limits/ standards as first line of defense**

**No property right against reasonable increased land use restrictions.**

*Glisson v. Alachua County*, 558 So. 2d 1030 (Fla. 1st DCA 1990), *rev. denied*, 570 So.2d 1304 (Fla. 1990)

*Lee County v Morales*, 557 So.2d 652 (Fla. 2nd DCA 1990)

- directly relevant to sea level –rise issues

**Harris Act:** Ambiguous, but likely, not much greater, restriction on regulation.

## **Ch. 163: Infrastructure Elements:**

Investments in infrastructure are generally long-term, difficult to reverse, and resource-intensive, emphasizing the importance of “getting it right the first time.” Verchick & Abrams, 2011 B.Y.U. L. Rev. 2203, 2221

Local agencies should exercise their discretion to refrain from extending or rebuilding roads, water and sewer lines and other infrastructure into projected vulnerable areas.

Comprehensive plans for coastal cities and counties are required to “[l]imit public expenditures that subsidize development in coastal high-hazard areas.” §163.3177 (6)(g)6, Fla. Stat.

Local governments may require builders to pay their “proportionate share” of any transportation improvements required to serve their developments. §163.3180(5) (h), Fla. Stat.

## **Protecting Current & Future Wetlands through Comprehensive Planning**

Ch. 163 ... extensive Conservation Element requirements relevant to sea level rise impacts. §163.3177(6) (d) 1.

Plans must direct future land uses that are incompatible with the protection and conservation of wetlands and wetland functions away from wetlands. § 163.3177(6) (d) 2.

Also, data and analysis supporting the need to maintain lands for future habitat migration will support appropriately –limited land use designations per 163.3177(6)(a).

## **Ch. 163: Coastal Management**

Legislature recognizes that, in the event of a natural disaster, the state may provide financial assistance to local governments for the reconstruction of roads, sewer systems, and other public facilities. §163.3178 (1)

Plans must restrict development activities that would damage or destroy coastal resources, and protect human life and limit public expenditures in areas that are subject to destruction by natural disaster. §163.3178 (1)

Extensive specific natural resource protection requirements in §163.3178 (2) a. and b.

## **Ch. 163: Hurricane Evacuation and Public Safety**

Hurricane evacuation/ public safety requirements may be particularly important as a matter of public policy and to the legal defensibility of cautious limits on coastal development.

Plans must provide a mitigation plan that requires developers to contribute resources to hurricane shelters and evacuation capabilities if their projects would result in higher population concentrations within the CHHA.

§ 163.3178(8) (a) (3)

Land uses must maintain or lower evacuation times, possibly by requiring developers to contribute money or land sufficient to meet the hurricane shelter and transportation needs of their developments. §163.3178 (8).

## **Ch 163: Adaptation Action Areas**

Optional designation of an “adaptation action area” §163.3177(6) g.10; §163.3164(1)

“low-lying coastal zones that are experiencing coastal flooding due to extreme high tides and storm surge and are vulnerable to the impacts of rising sea level.” §163.3177(6) g.10

“to improve resilience to coastal flooding resulting from high-tide events, storm surge, flash floods, stormwater runoff, and related impacts of sea-level rise.” §163.3177(6) g.10

Authorization for AAAs does not excuse non-compliance with the many mandatory requirements implicated by sea level rise.

## **Special Consideration: Cumulative Impacts**

Ecosystems that are already degraded or impaired are more vulnerable to, and less able to adapt, to climate – related impacts.

Local coastal management plans must “protect human life and ... control proposed development and redevelopment in order to protect the coastal environment and give consideration to cumulative impacts” §163.3178 (2).

## Special Consideration: Open Space

- “Given that one of the most damaging existing stressors for many species is loss of habitat, **one of the most effective adaptation measures humans could implement may be to preserve as much connected and varied open space as is physically and politically possible and let species and ecosystems sort themselves out in response to climate change impacts.**” Robin Kundis Craig, Stationarity is Dead – Long Live Transformation: Five Principles for Climate Change Adaptation, 34 Harv. Envtl. L. Rev. 9, 51-52 (2010)

## **Special Consideration: Planning With Scientific Uncertainty and Dispute: The Precautionary Principle**

“[T]he police power of the state is not static. The courts are duty bound to recognize its expansion in proper cases to meet conditions which necessarily change as business progresses and civilization advances.” *L. Maxcy, Inc. v. Mayo*, 139 So. 121, 131 (Fla. 1931)

Government is “not limited to acting only where there is scientific certainty.” *Haire v. Fla. Dep’t of Agriculture & Consumer Services* 870 So.2d. 774 (Fla. 2004).

Where there is scientific dispute, courts defer to an agency’s scientific / technical expertise and “informed discretion” so long as they are reasonable *Haire v. Florida Department of Agriculture & Consumer Services* 870 So.2d. 774 (Fla. 2004).

Government is “not limited to acting only where there is scientific certainty.” *Haire v. Florida Department of Agriculture & Consumer Services* 870 So.2d. 774 (Fla. 2004).

## What the Courts have said...

“[W]here there are present or potential threats of serious damage, lack of full scientific certainty should not be a basis for postponing effective measures to prevent environmental degradation. Awaiting for certainty will often allow for only reactive, not preventive, regulatory action.” *Ethyl Corp. v. EPA*, 541 F.2d. 1, 29 (DC Cir. 1976)

“Uncertainty regarding the exact level of protection necessary justifies neither the least protection feasible nor the absence of protection. \*\*\* a trustee’s duty to protect the resource mitigates in favor of choosing presumptions that ... protect the resource.” *Lead Indus. Ass’n v. EPA*, 647 F.2d 1130 (DC Cir. 1976).

Government must recognize the preliminary and incomplete nature of existing evidence, and “incorporate[] elements of uncertainty and risk as part of its analysis. Such a methodology, by its nature, must rely as much on policy considerations as on hard scientific ‘facts.’” *Ethyl Corp. v. EPA*, 541 F.2d. 1, 29 (DC Cir. 1976)

# **Private Property Rights**

**Safety net based on fairness principles, not a guarantee of profit or protection against otherwise valid changes in the law.**

**Not as limiting on the ability of government to regulate as many assert.**

**Government may reduce allowable uses & increase restrictions so long as:**

- # “Economically viable” uses still allowed.**
- # Landowner isn’t “inordinately burdened.”**
- # A valid reason for the change exists.**
- # legally vested rights aren’t denied.**

# What the courts have said...

“[t]he degree of constitutionally protected property rights must be determined in the light of social and economic conditions which prevail at any given time.” *Dept. of Agric. & Cons. Servs. v. Mid- Fla. Growers*, 521 So.2d 101 (Fla. 1988).

‘[g]overnment hardly could go on if ... [property] values could not be diminished without paying for every such change in the ...law.’  
*Lingle v. Chevron USA, Inc.*, 544 U.S. 528, 538 (2005)

“An owner of land has no absolute and unlimited right to change the essential natural character of his land so as to use it for a purpose for which it was unsuited in its natural state and which injures the rights of others.” *Graham v Estuary Properties, Inc.*, 399 So.2d 1374 (Fla. 1981).

