

# THE NEW IMPERATIVE: MEETING THE CLIMATE CHANGE ADAPTATION CHALLENGE

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**C L A R I O N**



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## Session Agenda



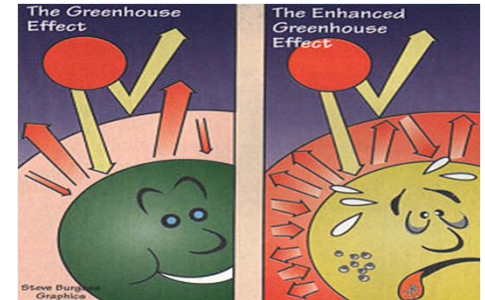
- **Climate Change Adaptation: Overview**
  - Chris Duerksen, Senior Counsel, Clarion Associates
- **Climate Change Adaptation National Best Practices**
  - Kate Marshall, Principal, SRA International
- **Western Case Study: Flagstaff, AZ**
  - Stephanie Smith, Sustainability Specialist, City of Flagstaff

# Climate Adaptation: What, Me Worry??

What, Me Worry?



- Most Climate Change Sustainability Initiatives Focus on **Climate Change Mitigation**.
- Climate Change Mitigation = Techniques to slow or halt climate change related to human activities
  - Reduce Greenhouse Gas Emissions From Burning of Fossil Fuels
  - Promote Alternative Energy Sources
  - Reduce Vehicle Miles Traveled
  - Encourage Energy Conservation



# Climate Change Mitigation: Too Little, Too Late??

- Clear That Even If Climate Mitigation Techniques Are Effective, Impacts Of Climate Change Already Being Felt Throughout USA and Will Intensify
- Recent “Monster” Increase In CO2 Output
- Underwater Cities...Miami, Honolulu
- Other Climate Change Impacts
  - Drought/water shortages
  - Wildfires
  - Loss of winter recreation
  - Wildlife habitat destruction
  - More violent storms
  - Agricultural impacts
  - Landslides/erosion
  - Flooding



# Natural Hazards: Why Plan For Disaster-Resilient Communities

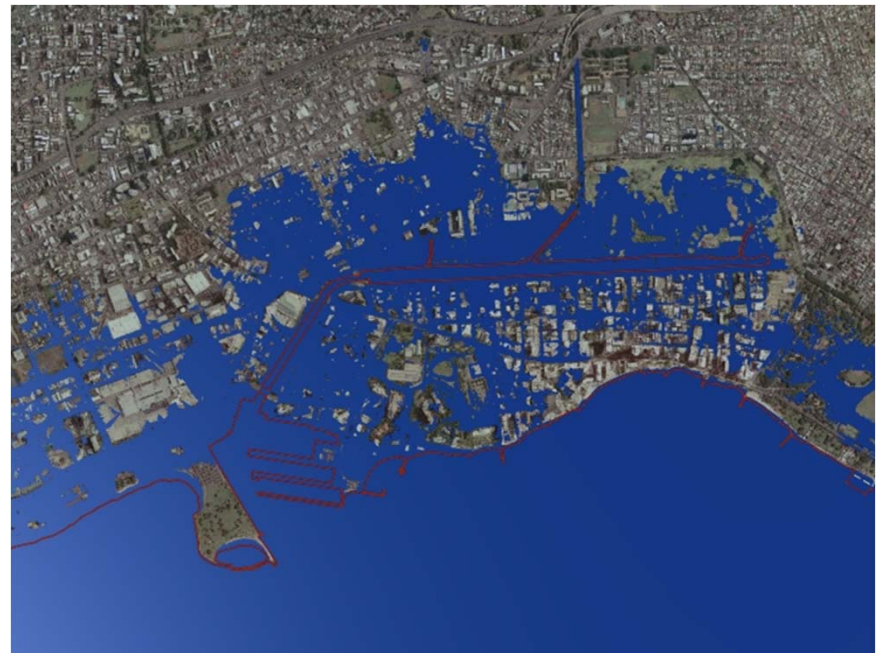
- **75% of US Housing Stock Susceptible To Natural Hazards**
- **10 Million Homes At Risk From Flooding; 2 Million From Coastal Storm Surges**
- **50 Million Homes In Counties With Significant Wildfire Risk**
- **Sea level rise threatens many major coastal cities**