No property right to existing zoning or to increases uses or intensities.  
*Smith v. City of Clearwater*, 383 So.2d 681 (Fla. 2<sup>nd</sup> DCA 1980);  
*Martin Cnty v. Yusem*, 690 So. 2d 1288, 1295 (Fla. 1997)

## **“Takings” Defenses:**

**Awareness of sea level rise issues and limitations reduces a landowner’s protected “reasonable” development expectations.** FLA. STAT. § 70.001(3) (e) (1); *Good v. United States*, 39 Fed. Cl. 81, 112-14 (1997); Ruppert, *Reasonable Investment-Backed Expectations: Should Notice of Rising Seas Lead to Falling Expectations for Coastal Property Purchasers?*, 26 J. Land Use & Envtl. L. 239, 246 (2011)

**The more imperative the governmental interest, the farther regulation can go without be a “taking”. Regulations preventing public harm are less likely to be a “taking”.** *Penn Central Transp. Co. v. New York City*, 438 U.S. 104 (1978)

**Regulations intended to prevent public safety and other “nuisances” may be immune from “takings” suits.** *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992)

**Courts will tend to view sea level rise and erosion protections as mutually beneficial to the public and individual landowners.**

*Stop the Beach Renourishment, Inc. v. FDEP, et. al*, 998 So.2d 1102,1115 (2008)

## Property Rights & Public Subsidies

### **No right to a public subsidy –**

The law supports the strictest regulations that tolerate zero adverse impacts on natural resources or the property of others outside the boundaries of an individual landowner's property:

“Insisting that landowners internalize the negative externalities of their conduct is a hallmark of responsible land-use policy, and we have long sustained such regulations against constitutional attack.” *Koontz v. St. John's River Management District*, 133 S. Ct. 2586 (2013).

Government may require 100% impact fees & prohibit structures likely to pose safety or flooding hazards to other property.

## FINAL ADVICE

Allow only uses & intensities inherently suitable for projected future scenarios.

“No Regrets – Precautionary” planning – its easier to lift restrictions than to reduce prior perceived entitlements.

The most effective regulatory decisions, and those most capable of passing political and judicial scrutiny, are place – specific.

Avoid a “one size fits all” approach and establish standards for land use and development that are tailored to specific areas defined by their level of contribution or vulnerability to climate and sea level rise impacts.

Maximize the police power to plan and regulate to protect the public, but engage landowners/ stakeholders to maximize the integrity of and support for necessary measures.

Thomas Ruppert

Coastal Planning Specialist, Florida Sea Grant



# Sea-Level Rise: Potential Legal and Fiscal Liabilities for Local Governments

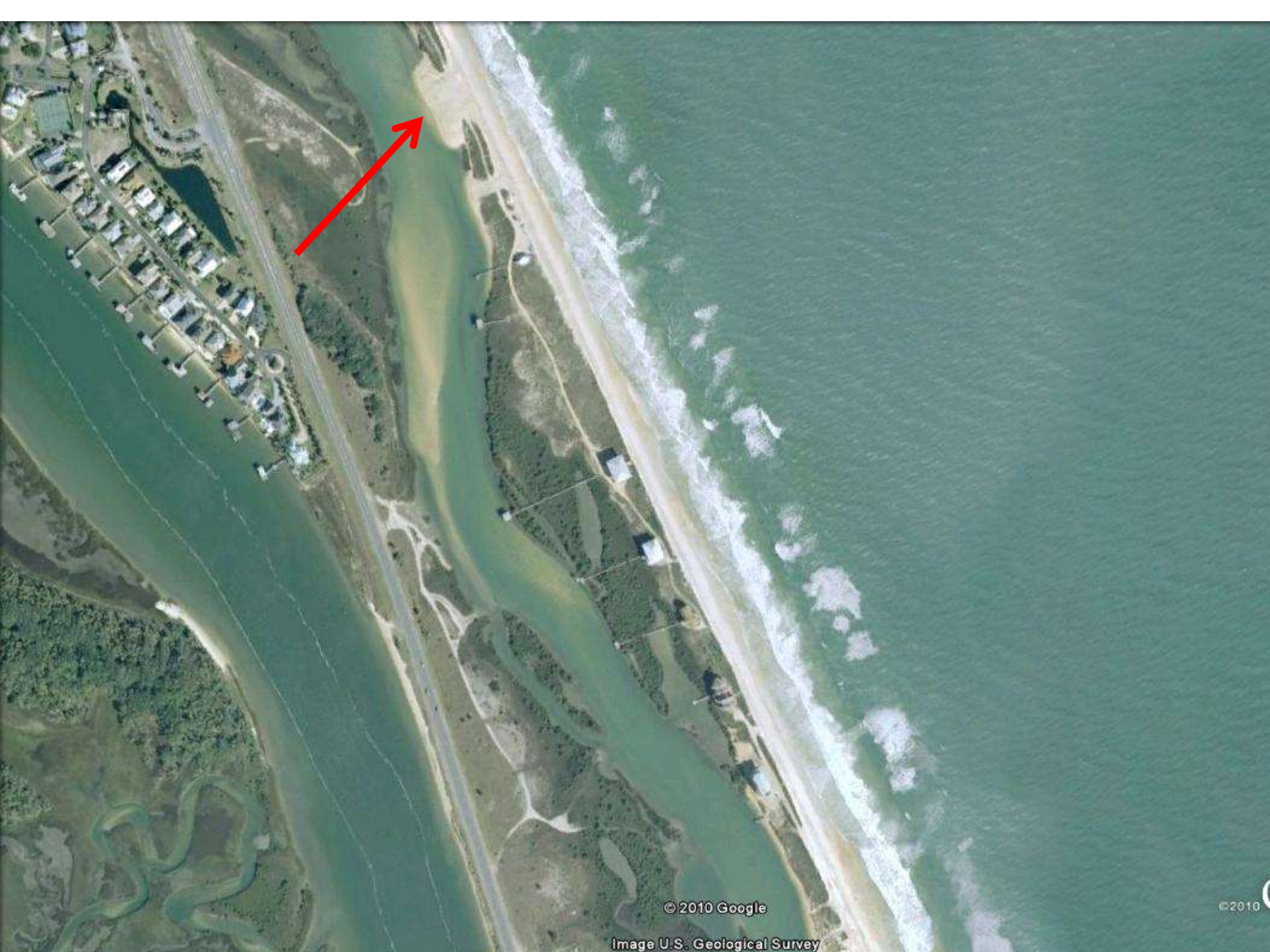
Thomas Ruppert  
Coastal Planning Specialist  
Florida Sea Grant

# Overview

- Potential sources of liabilities
- Lesson: Past decisions = today's liabilities and today's decisions = possible future liabilities
- Options
  - Start by getting local government's house in order
  - Tell everyone about the issues (through permitting and notice requirements)
  - Discourage development in the most hazard-prone areas

Scenario #1:  
Permit Issuance in  
Hazardous Areas





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Image U.S. Geological Survey



Photo courtesy of St. Johns County

A coastal scene with a sandy beach in the foreground. In the middle ground, there is a white house with a chimney on a dune, and a utility pole stands to its left. Further down the beach, there is a smaller structure and two people walking. The sky is overcast and grey.

- Claims:

- Duty to maintain road
- Taking

- 5<sup>th</sup> DCA

- Discretion not absolute
- County must provide “reasonable level of maintenance” that results in “meaningful access”
- How can County fight the ocean?

# Scenario #3, INFRASTRUCTURE:

- Refusal or inability of local government to remedy increasingly problematic tidally-influenced flooding in existing neighborhoods.
- No (unlikely) legal liability (but political pressure)

## **Drowning in Place: Local Government Costs and Liabilities for Flooding Due to Sea-level Rise**

by Thomas Ruppert and Carly Grimm

- No duty of local gov't to provide drainage
  - As with many services, *authority* or *power* to provide, but not duty (fire, police, etc.)
- However, if provided, duty to maintain arises
  - Maintenance must be done with reasonable care
  - Liability for failure to maintain

# Maintenance vs. Upgrade

- Immunity through “planning” vs. “operational” distinction
  - Immunity for planning as this is legislative
  - No immunity for “operations;” always a duty to act with reasonable care to avoid harm to others



# Options

- Get your own house in order
- Inform about the hazards
  - Notice, acknowledgement, waiver/release, assumption of the risk, hold harmless\*
- Proactively Prevent Hazard-Prone Development

\* -- Thanks to St. Johns County Attorney Patrick McCormack for this breakdown





- Keep your own facilities out of harm's way

# Florida's Coastal Hazards Disclosure Law: Property Owner Perceptions of the Physical and Regulatory Environment

- Florida Statute §161.53
- 85.7% did not receive or do not recall receiving



# Potential Legal Import of Notice

- “Reasonable investment-backed expectations”
- How might notice affect expectations????
- St. Johns County’s “assumption of risk” called “repugnant”

# California Coastal Com'n Permits

## **SPECIAL CONDITIONS**

### **Assumption of Risk, Waiver of Liability and Indemnity**

By acceptance of this permit, the applicant acknowledges and agrees (i) that the site may be subject to hazards from bluff and slope instability, erosion, landslides, waves, and sea level rise; (ii) to assume the risks to the applicant and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.

# Prevent Hazard-Prone Development

- “. . . [I]t is the intent of the Legislature that local government comprehensive plans . . . protect human life and limit public expenditures in areas that are subject to destruction by natural disaster.
  - Fla. Stat. § 163.3178(1)(2014).
- “A redevelopment component which outlines the principles which shall be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise.”
  - Fla. Stat. § 163.3178(2)(f)(2014).

# Coastal Construction Control Line

- “to preserve and protect [Florida’s beaches] from **imprudent construction** which can jeopardize the stability of the beach-dune system, accelerate erosion, provide inadequate protection to upland structures, endanger adjacent properties, or interfere with public beach access.”

# Coastal Construction Control Line

## **Eroding Long-Term Prospects for Florida's Beaches: Florida's Coastal Construction Control Line Program<sup>1</sup>**

**Thomas K. Ruppert<sup>2</sup>**

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# Summary and Lessons

- Potential liability for permitting of risky development
  - Maintenance costs of infrastructure in hazardous areas
  - Legal battles
- Providing notice—or more—serves many useful purposes
- Lead by example: consider SLR in public infrastr.
- Implement strategies to minimize risky development
- **Permitting risky development now to avoid takings risk now may lead to greater future costs**

“[A] foolish man . . . built his house on sand. The rain came down, the streams rose, and the winds blew and beat against that house, and it fell with a great crash.”

Matthew 7: 26-27

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Erin L. Deady, P.A.

President, Erin L. Deady, P.A.

# Planning Strategies for Sea Level Rise

Erin Deady, AICP, Esq., LEED AP

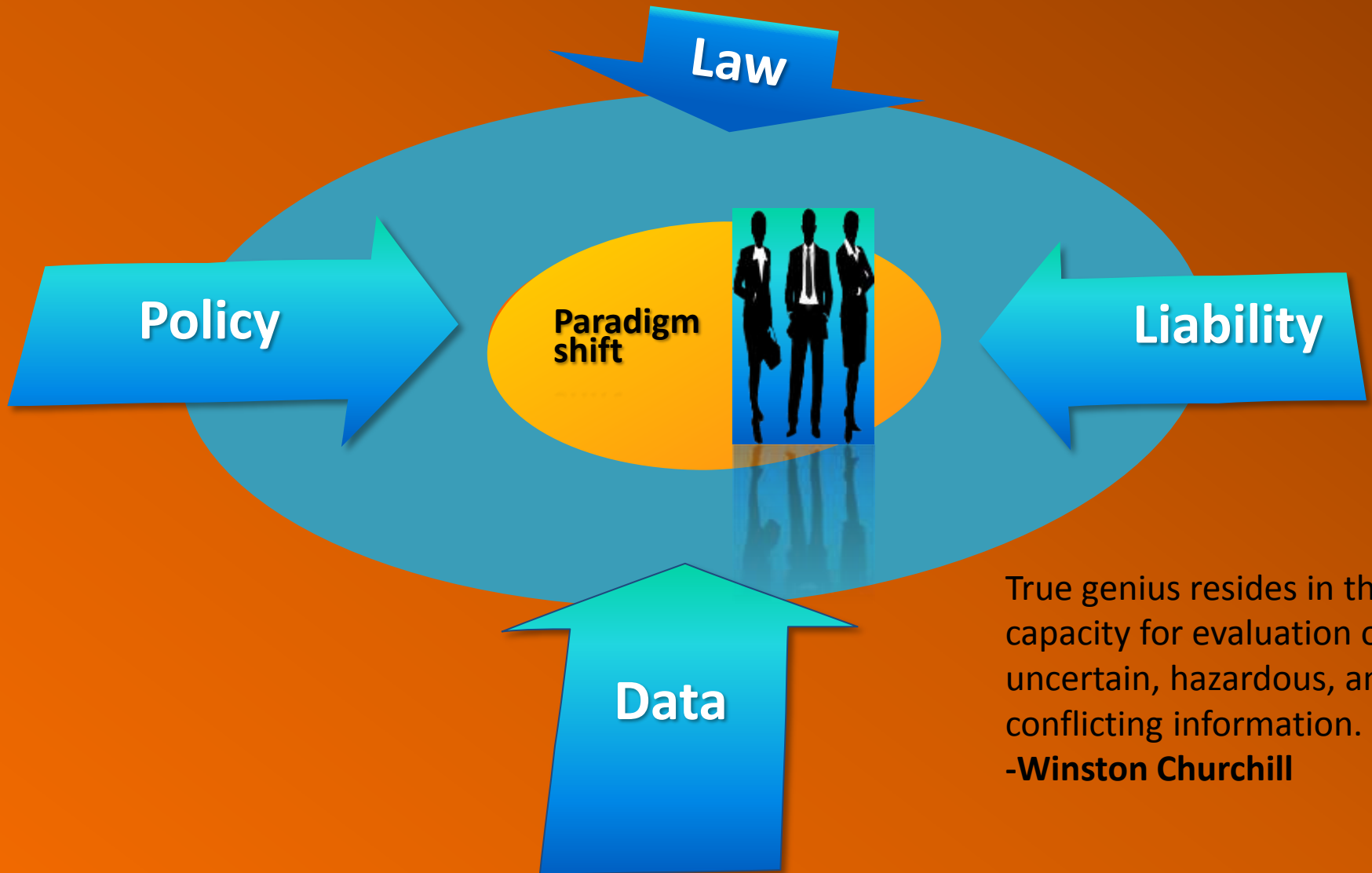
# Flooding, SLR and Storms



Pensacola 4/30/14



Increasing liability, new policy and better data are influencing our approach to planning