# Honolulu: Sea Level Rise

- Rise of 3.3 mm/yr 1993–2011 (2.5"/18yr)
- Estimate 1-2ft by 2050 & 3-6ft by 2100



# Sea Level Rise – It's Here Now

## Kapoho, Big Island, Hawaii



ocean





# Sea Level Rise – Kapoho





# Sea Level Rise – Kapoho





# The Climate Change Adaptation Imperative

- **Climate Change Adaptation:** Approaches and strategies to adapt to or become more resilient in dealing with unavoidable impacts of climate change and associated natural hazards.
- Climate adaptation should be addressed in comp plans and codes—not just emergency plans



# The Challenges Of Climate Change Adaptation

- Local impact data lacking or inconclusive
- Multiple and widely varying climate change impacts
- Differing community resources and contexts (urban, rural, coastal, interior)
- Lack of political willpower to restrain development in hazard areas
- Multiple local/state/federal agencies



# The Legal Framework For Addressing Climate Adaptation And Natural Hazards

- **National Flood Insurance Act of 1968 (42 USC 4104c)**
  - Created National Flood Insurance Program
  - Communities adopt and enforce a floodplain management ordinance approved by FEMA, and federal govt. makes available flood insurance (prior to that, private insurers would not offer flood insurance).
  - Costs taxpayers \$200 million annually and \$38 billion in claims since 1978.
  - Coastal Barrier Resources Act precludes federal flood insurance for new/improved structures on barrier islands

# The Legal Framework For Addressing Climate Adaptation And Natural Hazards

- **Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.)**
  - State and local govts. required to develop hazard mitigation plans (Sec. 322) as condition for receiving non-emergency disaster assistance.
  - Risk-based approach to reducing natural hazards through mitigation planning
  - 44 CFR 201 sets out FEMA policies and procedures for mitigation planning. Must...
    - Incorporate open public process
    - identify risks and vulnerabilities
    - Describe actions to mitigate hazards and risks
    - Establish implementation strategy and update process
  - Grants available for local plans



# The Legal Framework For Addressing Climate Adaptation And Natural Hazards

- **Coastal Zone Management Act (16 USC 1451 et seq.)**
  - Funding provided for state coastal zone management planning. All coastal states participate.
  - Federal projects and actions must be consistent with state plans.
  - State plans must address coastal hazard mitigation planning and shoreline erosion including potential impacts of sea level rise.
  - States require local governments to adopt plans and implementation strategies consistent with state plan to protect and restore natural resources in coastal zone while allowing growth.



# Local CZM Initiatives

- Stricter shoreline setbacks and standards for variances
- Closer scrutiny of all development applications within designated areas
- Limit new seawall construction & reconstruction
- Study of coastal erosion rates and sea level rise linked to increased shoreline setbacks
- Coordination with hazard mitigation plans
- Enhanced stormwater runoff regs and green infrastructure options
- Coastal wildlife habitat management plans/regs

# The Legal Framework For Addressing Climate Adaptation And Natural Hazards

- **Federal Wildfire/Wildland Fire Management**
  - 1995 Federal Wildland Fire Management Policy adopted by Depts. Of Agriculture, Interior, Defense, and Energy. Highly integrated.
  - Key goal is to suppress fires to protect human communities adjacent to federal lands. Legal authority to respond to fires threatening fed lands
  - Various federal laws support local efforts and provide grants for Community Wildfire Protection Plans (CWPP)
    - Reciprocal Fire Protection Act of 1955
    - Federal Land Policy and Management Act of 1976
    - 2009 Guidance for Implementation of Federal Wildland Fire Management Policy
    - Wildfire Suppression Assistance Act of 1989

# The Legal Framework For Addressing Climate Adaptation And Natural Hazards

- **CWWPs focus mainly on fuel reduction, defensible space, and fire-resistant building materials, not land use.**
- **All states have local govt. fire protection and suppression assistance programs**
  - Wildland fire training, equipment, etc.
  - Grants
  - Suppression assistance when local capabilities exceeded
  - Pay for suppression costs in some instances
- **State forester usually in charge of programs—widely divergent institutional arrangements.**