True genius resides in the capacity for evaluation of uncertain, hazardous, and conflicting information.  
-Winston Churchill

# Law: Where Does Climate Change Show Up?

- ESA
- NEPA
- CAA
- CWA
- MMPA
- FOIA/1<sup>st</sup> Amendment
- Energy Policy Act
- Global Climate Change Research Act
- Corporate Reporting/Securities Disclosure
- FTC
- “Cap-and-trade” regulation where GHGE’s are capped and allocated
- right to
- Regulate activities (public and private), failing to regulate or regulating too much
- Green & Energy Building/Codes (New Mexico case)
- Money damages and insurance coverage (common law claims)
- Protestors and scientists

**527 total cases as of  
October 3, 2012**

# Liability: Flood Control Example

- *In re Katrina Canal Breaches Consolidated Litigation* (Robinson), 647 F. Supp.2d 644 (E.D. La. 2009).
- 400+ plaintiffs sued to recover for Katrina-related damages and the Corps' mismanagement of the Mississippi River Gulf Outlet or MRGO.
- 7 of these plaintiffs (the "Robinson plaintiffs") went to trial. Plaintiff's win, Corps appeals to 5<sup>th</sup> Circuit and loses. No sovereign immunity, data was there & Corps was negligent (grossly).
  - No defense under Flood Control Act (no safe haven)
  - No exception under Federal Tort Claims Act (Corps did nothing to protect against storm surge effect)
  - Should have updated EIS under NEPA \*\* Ongoing obligation under NEPA to consider adapting to a changing climate \*\*
  - Negligence (this could attach to privately constructed structures too)
- Scientific data "foreseeable" ie; sea level rise?
- Just under \$720,000 awarded to 5 plaintiffs BUT
- Corps dismissed from case (immunity argument was appealed but U.S. Supreme Court denied Certiorari for Appeal, June 26, 2013)

# The New Elephant: Farmers Insurance v. “Everyone”

- “..property insurance companies ... **sustained property and other economic losses** arising from one or more of Defendants' ownership, operation and/or control of a stormwater sewer system and/or sanitary water sewer system...”
- Defendants adopted the scientific principle that climate change has caused increases in rain fall amount, intensity and duration ... as evidenced **by their adoption of the Chicago Climate Action Plan**.
- “...**defendant knew or should have known** that climate change ... has resulted in greater rain fall volume, greater rainfall intensity and greater rainfall duration.”
- “...defendant **failed to adopt and/or implement policies** which would maximize the stormwater storage capacity of its stormwater sewers and sanitary water sewers so as to prevent injury.”

Filed 4/17/14  
Withdrawn 6/3/14



Photo credit: Chicago Tribune

“We made our point” – Farmer’s

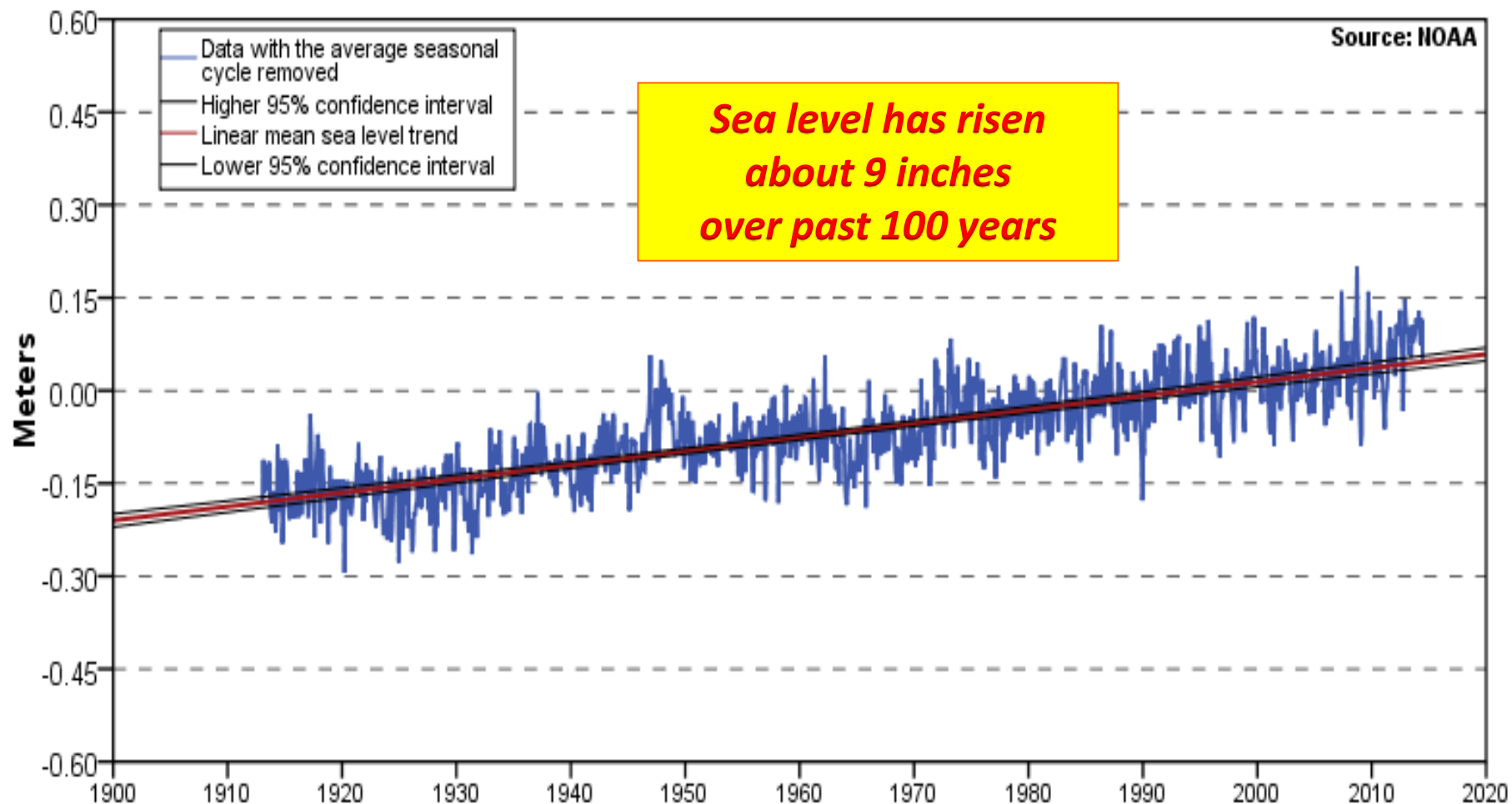
# POLICY: 163 and Beyond

- GHGEs to 2000 levels by 2017, to 1990 levels by 2025, and by 80% of 1990 levels by 2050 (EO 07-127)
- Florida adopts the California motor vehicle emission standards (22% reduction in vehicle emissions by 2012 and a 30% reduction by 2016) (EO 07-127)
- Building Efficiencies/Code, Chapter 553, F.S. increasing energy standards
- HB 7123: Model Green Building Code (2007)
- HB 697 (GHG reduction strategies in local government's Comprehensive Plan). Some requirements recently eliminated.
- HB 7135 (State and Local Government Buildings "greener")
- HB 7179 (PACE)- energy, renewable energy and wind resistance initiatives for financing
- SB 1122 (AAAs)- voluntary adaptation action areas
- HB 7117 (Energy Bill- 2012)
- Virtually nothing 2013/2014

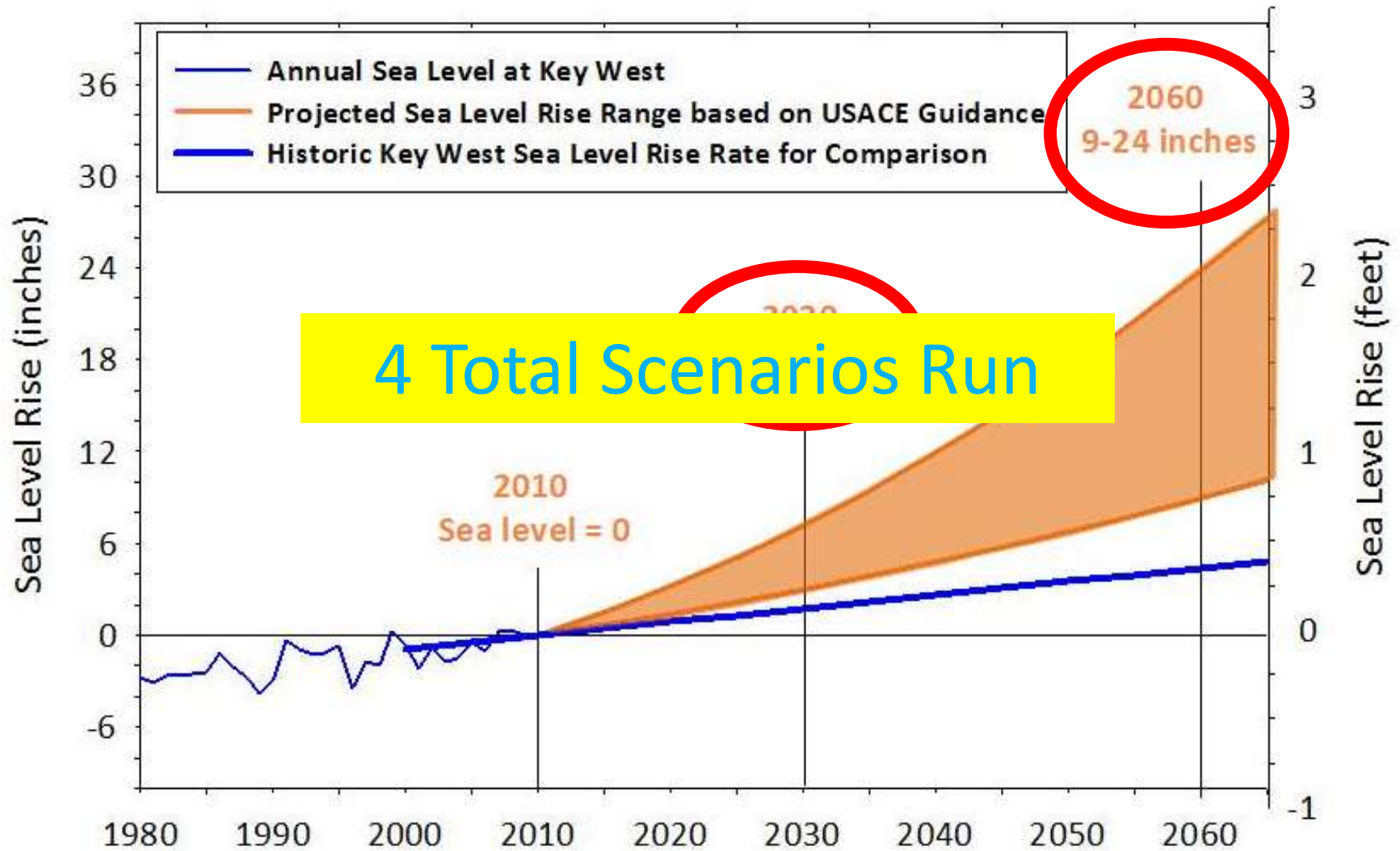
# The Data: Historic

Key West, FL

2.24 +/- 0.16 mm/yr



# Future Conditions: Southeast Florida Regional Climate Compact



# Other Planning Considerations

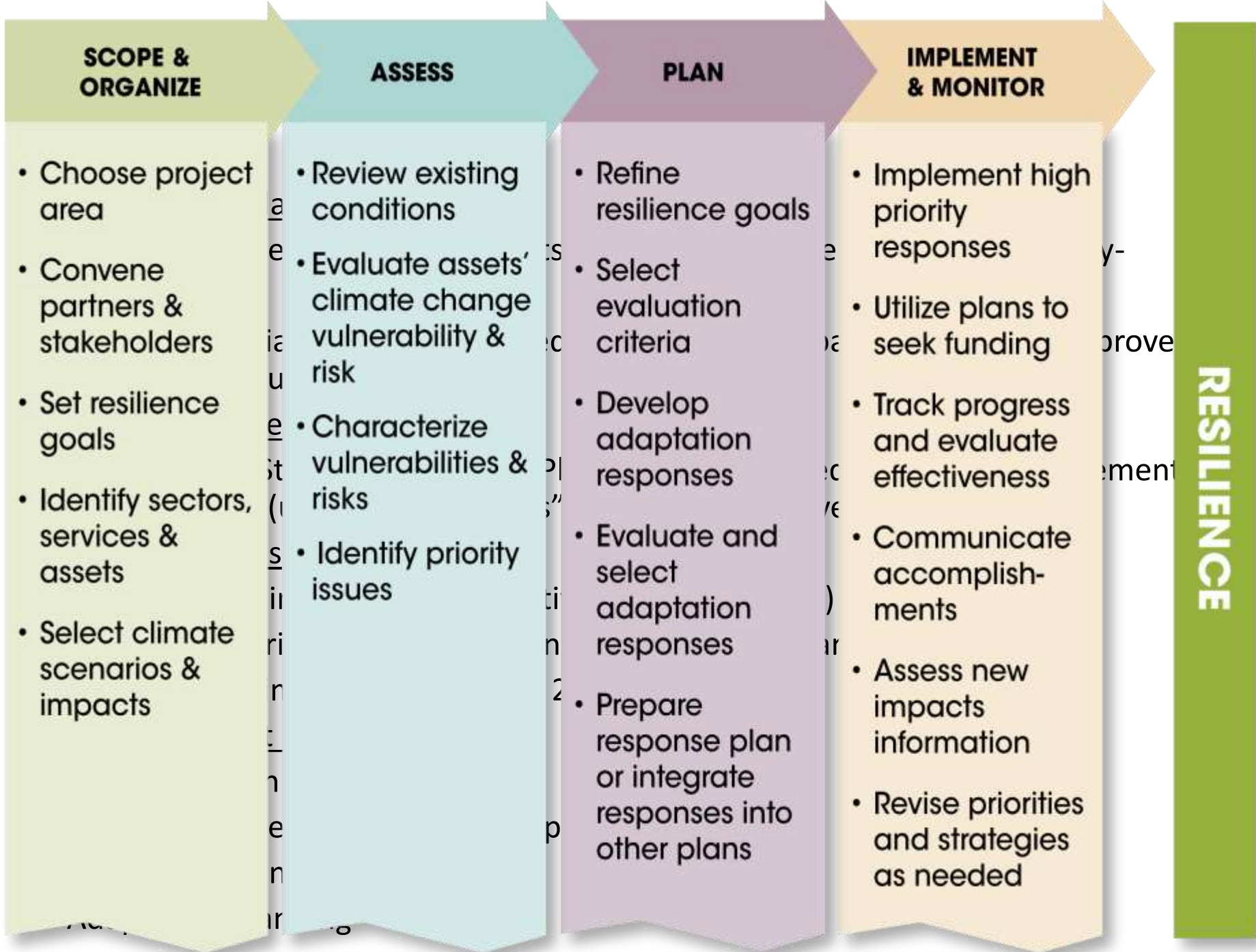
- Insurance will be a limiting factor in terms of where we live or “retreat” to-
- Insurance companies will start to “consider” prospective factors in rates such as sea level rise-
- Communities may be “forced” to implement mitigation and adaptation strategies in response-
- Tying planning process to FEMA’s Community Rating System so strategies result in tangible benefits to people-
- Multiple benefits of planning as an approach to address sea level rise-