# The Legal Framework For Addressing Climate Adaptation And Natural Hazards

- **Section 404 of the Clean Water Act (33 USC 403)**
  - Grants Corps of Engineers authority to regulate dredging and filling associated with navigable waters and coastal zone.
  - Helps reduce loss of wetlands and dunes that buffer communities from storm surges and floods
- **Clean Water Act (33 USC 1251)**
  - Requires construction erosion and sediment control programs and post-construction runoff regulations. Helps reduce flooding.
  - Opportunities for use of “green” infrastructure and preservation of native vegetation

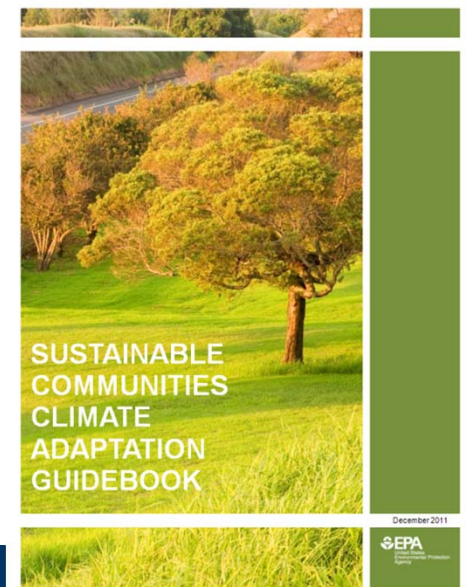
# **The Legal Framework For Addressing Climate Adaptation And Natural Hazards**

- **State land use and hazard mitigation laws**
  - Climate change/adaptation or hazard mitigation must be addressed in local plans (FL, CA, OR)
  - All states have adopted hazard mitigation plans to qualify for Stafford Act funding. Local plans often required.

# APPROACHES: ADAPTATION PLANNING THROUGH SMART GROWTH

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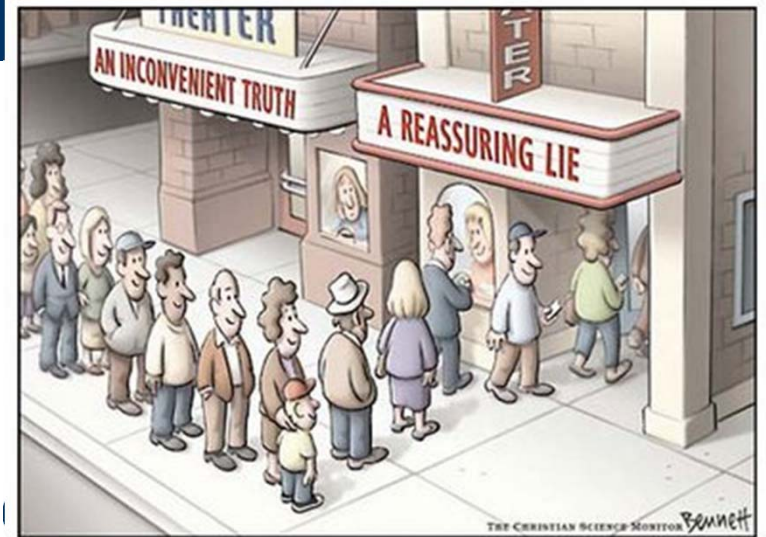
RMLUI Annual



# Getting started

## Vulnerability planning

- Sensitivity analysis
- Adaptive capacity
- Vulnerability assessment
- Risk assessment



### Planning Areas with Systems that are...

	Low Vulnerability	High Vulnerability
High Risk	May be priority planning areas	Should be priority planning areas
Low Risk	Are unlikely to be priority planning areas	May be priority planning areas



# Making the “climate connection”

- Climate adaptation planning is a natural extension of sustainable land use planning (e.g., smart growth)
- Focus on use of existing tools for adaptation planning
- Three primary categories of approaches:

DRAFT - September 2009  
**ESSENTIAL SMART GROWTH  
FIXES FOR URBAN AND  
SUBURBAN ZONING CODES**



United States Environmental Protection Agency  
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Charles Associates, Inc.  
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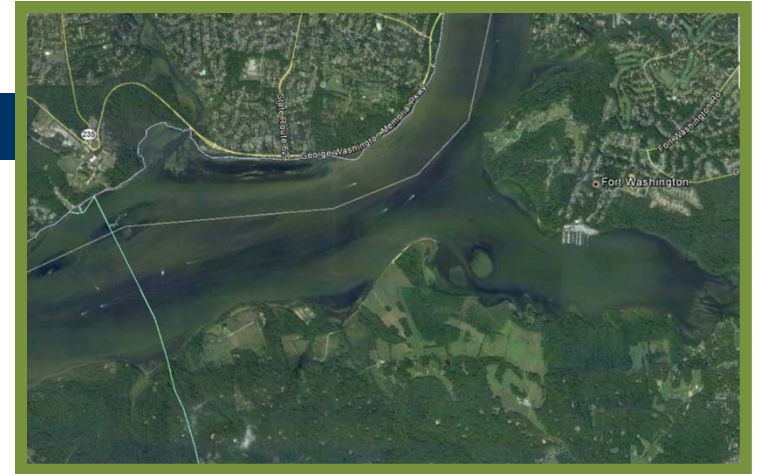
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# Protect vulnerable areas from development

## Identify areas in the community that:

- Are not developed
- Have a higher vulnerability and risk to climate changes



## Protect these areas from future development

- Evaluate development incentives provided in vulnerable areas
- Adopt protective regulations for vulnerable areas
- Direct development away from vulnerable areas on large development sites

## ***Example Approach: Evaluate development incentives provided in vulnerable areas***

- Review financial incentives and regulatory development policies
- Revise policies and incentives that inappropriately encourage development in vulnerable areas
- Make adjustments for future development
  - Link incentives to the comprehensive plan
  - Draft regulatory incentives to protect vulnerable areas (e.g., tie development bonuses to open space provision or TIF funds to rehabilitation of

# Protect people and assets in vulnerable areas

Identify vulnerable areas in the community

Traditional approaches:

- Engineered protective structures
- Retrofitting buildings
- Softer techniques to increase resiliency
- Relocating people or assets

Smart growth approaches:

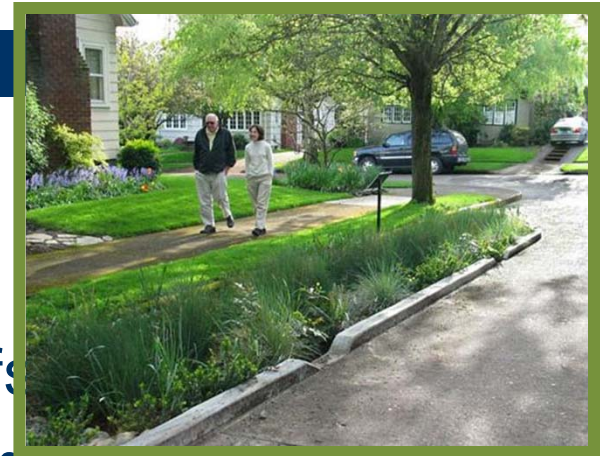
- Improve stormwater management approaches
- Adapt zoning and building codes to evolving risks
- Create special taxing and assessment districts to fund the protection of buildings and infrastructure
- Amend non-conforming use provisions to allow safer, sustainable redevelopment in vulnerable areas
- Identify transportation system vulnerabilities
- Implement integrated heat island and stormwater reduction strategies
- Use non-structural flood mitigation measures for buildings in floodprone sites





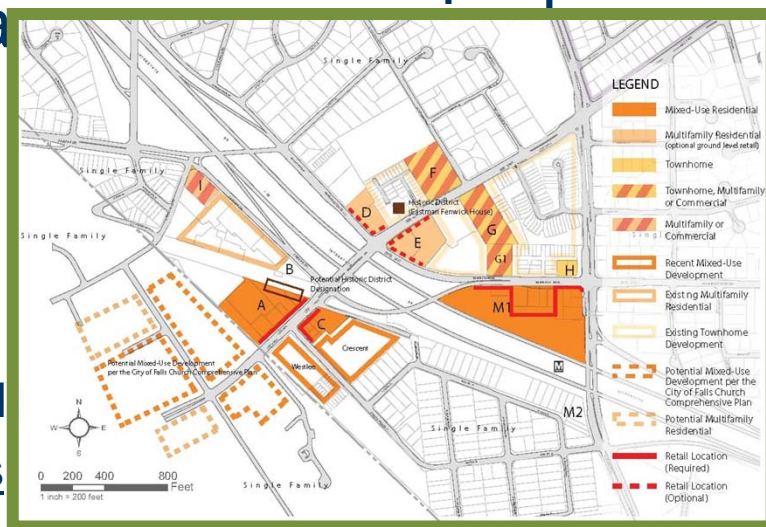
# *Example Approach:* Implement integrated heat island and stormwater reduction strategies