# What is a Good Approach?

1. **UNDERSTAND** your infrastructure vulnerabilities
2. **ADDRESS** critical near-term vulnerabilities first
3. **MINIMIZE** new problems through planning

*Resilience to flooding and sea level rise as a core concern in all government projects and operations*

4. **BE A GLOBAL LEADER** for reducing carbon emissions



**RESILIENCE**



# Data to Start Collecting



# Two Case Studies



# Increase in “Nuisance Flooding”



1980-1982  
**.67 per year**



2010-2012  
**2.3 per year**



2030 at 3”  
**20 per year**



2030 at 7”  
**78 per year**



2060 at 9”  
**139 per year**



2060 at  
24”  
**672 per year**

3x 2010

9x 2010

34x 2010

60x 2010

**Flooding  
more than  
1x per day**

# ROADS ANALYSIS

## DEVELOPMENT OF A GEOGRAPHIC INFORMATION SYSTEM (GIS) TOOL FOR THE PRELIMINARY ASSESSMENT OF THE EFFECTS OF PREDICTED SEA LEVEL AND TIDAL CHANGE ON TRANSPORTATION INFRASTRUCTURE

Based on FDOT Sea Level Rise  
Sketch Tool \*

*Developed by University of Florida*

<http://sls.geoplan.ufl.edu/documents-links/>



**FDOT Contract# BDK75 977-63  
September 2013  
Final Report**



**Prepared by  
Alexis Thomas  
Dr. Russell Watkins  
The GeoPlan Center  
Department of Urban & Regional Planning  
University of Florida**



**Funded by  
Florida Department of  
Transportation**

*\*General planning assessment tool requires additional  
data for use in site-level decisions*

**2060 LOW SCENARIO  
9 INCHES SEA LEVEL RISE**

# Big Pine Key

*Road centerlines and aerial imagery:  
Monroe County  
Property Appraiser's Office*



# Lower Matecumbe Key



**2030 High Scenario**  
***7 inches sea level rise***

# FKAA Groundwater Wells

The screenshot displays the USGS IMAGE web application interface. At the top, the USGS logo and tagline "science for a changing world" are visible. Below the logo is a horizontal strip of images related to environmental science. The main header reads "IMAGE: Internet-based Modeling, Mapping, and Analysis for the Greater Everglades".

The central map shows a satellite-style view of the Greater Everglades region, with a red circle highlighting a specific area. The map includes a navigation panel on the left with a compass and zoom controls, and a scale bar at the bottom left showing 10 km and 10 mi. A "Permalink" button is located at the bottom right of the map area.

The right-hand side of the interface contains a "Map Layers" and "Point Info" section. Below this is a "Graphs" section. The "Imagery:" section shows "Landsat 7 (543 bands)". The "BISECT Sea Level Rise and Habitat Distribution" section has a "BISECT:" dropdown menu set to "-- None --". The "SLOSH Storm Surge Model" section has a "Category:" dropdown menu set to "-- None --". The "HAZUS Damage Model" section has a "Cat:" dropdown menu set to "1" and a "Value:" dropdown menu set to "-- None --".

The "General Data" section includes several checkboxes and icons for various data layers:

- County Boundaries
- 2025 Urban Expansion Area
- 2015 Urban Development Boundary
- CERP Projects
- Groundwater Travel Time Contours (Miami-Dade)
- Surface Water Control Network
- Roads and Streets (Miami-Dade)
- Canals
- Basins
- Elevation (NED)
- USGS NLCD 2006 Land Cover

<http://lcat.usgs.gov/image/image.html>

# Resources for Planning

Tool	Data Created	Basis for Decisions
NOAA Sea Level Rise and Coastal Flooding Impacts Viewer	Preliminary look at SLR and coastal flooding impacts.	Establishing priorities for vulnerable infrastructure
The Nature Conservancy's Coastal Resilience 2.0	Storm surge, sea level rise, natural resources and economic assets	Identify opportunities for green infrastructure solutions
FDOT tool (Florida Sea Level Scenario Sketch Planning Tool)	Inundation and affected transportation infrastructure layers	ID transportation facilities potentially vulnerable to climate trends
U.S. Army Corps of Engineers (FEMA and NOAA) Sea-Level Change Calculator	Site-specific detail on projected flood elevations for 5-year intervals from 2010 to 2100	Additional safety margins above FEMA requirements- best available elevation data

## Avoided Damages by 2060 – With High or Low SLR

	Avoided Damages Low SLR (9")	Avoided Damages High SLR (24")
Scenarios Considered	(\$ Millions)	(\$ Millions)
<b>Action 1: Elevate &amp; Floodproof</b>	<b>\$850.6</b>	<b>\$1,209.8</b>
<b>Action 2: Construct Breakwater</b>	<b>\$12.8</b>	<b>\$13.2</b>
<b>Action 3: Voluntary Relocation</b>		
10% Participation Now; 50% Participation in 2030	<b>\$26.8</b>	<div style="background-color: #f0e6e6; padding: 5px; display: inline-block;">Figures Discounted 3.3%</div> <b>\$71.5</b>

## Cost Estimates By Year 2060 – For Each Action: COSTS

	Low Cost Estimate (\$ millions)	High Cost Estimate (\$ millions)
<b>Action 1: Elevate &amp; Floodproof</b>	\$79.2	\$162.2
<b>Action 2: Construct Breakwater</b>	\$6.0	\$8.0
<b>Action 3: Voluntary Relocation</b> 10% Participation Now, 50% in 2030	\$60.7	\$91.0

Figures Discounted 3.3%

## Benefit Cost Ratios of Actions by Year 2060

	Benefit/Cost Ratios – Using Low Cost Estimate	
	Low SLR	High SLR
<b>Action 1: Elevate &amp; Floodproof</b>	<b>10.75</b>	<b>15.28</b>
<b>Action 2: Construct Breakwater</b>	<b>2.12</b>	<b>2.2</b>
<b>Action 3: Voluntary Relocation</b> 10% Participation Now, 50% in 2030	<b>0.44</b>	<b>0.07</b>

Discounted 3.3%, Values over 1.0 are considered positive.

# Decision Making Paradigm Shift



## Land-Acquisition/Management

Species, Habitat and  
Adaptation/Mitigation

Policy Implementation-  
Departmental Collaboration,  
Comp Plan, Code, Legal Issues



## Project Planning-

Addressing Priority Vulnerabilities,  
Budget Implications (New Cost Considerations),  
Departmental Collaboration

# Other Issues on the Rise

- The solutions: armoring and renourishment
- Retreat and property rights issues
- Sea level rise and “extreme” precipitation
- Insurance liability and coverage
- Water rights and scarcity
- Responding and rebuilding
- Immigration and refugee issues



Photo credit: [Lobsterboatblockage.org](http://Lobsterboatblockage.org)



# The PowerPoint is available at

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**Our Vision for Florida's Future...**

Picture a Florida with vibrant cities and towns, thriving and livable neighborhoods, and an outstanding quality of life. Imagine communities where kids can ride their bikes to school or the park, and parents can walk to the store or take a bus to work if they wish. [Read More >](#)

**1000 Friends Honors Lee Constantine**

Constantine honored for his "leadership on critical conservation and water resource protection in Florida." [Read More >](#)

**Register Now for Fall Webinars**

**What's New**

**Planning for Sea Level Rise in Broward County Webinar on October 8**

The PowerPoint is now available [Read More >](#)

**Scale Back Minto West**

Massive development planned for western Palm Beach County [Read More >](#)

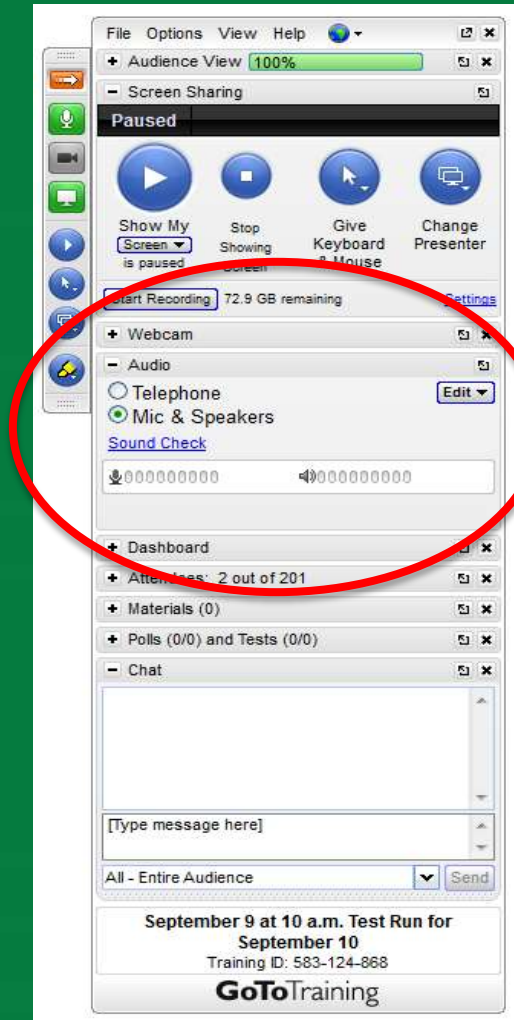
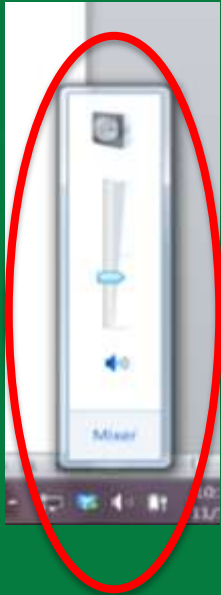
**Survey on Climate Change/Sea Level Rise**

Take a few minutes to share what your community is doing [Read More >](#)

**Please Vote Yes on**

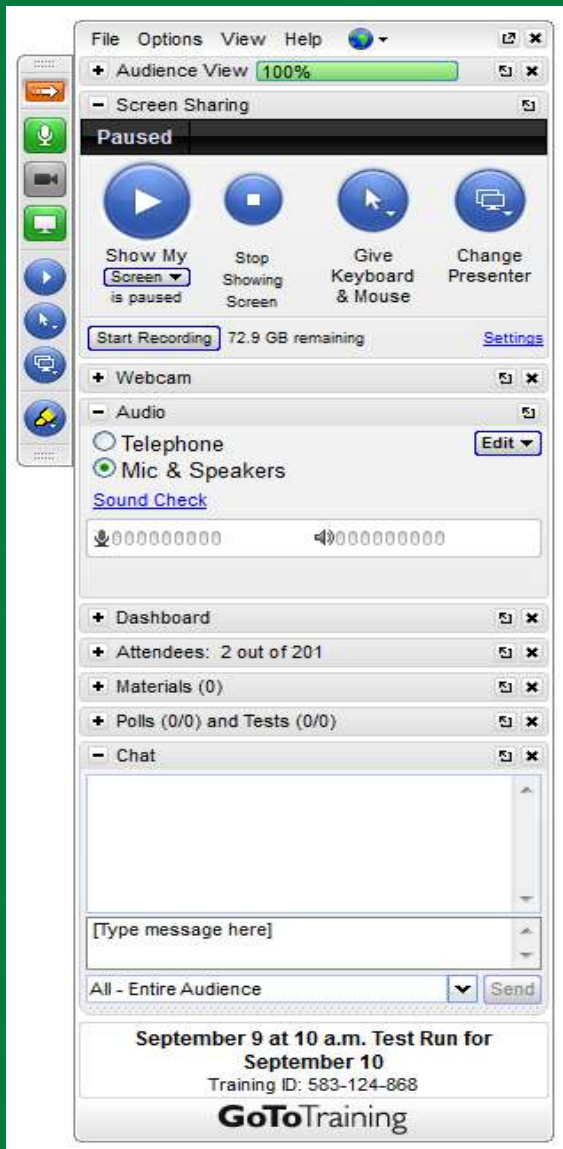
**Current Foresight**

# If you have sound issues:



1. Adjust the volume on your computer
2. Adjust the audio on Go-to-Training

# If you have questions:



- Your webinar control panel includes a “Chat” box
- Please click on “+” sign and type any questions in this box
- Please refer to the slide number and/or speaker when you post your question
- Please keep your questions succinct!
- Staff will ask the presenters questions, as time permits
- Please complete the survey in the post-webinar email