- Urban forestry
- Require cool technologies
  - Reflective roofing and green roofs
  - Pervious and light-colored pavement
- Green building standards
- Building codes
- Community involvement
- Improved street design
- Maintenance plans



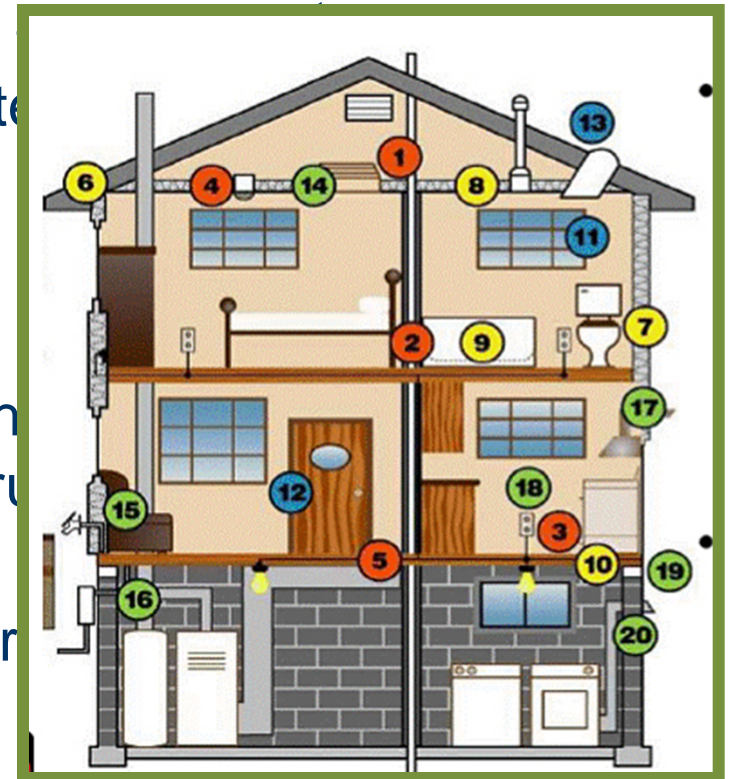
# Encourage sustainable development in appropriate, less-vulnerable areas

- Identify areas in the community expected to be less-vulnerable to climate change
- Compare less-vulnerable areas against areas prioritized for future development
- Determine whether any changes are needed
- Encourage development in
  - Promote infill development
  - Remove roadblocks to development in appropriate areas
  - Adopt complete streets design standards
  - Upgrade building code requirements
  - Incorporate passive survivability into new



## *Example Approach:* Upgrade building code requirements

- Incorporate weather and climate vulnerable design criteria established in vulnerability
- Establish zoning areas with height requirements
- Create incentive programs tied to voluntary higher standards
- Consider adopting stretch or reach codes (International Green Construction Code)
- Adopt ordinances that give greater flexibility to building and zoning departments to approve projects certified under a third party system



## Selected References

- **National Flood Insurance Program: FEMA** has many publications dealing with flood hazard planning and mitigation. See generally--  
<http://www.fema.gov/business/nfip/>
- **Stafford Disaster Relief Act:** For an overview of the basic of local hazard mitigation planning.  
<http://www.fema.gov/library/viewRecord.do?id=1867>  
For an excellent guide to post-disaster planning, see “Post-Disaster Redevelopment Planning: A Guide for Florida Communities.” (2010)  
<http://www.floridadisaster.org/recovery/documents/Post%20Disaster%20Redevelopment%20Planning%20Guidebook%20Lo.pdf>



## Selected References

- **Wildfire/Wildland Planning:** For an overview of wildland fire protection roles and laws. see Donald Artley, “Wildland Fire Protection in the United States.” (2009) and Duerksen et al, “Addressing Community Wildfire Risk: A Review and Assessment of Regulatory and Planning Tools.” (2011 Fire Protection Research Foundation)
- **Coastal Zone Management Act:**  
<http://www.fws.gov/laws/lawsdigest/coaszone.html>

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# WWW.LAW.DU.EDU/RMLUI



## **Sustainable Community Development Code**

A Code for the 21<sup>st</sup> Century

Beta Version 1.1



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