# This webinar has been approved for:

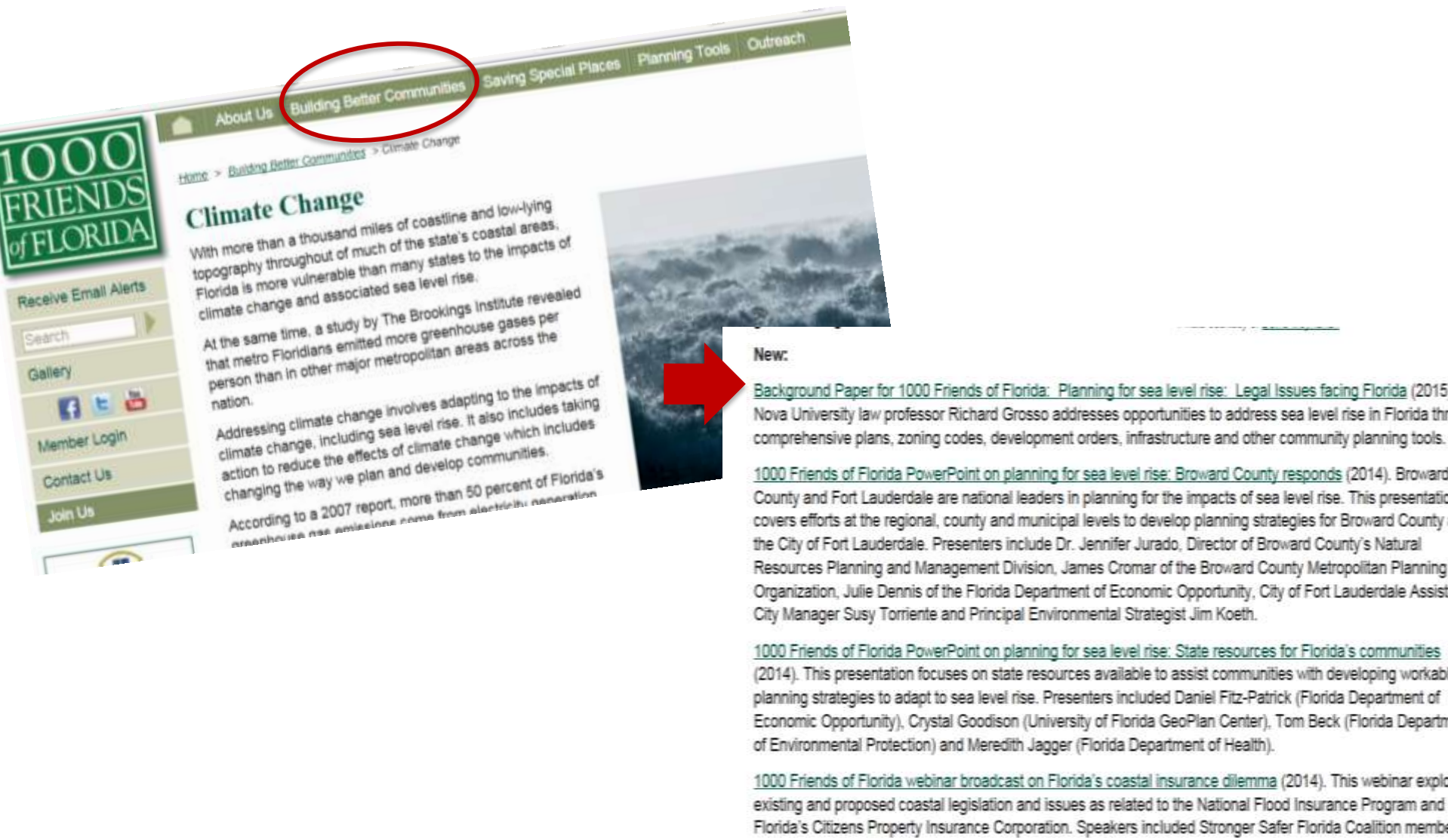
- 1.5 LEGAL AICP CM credits for Planners ([#e.29013](#))
- CLE Credits by the Florida Bar ([#1409451N](#))
- 1.5 Contact Hours for Certified Environmental Health Professionals
- 1 CEC for Certified Floodplain Managers

# Upcoming webinars:

- **February 11, 2015, Noon to 1:30 p.m.**  
**Victor Dover on Street Design: The Secret to Great Cities and Towns**
- **March 11, 2015, Noon to 1:30 p.m.**  
**2015 Florida Legislative Update**

# For more on climate change and sea level rise in Florida visit:

[www.1000friendsofflorida.org/building-better-communities/climate-change/](http://www.1000friendsofflorida.org/building-better-communities/climate-change/)



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## Climate Change

With more than a thousand miles of coastline and low-lying topography throughout of much of the state's coastal areas, Florida is more vulnerable than many states to the impacts of climate change and associated sea level rise.

At the same time, a study by The Brookings Institute revealed that metro Floridians emitted more greenhouse gases per person than in other major metropolitan areas across the nation.

Addressing climate change involves adapting to the impacts of climate change, including sea level rise. It also includes taking action to reduce the effects of climate change which includes changing the way we plan and develop communities.

According to a 2007 report, more than 50 percent of Florida's greenhouse gas emissions come from electricity generation

**New:**

- [Background Paper for 1000 Friends of Florida: Planning for sea level rise: Legal Issues facing Florida](#) (2015). Nova University law professor Richard Grosso addresses opportunities to address sea level rise in Florida through comprehensive plans, zoning codes, development orders, infrastructure and other community planning tools.
- [1000 Friends of Florida PowerPoint on planning for sea level rise: Broward County responds](#) (2014). Broward County and Fort Lauderdale are national leaders in planning for the impacts of sea level rise. This presentation covers efforts at the regional, county and municipal levels to develop planning strategies for Broward County and the City of Fort Lauderdale. Presenters include Dr. Jennifer Jurado, Director of Broward County's Natural Resources Planning and Management Division, James Cromar of the Broward County Metropolitan Planning Organization, Julie Dennis of the Florida Department of Economic Opportunity, City of Fort Lauderdale Assistant City Manager Susy Torriente and Principal Environmental Strategist Jim Koeth.
- [1000 Friends of Florida PowerPoint on planning for sea level rise: State resources for Florida's communities](#) (2014). This presentation focuses on state resources available to assist communities with developing workable planning strategies to adapt to sea level rise. Presenters included Daniel Fitz-Patrick (Florida Department of Economic Opportunity), Crystal Goodison (University of Florida GeoPlan Center), Tom Beck (Florida Department of Environmental Protection) and Meredith Jagger (Florida Department of Health).
- [1000 Friends of Florida webinar broadcast on Florida's coastal insurance dilemma](#) (2014). This webinar explored existing and proposed coastal legislation and issues as related to the National Flood Insurance Program and Florida's Citizens Property Insurance Corporation. Speakers included Stronger Safer Florida Coalition members

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